

## Multidimensional Scale of Perceived Social Support (MSPSS) in Cancer Patients: Psychometric Properties and Measurement Invariance

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### Abstract

**Background:** The aim of this study was to evaluate the psychometric properties, convergent validity, and factorial invariance of the Multidimensional Scale of Perceived Social Support (MSPSS) in cancer patients. **Method:** Confirmatory factor analysis (CFA) was conducted to explore the scale's dimensionality and test for strong measurement invariance across sex and age in a cross-sectional, multicenter, prospective study. Patients completed the MSPSS and Satisfaction with Life Scale (SWLS). **Results:** A total of 925 consecutive patients were recruited in 13 hospitals between July 2015 and December 2018. The CFA indicated that the original three-factor model was replicated in patients with cancer. The results of the multi-group CFA revealed a strong invariance according to sex and age. The Spanish version of the MSPSS had high estimated reliability with values exceeding .90. The simple sum of the items of each scale was a good indicator of oncology patients' perceived social support. The three MSPSS subscales correlated significantly with the SWLS. Women scored higher on social support by friends than men. **Conclusion:** The Spanish version of the MSPSS proved to be a valid, reliable instrument to assess perceived social support in cancer patients.

**Keywords:** Social Support; satisfaction; psychometric properties; invariance; cancer.

### Resumen

*Escala Multidimensional de Apoyo Social Percibido (MSPSS) en pacientes con cáncer: propiedades psicométricas e invariancia de medida.*

**Antecedentes:** el objetivo de este estudio fue evaluar las propiedades psicométricas, la validez convergente y la invariancia factorial de la Escala Multidimensional de Apoyo Social Percibido (MSPSS) en pacientes con cáncer. **Método:** el análisis factorial confirmatorio (CFA) se realizó para explorar la dimensionalidad de la escala y la invariancia de medición por sexo y edad en un estudio prospectivo, transversal y multicéntrico. Los pacientes completaron el MSPSS y la Escala de Satisfacción con la Vida (SWLS). **Resultados:** un total de 925 pacientes consecutivos fueron reclutados en 13 hospitales entre julio de 2015 y diciembre de 2018. El CFA indicó que el modelo original de tres factores fue replicado en pacientes con cáncer. Los resultados del CFA multigrupo revelaron invariancia fuerte según el sexo y la edad. La versión en español del MSPSS tenía una alta fiabilidad estimada, con valores superiores a 0,90. La suma simple de los ítems de cada escala fue un buen indicador del apoyo social percibido de los pacientes oncológicos. Las tres subescalas MSPSS se correlacionaron significativamente con el SWLS. **Conclusión:** la versión en español del MSPSS demostró ser un instrumento válido y confiable para evaluar el apoyo social percibido en pacientes con cáncer.

**Palabras clave:** apoyo social; satisfacción; propiedades psicométricas; invariancia; cáncer.

The term "social support" refers to that support intended to meet emotional needs and help to manage the ordinary aspects of everyday life in challenging or stressful situations (Zimet et al., 1990). Social support is a widely recognized protective factor for health (Oh et al., 2020). Receiving a diagnosis of cancer is a life event that causes emotional stress and patients with cancer must confront major behavioral and social changes in order to manage

situations associated with great psychological impact, such as uncertainty and fear of pain, treatments, loss of life's meaning, and in short, fear of dying (Hong et al., 2020; Pruneti et al., 2020). Social support helps patients express their emotions and share experiences; it boosts the perception of psychological wellbeing, and aids in choosing efficient coping strategies (Hong et al., 2020; Pruneti et al., 2020). In this regard, social support is a variable that contributes to adapting to the disease (Oh et al., 2020; Pruneti et al., 2020).

The Multidimensional Scale of Perceived Social Support (MSPSS) is one of the most broadly used scales to rate social support (Dambi et al., 2017, 2018). The MSPSS was created to examine social support in American adolescents (Zimet et al., 1990). It consists of 12 items that rate three sources of personal support, such as family, friends, and significant others, on a

trifactorial scale. The original version of the MSPSS displays high internal consistency ( $\alpha = 0.88$ ) and high 3-month stability ( $r = .85$ ); it correlates negatively with anxiety and depression, and positively with quality of life and satisfaction with life, indicating good concurrent validity (Zimet et al., 1990). The MSPSS has been translated to numerous languages, such as Arab, Chinese, French, Korean, Portuguese, Spanish, Thai, etc. (Dambi et al., 2018; Laksmi et al., 2020; Teh et al., 2019). Suitable psychometric properties have been shown in patients with cancer (Dambi et al., 2017), psychiatric disorders (Teh et al., 2019), heart disease (Bugajski et al., 2019), or chronic diseases (Nearchou et al., 2019). Most studies have confirmed the scale's trifactorial model (Bugajski et al., 2019; Laksmi et al., 2020; Teh et al., 2019), whereas others have identified a single-factor (Akhtar et al., 2010; Nearchou et al., 2019; Wongpakaran et al., 2011), or bifactorial (Dambi et al., 2017) structure. The differences in the factorial structure have been attributed to several causes. On the one hand, the study samples have been diverse (age, socio-economic level, medical situation), the translation and cultural adaptations (for example, the term "someone special" being substituted for "husband") (Aroian et al., 2010). On the other hand, differences in the scoring system, establishing three (Hetherington et al., 2015), four (Guan et al., 2015), or five levels of response (Stewart et al., 2014), instead of the 7 points of the original scale (Dambi et al., 2018). Likewise, methodological issues have come into play (most studies have used the exploratory factor analysis), as well as cultural characteristics, such as difficulties distinguishing between the support provided by family, friends, or others in some societies deemed more "collectivistic" (Dambi et al., 2018; Wongpakaran et al., 2011). All of these factors have contributed to accounting for the variability in the MSPSS factorial structure (Dambi et al., 2018).

One critical issue that has aroused interest recently is the intergroup invariance measurement based on gender and age. There are studies that suggest that women seek and make use of social support more than men (Dong & Liu, 2017; Rutkowski et al., 2018) and that young people are at a greater disadvantage in terms of social support versus older adults (Geue et al., 2019; Rutkowski et al., 2018). Prior to probing these differences, the authors guarantee that the different groups scrutinized interpret the measure "social support" in a conceptually similar way, such that these differences can be attributed to factors other than the scale itself. Gender invariance studies have found strict invariance in Nigerian (Aloba et al., 2019) (Wang et al., 2017) Chinese, Indonesian adolescents (Laksmi et al., 2020). However, testing of the scale's validity in oncology patients is lacking and how satisfaction with social support changes across life-span, particularly in Spanish population.

Against this backdrop, a CFA was conducted to evaluate the three-dimensional structure of the MSPSS in a sample of patients with non-metastatic cancer. Measurement invariance of the MSPSS was analyzed across sex and age groups by means of a multi-group CFA; the reliability of the Spanish version of the MSPSS and evidence of validity were examined using a full structural equation model.

## Method

### Participants

The study sample comprised 925 patients with cancer (60.3% females and 39.7% males), aged 24–85 years ( $M = 59.0$ ,  $SD = 12.2$ ),

consecutively referred to the Department of Medical Oncology at each hospital, predominantly married or partnered (76.2%) and unemployed or retired (57.9%). More than half (53.6%) had completed primary education.

As for the cancer characteristics, the most frequent cancer locations were colon (42.1%); breast (34.5%) and others (23.5%). Stage was I-II in 55.6% and stage III in 44.2%. Everyone received adjuvant chemotherapy and 33.4% received associated radiotherapy. The mean time between onset of symptoms and diagnosis of cancer was 60.1 days ( $SD = 101.7$ ) and 44.7% were diagnosed in less than one month from the first medical consultation due to symptoms.

### Instruments

The MSPSS (Zimet et al., 1990) is a 12-item instrument that measures the perceived adequacy of social support from three sources: family members (items 3, 4, 8, and 11), friends (items 6, 7, 9, and 12), and significant others (items 1, 2, 5, and 10). These 12 items were rated on a 7-point Likert-type scale ranging from very strongly disagree (1) to very strongly agree (7). We used the Spanish version of the MSPSS ([www.heardalliance.org](http://www.heardalliance.org)). Scores from the original version of the MSPSS have very good internal reliability with an  $\alpha$  coefficient of .88 for the total scale, .87 for the family subscale, .85 for the friend subscale, and .91 for the significant others subscale (Zimet et al., 1990).

The Spanish version Satisfaction with Life Scale (Diener et al., 1985) consisting of 5 items rated on a 7-point Likert scale, with higher values representing greater satisfaction. SWLS scores showed excellent internal consistency ( $\alpha_{\text{ordinal}} = .91$ ;  $\omega_{\text{ordinal}} = .91$ ) (Lorenzo-Seva et al., 2019).

Demographic and clinical variables. The patient and cancer variables collected were: age, gender, marital status (married/partnered, not partnered), three age group ( $\leq 55$ , 56–65,  $\geq 66$  years), employment status (inactive, active), tumor location (colon, breast, others), cancer treatment (chemotherapy, chemotherapy and radiotherapy), and tumor stage (I–II, III).

### Procedure

A national, multicenter, cross-sectional study design was applied in this study. The study is supported by Continuous Care Working Group of the Spanish Society of Medical Oncology (SEOM, for its acronym in Spanish) and was conducted at 13 medical oncology departments in Spain. The study complied with the ethical guidelines for research in human beings, was classified as an observational study by the Spanish Agency for Medicines and Medical Devices (AEMPS; Identification code: ES14042015), and was approved by the Ethics Committee at each hospital in accordance with the 1964 Declaration of Helsinki, revised in Seoul in 2008. Participants were informed as to the study objectives and procedures and they were made clear that their participation was voluntary and that all data collected would remain anonymous and would be used solely for research purposes. All the subjects signed informed consent prior to study commencement. No incentives were given.

Suitable patients for inclusion were adults ( $\geq 18$  years) who had a histologically confirmed, non-advanced solid tumor treated with surgery and for which international clinical guidelines consider that adjuvant treatment may be an option. Patients were excluded if they had a metastatic disease if they were treated with preoperative radiotherapy or chemotherapy or only with

adjuvant hormonal therapy or radiotherapy without chemotherapy. Patients having physical conditions, comorbidity and/or age that preclude chemotherapy were excluded. Those patients with personal, psychological, family, sociological, geographical, and/or underlying medical condition that, in investigator’s opinion, might hinder the individual’s ability to participate and complete the study questionnaires were likewise excluded. One thousand and three patients were invited to participate; 78 were excluded on the basis of inclusion and/ or exclusion criteria.

Data analysis

A five-stage approach was used in the analyses. First, sample descriptive statistics were obtained. Second, the dimensionality and structure of the MSPSS were assessed in the entire sample using a semi-confirmatory factor-analytic approach. Third, provided that a clear, strong and simple structure was found at second stage, multiple-group confirmatory factor analyses (CFAs) were performed for assessing measurement invariance in groups defined by gender and age. Fourth, the reliability and appropriateness for individual assessment of the scores derived from the chosen FA solution were examined. Finally, convergent validity was assessed by using a full structural model in which the CFA was extended to include an external variable. With regards to second stage, given that the theoretical dimensionality and structure of the MSPSS were well-defined from the initial design, and the main alternative proposed so far was a unidimensional structure, this issue was explored based on a semi-confirmatory factor analytic approach in which two solutions were compared. The first was an essentially unidimensional solution in which the 12 MSPSS items were considered as measures of a broad dimension of social support. The second was a tridimensional solution with correlated factors, in which the expected pattern was operationalized by an initial semi-specified target matrix (Browne, 1974) defined in accordance to the item assignment described above, and which was objectively refined using the RETAM procedure (Lorenzo-Seva & Ferrando, 2020). A full independent-clusters (confirmatory) solution was not still specified at this stage because personality measures are not usually as “clean” as the confirmatory hypothesis assumes and contain generally non-negligible cross-loadings (Ferrando & Lorenzo-Seva, 2013). Provided that a clear, replicable, and sufficiently simple structure was attained, the multiple-group analyses of the subsequent stages (summarized below) was based on a fully confirmatory solution. As discussed above, determining measurement invariance of the MSPSS scores (third stage) is a key issue that deserves further research, and the relevant groups for evaluating this invariance appeared to be those defined by gender and age. We wanted the scores of individuals belonging to the different resulting groups (male vs. female, young vs. mature) to be comparable, and the mean difference levels observed between groups to be validly interpreted. These requirements are already met if strong or scalar invariance (Millsap & Meredith, 2007) is attained (see Ferrando, 1996), and forcing stricter forms of invariance might be detrimental and prone to lead to biased parameter estimates (Little, 1997). So, strong invariance was appraised in the multiple-group CFAs, and, if attained, mean differences in the groups defined by gender, and age were then compared. At four stage, the reliability and accuracy of the MSPSS scores derived from the factorial solution was examined for two types of possible scores: factor score estimates obtained from using

all the information contained in the FA results, and the simpler sum-scale scores derived from assigning unit weights to the salient pattern loadings. For this second type of scores, reliability was determined by using McDonald’s Omega estimate.

Finally, evidence of validity was obtained by using a full structural equation model, in which the CFA was extended to include the total scores of the SWLS. The SWLS scores were then taken as an external variable that was regressed onto the three MSPSS factors. The resulting standardized regression beta weights obtained from fitting the model are then structural coefficients corrected for measurement error.

Results

Dimensionality and Factor Structure

Descriptive statistics of the MSPSS can be found in Table 1. Mean item scores ranged from 5.44 (item 5) to 6.65 (item 3), and the distributions of all item scores were negatively skewed. Given this result and the fact that the responses are ordered-categorical, the appropriate model for this data would be the non-linear item factor analysis model based on an underlying-variables approach (UVA; see e.g. (Ferrando & Lorenzo-Seva, 2013). However, the number of item response points is also rather large, and it was found that, even with the skews: (a) the solutions provided by the linear and the UVA approaches were very similar, and (b) the linear solution was far more stable. Furthermore, the simplicity of the linear model becomes a clear advantage in the multiple-group invariance analyses that follow. For these reasons, the simpler linear FA model was chosen in this case. As for the data adequacy, it was good: the Kaiser-Meyer-Olkin index (KMO): .87 and Bartlett’s test ( $\chi^2 = 9228.5$ ,  $p < .001$ ) suggested that the inter-item relations were consistent enough to be fitted by the FA model.

The two competing solutions were fitted to the data using robust unweighted least squares estimation with mean-and-variance

*Table 1*  
Summary statistics for the items by subscales, and skewness

Items	Item	M	SD	Skews
<i>Family scale (ω=.90)</i>				
My family really tries to help me	3	6.65	0.75	-3.25
I get the emotional help and support I need from my family	4	6.64	0.83	-3.01
I can talk about my problems with my family	8	6.40	1.0	-2.23
My family is willing to help me make decisions	11	6.57	0.85	-2.96
<i>Friends scale (ω=.93)</i>				
My friends really try to help me	6	5.80	1.29	-1.73
I can count on my friends when things go wrong	7	5.44	1.46	-1.30
I have friends with whom I can share my joys and sorrows	9	5.62	1.44	-1.50
I can talk about my problems with my friends	12	5.54	1.46	-1.40
<i>Significant others scale (ω=.91)</i>				
There is a special person who is around when I am in need	1	6.53	0.90	-2.64
There is a special person with whom I can share my joys	2	6.53	0.91	-2.74
I have a special person who is a real source of comfort to me	5	5.44	1.46	-2.92
There is a special person in my life who cares about my feelings	10	6.56	0.98	-2.72
<i>Note: MSPSS= Multidimensional Scale of Perceived Social Support</i>				

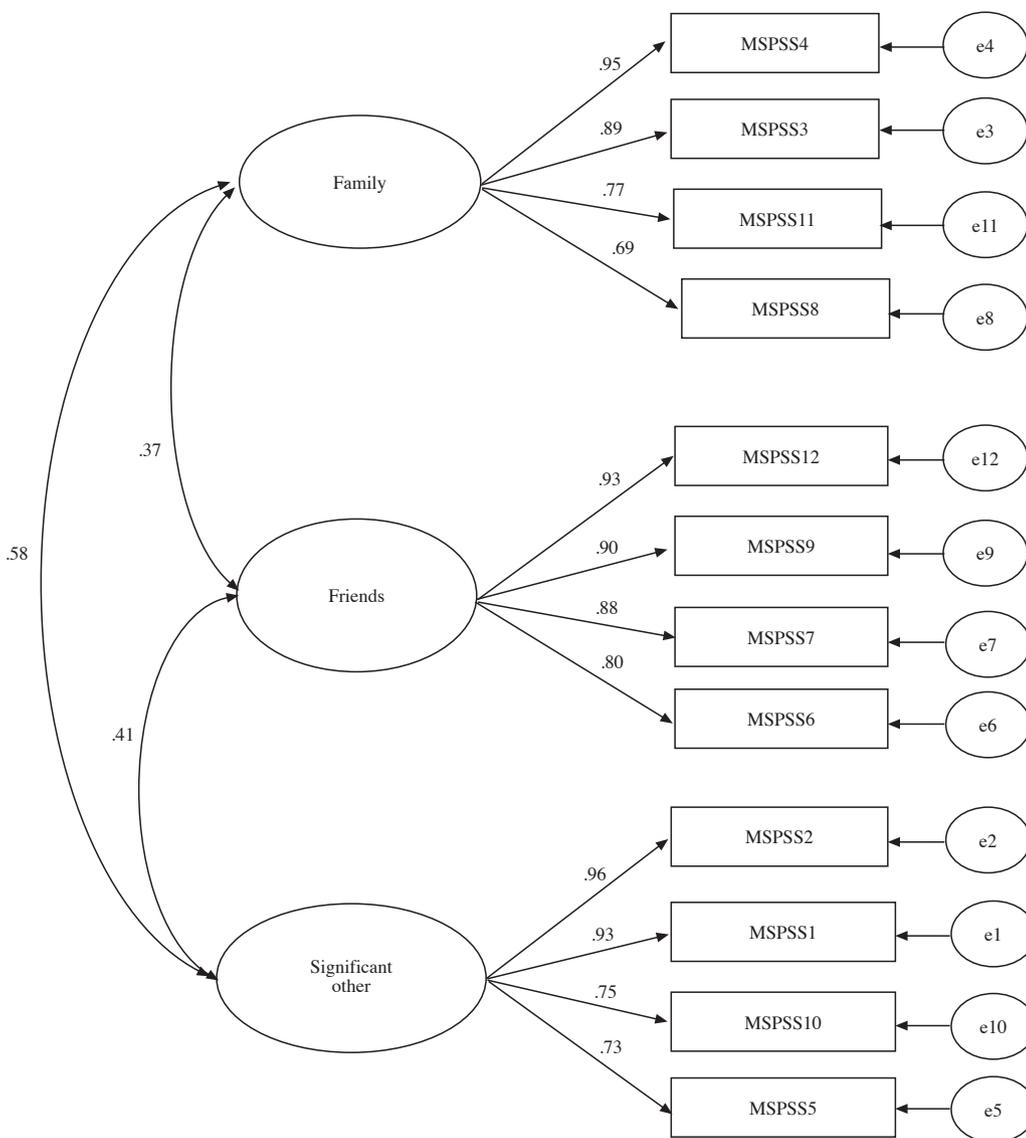
corrected fit statistics as implemented in the FACTOR program (Ferrando & Lorenzo-Seva, 2017). Results can be summarized as follows. First, the unidimensional solution had an unacceptable fit, and the Explained Common Variance (ECV) index of closeness to unidimensionality (ECV=.72) was well below the minimal .80 threshold for considering the data as essentially unidimensional (Ferrando & Lorenzo-Seva, 2018). Second, the fit of the 3-factor solution was quite acceptable: (a) Standardized root-mean-square residual (SRMS): .02; (b) root-mean-square error of approximation (RMSEA): .07, and (c) Comparative fit index (CFI) .98. Measure (a) is an indicator of absolute fit, (b) indicates relative fit, and (c) is a method of comparative fit with respect to the null independence model. Furthermore, the congruence between the rotated solution and the ‘a priori’ target solution was excellent. The overall congruence was 0.99, which means that the obtained solution totally matches the expected ‘a priori’ structure (Lorenzo-Seva & ten Berge, 2006). Finally, the rotated solution was remarkably simple: (Hu & Bentler, 1999). To sum up, it seems clear that in this

(large) sample, the MSPSS scores behaved as tridimensional and in accordance to the structure which was theoretically proposed, see Figure 1.

We would like to make some additional remarks at this stage. First, it was checked that the tridimensional solution was quite stable under cross-validation, and this result should be anticipated given that the values of the construct replicability indices were above .92 for all three factors (see (Ferrando & Lorenzo-Seva, 2018)). Second, we note that, with only three primary factors, a second-order solution is just-identified and cannot be tested. However, the strong positive relations among the factors suggests that a single-general factor, second-order structure is plausible.

*Measurement Invariance*

Given the factorial simplicity obtained at the previous stage, multiple group CFAs were fitted using robust, weighted least squares estimation with second-order (mean and variance)



**Figure 1.** The standardized solutions for the three-factor model (12 items) of the Spanish version of the Multidimensional Scale of Perceived Social Support (MSPSS)

corrections (WLS-MV), as implemented in Mplus (Muthén & Muthén, 2004). Model fit and appropriateness were explored by using the RMSEA and CFI as in the previous stage. As a summary, strong invariance across both gender and age was clearly achieved. Furthermore, in both cases the strongly invariant restricted models had an excellent fit, which, in relative terms, was far better than of the previous less restricted models (baseline and weak invariance). For this reason, only the strong invariance results are shown. They are in table 2 together with the mean group estimates. To interpret these results, it should be taken into account that the mean on the first group is fixed to zero for identification purposes, and that the remaining means are to be compared with this fixed value in terms of their standard errors.

Results are summarized as follows. First, significant differences in mean groups appear mainly in the 3<sup>rd</sup> factor. In this factor, women show high levels in friends support and the difference is statistically significant. The effect size for this difference (Cohen’s d) is about .42, which would qualify as medium-small. In terms of age, means in the third factor become progressively and significantly lower as age increases. Finally, the oldest group shows also significantly lower mean levels in the first factor with respect to the youngest group.

Measurement invariance is not only essential for validly comparing group differences, but also for assessing possible differential item functioning (DIF; e.g. Traver et al., 2000). Now, in the item response theory (IRT) parameterization of the linear model used here, (Ferrando, 2009), the strong invariance level achieved implies that (a) both the item location and the item discrimination parameters are invariant in the groups that are compared, and so, (b) the expected item score depends only on trait level and not on

group membership. Therefore, the invariance results obtained here imply that the MSPSS items do not function differentially across gender and age.

*Reliability and determinacy*

The reliabilities of the factor score estimate based on the tridimensional solution were .93 (F1), .93 (F2), and .94 (F3), and the Factor Determinacy Index (FDI) value was .97 in the three cases. As for the sum-scale scores, McDonald’s Omega reliability estimates were .91 (F1), .90 (F2) and .93 (F3). The interpretation of these results is as follows (see (Ferrando & Lorenzo-Seva, 2018): For each of the three dimensions of the MSPSS, the factor score estimates are highly accurate for individual assessment and are univocal indicators of the factor they intend to measure. This is quite a remarkable result given that each factor is only defined by 4 items. The reliability of the simple sum scores is slightly lower, as would be expected (they use less information), but the loss of accuracy is small: the conclusion is that sum scores can safely be used for individual assessment purposes. The fact that the simple sum scores are almost as accurate as the factorial score estimates is due to the strength and simplicity of the factorial structure of the MSPSS.

*Validity evidence*

The structural model summarized above fitted quite well the data (RMSEA=.03; CFI=.95). The standardized regression coefficients (i.e. beta weights) of the SWLS scores on the factors were: .18 (F1), .24 (F2) and .17 (F3). All three were statistically significant, and, when interpreting it, it should be remembered that they are corrected for measurement error. The multiple correlation for predicting the SWLS scores from the three MSPSS factors was .47 and was again statistically significant (the standard error was .03). The corresponding f<sup>2</sup> effect size (f<sup>2</sup>=.28) should be considered to be medium.

*Normative Table*

In order to help the applied psychologist to interpret the responses obtained in a practical situation, we constructed a normative table to convert raw scores to T-scores and centiles. It must be noted, however that MSPSS requires to focus on the critical lower tail of the distribution (i.e. individuals with low perceived support). So, the table focuses on this tail. It can be found in Table 3.

Discussion

This study analyzed the factor structure of the MSPSS, measurement invariance across sex and age groups, as well as assessing the validity and reliability of the scores in individuals with resected, non-metastatic cancer. A semi-confirmatory factorial analytical approach was used to examine the original, well-defined factor structure of the MSPSS (Zimet et al., 1990) and the alternative proposal of a unidimensional structure (Akhtar et al., 2010; Nearchou et al., 2019; Wongpakaran et al., 2011). The results attained indicate that the original 3-factor structure of the scale is replicable, revealing better fit indices compared to SRMS (.02), RMSEA (.07) and CFI (.98) (Hu & Bentler, 1999; Kline, 2011) values.

*Table 2*  
Results of the strong invariance model for sex and age

Groups	Means	SE	$\chi^2$ (df)	CFI	RMSEA	(90%CI)
Sex			196.33 (120)	.95	.03	(.02; .04)
Men (fixed)	.00	–				
	.00	–				
	.00	–				
Women	-.09	.05				
	-.09	.05				
	<b>.40</b>	.07				
Age			264.86 (189)	.95	.03	(.02; .04)
Group 1 (<=55) (fixed)	.00	–				
	.00	–				
	.00	–				
Group 2 (56-65)	-.01	.06				
	.06	.06				
	<b>-.20</b>	.08				
Group 3 (>= 66)	<b>-.14</b>	.06				
	.05	.05				
	<b>-.41</b>	.07				

*Note:* SE.= standard error; RMSEA=Root Mean Square Error of Approximation; CFI=Comparative Fit Index; CI= Confidence Interval  
Bold values indicate significance at the 5% level

*Table 3*  
Scale table to convert raw scores to T-scores and centiles

Centile	TOTAL		Family Members		Friends		Significant others		Centile
	Raw Score	T-Score	Raw Score	T-Score	Raw Score	T-Score	Raw Score	T-Score	
1	24 - 48	0 - 20	4 - 14	0 - 14	4 - 6	0 - 14	4 - 12	0 - 11	1
2	49 - 51	21 - 23	16	20	7 - 10	18 - 22	13 - 15	14 - 19	2
3	52 - 53	24 - 25	17	23	11	22	-	-	3
4	54 - 56	26 - 29	18	26	12 - 14	26 - 30	16 - 17	22 - 25	4
5	57 - 58	30 - 31	19	29	15	32	18	28	5
6	59	32	-	-	-	-	19	31	6
7	60	33	20	32	-	-	-	-	7
8	61	34	21	35	-	-	20	33	8
9	62	35	-	-	16	34	-	-	9
10	63	36	-	-	-	-	21	36	10
11	64	37	22	38	17	37	-	-	11
12	65	39	-	-	-	-	-	-	12
13	66	40	-	-	-	-	22	39	13
14	-	-	-	-	18	39	-	-	14
15	67	41	23	41	-	-	-	-	15
16	68	42	-	-	19	41	23	42	16
19	69	43	-	-	-	-	-	-	19
20 - 30	70 - 72	44 - 46	24 - 25	44 - 47	20 - 21	43 - 47	24	45	20 - 30
30 - 40	74 - 75	47 - 50	26	50	22 - 23	47 - 49	25 - 26	47 - 50	30 - 40
40 - 50	76 - 77	51 - 52	27	53	24	51	27	53	40 - 50
50 - 99	78 - 84	53 - 59	28	56	25 - 28	53 - 59	28	56	50 - 99
Mean	75.4		26.0		23.5		25.9		
SD	9.1		3.3		4.8		3.6		
Reliability	.93		.91		.90		.93		

Note: SD.= standard deviation

This analysis finds that the three primary factors, with 4 items each (family, friends, and significant others) have an added value in their own right (Calderon et al., 2019) and contribute more accurate and useful information than the total score. This suggests that the scale behaves in a multidimensional way, with factors that are strongly related to one another, which would point toward the presence of a second-order social support factor.

Similarly, the multigroup confirmatory factor analysis performed in this study exhibited strong invariance, with excellent fit. This evinces that both the structure and the content of the MSPSS items remain stable regardless of sex and age. Gender-based invariance has been proven in earlier studies (Aloba et al., 2019; Laksmi et al., 2020; Wang et al., 2017), and so far as we know, this is the first study to analyze the invariance of the factorial structure on the basis of age.

Women exhibited higher levels than men of social support from friends, with a moderate effect. Previous studies have detected differences in social support from friends according to sex, with females displaying greater levels of social support than males (Dong & Liu, 2017; Rutkowski et al., 2018). These differences may be due to different coping styles, since women probably depend on more emotional support than men, and this support is largely provided by friends (Costa-Requena et al., 2015). Finally, as participants age, perceived social support is found to decrease. People aged >66 years scored lower on perceived support from significant others compared to younger patients. Some authors

point out that younger individuals seek out more support from their peers than do seniors (Rutkowski et al., 2018). Some studies have revealed that young adults need more on-going and greater social support than the elderly, not only from healthcare professionals, but also from family and significant others (Nearchou et al., 2019; Rutkowski et al., 2018; Zimet et al., 1990). In young people with cancer, this greater need and search for social support may be due to the greater psychological impact their diagnosis, treatment, and sequel have on them (Dong & Liu, 2017; Oh et al., 2020; Rutkowski et al., 2018).

The internal consistency of the MSPSS total and subscale scores was estimated by McDonald's omega ( $\omega$ ) a better estimate than Cronbach's alpha, except under restrictive conditions. The reliability of the three dimensions as estimated from the simple sum scores ranges between .90 and .93, slightly lower than the factorial score estimates. This illustrates the robustness and simplicity of the factorial structure of the MSPSS in this sample and shows that the simple sum of the items is a good estimate to evaluate perceived social support in this patient group. Likewise, the scale's simplicity was very good, as was its coefficient of determination (all the factors had  $FDI > .97$ ) (Beauducel, 2011), indicating that the factor score estimates unequivocally reflect the underlying levels being measured. Insofar as validity evidence, the outcomes of this study show that the factors of the MSPSS correlate modestly but significantly with satisfaction with life. One explanation is that those individuals that have greater social support are more satisfied

with their life, which has been observed in earlier studies (Taheri et al., 2014).

It must be pointed out that MSPSS does not include wordy reversed items. This kind of items are useful when acquiescence response can be expected from responders (see for example, Vigil-Colet et al., 2020). However, the patients that are to answer MSPSS are typically very motivated to participate in the assessment process, so they are not like to produce imprecise responses. In addition, the test is administered to the patient in individual sessions, and the psychologist is present to solve any possible questions about the content of the items that might be not understood by the patient. As a result, acquiescent response is likely to be present in this test.

The present study has both strengths and limitations. Its major strengths are that the psychometric properties of the MSPSS have been analyzed in a large sample of cancer patients, which enabled us to properly develop the statistical analyses by dividing the total group into two randomly selected subsamples in which to independently perform the exploratory and confirmatory analysis. As for the study's limitations, the use of a cross-sectional design means that it is not possible to infer the direction of causality

between the variables. Relationships of causality should be examined in future studies. The instruments were always presented in the survey in the same order, and therefore, their presentation was not counterbalanced to control for order effects. Finally, the evidence of validity as regards the connection with other variables could be probed in greater depth by means of associations with stress or subjective wellbeing measures.

To conclude, the Spanish version of the MSPSS is suitable to ascertain the social support people with cancer perceive. Understanding their support networks can help the clinician to put in place actions and design strategies that bolster this kind of support that enhances quality of life and satisfaction with life for their patients.

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