

Article

Validation of the Spiritual Distress Scale in Portuguese Cancer Patients Undergoing Chemotherapy: A Methodological Study

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Abstract: Spiritual distress may ascend from unmet spiritual needs. The use of instruments to measure spiritual distress seems to facilitate the approach to spirituality, such as the Spiritual Distress Scale (SDS) that has been used worldwide. No instrument to assess spiritual distress in cancer patients is currently available in Portugal. This study aims to conduct the translation, adaptation and validation of the SDS in Portuguese cancer patients undergoing chemotherapy. Methodological study based on Sousa and Rojjanasrirat (2011), a seven-step approach, started with the linguistic translation to the psychometric tests. The main participants (55.4%) were older than 60 years; about 64.7% were females, married (68.0%), and 86.7% were Catholic. Moderate spiritual distress was experienced by 49.3% of the participants. Linguistic and conceptual equivalences were obtained. The SDS European Portuguese version has an overall Cronbach's alpha of 0.91, and the subscales were as follows: "relationship with self" (0.92), "relationship with others" (0.63), "relationship with God" (0.64) and "facing death" (0.85). Four factors emerged after Varimax rotation. Overall, these results indicate that the SDS European Portuguese version has good psychometric characteristics and can be used in assessing spiritual distress in cancer patients.

Keywords: assessment; cancer; nursing; spiritual distress; tool; validation

1. Introduction

Spiritual distress is a deep and intimate experience, shrouded in great suffering from the patients (Martins and Caldeira 2018). Spiritual distress arises when an individual experiences suffering that challenges the sense of purpose and personal identity (Caldeira et al. 2017). According to Caldeira et al. (2017) the prevalence of spiritual distress is 40.8% in cancer patients undergoing chemotherapy. Also, high scores of depression have been associated with spiritual distress (Kopacz et al. 2015; Velosa et al. 2017) and risk for suicide (Kopacz et al. 2015).

Nurses often describe difficulty in addressing spiritual distress mainly because of perceiving a lack of education or experience, as well as failure to listen deeply and respond empathically to patients' spiritual needs (Taylor and Mamier 2013).

Spiritual distress (00066) is a nursing diagnosis listed in NANDA International, Inc. (NANDA-I) since 1978 (Herdman and Kamitsuru [1994] 2018). Lately, Caldeira et al. (2013, p. 6)

performed a concept update of spiritual distress and defined this as “a state of suffering related to the impaired ability to experience meaning in life through connectedness with self, others, world or a Superior Being” (Caldeira et al. 2013, p. 82). More recently, Martins and Caldeira (2018) conducted a synthesis of qualitative studies of spiritual distress, and the major theme of “suffering” emerged as foundational, which was triggered by alienation, anger, anxiety, body image, burden to family, crying, disconnected, fatalism, fear, forgiveness, good death/desire to die, guilt/punishment, hopelessness, impaired role performance, insomnia, lack of autonomy/dignity, lack of relative and friends support, loneliness, loss of self/lost identity, physical symptoms, refusing to see relatives, relationship with God, social isolation, uncertain future and worthlessness.

Assessing the diagnosing spiritual distress can be a difficult and complex task (Martins et al. 2015). As claimed by Bornet et al. (2016), spiritual distress ascends from unmet spiritual needs. Therefore, assessing the spiritual needs of patients is fundamental for nursing practice (Caldeira et al. 2019; Draper 2012). Lately, Büssing et al. (2018) performed the factor structure of the Spiritual Needs Questionnaire in persons with chronic diseases, elderly and healthy individuals. This scale in an added value to clinical practice since it was found to be reliable in different participants, facilitating an objective assessment of spiritual needs. In fact, there has been an effort towards developing new instruments to assess the spiritual needs of patients (Monod et al. 2011). In order to get a better understanding of the different tools available to assess spiritual distress, the latest reviews concerning this topic are presented. Seddigh et al. (2016) conducted a review and identified eight questionnaires which allowed the assessment of spiritual needs of patients. Best et al. (2015) completed a systematic literature review and only found the Spiritual Distress Scale (Ku et al. 2010) that measured the spiritual distress construct. More recently, Bahraini et al. (2019) performed a systematic review regarding the accuracy of measures in screening adults for spiritual suffering and identified 24 spiritual screening measures, although few had sufficient accuracy to assess spiritual suffering in health care settings. However, the Spiritual Dryness Scale is a valid instrument that assesses if individuals experienced a spiritual crisis (Büssing et al. 2013).

Currently, worldwide, there is little variety of scales that allow an accurate assessment of the spiritual distress diagnosis in clinical practice. At this moment, there is no validated instrument to assess spiritual distress in Portuguese cancer patients, but only scales that measure spiritual well-being. Thus, conducting the validation of an instrument to assess spiritual distress, particularly in cancer patients, seems essential, as nurses and healthcare providers will have available a tool to support the assessment, diagnosis and intervention.

This study aims to conduct the translation, adaptation and validation of the psychometric properties of the Portuguese European version of the Spiritual Distress Scale (SDS) in cancer patients.

2. Methods

2.1. Design

This is a methodological study, and the process of translation, adaptation and validation of the cultural characteristics of a population requires the planning of a set of steps to attain a reliable and valid measure (Sousa and Rojjanasrirat 2011).

The methodological approach used was the guideline by Sousa and Rojjanasrirat (2011), that is a seven-step approach these authors developed for translation, adaptation and validation of instruments or scales for use in cross-cultural health care research.

Step 1: translation of the original instrument into the target language

The original instrument (English) was translated to the target language (Portuguese) by two independent translators (TL1 and TL2) who were bilingual and certified translators, whose native language was Portuguese. One of the translators had experience and knowledge in health terminology and the construct of the instrument that was validated.

Step 2: comparison of the two translated versions of the instrument (TL1 and TL2): synthesis I

The two translated versions TL1 and TL2 were compared. To achieve synthesis I, a third independent bilingual translator was added. Finally, to achieve the preliminary instrument, a consensus between the three translators and the two main researchers was performed.

Step 3: blind back-translation (blind backward translation or blind double translation) of the preliminary initial translated version of the instrument

The next step was to translate the preliminary instrument back into English. A blind double translation required two bilingual certificated translators, whose native language is English. The required characteristics of the translators are similar to step 1 (one of the translators had to have experience and knowledge of health terminology and the constructs of the instrument that was validated).

Step 4: comparison of the two back-translated versions of the instrument (B-TL1 and B-TL2): synthesis II

In this step, a multidisciplinary committee was used in order to obtain the conceptual equivalence of the items of the instrument process. Ambiguities or discrepancies were found. However, after discussion, consensus was reached, and synthesis II was obtained.

Step 5: pilot testing of the pre-final version of the instrument in the target language with a monolingual sample: cognitive debriefing

A pilot test of the pre-final version was conducted in 20 cancer patients undergoing chemotherapy. Each participant was asked to evaluate the items of the scale with a dichotomy answer “clear” or “not clear”. The inter-rater agreement in the pilot test was 98.10%, which was a positive outcome), as a minimum of 80.0% inter-rater agreement of the sample is needed to ensure conceptual, semantic and content equivalency (Sousa and Rojjanasrirat 2011). The next stage to determine conceptual and the content equivalence of the construct of the instrument was the use of an expert panel. Sousa and Rojjanasrirat (2011) recommend a minimum of six to ten experts. Nine expert committees were used in this study in order to evaluate each item of the instrument intended for content equivalence. The results of the panel of experts showed that the content validity index at the item level and at the scale level was above 0.90, as recommended.

Step 6: preliminary psychometric testing of the pre-final version of the translated instrument with a bilingual sample

This step was not performed because it is not mandatory in the authors’ guideline, since it is difficult to achieve a bilingual sample.

Step 7: full psychometric testing of the pre-final version of the translated instrument in a sample of the target population

The final step of the full psychometric testing is explained in detail in the following subthemes.

2.2. Setting

Participants were recruited at the Oncology Day Unit of a hospital in the south of Portugal.

2.3. Population and Sampling

A convenience sampling procedure was used to recruit participants. The sample size was achieved according to the rule that each item on the scale required five questionnaires (Munro [1986] 2005). Since the SDS has 30 items, the estimated sample size was 150 participants. Sousa and Rojjanasrirat (2011) recommend a sample size between 300–500 participants, but this was not possible to fulfill, based on time, resources and number of patients with the criteria to be enrolled.

The inclusion criteria of this study included the following: cancer patients who attended the Oncology Day Unit of a hospital and were able to give written consent, patients undergoing chemotherapy (intravenous, oral and subcutaneous), 18 years and over, and being able to read and write.

The sample consisted of 150 participants, 53 males (35.3%) and 97 females (64.7%). Ages ranged from 35 to 83 years old ($M = 59.50$; $s = 11.24$). More demographic characteristics are summarized in Table 1.

Table 1. The characteristics of the participants.

Variable	<i>n</i>	%
Gender		
Male	53	35.3
Female	97	64.7
Age group		
35–39	8	5.3
40–59	59	39.3
60–79	82	54.7
80–99	1	0.7
Age range (35–83 years)		
$M = 59.50 \pm s = 11.24$		
Marital status		
Single	11	7.3
Married	102	68.0
Widower	13	8.7
Divorced	15	10.0
Unmarried	9	6.0
Educational level		
1° Cycle	53	35.3
2° Cycle	11	7.3
3° Cycle	25	16.7
High school	38	25.3
Diploma/Degree	22	14.7
Master's degree	1	0.7
Professional occupation		
Specialists in intellectual and scientific activities	18	12.0
Middle level technicians and professions	6	4.0
Administrative staff	4	2.7
Workers in personal and protective services	1	.7
Farmers and skilled workers	7	4.7
Skilled industry workers	7	4.7
Plant and machine operators	2	1.3
Unskilled workers	34	22.7
Retired	62	41.3
Domestic	7	4.7
Unemployed	2	1.3
Religion		
Catholic	130	86.7
Protestant	9	6.0
Agnostic	11	7.3
Clinical diagnosis		
Lung	23	15.3
Pancreas	2	1.3
Colorectal	39	26.0
Uterus	6	4.0
Breast	53	35.3
Stomach	3	2.0
Prostate	6	4.0

Others	6	4.0
Non-Hodgkin's lymphoma	5	3.3
Hodgkin's lymphoma	2	1.3
Multiple myeloma	3	2.0
Testicles	1	0.7
Liver	1	0.7

2.4. Instrument

The SDS is a valid tool to assess spiritual distress of cancer patients (Ku et al. 2010). The SDS started in 2003 and 2004, by Ya-Lie Ku (2005), who developed a qualitative scale in order to assess spiritual distress in 20 cancer patients from chemotherapy clinics in southern Taiwan. In 2010, the validation of the Spiritual Distress Scale was originally conducted. In this step, Ya Lie-Ku required the collaboration of two other researchers. This quantitative scale was applied to 85 cancer patients who were admitted to the oncology service at a medical center in southern Taiwan. The scale is composed of 30 items and four domains: “relationship with self” (14 items), “relationship with others” (five items), “relationship with God” (seven items) and “facing death” (four items). As such, the subscales of the SDS concern different areas, specifically in the domain “relationship with self”, patients emotion and thoughts are assessed; in the domain “relationship with others”, the relationship with others is explored; “relationship with God” relates to the relationship with God and the religious practices of the individuals; and in the domain “facing death”, the focus is on patients’ inability to discuss death or whether they are afraid to die (Ku 2005). Each item is scored from 1–4, and the scores range between 30–120. A higher score indicates a higher level of spiritual distress. Additionally, the SDS has a global Cronbach’s alpha of 0.95.

The Spiritual Well-Being Questionnaire (SWBQ) (Gomez and Fisher 2003; Gomez and Fisher 2005a, 2005b; Gouveia et al. 2009) was used to perform the divergent validity. The SWBQ is comprised of 20 items and is divided into four subscales: personal (items 5, 9, 14, 16, and 18), communal (items 1, 3, 8, 17, and 19), environmental (items 4, 7, 10, 12, and 20) and transcendental (items 2, 6, 11, 13, and 15) (Gomez and Fisher 2003). The personal domain is related to the way people relate to themselves and with the meaning, purpose and values in life; the communal domain is associated with interpersonal relations regarding morality, culture and religion; the environmental domain embraces the physical and biological relationships; and the transcendental domain refers to relationship with a higher force (Gouveia et al. 2009). This instrument allows participants’ reply using a five-point Likert scale, and the scores of the SWBQ range between 20 to 100. Furthermore, the SWBQ has a global Cronbach’s alpha of 0.89 (Gouveia et al. 2009). In fact, as no other instrument concerning spiritual distress was available in Portugal, the SWBQ was used considering previous studies that found that cancer patients undergoing chemotherapy and having spiritual distress had lower scores of spiritual well-being (Caldeira et al. 2017).

2.5. Data Collection

Data collection was conducted from 14 July to 4 October 2018. Participants were recruited from the Oncology Day Unit of a hospital, and the first approach was to invite the participants. After informed consent was obtained, a self-completion questionnaire was given to each participant. This questionnaire included demographics, clinical condition and the SDS scale. Participants were informed that it may take 15 min to complete, and in case of any doubts regarding the questionnaire, a researcher was available to give full support and clarification.

The data collection was conducted by one researcher who had previous experience in collecting data. All data were entered into a Statistical Package for the Social Sciences (SPSS) sheet, double checked for bias in transcription and protected and accessed only by researchers.

2.6. Data Analysis

All statistical analyses were performed using SPSS software, version 21.0 (SPSS Inc., Chicago, IL, USA). In addition, descriptive statistics, correlations, reliability, exploratory factor analysis,

divergent validity and Receiver Operating Characteristic (ROC) were performed. The concurrent validity was not performed as no other valid Portuguese tool was available. The α level of significance tests was 0.05 except noted otherwise.

2.7. Ethical Considerations

The recommended ethical procedures were followed. The author of the original scale was contacted, and the permission of the copyright was given.

Ethical approval was obtained from the Oncology Day Unit of a hospital in the south of Portugal. All participants provided written and verbal informed consent. Throughout the study, the confidentiality and anonymity of the participants were preserved. Also, they were reminded of their right to withdraw at any time of the study.

3. Results

3.1. Descriptive Results of the SDS

The overall M score of the SDS was $M = 61.57$ ($s = 13.91$), and the scores ranged between 35–98. Descriptive results of the SDS of the SDS are summarized in Table 2.

Table 2. The characteristics and the total score of the SDS in the participants ($N = 150$).

Variable	Total Mean Score (M)	Standard Deviation (s)
Gender		
Male	61.23	13.38
Female	61.76	14.25
Age group		
35–39		
40–59	60.13	5.32
60–79	64.15	1.93
80–99	59.98	1.43
Marital status		
Single	62.27	17.49
Married	61.59	13.62
Widower	59.00	10.25
Divorced	62.47	19.01
Unmarried	62.78	8.57
Educational level		
1 ^o Cycle	59.77	13.79
2 ^o Cycle	68.82	11.99
3 ^o Cycle	64.80	14.49
High school	60.87	12.45
Diploma/Degree	58.86	15.52
Master's degree	83.00	
Professional occupation		
Specialists in intellectual and scientific activities	60.33	15.69
Middle level technicians and professions	65.50	10.89
Administrative staff	70.25	19.75
Workers in personal and protective services	75.00	
Farmers and skilled workers	68.14	19.91
Skilled industry workers	65.29	13.31
Plant and machine operators	58.00	24.04
Unskilled workers	61.35	14.30
Retired	59.92	13.13

Domestic	61.43	7.82
Unemployed	60.00	2.82
Religion		
Catholic	61.91	14.07
Protestant	55.56	13.36
Agnostic	62.55	12.25
Clinical diagnosis		
Lung	62.62	12.47
Pancreas	62.13	13.59
Colorectal	56.74	14.53
Uterus	50.50	12.02
Breast	63.17	19.83
Stomach	73.67	9.71
Prostate	62.17	12.31
Others	64.83	23.19
Non-Hodgkin's lymphoma	64.40	11.86
Hodgkin's lymphoma	60.00	25.45
Multiple myeloma	58.33	16.07
Testicles	50.00	
Liver	59.00	

Concerning the descriptive scores of the SDS scale, the item with the highest average score was item 24 “I feel sinful”, and the item with the lowest M score was item 29, “I worry about my dying ceremony” (Table 3).

Table 3. Items in English and European Portuguese and average scores on the SDS (N = 150).

Item	SDS Items in English	SDS Items in European Portuguese	M (Range of Values: 1–5)	s
	Domain: Relationship with self	Domínio: Relação com o próprio	2.08	0.85
1	I feel shock	Sinto-me em choque	1.90	0.86
2	I feel denial	Sinto-me em negação	1.99	0.94
3	I feel fear	Sinto-me com medo	2.41	0.77
4	I feel suffering	Sinto-me em sofrimento	2.38	0.98
5	I feel sorrow	Sinto mágoa	1.87	0.82
6	I feel loneliness	Sinto solidão	1.99	0.87
7	I feel numb	Sinto entorpecimento (dormente)	1.89	0.82
8	I feel regret	Sinto arrependimento	1.95	0.80
9	I feel discontented	Sinto descontentamento	2.21	0.89
10	I feel worry	Sinto preocupação	2.70	0.88
11	I feel fatalism	Sinto fatalismo	1.95	0.80
12	I feel like giving up the life	Sinto vontade de desistir da vida	1.61	0.71
13	I feel pessimistic	Sinto-me pessimista	2.21	0.86
14	I feel something in my mind	Sinto algo na minha mente	2.00	0.81
	Domain: relationship with others	Domínio: Relação com os outros	2.15	0.80
15	I cannot be satisfied by others	Não consigo ser satisfeito por outros	1.97	0.71
16	I cannot trust others	Não consigo confiar nos outros	2.44	0.80
17	I cannot obey others	Não consigo obedecer aos outros	2.27	0.71
18	I cannot forgive others	Não consigo perdoar os outros	2.13	0.87
19	I feel alienated from others	Sinto-me alienado (distante) dos	1.96	0.89

		outros		
	Domain: Relationship with God	Domínio: Relação com Deus	2.03	0.95
20	I feel no respect for God	Não sinto respeito por Deus	1.73	1.07
21	I feel God is powerless	Sinto que Deus é impotente	2.13	1.12
22	I feel no protection from my ancestors	Sinto que não sou protegido pelos meus antepassados	1.90	0.94
23	I feel tied up by my faith	Sinto-me preso pela minha fé	1.61	0.75
24	I feel sinful	Sinto-me pecador	2.43	0.74
25	I feel no peace of mind	Não sinto paz de espírito	2.08	0.87
26	I cannot attend religious activities	Não consigo participar em atividades religiosas	2.35	1.14
	Domain: Facing death	Domínio: Encarar a morte	1.89	0.87
27	I am afraid to discuss death	Tenho medo de conversar sobre a morte	2.08	0.95
28	I worry about my dying situation	Preocupo-me com a situação da minha morte	2.16	0.93
29	I worry about my dying ceremony	Preocupo-me com a minha cerimónia fúnebre	1.58	0.75
30	I worry about where I am going after death	Preocupo-me para onde vou depois de morrer	1.72	0.84

The data of the total the SDS results suggest that nearly half (49.3%, $n = 74$) of the participants experienced moderate spiritual distress, 44.0% ($n = 66$) of participants had low spiritual distress, and a small portion of participants (6.7%, $n = 10$) had severe spiritual distress. The SDS had an area under the ROC curve (AUC) of 0.890 (95% CI, 0.83–0.94) at an optimal cut-off value of 58.50.

The total M scores of the SDS were analyzed in detail: females, ($M = 61.76$, $n = 97$) and males, ($M = 61.23$, $n = 53$); the age group between 40 and 59 presented the highest total M score of the SDS ($M = 64.15$, $n = 59$). Concerning the religious affiliation, the highest M score of the SDS was obtained by Agnostic ($M = 62.55$, $n = 11$), followed by Catholic ($M = 61.91$, $n = 10$) and Protestant ($M = 55.56$, $n = 9$). Analyzing the mean scores of various domains of the SDS, in the domain “relationship with self”, the religious affiliation with the highest M score was Catholic ($M = 2.11$), followed by Agnostic $M = 1.95$ and Protestant ($M = 1.78$). Concerning the domain “relationship with self”, the highest M score was Catholic ($M = 2.11$), Agnostic ($M = 1.95$) and Protestant ($M = 1.78$). In the domain “relationship with God”, the religious affiliation with the highest M score was Agnostic ($M = 2.43$), Catholic ($M = 2.02$) and Protestant ($M = 1.79$). Finally, in the domain “facing death”, the religious affiliation with the highest M score was Catholic ($M = 1.90$), followed by Agnostic ($M = 1.80$) and Protestant ($M = 1.72$).

3.2. Exploratory Factor Analysis

Kaiser-Meyer-Olkin (KMO) sampling adequacy showed a high score of 0.88, and the Bartlett’s Test of Sphericity was significant ($\chi^2 = 2316.94$; $df = 435$; $p = 0.00$), indicating that performing a factor analysis was appropriate.

Regarding the Principal Component Analysis (PCA), all 30 items had factor loadings values above 0.30. As a result, no item from the final scale was deleted, in agreement with Waltz et al. (Waltz et al. [1991] 2016), who recommends that the extraction values should be above 0.30. The items with the highest extraction values were 19, 29 and 30; in addition, the lowest was item 23 (Table 4).

Table 4. Principal component analysis of the SDS.

Variable	Initial	Extraction
SDS 1 (shock)	1.00	0.74
SDS 2 (denial)	1.00	0.55
SDS 3 (fear)	1.00	0.61
SDS 4 (suffering)	1.00	0.67
SDS 5 (sorrow)	1.00	0.49
SDS 6 (loneliness)	1.00	0.71
SDS 7 (numb)	1.00	0.73
SDS 8 (regret)	1.00	0.51
SDS 9 (discontented)	1.00	0.62
SDS 10 (worry)	1.00	0.58
SDS 11 (fatalism)	1.00	0.72
SDS 12 (giving up)	1.00	0.56
SDS 13 (pessimistic)	1.00	0.60
SDS 14 (my mind)	1.00	0.50
SDS 15 (satisfied by others)	1.00	0.51
SDS 16 (trust others)	1.00	0.51
SDS 17 (obey others)	1.00	0.58
SDS 18 (forgive others)	1.00	0.62
SDS 19 (alienated)	1.00	0.75
SDS 20 (respect for God)	1.00	0.73
SDS 21 (God is powerless)	1.00	0.59
SDS 22(my ancestors)	1.00	0.52
SDS 23 (faith)	1.00	0.40
SDS 24 (sinful)	1.00	0.54
SDS 25 (peace of mind)	1.00	0.60
SDS 26 (religious activities)	1.00	0.60
SDS 27 (discuss death)	1.00	0.71
SDS 28 (dying situation)	1.00	0.57
SDS 29 (dying ceremony)	1.00	0.75
SDS 30 (after death)	1.00	0.75

According to the Guttman-Kaiser rule, the eigenvalue should be higher than one (Guttman 1954; Kaiser 1961). Therefore, the principal factor analysis revealed a six-factor solution with an eigenvalue 1.11 that explained 61.56% of the total variance of the scale. Additionally, one factor with an eigenvalue of 9.87 explained 32.91 % of the total variance (Figure 1).

In the original scale by Ku et al. (2010), a varimax rotation was performed concerning the factor analysis. In this study, a varimax rotation method with Kaiser normalization was also conducted, and the results indicated a six-factor solution (Table 5).

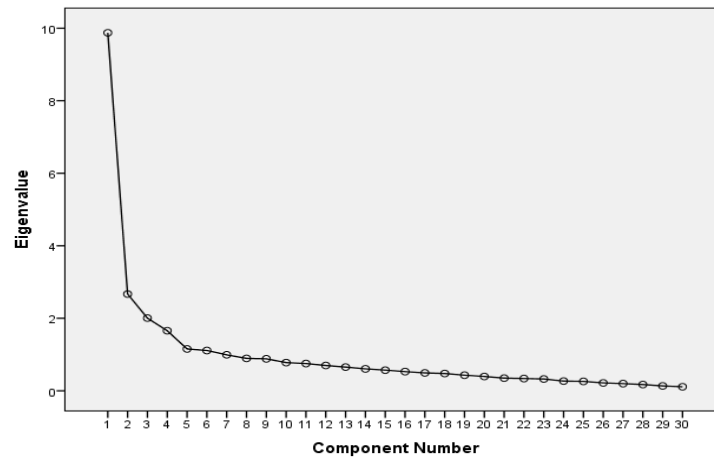


Figure 1. Scree Plot.

Table 5. Varimax rotation method in the SDS.

	Components					
	1	2	3	4	5	6
SDS 1 (shock)	0.70	0.46	0.05	0.16	0.06	0.14
SDS 2 (denial)	0.68	0.28	−0.03	0.17	0.04	0.08
SDS 3 (fear)	0.74	0.04	−0.18	0.03	0.14	−0.14
SDS 4 (suffering)	0.71	0.26	−0.13	0.02	−0.04	0.30
SDS 5 (sorrow)	0.38	0.37	0.11	0.44	0.08	0.02
SDS 6 (loneliness)	0.39	0.20	0.08	0.72	−0.02	0.04
SDS 7 (numb)	0.678	0.39	0.10	0.28	0.03	0.18
SDS 8 (regret)	0.33	0.19	−0.05	0.32	0.31	0.42
SDS 9 (discontented)	0.71	0.09	0.07	0.26	0.21	−0.01
SDS 10 (worry)	0.70	−0.05	−0.02	0.16	0.27	−0.05
SDS 11 (fatalism)	0.72	0.32	0.11	0.25	−0.03	0.16
SDS 12 (giving up)	0.54	0.38	0.19	0.29	−0.08	−0.05
SDS 13 (pessimistic)	0.69	0.24	0.11	0.18	−0.05	−0.13
SDS 14 (my mind)	0.57	0.19	0.27	0.20	0.18	−0.01
SDS 15 (satisfied by others)	0.25	0.20	0.28	0.33	0.43	−0.21
SDS 16 (trust others)	0.08	−0.20	0.13	0.23	0.62	−0.14
SDS 17 (obey others)	−0.02	0.17	0.01	−0.06	0.72	0.23
SDS 18 (forgive others)	0.27	0.18	0.11	−0.03	0.67	0.27
SDS 19 (alienated)	0.30	0.09	0.16	0.76	0.04	0.22
SDS 20 (respect for God)	0.00	−0.11	0.831	0.16	0.05	−0.04
SDS 21 (God is powerless)	−0.01	−0.08	0.75	0.12	0.13	−0.04
SDS 22(my ancestors)	0.18	0.03	0.63	−0.09	0.06	0.29
SDS 23 (faith)	0.22	0.16	−0.14	0.47	0.22	−0.21
SDS 24 (sinful)	−0.05	0.04	0.04	0.03	0.12	0.73
SDS 25 (peace of mind)	0.59	−0.03	0.25	0.21	0.33	−0.20
SDS 26 (religious activities)	−0.01	0.26	0.73	−0.06	0.00	−0.05
SDS 27 (discuss death)	0.34	0.73	−0.03	0.04	0.25	−0.06
SDS 28 (dying situation)	0.39	0.63	0.02	0.13	0.08	−0.03
SDS 29 (dying ceremony)	0.15	0.83	0.06	0.13	−0.14	0.05
SDS 30 (after death)	0.15	0.83	−0.01	0.15	0.07	0.16

The six factor solution shows that the items were assigned as follows: factor one (1, 2, 3, 4, 7, 9, 10, 11, 12, 13, 14, and 25), factor 2 (27, 28, 29 and 30), factor 3 (20, 21, 22 and 26), factor 4 (5, 6, 19 and 23), factor 5 (15, 16, 17 and 18) and factor 6 (8 and 24).

Although the original scale had four domains, in this study, the factor analysis resulted in six components. A varimax rotation with four fixed number of factors was performed (Table 6). The four-factor solution with an eigenvalue of 1.65 explained 54.01% of the total variance of the scale; this value is in agreement with Tabachnick and Fidell (Tabachnick and Fidell [1983] 2013), who recommend variance values between 50.0–60.0%.

Table 6. Rotated component matrix with four components.

	Components			
	1	2	3	4
SDS 1 (shock)	0.67	0.50	0.02	0.11
SDS 2 (denial)	0.65	0.32	−0.05	0.06
SDS 3 (fear)	0.70	0.02	−0.21	0.03
SDS 4 (suffering)	0.58	0.38	−0.18	0.09
SDS 5 (sorrow)	0.53	0.35	0.16	0.07
SDS 6 (loneliness)	0.63	0.22	0.16	−0.03
SDS 7 (numb)	0.69	0.45	0.09	0.09
SDS 8 (regret)	0.40	0.24	−0.02	0.45
SDS 9 (discontented)	0.76	0.09	0.06	0.14
SDS 10 (worry)	0.72	−0.06	−0.04	0.17
SDS 11 (fatalism)	0.71	0.40	0.08	0.03
SDS 12 (giving up)	0.59	0.40	0.19	−0.10
SDS 13 (pessimistic)	0.70	0.25	0.08	−0.12
SDS 14 (my mind)	0.61	0.17	0.26	0.12
SDS 15 (satisfied by others)	0.44	0.05	0.33	0.27
SDS 16 (trust others)	0.26	−0.35	0.18	0.45
SDS 17 (obey others)	0.02	0.01	0.03	0.75
SDS 18 (forgive others)	0.27	0.08	0.11	0.71
SDS 19 (alienated)	0.55	0.15	0.25	0.09
SDS 20 (respect for God)	0.07	−0.12	0.84	−0.01
SDS 21 (God is powerless)	0.05	−0.11	0.75	0.06
SDS 22(my ancestors)	0.08	0.11	0.57	0.16
SDS 23 (faith)	0.45	0.05	−0.05	0.09
SDS 24 (sinful)	−0.13	0.20	0.03	0.43
SDS 25 (peace of mind)	0.68	−0.11	0.25	0.15
SDS 26 (religious activities)	−0.02	0.22	0.71	−0.02
SDS 27 (discuss death)	0.37	0.63	−0.01	0.23
SDS 28 (dying situation)	0.41	0.59	0.03	0.09
SDS 29 (dying ceremony)	0.17	0.82	0.08	−0.04
SDS 30 (after death)	0.67	0.50	0.02	0.11

The four factor solution (Table 6) demonstrates that the items were assigned as follows: factor one (1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, and 15), factor 2 (27, 28, 29, and 30), factor 3 (20, 21, 22, and 26), and factor 4 (8, 16, 17, 18, and 24).

When comparing the two models, a 4-factor solution was a more valid solution. A 6-factor solution raised some questions, since domain 6 was a very poor measure, only comprising 2 items (item 8 and item 24).

3.3. Reliability

Reliability is related to the consistency of a measure (Heale and Twycross 2015). One of the measures of reliability is the internal consistency, which allows measuring if all the items on a scale measure one construct; the most commonly test used is Cronbach's alpha (Heale and Twycross 2015). The overall internal consistency of the European Portuguese version of the SDS revealed a good Cronbach's alpha value (0.91); also, all Cronbach's alpha values were above 0.90 if an item was deleted (Table 7).

Table 7. Item-total statistics and Cronbach's alpha if an item was deleted from the SDS.

	Scale M if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha If Item Deleted
SDS 1 (shock)	59.67	175.47	0.75	0.82	0.90
SDS 2 (denial)	59.58	176.98	0.62	0.61	0.90
SDS 3 (fear)	59.17	182.70	0.48	0.54	0.90
SDS 4 (suffering)	59.19	177.99	0.55	0.56	0.90
SDS 5 (sorrow)	59.71	179.53	0.60	0.49	0.90
SDS 6 (loneliness)	59.59	178.63	0.60	0.64	0.90
SDS 7 (numb)	59.69	176.08	0.76	0.80	0.90
SDS 8 (regret)	59.63	182.12	0.49	0.47	0.90
SDS 9 (discontented)	59.37	176.61	0.67	0.60	0.90
SDS 10 (worry)	58.87	179.58	0.55	0.55	0.90
SDS 11 (fatalism)	59.62	176.78	0.74	0.72	0.90
SDS 12 (giving up)	59.97	180.66	0.64	0.60	0.90
SDS 13 (pessimistic)	59.37	178.18	0.62	0.58	0.90
SDS 14 (my mind)	59.57	178.82	0.63	0.58	0.90
SDS 15 (satisfied by others)	59.61	183.08	0.50	0.49	0.90
SDS 16 (trust others)	59.13	188.21	0.20	0.33	0.91
SDS 17 (obey others)	59.30	189.12	0.19	0.28	0.91
SDS 18 (forgive others)	59.45	182.49	0.43	0.43	0.91
SDS 19 (alienated)	59.61	179.08	0.56	0.62	0.90
SDS 20 (respect for God)	59.84	185.92	0.21	0.61	0.91
SDS 21 (God is powerless)	59.44	185.83	0.20	0.50	0.91
SDS 22 (my ancestors)	59.67	184.94	0.29	0.35	0.91
SDS 23 (faith)	59.97	185.64	0.35	0.30	0.91
SDS 24 (sinful)	59.15	191.18	0.08	0.20	0.91
SDS 25 (peace of mind)	59.49	179.08	0.58	0.57	0.90
SDS 26 (religious activities)	59.23	184.79	0.23	0.37	0.91
SDS 27 (discuss death)	59.49	177.71	0.58	0.60	0.90
SDS 28 (dying situation)	59.41	178.04	0.58	0.58	0.90
SDS 29 (dying ceremony)	59.99	183.63	0.45	0.71	0.90
SDS 30 (after death)	59.85	181.09	0.51	0.72	0.90

The construct validity showed that significant correlations between the individual SDS items and the total score ranged from 0.14 to 0.79 ($p < 0.01$); the item with the highest correlation was item 7 "I feel numb", and the lowest was item 24, "I feel sinful" (Table 7).

The internal validity of all SDS domains is described in Table 8.

Table 8. Cronbach's alpha of the four domains of the SDS.

Domains	Cronbach's α
Relationship with self	0.92
Relationship with others	0.63
Relationship with God	0.64
Facing death	0.85

Correlation between all the domains of the SDS was achieved, and the values ranged between 0.20 and 0.62 (Table 9).

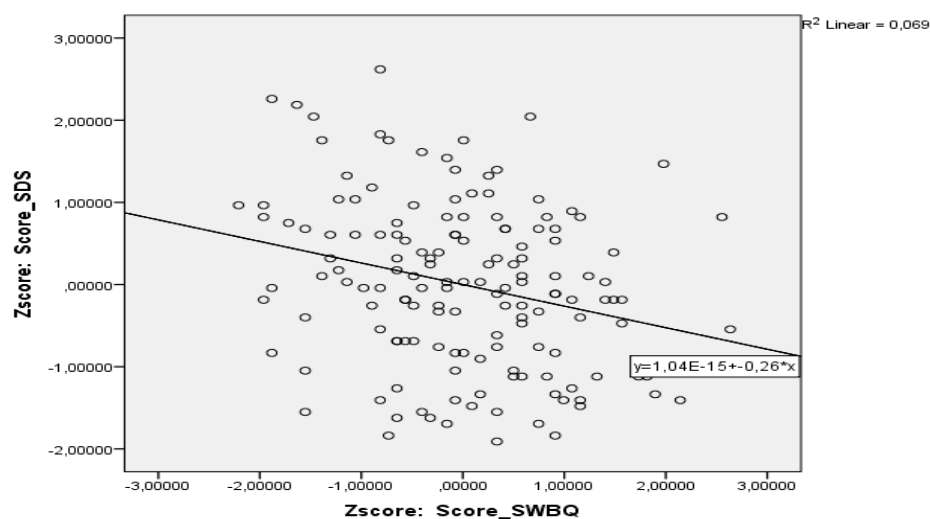
Table 9. Correlation between all the domains of the SDS.

Domains	Facing Death Domain	Relationship with Others Domain	Relationship with God Domain	Relationship with Self Domain
Facing death domain	-			
Relationship with others domain	0.30 **	-		
Relationship with God domain	0.20 *	0.43 **	-	
Relationship with self domain	0.62 **	0.52 **	0.33 **	-

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

3.4. Divergent Validity

The divergent construct validity is when the instrument measures the construct opposite to the constructs measured by a new instrument (Gray et al. [1987] 2017). In order to perform this type of validity, the Spiritual Well-Being Questionnaire (SWBQ) (Gouveia et al. 2009) was used, since according to the literature, there is negative correlation between SWB and spiritual distress (Caldeira et al. 2017). First, this procedure was necessary to transform the variables of the Z scores because the two scales had different Likert variable scores. Then, a correlation between the SDS and the SWBQ (Pearson coefficient $r = -0.26$; p -value = 0.001) was performed, and the results suggested a statistically weak negative correlation. This correlation was observed with a trend line on the scatter plot (Figure 2).

**Figure 2.** Scatter plot of the divergent validity between the SDS and the SWBQ.

A moderate correlation between the SDS and the personal domain of SWBQ was found (Table 10), as well as a statistically weak correlation between the communal and transcendental domain.

Table 10. Correlation between the four domains of the SWBQ and the SDS.

Domains	Personal Domain	Communal Domain	Environmental Domain	Transcendental Domain	Score SWBQ	Score SDS
Personal domain	-					
Communal domain	0.67 **	-				
Environmental domain	0.24 **	0.39 **	-			
Transcendental domain	0.20 *	0.26 **	0.19 *	-		
Score SWBQ	0.64 **	0.72 **	0.67 **	0.72 **	-	
Score SDS	-0.52 **	-0.25 **	0.018	-0.11	-0.26 **	-

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

4. Discussion

Upon arriving at this phase, the initial predefined objectives were achieved. The SDS European Portuguese has been translated, adapted and validated with good psychometric characteristics. The methodology used (Sousa and Rojjanasrirat 2011) has the advantage of having being developed to be applied specifically in healthcare frameworks.

The SDS has the advantage of having a broader assessment when comprising the domain “relationship with others” (Ku et al. 2010). This allows measuring the interaction of cancer patients with significant others, which is an important domain of spirituality and particularly important to cancer patients in times of thinking identify and their own existence, as a unique individual, and also of value to others (Ku et al. 2010). The final version of the SDS European Portuguese kept the same 30 items of the original scale; however, in Simão et al. (2015) the final version had 28 items since item 22 and item 24 were deleted because the factorial loadings were below 0.3.

Concerning the scores of the SDS in our study, the results shows that 49.3% had moderate spiritual distress, and 6.7% had severe spiritual distress. The prevalence of the nursing diagnosis spiritual distress was 40.8% in cancer patients receiving chemotherapy (Caldeira et al. 2017). Also, in a study conducted in palliative care by Velosa et al. (2017), the prevalence of spiritual distress was 23%. More recently, Lestari et al. (2018) suggested that 32.2% of women with breast cancer had moderate spiritual distress and 5.4% had severe spiritual distress.

The overall Cronbach’s alpha was 0.91, which is considered a good value according to the literature (Gray et al. [1987] 2017). SDS has the ability to measure one construct, which is spiritual distress, and this is quite important for an accurate diagnosis and intervention. Comparing the reliability with the validation of the Brazilian Portuguese SDS, which was performed by Simão et al. (2015), the Cronbach’s alpha was 0.87, which means that the results of Cronbach’s alpha in this study are slightly higher. Examining the internal reliability of the four domains of the SDS, in the domain “relationship with others” Cronbach’s alpha was 0.63, whereas in the domain “relationship with God”, Cronbach’s alpha was 0.64. These values of the subscales are more acceptable than those reported by Simão et al. (2015). Regarding the “relationship with self” and “facing death” domains, the results also achieved a higher reliability compared with Simão et al. (2015).

The factorial analysis performed by varimax rotation allowed the identification of six component, which used the rule of Guttman-Kaiser. However, this rule was not followed; instead, a fixed 4-component rotation was carried out. The six-factor solution was not considered as a valid solution since domain 6 only comprised two items. Interestingly, some items migrated to different domains compared to the original version of the scale. The main reason relates to participants’ interpretations of these items, which is particularly important to consider when assessing spirituality, which is a subjective and individual experience. Additionally, the cultural background may lead to these differences regarding the psychometric properties of the SDS. When comparing the results of the

factor analysis with Simão et al. (2015), four factor components also emerged, and both results are in agreement with the original scale. Nonetheless, no information is available concerning the type of rotation used and if the Guttman-Kaiser rule was respected in the study of Simão et al. (2015).

The divergent construct validity of this scale was reached, although there is a statistically weak negative correlation. Comparing the divergent validation process with Simão et al. (2015), in which they also applied the SWBQ, they obtained a higher correlation value ($r = -0.46$; $p\text{-value} < 0.001$) compared with this study.

One of the difficulties of this study was the fact that there was only one validation of the SDS published. This limited the discussion since we could not compare our findings to the results of other studies.

Limitations of this study are the following: first, the use of the convenience sampling technique; second, a sample with homogeneity in a religious profile; and third, the test-retest assessment was not conducted but would improve the accurate reliability. The latter procedure was not performed primarily because cancer patients are a vulnerable population. Notwithstanding, the limitations of this study, this is the first scale validated regarding spiritual distress in Portugal that allowed accurate assessment of this nursing diagnosis in clinical practice.

Future research may consider testing this scale in other settings, contexts and religious profiles. Similarly, the domains of the SDS “relationship with others” and “relationship with God” could be improved in order to enhance internal reliability. As there are few available scales to assess the nursing diagnosis spiritual distress, another important suggestion for future research would be the development of other scales in order to have more available tools to conduct an accurate assessment of spiritual distress.

5. Conclusions

Overall, results indicate that the SDS European Portuguese version has reasonable psychometric characteristics, as well as high construct validity with item loading in a four-factor model. Results showed both high reliability and high internal consistency.

The validation of the European Portuguese SDS scale in the context of cancer patients is an added value in nursing clinic practice because this tool may facilitate the clinical reasoning process in cancer patients with spiritual distress, in order to plan interventions that reestablish spiritual health and spiritual well-being in cancer patients.

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