Research Paper

The Psychometric Evaluation of Somatic Symptom Scale-8 in Patients With Major Depressive Disorder

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ABSTRACT

Objective: Somatic Symptom Disorder (SSD) is characterized by somatic symptoms that are very distressing or cause considerable functional disability. SSD is associated with various medical and psychiatric conditions and imposes high costs on the health care system. Therefore, early diagnosis and treatment of SSD are crucial. The somatic symptom scale-8 (SSS-8) is a valuable and brief self-report questionnaire to assess somatic symptom burden. The current study determined the psychometric properties of the Persian version of SSS-8 in depressed samples.

Methods: The study data were collected from a clinical setting with individuals diagnosed with major depressive disorder (MDD, n=122). The convergent validity of SSS-8 was examined by assessing its correlation with the hospital anxiety and depression scale (HADS), the Whiteley index (WI-14), and somatic symptom disorder-B criteria scale (SSD-12) questionnaires.

Results: The Cronbach α results confirmed the reliability of SSS-8. Reliability assessment with test-retest showed excellent reliability for scale. The confirmatory factor analysis also approved the SSS-8 single-factor structure. The results of construct validity analysis of the questionnaire showed that SSS-8 has a positive and significant relationship with depression, anxiety, WI, and SSS-12.

Conclusion: The Persian version of the SSS-8 is an 8-item self-report questionnaire that health professionals and researchers can use to assess and screen somatic symptoms in individuals diagnosed with MDD.

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Highlights

• According to the Cronbach α results, the SSS-8 has acceptable internal consistency in depressed samples, and the results of the test-retest reliability coefficient using the intraclass correlation coefficient are also good.

• Based on the confirmatory factor analysis results, the higher-order general factor and simple general-factor model of the SSS-8 achieved good fit indices.

• Based on the results of the construct validity analysis, the correlations between SSS-8 and depression and anxiety, SSS-8 and somatic symptom disorder-B criteria, and SSS-8 and health anxiety are statistically significant.

Plain Language Summary

The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) has changed the diagnostic category of somatoform and related disorders to somatic symptom and related disorders (SSD). SSD is among the most common mental health disorders in medical settings and the general population. SSD has high comorbidity with depression disorders, and this comorbidity is associated with poor prognosis of treatment, higher functional disability, and higher use of medical care services. The somatic symptom scale-8 (SSS-8), an abbreviated version of the patient health questionnaire-15 (PHQ-15), was first developed to assess the A criterion (distressing somatic symptoms) of the new definition of SSD in DSM-5. The validation of SSS-8 in the major depressive disorder has not been conducted in Iran. Therefore, the present study aimed to determine the psychometric properties of the Iranian version of the SSS-8 in patients with major depressive disorder. For this purpose, the SSS-8 questionnaire was translated into Persian and administered to 122 depressed people. In the end, the Persian version of the SSS-8 questionnaire showed good validity and reliability, and its 1-factor structure and higher-order factor were supported. Because this questionnaire is simple and short, it can be beneficial for primary and early diagnosis and use in crowded medical settings.

1. Introduction

The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association , 2013) has changed the diagnostic category of somatoform and related disorders to somatic symptom and related disorders (SSD). This revision fundamentally shifted the definition of somatoform disorders (Dimsdale et al., 2013). Common somatic symptoms of this disorder include various types of pain (e.g., headache), cardiovascular symptoms (e.g., sweating, breathlessness), gastrointestinal symptoms (bloating), chronic fatigue, and general symptoms (Henningsen, 2018; Kohlmann et al., 2013; Kroenke et al., 2010; Zijlema et al., 2013b).

DSM-5 predicts a higher prevalence for SSD than the former somatization disorder in the general population but a lower prevalence than undifferentiated somatoform disorders, rating from 5% to 7% (American Psychiatric Association, 2013). Based on these numbers, SSD is one of the most common mental health disorders in medical settings and the general population (de Waal et al., 2004; Fink et al., 1999; Hiller, Rief, & Brahler, 2006; Wahl et al., 2014). In addition, there is extensive evidence that depression disorders are strongly related to somatic symptoms in the general population, primary care centers, and specialized clinics (Garcia-Cebrian et al., 2006). The presence of somatic symptoms with depressive and anxiety disorders is associated with poor prognosis of treatment (Hung et al., 2010), high functional disability, more use of medical care services, and high costs (Barsky, Orav, & Bates, 2005).

Because of the high prevalence of somatic symptoms, its high comorbidity with psychiatric disorders, especially major depressive disorder (MDD), and the significant socioeconomic burden of this syndrome, an early and accurate diagnosis is essential to choosing the appropriate treatment for a patient. These measures can reduce individual, familial, and societal costs (Murray et al., 2016).

Several ways, including self-report questionnaires, can diagnose somatic symptoms of this disorder. One of the most frequently used self-report questionnaires to assess the presence and severity of common somatic symptoms is the patient health questionnaire-15 (PHQ-15) (Kroenke, Spitzer, & Williams, 2002; Zijlema et al., 2013a). The somatic symptom scale-8 (SSS-8) is a short

version of the PHQ-15. It was first developed to assess the A criterion (distressing somatic symptoms) of the new definition of SSD in DSM-5 (Gierk et al., 2014). The SSS-8 consists of 8 items that assess the following symptoms: stomach or bowel problems; back pain; pain in arms, legs, or joints; headaches; chest pain or shortness of breath; dizziness; tired or low energy; and trouble sleeping. These items comprise gastrointestinal, pain, cardiopulmonary, and fatigue symptom domains. Respondents rate how much each symptom has bothered them during the previous seven days and score each item from 0 to 4: not at all (0), a little bit (1), somewhat (2), quite a bit (3), and very much (4), with no reverse-scores items included. The total score, ranging from 0 to 32, is a simple sum: a higher score indicates a more severe somatic symptom burden (Gierk et al., 2014).

Several studies have shown the good item characteristics and excellent reliability of SSS-8 in different clinical settings (Petrelis, Domeyer, & Rehabilitation, 2021; Toussaint, Kroenke, et al., 2017), in the general population (Gierk et al., 2014), and different countries (Kliem et al., 2021; Matsudaira et al., 2017; Petrelis et al., 2021; Yang et al., 2020). Studies have also reported its psychometric properties equivalence to the PHQ-15 (Gierk et al., 2015; Toussaint, Kroenke, Baye, & Lourens, 2017).

According to the mentioned studies, SSS-8 is a valuable and short instrument for assessing common somatic symptoms in clinical settings. However, the validation of SSS-8 in MDD has not been conducted in Iran. Hence, the present study was conducted to determine the psychometric properties of the Iranian version of the SSS-8 in patients with MDD.

2. Materials and Methods

Study participants

The sample consisted of patients who met DSM-5 criteria for major depression disorder (N = 122; Mean±SD age: 35.16 [8.79] years, range = 18-60 years; female = 73.8%). The patients were recruited from several outpatient clinics in Tehran City, Iran, between February 2020 and March 2021. A purposive sampling method was used for sample recruitment. This sampling is a type of non-probability sampling and a systematic strategy for selecting participants based on certain criteria important to the research. Regarding marital status, 50.8% of the participants were single, and 49.5% were married. Concerning educational level, 1.6%, 18%, 53.3%, 25.4%, and 1.7% had under diploma, diploma, Bachelor's, Master's, and PhD degrees, respectively.

Study measures

The Structured Clinical Interview for DSM-5

The structured clinical interview for DSM-5 (SCID-5; Regier et al., 2013) is a semi-structured interview developed to assess clinical disorders. SCID-5 has shown adequate reliability and validity (Clarke et al., 2013; Regier et al., 2013). The Persian version of SCID-5 has indicated an acceptable value for internal consistency (0.95 - 0.99), test-retest reliability (0.60 - 0.79), and Kappa reliability (0.57 - 0.72) (Mohammadkhani et al., 2020).

Somatic Symptom Scale-8

The somatic symptom scale-8 (SSS-8) is a self-administered questionnaire assessing somatic symptom burden (Gierk et al., 2014). SSS-8 is an 8-item self-report scale that assesses the somatic symptoms prevalent in primary care. It is rated on a 5-point Likert scale from 0 (not at all) to 4 (very much). The total score ranges between 0 and 32. Higher scores indicate more severity of somatic symptom disorder. SSS-8 had good reliability (0.81) and significantly correlated with depression, anxiety, general health status, and health care use (Gierk et al., 2014). The Persian version of SSS-8 has shown good internal consistency (0.75) and a significant association with anxiety and general health (Goodarzi et al., 2020).

Somatic Symptom Disorder-B Criteria Scale

Somatic symptom disorder-B criteria scale (SSD-12; Toussaint et al., 2016) is a validated and self-report questionnaire that assesses excessive thoughts, feelings, and behaviors related to problematic somatic symptoms or associated health concerns in diagnosing somatic symptom disorder according to DSM -5 (Association & American Psychiatric Association %J Arlington, 2013). SSD-12 has 12 items rated on a 5-point Likert scale from 0 (never) to 4 (very often). The results of several studies in specialized care centers (Toussaint et al., 2016), general population (Toussaint, et al., 2017), and primary care settings (Toussaint et al., 2018) have shown that the total score of SSD-12 and its subscales have high reliability. The total score of SSD-12 has strong correlations with other scales, such as the generalized anxiety disorder scale (GAD-7), patient health questionnaire (PHQ-15), the Whiteley index (WI-7), and somatic symptom scale-8 (Kop et al., 2019; Toussaint et al., 2016). The Iranian version of the SSD-12 has demonstrated good construct validity and internal consistency (0.90).

Hospital anxiety and depression scale

The hospital anxiety and depression scale (HADS; Zigmond & Snaith, 1983) is a self-report 14-item questionnaire designed to screen for the presence and severity of depressive (seven items) and anxiety (seven items) symptoms in patients during the past week. Anxiety (α=0.83) and depression (α=0.82) subscales have yielded good internal consistency. HADS has shown moderate to high correlations with other common questionnaires, 0.49 to 0.83 (Bjelland et al., 2002). The Persian version of HADS showed good internal consistency and test-retest reliability for anxiety and depression subscales as 0.85; r=0.75 for anxiety and 0.70 and r=0.71 for depression, respectively (Kaviani et al., 2009). Both anxiety and depression subscales ratings are between 0 and 21 points. Zero to seven points are normal, 8 to 10 points are mild, and 11 to 21 points are abnormal.

Whiteley index

Whiteley index (WI-14; Pilowsky, 1967) is a 14-item self-report questionnaire that assesses the severity of health anxiety. WI is rated on a 5-point Likert scale from 1 (never) to 5 (very much). Ratings are between 14 to 70 points. Higher scores mean more severity of health anxiety. WI yielded acceptable construct validity and a high test-retest reliability of 0.80 (Pilowsky, 1967). The Persian version of the WI-14 has demonstrated good construct validity and internal consistency of 0.88 (Mahin et al., 2017).

Study procedure

The English version of the SSS-8 was translated into Persian and back-translated into English independently by a bilingual translator with English language expertise. Translated and original SSS-8 were compared independently by a person expert in English. Then, seven Assistant or Associate Professors of Clinical Psychology checked the translation to ensure the questionnaire's content validity. The psychologists found the translated SSS-8 fluent and comprehensive in assessing somatic symptoms (content validity index CVR=0.91). After this initial preparation, all participants diagnosed with MDD disorder by a psychiatrist were interviewed using SCID-5 by research assistants (MSc in Clinical Psychology or PhD in Clinical Psychology) to check for the inclusion and exclusion criteria. The inclusion criteria included a diagnosis of MDD and being at least 18 years old. Participants with a learning disability, psychotic features, cognitively impaired, and substance abuse was excluded from the study. Initially, 185 eligible patients were recruited. Sixty-three patients were excluded from the study due to dissatisfaction and exclusion criteria. A general population sample (n=73) was selected to fill out the SSS-8 twice within a 2-week interval to examine test-retest reliability.

All eligible participants who completed the study battery of questionnaires were included in the analysis. The study purpose was explained, and confidentiality was assured. This procedure was approved by the Ethics Review Board of Shahid Beheshti University of Medical Sciences, Tehran, Iran (IR.SBMU.MSP.REC.1399.291).

Data analysis

The factor structure of the SSS-8 was examined using confirmatory factor analysis (CFA) with maximum likelihood estimation and fixing a factor loading to 1-method, using AMOS 23. Goodness-of-fit for the CFA model was checked using the following criteria: Chi-square (χ^2) with a ratio < 5 as an acceptable ratio (Meyers et al., 2016); and the goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), and comparative fit index (CFI) with a cut-off ≥0.90 as acceptable (Meyers, Gamst, & Guarino, 2016). Also, the root mean square error of approximation (RMSEA) with a value < 0.08 was considered acceptable (Meyers et al., 2016). Internal consistency was evaluated using the Cronbach α test. Test-retest reliability was evaluated using the intraclass correlation coefficient (ICC). SPSS 23 and AMOS 23 were used to analyze the data.

3. Results

Scale reliability

The Cronbach α coefficient of the SSS-8 was satisfying (0.79), which showed the scale's internal consistency (Table 1). Moreover, the Cronbach α was not increased by deleting any of the 8 items on the scale. Furthermore, item-total correlations for the SSS-8 were agreeable, ranging from 0.36 (SSS6 6) to 0.57 (SSS 5), and inter-item correlations ranged from 0.14 (between items 6 and 8) to 0.51 (between items 8 and 7). The item means varied between 0.69 to 2.43, reflecting an acceptable range of item difficulty (Table 1). Finally, the results of test-retest reliability coefficient using intraclass correlation coefficient for SSS-8 was good (ICC=0.89 [0.83-0.93], P<0.001) (Table 1).

Table 1. The results of the confirmatory factor analysis on the SSS-8, test-retest reliability, cronbach α, item-total, and inter-item correlations obtained from the eight items of the SSS-8 in patients with MDD

		Factor Loadings			Inter-Item Correlation						
Item	Mean±SD	Higher-Order Model	Simple-General Factor Model	Item-Total Correlation	2	3	4	5	6	7	8
SSS-8	1.41±1.12	0.59	0.59	0.51	0.33	0.37	0.32	0.23	0.38	0.26	0.31
SSS-8	1.31±1.10	0.65	0.58	0.54		0.43	0.51	0.32	0.26	0.28	0.29
SSS-8	1.14±1.19	0.67	0.57	0.48			0.29	0.37	0.18	0.31	0.24
SSS-8	1.40±1.08	0.77	0.61	0.54				0.46	0.35	0.28	0.24
SSS-8	1.01±0.3	0.74	0.67	0.56					0.35	0.35	0.27
SSS-8	0.95±0.69	0.48	0.45	0.36						0.17	0.14
SSS-8	2.43±1.1	0.76	0.50	0.50							0.51
SSS-8	2.02±1.25	0.67	0.45	0.46							
The Cronbach α	±0.79										
Test-retest Reliability	±0.89										
AVE	±0.46										
CR	±0.86										

All factor loadings and item-item Pearson correlations were statistically significant (P <0.001).

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Factorial validity

The higher-order general factor model of the SSS-8 was assessed via CFA with maximum likelihood. The higher-order general factor model of the SSS-8 yielded a good fit model (χ^2/df=0.66, GFI=0.98, AGFI=0.95, CFI=0.99, RMSEA=0.001). Moreover, the simple general-factor model achieved good fit indices too (χ^2/df=0.93, GFI=0.96, AGFI=0.93, CFI=0.99, RMSEA=0.001). Both models are displayed in Figure 1.

Convergent validity

Convergent validity was assessed by correlating the scores of SSS-8 with scores of related scales (HADS-depression scale, HADS-anxiety scale, SSD-12, and WI). The correlations between SSS-8 and depression scale of HADS (r=0.49, P<0.01), SSS-8 and anxiety scale of HADS (r=0.48, P <0.01), SSS-8 and SSD-12 (r=0.40, P<0.01), and SSS-8 and WI (r=0.58, P<0.01) were statistically significant (Table 2).

Table 2. Descriptive statistics and correlations between SSS-8 and other study variables in patients with MDD

Variables	Mean±SD	Skewness	Kurtosis	Correlation	P
HADS-depression	10.31±5.33	-0.10	-1.97	0.49	0.01
HADS-anxiety	9.18±4.59	0.25	-0.21	0.48	0.01
SSD-12	15.04±9.33	0.40	-0.31	0.40	0.01
WI	33.23±10.33	0.48	-0.42	0.58	0.01
SSS-8	11.33±5.69	0.36	-0.14		

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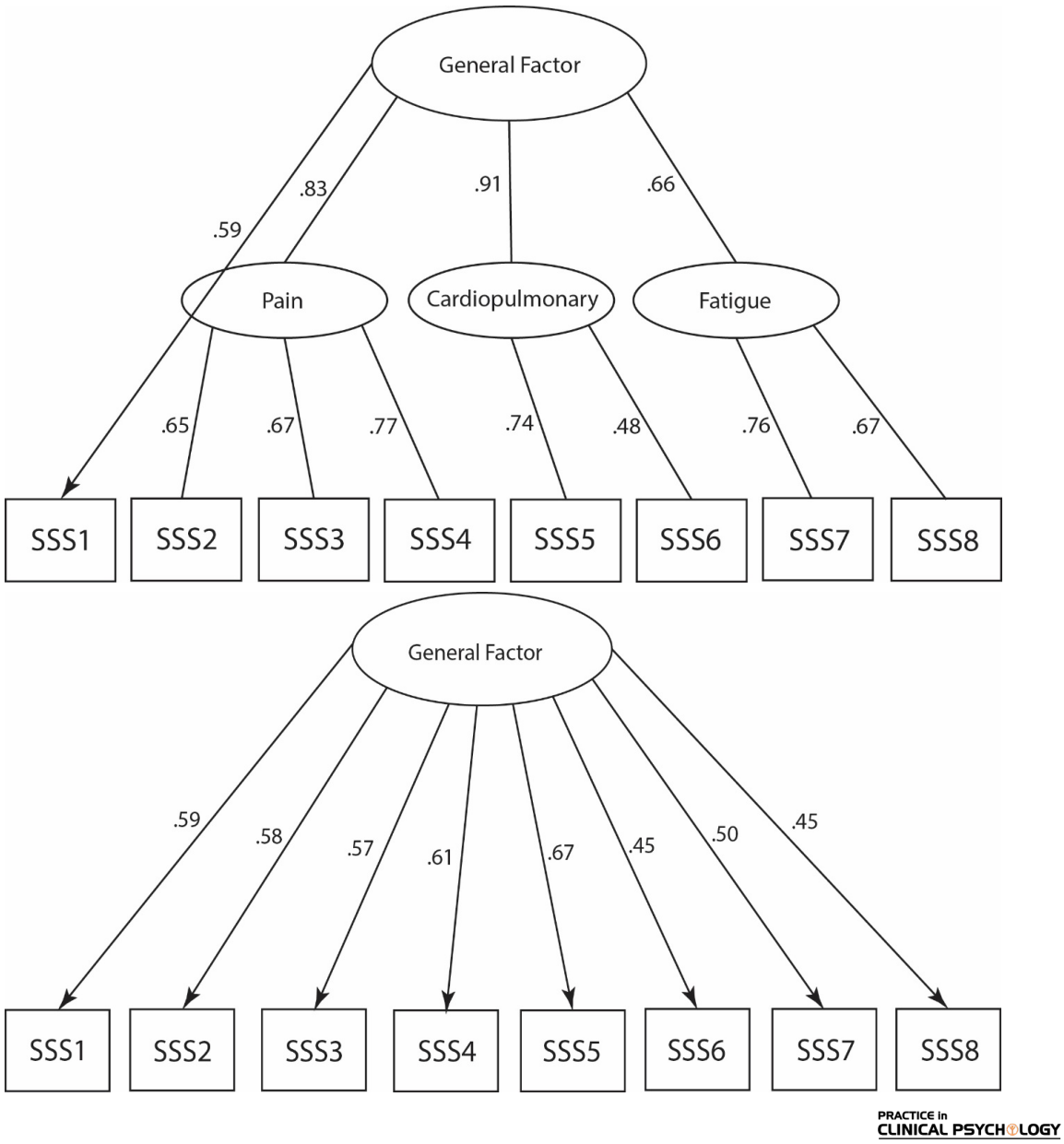

Figure 1. Higher-Order Factor and One General Factor of SSS-8 in MDD Samples

4. Discussion

The primary purpose of this study was to evaluate the psychometric properties, reliability, and validity of the SSS-8 questionnaire in people with depression disorder in Persian for the first time. For this purpose, the SSS-8 questionnaire was translated into Persian and administered to 122 depressed people, and its psychometric properties were evaluated. Generally, the Persian version of the SSS-8 questionnaire showed good validity and reliability, and its one-factor structure and higher-order factor were supported.

The results of evaluating the reliability of the SSS-8 using the Cronbach α showed that this questionnaire had acceptable reliability. The Cronbach α of this study was 0.79, which was slightly lower but acceptable compared to the German version with a value of 0.81 to 0.82 (Gierk et al., 2014; Kohlmann et al., 2016), the Japanese version with a value of 0.86 (Matsudaira et al., 2017), the Korean version with a value of 0.85 (Yang et al., 2020), and the Greek version with a value of 0.831 (Petrelis & et al., 2021). Also, except for item 6, which had a low detection coefficient (0.36), all other items had a detection coefficient above 0.45.

Test-retest results showed that this questionnaire had good test-retest reliability. The test-retest result obtained in this study with a value of 0.89 was higher than the Korean version with a value of 0.777 (Yang et al., 2020) and was lower than the Greek version with a value of 0.99 (Petrelis & et al., 2021). In this study, the test-retest reliability of the Iranian version of the SSS-8 questionnaire was statistically good. Considering 14 days for interval seems good because it minimizes potential memory effect bias and limits any significant clinical change between the two measurements, as SSS-8 refers to somatic symptoms within the last 14 days (Galanis, 2013, 2019). In general, the reliability of the SSS-8 questionnaire of the Iranian version was evaluated as high.

The results of the construct validity analysis by estimating the correlation with hospital anxiety and depression scale, somatic symptom disorder-B criteria scale, and the Whiteley index showed a moderate and robust relationship between SSS-8 and reference measures. The correlational analysis showed that the relationships between SSS-8 and depression and anxiety are positive and significant. Past research (Bener et al., 2013; Fujii et al., 2018; Henningsen et al., 2018; Kohlmann et al., 2016; Yoshimoto et al., 2017) has emphasized the relationship between SSS, depression, and anxiety, and our results are consistent with their results. In the German version, Gierk et al. (2014) found coefficient relationships of 0.58 with depression and 0.43 with anxiety, and A. Toussaint et al. (2016) found coefficient relationships of 0.53 and 0.37 with depression and anxiety, respectively. Petrelis and et al (2021) also found coefficient relationships of 0.68 and 0.67 with depression and anxiety in the Greek version. Our findings also showed a moderately positive and significant relationship between SSS-8 and SSS-12. This relationship is consistent with the result of a study by Toussaint et al. (2020). They suggested that a combination of SSS-8 and SSS-12 could be an efficient screening measure to help clinicians roll out or confirm SSD diagnosis, especially in crowded medical settings and when there is a shortage of time.

The confirmatory factor analysis results indicated that the model fits very well with the data regarding structural validity. Our confirmatory factor analysis results are in line with the results obtained from the German version (TLI=0.95, CFI=0.97, RMSEA=0.08) (Gierk et al., 2014) and the Greek version (TLI=0.959, CFI=0.975, RMSEA=0.061) (Petrelis & et al., 2021). They came up with a general factor like our study, but the Korean version had three factors (Yang et al., 2020). The average variance extracted (AVE) obtained in this study was 50.0, which was reasonable compared to 453.0 obtained in the Greek version (Petrelis & et al., 2021). According to Fornell and Larcker (1981), AVE values should be 0.5 or above by latent variables. The higher-order general-factor structure revealed by our analyses has been shown in previous studies (Gierk et al., 2014; Gierk et al., 2015; Kohlmann et al., 2013;Yang et al., 2020), investigating the latent dimensions of somatic symptoms that have revealed an overarching somatic symptom factor. From a clinical viewpoint, these clusters correspond to four common medical syndromes (pain, gastrointestinal symptoms, cardiopulmonary symptoms, and fatigue). Moreover, this factor structure allows aggregating the individual item scores into a simple, easily interpretable sum score ranging from 0 to 32 points.

This study also had its limitations. First, the generalizability of the results is limited because the study sample may not stand for all Persian-speaking individuals with depression in Iran. Second, this study was performed with a sample size of 122 depressed individuals, and although this number was sufficient for factor analysis, it is recommended that this study be repeated with a sample size of more than 200 to increase the strength of the test (Comrey & Lee, 2013). Third, this study was performed only on depressed people, so it is recommended to be done on people with other disorders such as anxiety.

5. Conclusion

In summary, the Persian version of SSS-8 showed good psychometric properties among depressed people. The reliability of SSS-8 was acceptable using the Cronbach α and good using test-retest. Construct validity was also supported by examining the relationships between SSS-8 and depression and anxiety scales. The Persian version of the SSS-8 is an 8-item self-report questionnaire that health professionals can widely use to diagnose depressed patients with somatic symptoms. Because this questionnaire is straightforward to use and its completion time is 2 minutes, it can be beneficial for primary and early diagnosis.

Ethical Considerations

Compliance with ethical guidelines

All ethical principles are considered in this article. The participants were informed of the purpose of the research and its implementation stages. They were also assured about the confidentiality of their information and were free to leave the study whenever they wished, and if desired, the research results would be available to them. This study was approved by the Ethics Review Board of

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Authors' contributions

Conceptualization and Supervision: Imaneh Abasi, Ala Ghapanch; Data collection: Ala Ghapanch, Imaneh Abasi, Maryam Bitarafan, Hamid Zarabi, Fatemeh Sara Derakhshan, Mohammad Kamran Derakhshan, Sepideh Ghanadanzadeh, Alireza Shamsi; Formal analysis: Imaneh Abasi; Investigation: Ala Ghapanch, Imaneh Abasi, Maryam Bitarafan, Hamid Zarabi, Fatemeh Sara Derakhshan, Mohammad Kamran Derakhshan, Sepideh Ghanadanzadeh, Alireza Shamsi; Methodology: Imaneh Abasi, Ala Ghapanch; Writing – original draft: Ala Ghapanch, Imaneh Abasi; Writing – review & editing: Ala Ghapanch, Imaneh Abasi, Maryam Bitarafan, Hamid Zarabi, Fatemeh Sara Derakhshan, Mohammad Kamran Derakhshan, Sepideh Ghanadanzadeh, Alireza Shamsi.

Conflict of interest

The authors declare that there are no conflicts of interests.

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