Patient Preference and Adherence

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ORIGINAL RESEARCH

Psychometric Properties of the Peruvian Version of the MOS Scale for Social Support in Cancer Patients and Convergent Network with Quality of Life

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Introduction: One of the key psychosocial factors that impact mental and emotional health is social support. While much research has been conducted on the role of social support in the lives of cancer patients, there is a lack of studies that consider populations who need specific tools to assess this concept.

Purpose: The aim of this study was to evaluate the psychometric properties of the MOS Social Support Scale (1991) in 499 Peruvian cancer patients between the ages of 18 and 87 (M= 46.30, SD = 15.747).

Methods: In this study, three models of the MOS were analyzed based on 19-item versions (four factor, second order and bifactor model).

Results: The results showed a better psychometric fit in the 19-item bifactor model with optimal fit indices through the structural equation method (SB-χ2/df = 1.94, CFI = 0.966, TLI= 0.955, SRMR = 0.038 and RMSEA = 0.058). Additionally, there was evidence of configural, metric and scalar invariance with this instrument according to the gender of the surveyed cancer patients. Convergent validity using a network analysis approach revealed positive associations between social support dimensions and quality of life.

Conclusion: Emotional support and positive interactions dimensions were found to be important interconnections in the overall network, as indicated by their greater centralities. Therefore, this instrument could be suggested as a reliable way to evaluate cancer patients and their perceived support.

Keywords: social support, factor invariance, oncology, cancer, network analysis

Introduction

Cancer is a major concern in the healthcare sector, affecting people of all social and cultural backgrounds. As a result, multidisciplinary efforts are being made to treat and manage the disease.[1] According to data from the International Agency for Research on Cancer,[2] there were 18.1 million new cases and 9.6 million deaths globally in 2018, highlighting the significant impact of cancer on public health. The rise in cancer cases can be attributed to factors such as aging, socioeconomic and lifestyle changes.[3] This issue has also been seen in less developed countries with problematic healthcare systems, such as Peru, where 66 thousand new cases of cancer were reported in 2018, with prostate cancer (11.4%), breast cancer (10.5%), and stomach cancer (8.6%) being the most common types of cancer.[4]

While cancer severity, reactions, and time of suffering may vary among cultural groups, it is crucial to explore humanistic ways to support patients during and after diagnosis and treatment.[5] For this, social support involves emotional, informational, tangible, and belonging support, which helps to reduce stressful events and negative experiences. Different types of support are effective for coping with less controllable stressors as chronic diseases, emphasizing the importance of providing comprehensive support to patients from professionals and family members to enhance their well-being.[6] In this way, social support refers to the resources, both tangible and intangible, that a person can draw on from their social network and it is more than just the presence of people in someone's life; it involves a subjective perception that one is cared for, loved, respected, and

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has a sense of belonging to a community.[7,8] This is supported by evidence from a systematic review that highlights the significance of social support in cancer survivals for various types and stages of cancer, particularly in patients who have a partner or have experienced the loss of one.[9]

In the oncology literature, it has been reported that cancer patients commonly express their desire for companionship and support in various forms, such as empathy, home care, information, equal treatment, and help with appointments.[10] On the other hand, patients with stomach, colon, and intestinal cancer reported a greater need for close individuals,[11] while lung cancer patients with less social support and lower resilience were more prone to emotional problems.[12] Furthermore, according to a systematic review, young patients under 40 years old report difficulties continuing their relationships with friends, parents, work, and romantic partners, and are more likely to seek information on how to talk about their cancer with others.[9] Social support has also been found to be crucial in cancer treatment, where samples of breast cancer patients with little personal or clinical social support are less likely to initiate adjuvant endocrine therapy.[13] Additionally, in a longitudinal study, social support was a significant predictor of better quality of life for lung cancer patients after several months.[14]

Determining valid ways to measure and monitor social support in oncological patients can help us better understand the impact it has on their recovery and overall well-being. There has been developed a large number of instruments that assess this same construct.[15] However, the MOS Questionnaire of social support[16] was developed especially for patients with chronic diseases and the psychological assessment of the social support they perceive in order to fulfill their personal needs, expectations, and values. This is one of the most widely used instruments worldwide, which has various cultural adaptations in Europe and America,[17,18] as well as in Asia and Africa[19–21] and South America.[22–24]

Several studies have evaluated the psychometric properties of the Spanish version of the MOS social support scale in different contexts, including samples of cancer patients and older adults. However, these previous studies have found good fits in different factorial specification models, including three-factor models, five-factor models, and even second-order models that take into account geographical and cultural differences.[18,25,26] In this way, it is necessary to conduct a new examination of the MOS scale to determine which factorial solutions are most appropriate in a different context, this time in a new South American country.

Including the assessment of bifactor and second-order models can provide new evidence. It is possible to evaluate these models because since the conception of the MOS Social Support Scale, total and dimensions scores have been assumed and even moderate-high correlations have been reported between the latter.[16] Thus, implementing these factorial specifications has the advantage of assuming that there is a more general underlying construct representing the first-order factors of social support, and that this construct consists of a wider dimension and several subdimensions. As for the second-order structure model, it is used to explain that there are first-order factors that are related to each other, however, this covariance is determined by a hierarchical factor above all others.[19,27] On the other hand, bifactor models do not have hierarchy and suggest that a single general factor directly represents a large part of the common variance in each measured variable, while the set of other orthogonal factors represents the remaining common variance in the evaluated construct.[28]

In addition, the relationship between gender and social support in cancer patients must be taken into account, since various studies have shown differences in the dimensions of social support in favor of women than men,[29–31] while other studies have found differences in favor of men with different types of cancer.[32,33] This last group stands out for their higher perception of tangible (material), emotional, and informative social support, which in many cases is attributed to both the greater participation of the partner or family in the care of men and the greater preference of this group for this type of instrumental support compared to other types of support.[33,34] Given the varying results in perceived social support between men and women with cancer, it's important to evaluate the MOS instrument to determine if gender is a significant factor in social support for these patients. This property allows us to identify any real differences in the construct between genders and make generalizations.[35,36] Given the lack of evidence in the Spanish-speaking Latin American context at the National Institute of Neoplastic Diseases of Lima, this evaluation is particularly essential.

Social support is often related to other variables that promote a beneficial effect on mental health and social well-being.[37] Evidence suggests that social support can help people better cope with life's challenges, maintain a good mood, and develop a sense of belonging and connection with others.[38,39] It can also increase positive affect and a perception of stability under various personal life conditions of cancer patients.[38,39] Therefore, it is reasonable to verify whether the instrument used is also convergent and complementary with other similar measures such as quality of life as reported in previous studies.[38,39]

For this purpose, a more informative approach to associations between such variables is network analysis. Through this approach, it is possible to visually display relationships between variables and examine the communities that form based on the strength of their association. In addition, network analysis allows us to examine which variables are the most influential and reinforce global connections in a network, providing a wider view.[40] This perspective has already been widely used in health areas such as psychology and medicine with results that provide different benefits compared to traditional correlation methods.[41,42] In that sense, this type of analysis in the current study could help understand which specific aspects of social support are more related to each other and which are more important in the network (centrality measures), as well as find out the role of other sociodemographic variables such as gender with respect to the components of social support.

In summary, with this study we sought to enhance the psychometric results of previous studies on the inclusion of new factorial models, measurement invariance, and convergence using a novel network analysis perspective on the MOS Scale. Therefore, it was proposed to evaluate the psychometric properties of the Peruvian adaptation of the 19-item MOS questionnaire, through confirmatory factor analysis, reliability by consistency Internal of the instrument, and invariance according to gender in Peruvian cancer patients. Finally, we examined convergent validity evidence through network associations and centrality measures between social support, gender, and quality of life.

Materials and Method

This section discussed the participants involved in this study, the instrument used for the analysis of the data gathered, the process involved and the result of the analysis conducted.

Participants

We used an online calculator[43] to calculate the necessary sample size in order to conduct confirmatory analysis with structural equation models, given the number of latent and observed variables, an effect size of 0.3, statistical power of 0.8 and a probability level of 0.05. The result indicated that 150 people were sufficient for the respective analysis, however, this number was widely exceeded in the present study. We conducted the study on convenience sampling, which was supported by the fact that the participants were all recruited from a single place (National Institute of Neoplastic Diseases), which meant that they were likely to share similar demographic, social, and cultural backgrounds. The sample consisted of 499 patients with various oncological diagnoses from the National Institute of Neoplastic Diseases. The inclusion criteria in the study were the following: a) being over 18 years of age, b) being diagnosed with some oncological disease, and c) having signed the written informed consent to be evaluated. Regarding the participants, the mean age was 46.30 years (SD = 15.75), and 67.1% were women. Approximately, 71.1% were Peruvians from different provinces, and 28.9% were from Metropolitan Lima. Regarding marital status, 53.9% of the patients were married or living with a partner; the rest were single, widowed, separated, or divorced. 39.68% were not actively employed at the time of the evaluation. 35.47% had only completed basic elementary studies, 43.88% secondary, and 20.64% higher education. The distribution of the sample according to the oncological medical department was composed as follows: 26.3% were in the area of oncological medicine, 22.4% in the area of the breast and soft tissues, 15.6% in the area abdomen, 15.6% in the area of gynecology, 6% in the area of head and neck, 4.4% in the area of urology, 3.6% in the area of neurosurgery, 3, 2% in the thorax area and 2.8% in the orthopedic area. Finally, regarding the clinical stage of the patients, 5.8% were in the first stage, 19.8% in the second, 27.5% in the third, 13.4% in the fourth stage, and in 34% their clinical stage was not registered (see Table 1).

Table 1 Description of Sociodemographic Data (n = 499)

	f	%
Distribution of patients by gender		
Female	335	67.1
Male	164	32.9

(*Continued*)

Table 1 (Continued).

	f	%
Distribution by place of origin		
Metropolitan Lima	144	28.9
Provinces**	355	71.1
Distribution of patients according to the level of education		
None	8	1.6
Complete primary	43	8.6
Incomplete primary	67	13.4
Complete secondary	157	31.5
Incomplete secondary	59	11.8
Complete Technical	48	9.6
Incomplete Technical	17	3.4
Complete superior	55	11
Incomplete superior	45	9
Distribution of patients according to the economic situation		
Good	33	6.6
Regular	258	51.7
Bad	208	41.7
Distribution of patients by the medical oncology department		
Oncological medicine	131	26.3
Breast and soft tissue	112	22.4
Abdomen	78	15.6
Gynecology	78	15.6
Head and Neck	30	6
Urology	22	4.4
Neurosurgery	18	3.6
Thorax	16	3.2
Orthopedics	14	2.8
Distribution of patients according to clinical stage		
I	29	5.8
II	99	19.8
III	137	27.5
IV	67	13.4
No registration	167	34

Note: **Others patients from other departments in Peru.

Instruments

In principle, an ad hoc file was developed and applied for the study for the purpose of collecting sociodemographic information from the participants. The MOS questionnaire was then administered to evaluate the level of social support perceived by the patients. We used the MOS questionnaire[16] in the initial Peruvian version with an oncological sample.[23] This instrument assesses functional social support (19 multiple-response items that measure the perception of support); four dimensions emerge from the latter: emotional support, tangible or instrumental, affective support and positive interaction, with five Likert-type response options (Never, almost never, sometimes, almost always, always). The general reliability for this measure was ω = 0.90, and the internal consistency of the factors was between 0.86 to 0.90.

For convergent validity we used the Multicultural Quality of Life Index Scale (MLQI), translated and validated into Spanish even in the Peruvian context.[44,45] The MLQI is a one-dimensional instrument that measures the quality of life of people and is made up of 10 items, which evaluates physical well-being, psychological or emotional well-being, self-care and various levels of functioning in daily life that are condensed into a perception of overall quality of life. Each item is answered in a range from 1 to 10 (from bad to excellent). For the present study, an internal consistency was obtained through an omega coefficient of 0.80.

Procedures

For the present study, a concordance analysis was carried out between 11 judges with experience in the field of Psycho-Oncology, on attributes such as clarity, relevance, and relevance of the items concerning the construct to be evaluated, whose V. de Aiken were higher than the established minimum [≥.70]; Escobar and Cuervo,[46] based on their suggestions, it was allowed to modify some terms to evaluate better the evidence related to the content of the items for the present sample. The study was conducted in compliance with relevant legal and ethical standards in the country, including the principles outlined in the Declaration of Helsinki, in order to ensure the protection of participants. Also, the research protocol was approved by the Ethics Committee of Cesar Vallejo University and by the National Institute of Neoplastic Diseases. Participants were informed about the objectives and academic purposes of the study and provided written informed consent before participating. Two psychologists administered the sociodemographic questionnaire and the MOS to 499 participants who volunteered and provided anonymous responses.

Data Analysis

The statistical analyzes were carried out with the R Studio 3.1.2 program. First, the existence of extreme scores was verified through asymmetry and kurtosis in the range ± 1.5[47] conveniently with polychoric matrices, because they are polytomous items.[48] Regarding the assumptions of multivariate normality, it was evaluated with the Mardia coefficient (G2), expecting magnitudes. To evaluate the validity based on the internal structure of the construct, the confirmatory factor analysis (CFA) was carried out. The fit indices were conveniently used to the standard and recommended distribution: chi-square with Satorra-Bentler correction,[49] the proportion between chi-square and the degrees of freedom [S-Bχ2/df] and the estimated values below or equal to five are considered a good fit.[50] Incremental adjustment indices according to Hu & Bentler:[51] CFI (≥.95), SRMR (≤.05) and RMSEA (≤.05) are the most adequate also for scores of bifactor model.[27]

Concerning the reliability of the MOS questionnaire, we considered using the internal consistency method through alpha (α) and omega (ω) coefficients greater than 0.70.[52] Finally, to examine whether the MOS questionnaire exhibits metric invariance according to gender, we progressively analyzed the invariant structure of each model for configural, loadings, intercepts, and residuals using the CFI (ΔCFI) and RMSEA (ΔRMSEA) indices to identify differences. The robust invariance is admitted when the factorial equivalence parameters of ΔCFI ≤ 0.01 and ΔRMSEA ≤ 0.015 are fulfilled in all models.[35]

Network Analysis

To assess convergent validity using network analysis, we used the most used statistical packages as qgraph, bootnet, mgm, and networktools.[53,54] This was estimated using a correlation network graph that showed the interaction between variables. In this graph, each element of the measures used is represented as circles, called "nodes" (or "vertices"). The nodes are connected by lines, called "edges", which can be understood as relationships between the elements. In the present network approach, we used the Spearman estimator for the GGM, as it is often recommended for ordinal and non-parametric variables. To visualize the network, we used the Fruchterman-Reingold algorithm, which determines the position of a node based on the sum of connections

it has with other nodes using the qgraph package. We also took into account the gender variable, using the R mgm package to examine the graphical model with different types of variables (continuous, categorical, and more). In addition, we considered estimating the accuracy of the edge weights, with a 95% accuracy of the confidence intervals through Bootstrapping of 3000 samples around each edge in the network. Finally, we considered centrality indices: expected influence, which allow us to identify the most important variables, as they were responsible for interconnecting all elements of the network.

Results

As a result of the linguistic revision described in the "procedures" section, it was decided to modify 4 items for their linguistic adaptation in the evaluated sample. Table 2 shows the original and the adapted version.

Univariate and Multivariate Normality

The extreme scores related to univariate normality were considered in the range of asymmetry and kurtosis ± 1.5[47] for all the items of the MOS questionnaire, where items 2, 6, 14 and 20 did not comply with these parameters. Moreover, the multivariate kurtosis of Mardia[55] reported normalized estimates> 70 (G2 = 614, p <0.000); therefore, it was decided to attenuate the data using the Satorra-Bentler chi-square.[49]

Confirmatory Factor Analysis (CFA)

Regarding the fit indices, the four-factor M1 model presented adequate values: SB-χ2/df = 2.67, CFI = 0.93, TLI=0.921, SRMR = 0.04, and RMSEA = 0.06 (the specifications are found in Table 4). The second-order hierarchical M2 model showed the following indices: SB-χ2/df = 2.19, CFI = 0.966, TLI= 0.948, SRMR = 0.030 and RMSEA = 0.059. On the other hand, the bifactor M3 model obtained slightly higher fit indices than the previous ones: SB-χ2/df = 1.94, CFI = 0.966, TLI= 0.955, SRMR = 0.038 and RMSEA = 0.058. This model allowed us to see the degree of influence of the general factor over the specific ones, obtaining better fit index values than the models described above. A descriptive analysis of the configuration coefficients of the bifactorial specification (see Table 3) showed that the values of explained common variance (ECV), proportion of unique variance (PUC), goodness-of-fit measure (Hh), and hierarchical omega are consistent with a two-factor model that fits the data well. Consequently, this factorial specification was chosen to continue with the analyzes of invariance.

Regarding the equivalence according to the gender with the bifactor model (see Table 4), the invariance analysis models were continuously evaluated, starting with the configurational invariance. Then, the metric invariance analysis was carried out, showing adequate fit indices (ΔCFI = 0.002 and ΔRMSEA = 0.013) following ΔCFI $\leq$ 0.01 and ΔRMSEA $\leq$ 0.015 recommendations. Next, strong invariance (MI3) was evaluated, obtaining values within the correspondence mentioned above parameters (ΔCFI = 0.002 and ΔRMSEA = 0.009). Chi squares comparisons between configural vs metric and metric vs scalar invariance were non-significant (p=0.156; p= 0.980, respectively) which shows all invariance models were supported.[35] This suggests that the MOS Scale function similarly across gender.

Table 2 Table of Original and Adapted Items

Original Items	Adapted Items
2. Someone to help you when you have to be in bed?	2. Someone to help you when you have to rest in bed because of your condition?
9. Someone to trust or to talk to about yourself and your concerns?	9. Someone you can trust or talk to about yourself and your concerns?
16. Someone to share your most intimate fears and problems with?	16. Someone with whom you can share your fears and problems?
17. Someone to advise you on how to solve your problems?	17. Someone to advise you on how to solve your problems?

Note: Modified Items: 2, 9 16, and 17.

Table 3 Factorial Weights for Each Estimated Model of the MOS (n = 499)

Domains	Four Factor Model	Second Order Model	Bifactor Model	
Emotional Support (ES)		SF	SF	GF
A3	0.737	0.737	0.150	0.771
A4	0.774	0.774	0.056	0.785
A8	0.716	0.716	0.061	0.727
A9	0.826	0.826	0.196	0.798
A13	0.817	0.817	0.135	0.807
A16	0.850	0.850	0.545	0.742
A17	0.866	0.866	0.538	0.762
A19	0.834	0.834	0.244	0.791
Tangible Support (TS)				
A2	0.674	0.670	0.452	0.477
A5	0.616	0.607	0.363	0.465
A12	0.754	0.760	0.667	0.444
A15	0.781	0.786	0.610	0.497
Positive Interaction (PI)				
A7	0.731	0.733	0.191	0.707
A11	0.841	0.840	0.411	0.752
A14	0.829	0.829	0.154	0.813
A18	0.873	0.872	0.455	0.781
Affective Support (AS)				
A6	0.720	0.712	0.435	0.585
A10	0.771	0.783	0.423	0.628
A20	0.686	0.682	0.436	0.542
ECV	–	–	0.760	
PUC	–	–	0.749	
ω_H	–	–	0.900	
H_H			0.953	
ω	0.960	–	–	

Note: Second order model (GF and specific latent factors loadings with ES, TS, PI, and AS were 0.926, 0.657, 0.954 and 0.811, respectively).

Abbreviations: SF, specific factors; GF, general factor; ECV, explained common variance; PUC, percentage of uncontaminated correlations; ω_H, hierarchical omega reliability coefficient; H_H, hierarchical factor loading; ω, four factor model omega reliability coefficient.

Network Analysis

On the other hand, network analysis results showed convergence between the four dimensions of social support (emotional, affective, tangible, and positive interactions) with a higher quality of life in cancer patients (Figure 1).

Table 4 Fit Indices of Factor Models and Invariance of the MOS Scale

Model	SB-X^2/df	CFI	RMSEA	ΔCFI	ΔRMSEA
M1: Four-factor model	2.67	0.932	0.061		
M2: Second order model	2.19	0.966	0.059		
M3: Bifactor model	1.94	0.966	0.058		
Factorial Invariance of the MOS- Scale					
M3- Configural	1.55	0.963	0.062	-	-
M3- Metric	1.51	0.961	0.046	0.002	0.013
M3- Scalar	1.48	0.963	0.055	0.002	0.009

Note: M3 configural, metric and scalar: configural, metric and scalar invariance of the bifactor model. p-value: models comparison.

Additionally, results showed that instrumental support had a greater relationship with male participants, while the lowest association in this same group was with affective support. In terms of predictability, positive interactions (r^2=0.71) and emotional support (r^2=0.70) were the most predicted variables in the network. With regard to expected influence indices (Figure 2), we identified that the dimensions of positive interactions and emotional support were the most influential in the overall network.

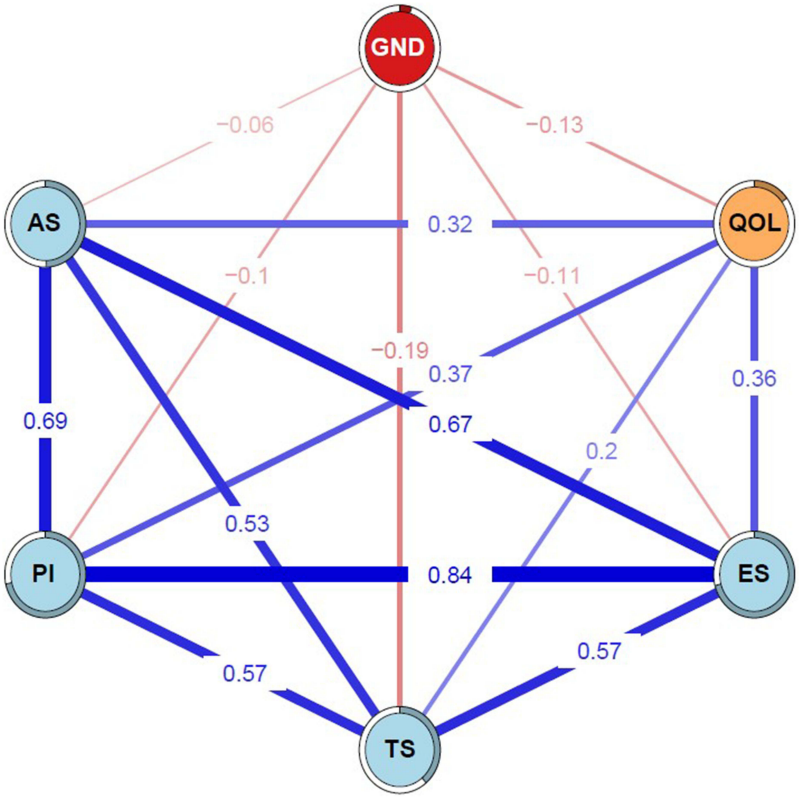

Figure 1 Network analysis of social support, quality of life measure and gender.
Note: The blue lines represent positive relationships, and the red lines are negative associations.
Abbreviations: GND, gender (male=1, female=2); QOL, quality of life; ES, emotional support; TS, tangible support; PI, positive interactions; AS, affective support.

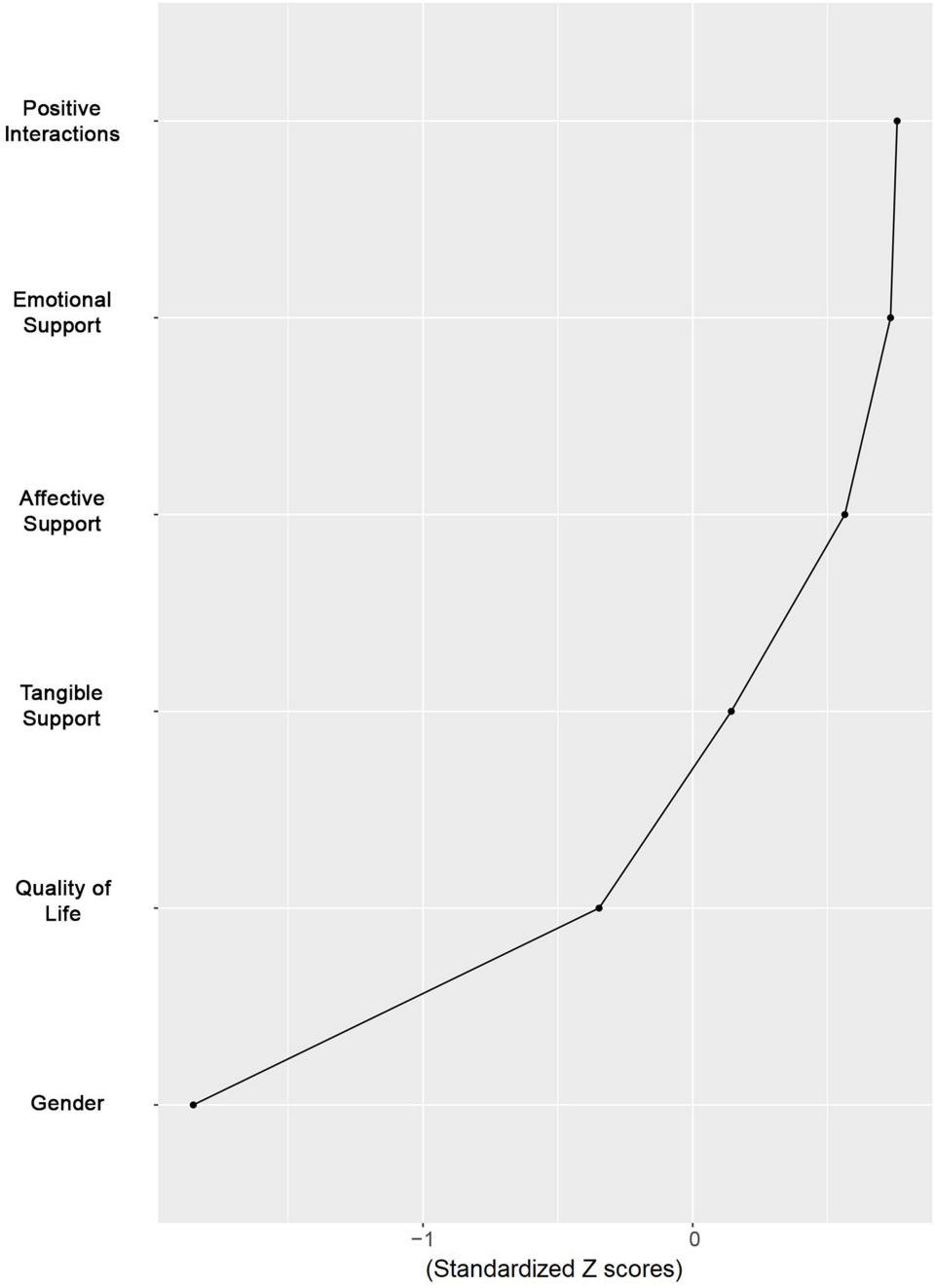

Figure 2 Expected influence of social support dimensions, quality of life measures and gender.
Note: The closer to the value of 1, the more influence it has on other variables in the network.

Discussion

The purpose of this research was to adapt the MOS questionnaire for Social Support in cancer patients of the National Institute of Neoplastic Diseases of Lima-Peru. The participation of expert judges was taken into account, which allowed us to achieve an understandable version for Peruvian cancer patients.

According to previous factorial structure evidence, three models were evaluated through confirmatory factor analysis. The first model was a four-factor structure that had been identified in previous studies.[21,24] The second model was a second order factor analysis that also demonstrated acceptable goodness-of-fit values. However, a better and parsimonious structure was found in the bifactor model.

Our results showed a more favorable evidence for the bifactorial model, which we also considered that fits with the initial approach of Sherbourne and Stewart.[16] To our knowledge, only a few studies have reported a satisfactory bifactor solution that fits this instrument in Spanish,[56] so that it may coherently explain a global score and dimensions of the instrument to be applied in oncological patients. This suggest that in a selection of Peruvian cancer patients, it could be advisable to interpret the results taking into account the four dimensions evaluated by the MOS, in addition to a total score. In contrast, despite having the validation of the tetra-factorial structure in previous studies in Latin America[22,24] and an initial Peruvian adaptation of the instrument in Peruvian patients with cancer,[23] there have been a few studies that presented factor loadings and correlation problems between dimensions of the MOS with coefficients close to one.[16,24]

Another results highlighted the equivalence according to gender as a contrast variable, showing the invariance of the bifactor model between men and women that provides a precedent for the psychometric research of the MOS in an oncological clinical sample following the standards proposed by The Standards for Educational and Psychological Testing.[57] A previous study found factorial invariance of MOS according to gender in adults.[22] This research shows that such equivalence also occurs in Peruvian patients with cancer diseases. It is important to note that the measurement invariance is based on the differences of the evaluated construct and not according to the specific sample.[36]

Regarding convergent validity through network analysis, the results represented positive associations between all dimensions of social support (affective, emotional, tangible, and positive interactions) and higher quality of life in cancer patients. These findings are consistent with previous work indicating that people with this illness are more likely to have more satisfying living conditions when the perception of social support is higher.[38,58] Specifically, affective and emotional support can provide a greater sense of connection to people with cancer, giving them resources not only to continue with the respective treatments but to manage stress and negative emotions that may arise during cancer treatment. These palliatives also tend to appear when relaxation- or fun-oriented interactions are promoted, as they often help patients manage pain, distract from their illness, and establish a positive attitude towards life.[59]

Network analysis results also revealed that tangible (instrumental) support was mainly associated with male participants, and to a lesser extent with affective support in this same group. These findings are in line with some previous work suggesting that there may be differences in the way support is perceived between men and women with cancer.[33,60] These differences may be linked to the influence of gender roles and gender stereotypes. According to this, women tend to develop more affective relationships, while men perceive that they receive more support from their family and close friends after a cancer diagnosis.[60] This is in line with previous work where male patients reported a higher perception of support in material resources and domestic self-care to develop their daily lives.[33,61] In addition, another cancer group felt more supported through positive interactions and enjoyable moments with family and friends during this time.[26,33] Regarding emotional support, there are also results in favor of the mentioned group of a higher perception of receiving advice from family and friends on problems and personal concerns related to the illness.[26] However, other studies show that male patients perceived their emotional needs were more satisfied by health professionals than by family or support groups.[34]

Additionally, positive interactions and emotional support dimensions had the highest centralities in the network (expected influence). Coincidentally, both dimensions had a high correlation with each other as in previous studies,[19,22] so they can be interpreted as a relevant association in the social support network, which allowed for an interconnection between all dimensions of the scale. The high association between the dimensions of positive interactions and emotional support can be explained by the fact that both types of support are related to the attention and care received by a cancer patient from their friends and family. In addition, emotional support and positive interactions can have mutual effects on well-being, as they can help improve the mood and self-esteem of the cancer patient, which in turn tends to promote a more positive perception of interactions with others.[39] Complementarily, people who perceive a trust-based support of their concerns and problems, and who have positive interactions often feel that they have the possibility to receive other types of support such as physical affection and practical or material help for their daily needs.[16]

Limitations

Among the limitations of this study, a non-probability sampling implies generalizations must be taken with caution. Likewise, it is recommended to expand psychometric studies in various medical populations. In this sense, future research should advance in the study of the invariance of the MOS according to hospital groups, chronic diseases, among others, to guarantee

the comparability and equivalence. This study has made some contributions. It is the first to perform a factorial invariance analysis of the MOS in a Peruvian oncological sample. On the other hand, the psychometric network analysis related to social support and quality of life in cancer patients provides a more innovative view of the possible interactions between these constructs. While previous studies have evaluated social support in isolation, network analysis allows for the examination of the dynamic components of a social support system and living conditions, and how they interact with each other. This perspective is already being used in various areas of the social and health sciences in order to provide a deeper understanding of systems of variables that have common characteristics and to identify which are the most important within that system. In this way, it is useful for examining interactions and how they affect the functioning of the system as a whole.

Conclusion

The present study evaluated the psychometric properties of the 19-item version of the MOS Scale that showed acceptable levels of internal consistency and reported evidence for a bifactor structure, which allowed evaluating a one-factor and underlying specific dimensions. Furthermore, they were invariant at a configurational and metric level between men and women. Additionally, we identified convergent relationships between social support instruments and quality of life, where the dimensions of emotional support and positive interactions were found to be the most influential in strengthening interdependent connections. Overall, the results support the use of the MOS as an adequate tool to globally measure the social support of cancer patients.

In addition to the results that demonstrate the adequate internal structure and invariance of the MOS instrument according to gender, it is important to consider other possible implications for Peruvian oncology patients. Based on our findings from network analysis and quality of life, it was observed that both indicators reinforce each other, but the components of positive interactions and emotional support stood out more as they influenced all the other components of the network. This finding highlights the importance to emphasize not only satisfying activities and emotional ventilation from caregivers and family, but also a genuine and positive therapeutic alliance that makes them feel empowered, valued, and recognized. This, in turn, can help them feel more emotionally secure and capable of facing these critical situations. This can also be especially important for cancer survivors, who often face unique emotional and psychological challenges after treatment, such as fear of disease recurrence, self-esteem issues, and changes in social and work life.

Data Sharing Statement

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Ethical Approval

All procedures involving participants were performed according to ethical guidelines of the Helsinki Declaration. The development of the present study was approved by the Ethics Committee of the National Institute of Neoplastic Diseases.

Informed Consent

The participants were informed about the study, the confidentiality of the data, and the possibility of participating in the research.

Disclosure

The authors declare that they have no conflicts of interest.

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