Trends
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Original Article

Construct validity of the Brazilian version of the Medical Outcomes Study Social Support Survey (MOS-SSS) in a sample of elderly users of the primary healthcare system

Validade de construto da versão brasileira do Medical Outcomes Study Social Support Survey (MOS-SSS) em uma amostra de idosos usuários de atenção primária

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Abstract

Objective: To assess the psychometric properties of the Medical Outcomes Study Social Support Survey (MOS-SSS) considering a sample of elderly users of the primary healthcare facilities of Ribeirão Preto, state of São Paulo, southeast Brazil.
Methods: The MOS-SSS is a widely used measurement of social support in different contexts, consisting of 19 items with answer categories that range on a 7-point rating scale. Data collection regarding the psychometric properties of the MOS-SSS was performed in a stratified sample of elderly users of primary healthcare facilities of Ribeirão Preto. Data were collected at five district basic health units located in the city through face-to-face interviews. Polychoric correlation matrix and exploratory (EFA) and confirmatory (CFA) factor analyses were performed.
Results: A total of 357 elderly subjects aged 60 years or older participated in the study (62.7% females). According to the polychoric correlation matrix, higher coefficients of correlation (> 0.90) were detected among 12 pairs of items and grouped into four factors, as suggested for EFA. The results of the CFA confirmed the construct validity of the four-factor structure of the MOS-SSS when applied to our sample, as well as the stability of this model in distinct subsamples.
Conclusion: The four-factor structure of the MOS-SSS was found to be suitable and presented adequate construct validity for the assessment of social support in elderly users of primary healthcare facilities.
Keywords: Social support, validity of tests, elderly, public health.

Resumo

Objetivo: Avaliar as propriedades psicométricas do Medical Outcomes Study Social Support Survey (MOS-SSS), considerando uma amostra de idosos usuários das unidades de atenção primária à saúde de Ribeirão Preto, São Paulo, sudeste do Brasil.
Métodos: O MOS-SSS é uma escala para investigação do suporte social amplamente utilizada e aplicável a diferentes contextos. A escala é composta por 19 itens com categorias de respostas que variam em uma escala de 7 pontos. A coleta de dados foi realizada em uma amostra estratificada de idosos usuários de serviços de atenção primária à saúde de Ribeirão Preto. Os dados foram coletados em cinco unidades distritais básicas de saúde (UBDS) do município por meio de entrevistas pessoais. A análise dos dados foi feita utilizando-se matriz de correlações policóricas e análise fatorial exploratória (AFE) e confirmatória (AFC).
Resultados: Participaram do estudo 357 idosos com 60 anos ou mais (62,7% do sexo feminino). De acordo com a matriz de correlações policóricas, maiores coeficientes de correlação (> 0,90) foram detectados em 12 pares de itens e agrupados em quatro fatores, conforme sugerido pela AFE. Os resultados da AFC confirmaram a validade de construto da estrutura de quatro fatores do MOS-SSS quando aplicado à amostra do estudo, bem como a estabilidade desse modelo em subamostras distintas.
Conclusão: A estrutura de quatro fatores do MOS-SSS mostrou-se apropriada para a população estudada e apresentou validade de construto adequada para a avaliação do suporte social em idosos usuários de serviços de atenção primária à saúde.
Descritores: Suporte social, validade dos testes, idosos, saúde pública.

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Introduction

Social support is defined by Cobb[1] as information leading individuals to believe they are cared for, loved, esteemed and valued, which can include communication network and mutual obligation measures. Some studies have reported that social support is related to positive health outcomes, such as lower risk of depression and/or depression symptoms,[2] better quality of life, better management for patients with cancer,[3] decreased risk of cardiovascular disease,[4] and reduction of general illness symptoms.[5]

The Medical Outcomes Study Social Support Survey (MOS-SSS) was introduced by Sherbourne & Stewart[6] in a study on patients with chronic conditions. The instrument comprises 19 items originally distributed into five dimensions covering different aspects of social support (affection; positive social interaction; emotional; informational; tangible or material): affective support involves expressions of love and affection; positive social interaction is the availability of other persons to entertain the patient; emotional support is defined as the expression of positive affect and empathetic understanding, including encouragement of expressions of feelings; informational support is defined as the offering of advice, information, guidance or feedback; and tangible support is the provision of material aid or behavioral assistance.[6,7] The affective support sub-scale includes three items, whereas the others include four items each. For each item, respondents are asked to indicate how often each kind of support is available to them if/when they needed it. Possible answers are: none of the time, a little of the time, some of the time, most of the time and all of the time. Based on a correlation matrix evaluation that showed considerable overlap between the emotional and informational support items, Sherbourne & Stewart[6] proposed that these sub-scales be combined into one emotional/informational support sub-scale.

The original version of the MOS-SSS was translated into and adapted to the Portuguese language by Fachado et al.[8] The authors assessed the psychometric properties of the translated version of the MOS-SSS by using a sample of 101 patients with chronic diseases attending a rural health center in Portugal, with a mean age of 63.4 years. Exploratory factor analysis (EFA) evidenced the existence of four factors, where the emotional and informational dimensions from the original scale were combined into one single factor. Pais-Ribeiro & Ponte[7] studied the properties of the adapted version of the MOS-SSS for a Portuguese elderly population aged over 65 years, reporting the same structure of four factors as that described by Fachado et al.[8]

The MOS-SSS was translated into Brazilian Portuguese by Chor et al.[9] The test-retest reliability of this version was assessed by Griep et al.[10] with a sample of 192 Brazilian employees from a university in Rio de Janeiro. The reliability of the instrument was considered adequate, thus enabling it to be used for the assessment of associations between social support and health-related outcomes in a subsequent cohort study (i.e. the Pro-Health Study[10]). Therefore, in a subsequent study, Griep et al.[11] assessed the construct validity of the Brazilian Portuguese MOS-SSS by applying it to a sample of 4,030 participants from the Pro-Health Study, with a mean age of 40 years (standard deviation = 8.8 years). The authors found good evidence of a high construct validity for this scale, supporting its use in future analyses. However, in this second study, the EFA yielded a three-factor structure, aggregating the affective, positive social-interaction and emotional and informational dimensions of social support. Soares et al.[12] described a similar structure in a study that assessed the psychometric properties of the Brazilian Portuguese version of MOS-SSS in a sample of Hodgkin's lymphoma survivors. Conversely, considering a sample of 129 Brazilian students from four higher-education institutions with ages ranging between 17 and 51 years, Zanini et al.[13] described a structure of four factors for MOS-SSS. In a more recent study based on a sample of 998 participants aged 12 to 73 years, Zanini & Peixoto[14] showed that the four-factor model had a better fit compared to factor structures shown in other Brazilian studies.

Considering the variety of structures detected for the Brazilian Portuguese version of MOS-SSS and the absence of validation studies of this instrument specifically for Brazilian elderly populations, the objective of the present study was to assess the construct validity of the MOS-SSS considering a sample of elderly users of primary healthcare facilities from Ribeirão Preto, state of São Paulo, southeast Brazil.

Methods

Ribeirão Preto is a medium-sized city in the state of São Paulo, with approximately 670,000 inhabitants. Its primary healthcare system is geographically organized into five Health Districts (North, South, Central, West and East), defined as regions with similar economic and social characteristics. In each of these Health Districts, there is a District Basic Health Unit (UBDS), which provides basic healthcare to the population residing in the area of coverage, in addition to being a referral center for some medical specialties in the region.

Assuming that people attending the UBDSs for basic healthcare may represent the population of primary healthcare users residing in the area of the respective Health District, the study data were collected from the five UBDSs in Ribeirão Preto.

The participants were primary care patients aged 60 years or older who were recruited while waiting for a medical appointment. Data collection was carried out from January to February 2017. The instrument was applied via face-to-face interviews by three trained researchers during the morning and afternoon periods throughout the week. The researchers approached all potential participants in the waiting rooms, where the interviews were also performed. As inclusion criteria, we considered only primary healthcare users aged 60 years or older who were able to answer the entire instrument. During the approach, potential participants were informed of the objectives of the study and expected duration of the interview, and that if they were called for the appointment while being interviewed, the interview would be interrupted and finished after the appointment (according to the participant's availability).

To characterize the sample, a questionnaire covering sociodemographic information such as gender (i.e., male or female), age, educational level (i.e., no schooling, elementary school, high school and higher education), marital status (i.e., married, divorced, single, widowed), self-perception of health (i.e., good, regular, poor) and socioeconomic status was also applied. With regard to socioeconomic status, the participants were classified as belonging to socioeconomic classes (i.e., A, B, C, D/E) according to the Brazilian Economic Classification Criteria proposed by the Brazilian Association of Research Companies (Associação Brasileira de Empresas de Pesquisa – ABEP).[15]

As mentioned above, the MOS-SSS comprises 19 items originally distributed into five dimensions covering different aspects of social support, such as affection, positive social interaction, emotional, informational, tangible or material. The original proposal of the instrument suggested that the score should be calculated by using the means and standard deviations of the answers.

Factorial validity of the MOS-SSS was assessed using EFA and confirmatory factor analysis (CFA). Polychoric correlation coefficients between the 19 items of the MOS-SSS were estimated with maximum likelihood estimation using the R polycor package.[16] The matrix of these correlations was used in the subsequent EFA, and the factors were extracted and rotated to orthogonal simple structure using the varimax method. Polychoric correlations are appropriate for variables which are measured on an ordinal scale. CFA was performed using weighted least squares means and variance adjusted estimation as well as polychoric correlation matrix before being implemented in the Mplus software, version 6.0. As goodness-of-fit indices, we considered the ratio of chi-square to its degrees of freedom (χ^2/df), comparative fit index (CFI), Tucker-Lewis index (TLI) and root mean square error of approximation (RMSEA). The fit of the models was considered adequate when $\chi^2/df \leq 2.0$, CFI and TLI ≥ 0.90 and RMSEA < 0.10. Items with factor weights (λ) < 0.40 were considered underweight for the corresponding factor. The modification indices obtained from the Lagrange multipliers were used to verify the existence of any correlation between errors. The comparison between distinct models was performed based on their respective fit and goodness-of-fit indices, with emphasis on the RMSEA index. The RMSEA is a parsimony correction index, with lower values being indicative of better model.

The stability of the models in randomly selected subsamples (factorial invariance) was assessed through multigroup analysis considering the chi-square difference ($\Delta\chi^2$). Firstly, the total sample was randomly divided into two equal parts and then divided into sub-samples of 70 and 30% each – the so-called test sample and validation sample, respectively. In this analysis, the equivalence of factorial weights (metric invariance) and intercepts (scalar invariance) as well as the equivalence of factorial weights, intercepts and variances/co-variances (strict invariance) were assessed.[17,18]

The internal consistency of the MOS-SSS was estimated by using Cronbach's alpha coefficient (α), with results above 0.7 being considered adequate.

This study was approved by the research ethics committee of Hospital das Clínicas de Ribeirão Preto (protocol 61567416.7.0000.5414), and data collection authorized by the Municipal Health Department of Ribeirão Preto. Informed consent was obtained from all participants.

Results

A total of 454 elderly users of primary healthcare were approached. Of those, 79 (17.40%) refused to participate (38 females [48.1%] and 41 [51.9%] males). Among the 375 elderly users who accepted to participate in the study (agreement rate = 82.6%), 18 (4.8%) were called for the medical appointment during the interview and could not continue after the consultation. Thus, the final sample comprised a total of 357 participants who answered all the questions of the instrument, distributed across the UBDSs as follows: 192 at Central UBDS (53.8%), 49 at Vila Virgínia UBDS

(13.7%), 45 at Sumarezinho UBDS (12.6%), 36 at Quintino UBDS (10.1%) and 35 at Castelo Branco UBDS (9.8%).

Table 1 shows the demographic characteristics of the sample. There was a representative number of participants in all three age groups assessed (60-65, 66-74, and 75 or older), for both males and females. The majority of the participants completed the elementary school (66.7%) and were married (55.2%). Approximately 15% of the participants belonged to socioeconomic class D/E and ranked their own health as poor.

Table 2 presents the distribution of participants according to the items of the MOS-SSS. No missing value was detected in our database for any MOS-SSS item. It was observed that the majority of participants answered all the time for all the items in the dimensions affectionate support, emotional/informational support and tangible support.

Figure 1 presents the polychoric correlation matrix for the 19 items of the MOS-SSS. The pairs of items with the highest correlation indices were neighbors, with higher coefficients of correlation (> 0.90) being detected among 12 pairs of items.

Table 3 presents the results of the EFA. According to this analysis, the MOS-SSS items applied to our sample can be grouped into four factors.

Figure 2 lists the results of the CFA considering both the four-factor structure, as suggested by the EFA, and the three-factor structure found in previous studies conducted with Brazilian populations.

Even though the three-factor model presented high factorial weights (0.86 to 0.99), the results of some goodness-of-fit indices were not adequate (χ^2/df = 8.14; CFI = 0.97; TLI = 0.96; RMSEA = 0.14 [RMSEA 95%CI = 0.13-0.15]), meaning that this structure has a poor fit to our data. Conversely, all goodness-of-fit indices of the four-factor model tested showed adequate fit to the data (factorial weights = 0.83-0.98; χ^2/df = 3.47; CFI = 0.99; TLI = 0.98; RMSEA = 0.08 [RMSEA 95%CI = 0.07-0.09]), especially the RMSEA. These results are useful to confirm that the four-factor structure was the best model, presenting an adequate distribution of items to our sample.

Table 1 - Demographic characteristics of elderly users of primary healthcare facilities (n = 357), Ribeirão Preto, state of São Paulo, 2017

	Total (n = 357)		Females (n = 224)		Males (n = 133)	
	N	%	n	%	n	%
Age group						
60-65	93	26.0	63	28.1	30	22.6
66-74	156	43.7	102	45.6	54	40.6
75 or older	108	30.3	59	26.3	49	36.8
Educational level						
No schooling	25	7.0	19	8.5	6	4.5
Elementary school	238	66.7	148	66.1	90	67.7
High school	68	19.0	43	19.2	25	18.8
Higher education	26	7.3	14	6.2	12	9.0
Marital status						
Married	197	55.2	102	45.5	95	71.4
Divorced	48	13.5	25	11.2	23	17.3
Single	28	7.8	24	10.7	4	3.0
Widowed	84	23.5	73	32.6	11	8.3
Self-perception of health						
Good	150	42.0	78	34.8	72	54.1
Regular	153	42.9	112	50.0	41	30.8
Poor	54	15.1	34	15.2	20	15.0
Socioeconomic status*						
A or B	92	25.8	55	24.6	37	27.8
C1	115	32.2	66	29.4	49	36.8
C2	95	26.6	65	29.0	30	22.6
D or E	55	15.4	38	17.0	17	12.8

* Based on average monthly household income.

Table 2 - Distribution of participants (n = 357) according to the items of the Medical Outcomes Study Social Support Survey (MOS-SSS), Ribeirão Preto, state of São Paulo, 2017

Items of MOS-SSS	None of the time (%)	A little of the time (%)	Some of the time (%)	Most of the time (%)	All of the time (%)
Positive social interaction					
1. Someone to do things with to help you get your mind off things	17.7	11.8	20.5	6.4	43.7
2. Someone to have a good time with	17.9	12.6	20.4	7.0	42.0
3. Someone to get together with for relaxation	23.8	12.6	19.3	7.6	36.7
4. Someone to do something enjoyable with	22.7	13.4	17.9	7.3	38.7
Affectionate support					
5. Someone to love and make you feel wanted	11.8	3.4	10.1	5.3	69.5
6. Someone who hugs you	9.0	3.9	12.3	5.6	69.2
7. Someone who shows you love and affection	9.2	2.5	10.4	5.9	72.0
Emotional/informational support					
8. Someone to share your most private worries and fears with	18.2	7.0	9.2	7.8	57.7
9. Someone who understands your problems	18.8	4.8	12.3	6.2	58.0
10. Someone to confide in or talk to about yourself or your problems	14.9	5.9	11.5	6.2	61.6
11. Someone you can count on to listen to you when you need to talk	15.7	4.2	12.3	4.8	63.0
12. Someone to give you good advice about a crisis	15.4	5.3	9.0	6.7	63.6
13. Someone to turn to for suggestions about how to deal with a personal problem	16.8	3.6	10.1	5.6	63.9
14. Someone whose advice you really want	19.6	3.9	12.3	5.3	58.8
15. Someone to give you information to help you understand a situation	12.0	3.6	9.5	6.2	68.6
Tangible support					
16. Someone to help you if you were confined to bed	10.1	3.4	9.0	4.8	72.8
17. Someone to take you to the doctor if you needed it	12.6	7.6	11.5	4.5	63.9
18. Someone to help with daily chores if you were sick	13.7	3.4	7.6	3.6	71.7
19. Someone to prepare your meals if you were unable to do it yourself	12.6	4.2	6.7	3.9	72.6

	Items																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
2	0.906																	
3	0.883	0.928																
4	0.889	0.934	0.944															
5	0.565	0.495	0.488	0.548														
6	0.538	0.519	0.489	0.531	0.885													
7	0.589	0.552	0.512	0.538	0.915	0.970												
8	0.481	0.489	0.420	0.480	0.635	0.628	0.661											
9	0.483	0.470	0.406	0.466	0.580	0.641	0.678	0.963										
10	0.498	0.494	0.447	0.510	0.590	0.620	0.658	0.859	0.880									
11	0.438	0.453	0.393	0.458	0.572	0.591	0.629	0.798	0.823	0.942								
12	0.446	0.468	0.361	0.429	0.586	0.613	0.645	0.814	0.808	0.872	0.891							
13	0.481	0.486	0.399	0.462	0.629	0.647	0.680	0.825	0.811	0.853	0.868	0.963						
14	0.481	0.466	0.381	0.428	0.573	0.611	0.651	0.821	0.799	0.813	0.835	0.879	0.889					
15	0.502	0.488	0.426	0.482	0.620	0.634	0.687	0.768	0.738	0.739	0.766	0.793	0.801	0.846				
16	0.355	0.352	0.349	0.404	0.497	0.484	0.508	0.459	0.494	0.546	0.532	0.396	0.491	0.506	0.524			
17	0.358	0.267	0.274	0.339	0.425	0.444	0.484	0.504	0.520	0.529	0.518	0.398	0.506	0.538	0.518	0.851		
18	0.313	0.276	0.249	0.323	0.389	0.451	0.459	0.403	0.434	0.510	0.469	0.360	0.405	0.412	0.495	0.924	0.812	
19	0.293	0.266	0.252	0.323	0.423	0.451	0.491	0.408	0.440	0.522	0.473	0.354	0.408	0.433	0.489	0.930	0.834	0.969

0.900 to 1.000
0.800 to 0.899
0.700 to 0.799
0.600 to 0.699
0.500 to 0.599

Figure 1 - Polychoric correlation matrix for the 19 items of the Medical Outcomes Study Social Support Survey (MOS-SSS) applied to elderly users of primary healthcare facilities (n = 357). Darker colours denote higher correlation coefficients.

Table 3 - Results of the exploratory factor analysis (EFA) of the Medical Outcomes Study Social Support Survey (MOS-SSS) applied to a sample of primary healthcare users of Ribeirão Preto, southeast Brazil

	Factor 1	Factor 2	Factor 3	Factor 4
Item 1	0.03022181	0.89478638	0.00264306	0.07193808
Item 2	0.08248673	0.96031272	-0.0421163	-0.0243594
Item 3	-0.0487899	0.99917419	-0.0069661	-0.0013346
Item 4	0.00885924	0.95345123	0.04550106	0.0039887
Item 5	0.05149381	0.04001421	-0.0021417	0.90688766
Item 6	0.08279651	0.01213838	0.01695957	0.90820484
Item 7	0.12995121	0.03448889	0.03365623	0.8675528
Item 8	0.87768891	0.02843494	-0.0196508	0.06565103
Item 9	0.87138591	0.01649768	0.02935943	0.04170223
Item 10	0.886413	0.06407462	0.11019664	-0.0518877
Item 11	0.93560925	0.00238741	0.08036409	-0.0641274
Item 12	1.00925356	-0.0278767	-0.1214286	0.02527193
Item 13	0.9252092	-0.006151	-0.0274034	0.0649996
Item 14	0.91398325	-0.0067988	0.0297344	0.00642852
Item 15	0.70957055	0.04470514	0.10377367	0.1257891
Item 16	0.02091852	0.05333145	0.92905799	0.02478899
Item 17	0.14219653	-0.0117385	0.8557802	-0.0337121
Item 18	-0.0244701	-0.0080415	0.98742738	-0.0030217
Item 19	-0.033507	-0.0317821	0.98871186	0.03722887

Items grouped according to factors are shaded.

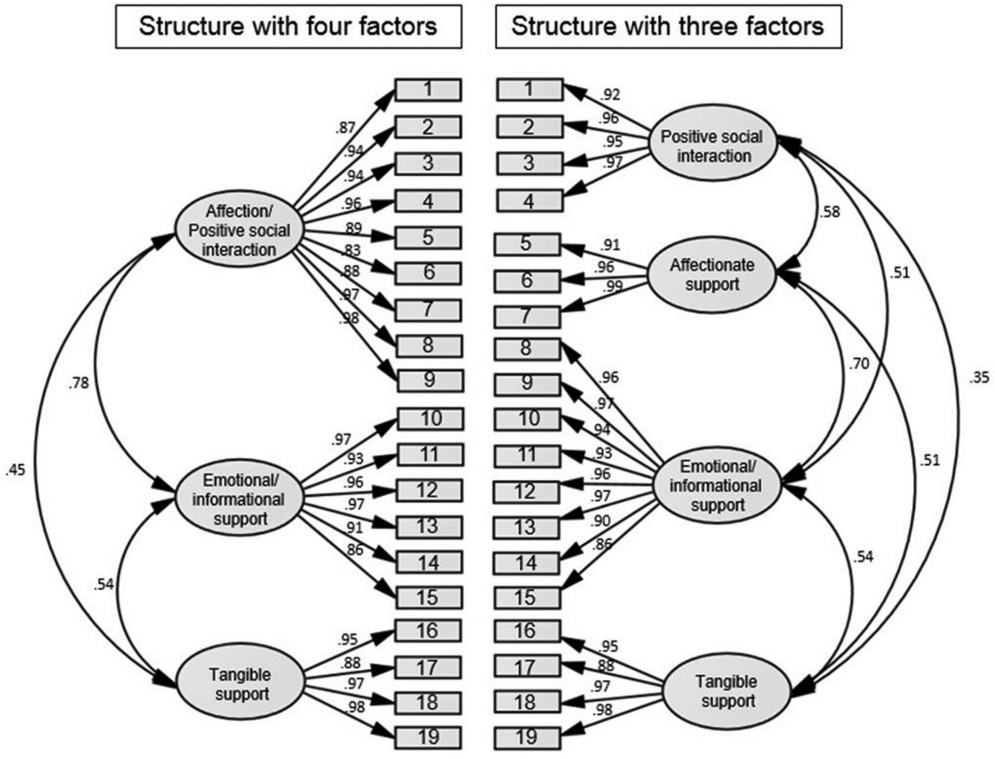

Figure 2 - Results of the confirmatory factor analysis (CFA) considering the structures with three and four factors of the Medical Outcomes Study Social Support Survey (MOS-SSS) applied to a sample of elderly users of primary healthcare facilities (n = 357), Ribeirão Preto, state of São Paulo, 2017.

The stability of the four-factor model in randomly selected subsamples (factorial invariance) was tested. This structure presented equivalence of factorial weights (metric invariance: p = 0.58) and equivalence of weights and intercepts (scalar invariance: p = 0.12) in both sample sub-divisions and can therefore be considered stable for different samples.

The internal consistency of the MOS-SSS was high for all situations studied. Considering all 19 items, Cronbach's alpha coefficient was 0.94. In the three-factor structure, the internal consistency was high for the three dimensions considered (affection/positive social interaction, α = 0.90; emotional/informational support, α = 0.94; tangible support, α = 0.92). Similar results were obtained considering the four dimensions of the four-factor structure (positive/social interaction, α = 0.95; affectionate support, α = 0.92; emotional/informational support, α = 0.95; tangible support, α = 0.92).

Discussion

The results of the present study have shown that the four-factor structure proposed for the MOS-SSS presented adequate fit and stability, suggesting suitable construct validity when applied to a sample of elderly users of the primary healthcare system of Ribeirão Preto, state of São Paulo. Moreover, the polychoric correlation matrix showed high coefficients of correlation between some groups of items when items were theoretically grouped into four factors (the distribution in each factor was further guided by EFA and confirmed as adequate in CFA). In this sense, we consider that the four-factor structure is the most adequate factorial model for the assessment of social support in the context here investigated, especially considering the adequate goodness-of-fit indices and suitable stability for distinct sub-samples, thus corroborating previous studies conducted with elderly populations.[7,8]

The aging process generates new demands for the healthcare system and consequently increases the need to discuss new multidimensional approaches by considering a new perspective of health, as recommended by the World Health Organization (WHO) and the Brazilian Ministry of Health.[19,20] According to Freitas et al.,[21] social support is one of the most relevant aspects when assessing improvements in the individual's living and health conditions, which becomes more important with age.[22] Considering previous studies, the lack of social support is predictive of mortality due to several impairments in both medical and social parameters, such as mental health, depression, disabilities, prevention of institutionalization, well-being and quality of life.[23] Therefore, the development and validation of psychometric scales supporting multidimensional studies with reliable results are necessary to guide the elaboration of health promotion strategies for the elderly population, enabling early intervention and enhancing their impact on the community.

Social support has been considered as a relevant factor in the prevention of physical and mental diseases inherent to aging, in addition to playing an essential role in maintaining the general well-being and quality of life of the elderly.[23] In fact, the MOS-SSS is the most widely used scale for the assessment of this construct. The MOS-SSS is also recognized in the literature as an instrument of easy application and understanding that can be used in many contexts.[24] However, some studies involving elderly populations suggest that the MOS-SSS should be applied with face-to-face interview to avoid possible biases in form-filling and understanding, which will consequently have an impact on the reliability of the data presented.

Recent studies have applied the MOS-SSS in specific contexts, such as in patients with cancer,[25] women with fibromyalgia,[21] caregivers,[26] patients with diabetes,[27] and residents of rural settlements,[28] among others. As for the Brazilian elderly, several studies conducted with distinct samples of subjects were found, such as elderly individuals living in poor areas and diagnosed with chronic diseases or depressive symptoms.[29] However, despite the vast use of the MOS-SSS, only a few Brazilian studies have evaluated its psychometric properties when applied to elderly populations. Thus, we strongly suggest that further studies be carried out to investigate the psychometric properties and factorial structure of the MOS-SSS in elderly populations in other Brazilian regions and under specific conditions, in order to contribute more accurate results and improve knowledge on assessment and interpretation of social support in the Brazilian context. We also suggest further investigation of the factorial structure of short versions of the MOS-SSS, considering the clinical relevance of simple, easy, quick instruments.

The limitation of our study has to do with the generalization of the results, as our sample is not representative of the entire population of Brazilian elderly users of the primary healthcare system.

Conclusion

The four-factor structure of the MOS-SSS was suitable and presented adequate construct validity for the assessment of social support in elderly users of the primary healthcare system.

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Disclosure

No conflicts of interest declared concerning the publication of this article.

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