

Psychometric Properties of the Patient Health Questionnaire–15 (PHQ–15) for Measuring the Somatic Symptoms of Psychiatric Outpatients

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Background: About 2% to 5% of all primary-care patients have a somatization disorder, and somatic symptoms are strongly associated with comorbid depression and anxiety disorders. **Objective:** The authors evaluated the validity of the 15-item Somatization module of the Patient Health Questionnaire (PHQ–15) among psychiatric outpatients. **Method:** The PHQ–15 was administered to patients with somatic complaints; it was compared with the Beck Depression Inventory (BDI) and the General Health Questionnaire–12 (GHQ–12). Fifty-seven Korean subjects completed the survey. **Results:** The PHQ–15 exhibited significant internal consistency, and test–retest reliability. Convergent validity with the BDI and GHQ–12 were positive. **Conclusion:** These results indicate that the Korean version of the PHQ–15 is appropriate for measuring the severity of somatic symptoms in a psychiatric outpatient setting.

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Somatic symptoms are ubiquitous within every medical clinic, and 2% to 5% of all primary-care patients have a somatization disorder.^{1–3} Somatic complaints are estimated to account for more than 400 million clinic visits in the United States annually.⁴ More

than half of all medical outpatients complain of somatic symptoms, one-third of which are medically unexplained.^{4,5} These somatic symptoms are strongly associated with comorbid psychiatric disorders such as depression and anxiety disorders.⁶ Medically unexplained somatic symptoms may negatively influence patients by deleteriously affecting treatment outcomes of comorbid psychiatric disorders,⁷ reducing quality of life, and causing functional impairment.^{3,8} Somatic symptoms are also an important indicator of subsequent mood disorders, indicating the importance of appropriate and early intervention to treat these symptoms.⁹ At least 25% of all patients continue to exhibit all somatic symptoms at a 1-year follow-up visit, and symptoms are chronic or recurrent in 20% to 25% of all patients, even if the depression or anxiety disorder is in remission.^{6,10} Clinicians must accurately measure the severity of so-

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matic symptoms during treatment, and thus a brief, validated, less time-consuming assessment is vital especially within a clinical setting. The Symptom Checklist-90 (SCL-90)¹¹ and the State University of New York at Albany (SUNYA) Psychosomatic Symptom Checklist¹² are examples of self-report questionnaires used to assess current somatic symptoms. These scales were developed to measure current somatic distress and are useful for research into the treatment outcomes of somatoform disorders. However, it takes a relatively long time to complete these scales, making analysis difficult within an actual clinical or community setting. In particular, the SUNYA Psychosomatic Symptom Checklist produces only modest reliability, poor discriminant validity, and a multifactor structure within a chronic-pain population.¹³

The 15-item version of the Patient Health Questionnaire (PHQ-15) is a somatic symptom severity subscale derived from the full PHQ. It assesses 15 somatic symptoms or symptom clusters that account for more than 90% of all physical complaints (excluding upper respiratory tract symptoms) reported by outpatients.¹⁴ Each item is rated on a scale from 0 to 2. Scoring simply requires adding the numbers circled, and scores can range from 0 to 30. The PHQ-15 has already been validated in primary-care settings.^{14,15} Previous studies found that the PHQ-15 exhibited good internal consistency ($\alpha=0.80$) and corresponded to criterion indices of physical dysfunction, disability days, clinical visits, and amount of difficulty that patients attributed to their symptoms.¹⁴ The original PHQ¹⁶ was designed for use in primary-care settings as a self-report instrument to diagnose mental disorders, using criteria from the DSM-IV.¹⁷ The PHQ assesses four specific DSM-IV diagnoses (major depressive disorder, panic disorder, other anxiety disorder, and bulimia nervosa) and four subthreshold disorders (other depressive disorders, probable alcohol abuse/dependence, somatoform, and binge eating disorder). The questionnaire is only three pages long, and can be entirely self-administered by patients.¹⁶ Several studies have established its diagnostic validity.^{16,18} The PHQ has been translated into many languages and has been applied to many sample groups, but it has not been translated into Korean or validated in any Korean psychiatric setting.

In this study, we evaluated the reliability and validity of the PHQ-15 when used to measure the severity of somatic symptoms in a psychiatric outpatient setting.

METHOD

Subjects

Subjects included both male and female psychiatric outpatients, all age 18 years or older. All subjects had exhibited one or more somatic symptoms during most days for at least 6 months. Also, they exhibited clinically significant distress or impaired social, occupational, or other important areas of functioning, caused by current somatic symptoms.

Exclusion criteria included any medical/surgical conditions that plausibly explained the somatic symptoms: rheumatic, inflammatory, or connective tissue disease; thyroid disease or a laboratory abnormality; a history of (and/or current) psychotic disorders, such as schizophrenia, schizoaffective disorder, and bipolar disorder; a history of substance abuse or dependence in the previous 12 months; a history of participation in any clinical research in the previous 30 days; any involvement in workers compensation, disability, or related litigation; any history or presence of an Axis I disorder, such as factitious disorder and malingering; current breast-feeding; and pregnancy.

The study procedures were reviewed and approved by the hospital institutional review board. All subjects provided written informed consent before participation.

Procedures

The questionnaire was based on the Korean version of the PHQ. The PHQ-15 was translated into Korean and translated back into English by a certified psychologist and a psychiatrist, who were each fluent in both Korean and English. The validated Korean version of the DSM-IV criteria were used as references during the process of translation.¹⁹ Translation and back-translation of the PHQ-15 were repeated after state-of-the-art procedures of cross-cultural assessment²⁰ until the clinicians felt that the Korean version corresponded closely to the English version and would be meaningful to elderly Koreans. Subjects were required to complete the PHQ-15 a second time 2 weeks after the baseline measurement.

The severity of somatic symptoms was measured by summing the scores from each PHQ-15 item (0-30 points) and classified as minimal, mild, moderate, or severe (scores 0-4, 5-9, 10-14, or 15-30, respectively, following the method of Kroenke *et al.*)¹⁴

Other Measures

Beck Depression Inventory The Beck Depression Inventory (BDI) was developed to assess the type and degree of depression, on the basis of depression symptoms. The BDI has been used for more than three decades to identify and assess depressive symptoms and is reported to be highly reliable, regardless of the population involved. The questionnaire contains 21 items about emotional, cognitive, motivational, physiological, and other symptoms. Each item consists of four statements, describing increasing intensity of depression symptoms. Items are rated on a scale from 0 to 3, and they reflect how participants have felt over the past week. Possible scores range from 0 to 63, with higher scores indicating more severe depressive symptoms.²¹ The BDI-II²² was developed in 1996 to reflect changes in the DSM-IV diagnostic criteria for depression. Some somatic items were removed in this revised scale; however, we applied the original 21-item BDI Korean version in this study.^{23,24}

General Health Questionnaire

The General Health Questionnaire (GHQ) is a measure of current mental health that was developed by Goldberg.²⁵ The questionnaire was originally set up as a 60-item instrument, but several shortened versions are now available (GHQ-30, GHQ-28, GHQ-20, GHQ-12). Items are rated on a 4-point scale (less than usual, no more than usual, rather more than usual, or much more than usual). The GHQ-12 has a maximum total score of 36, or 12, depending on the selected scoring methods; The most common scoring methods are bimodal (0/0/1/1) and Likert (0/1/2/3) scoring. The GHQ-12 is brief, simple, and easy to complete, and studies have demonstrated its effectiveness as a screening tool in research settings.^{26,27} Participants completed the GHQ-12 in the same time as the other scales. In this study, we applied the Korean version of the GHQ-12, with a maximum total score of 36.²⁸

Mini-International Neuropsychiatric interview (MINI)

The Mini-International Neuropsychiatric Interview (MINI) is a short, structured diagnostic interview developed to identify DSM-IV and ICD-10 psychiatric disorders.²⁹ It was designed to meet the need for a short but accurate structured psychiatric interview. Each MINI was conducted by a trained, certified clinical psychologist, and results were confirmed by a board-certified psychiatrist during a psychiatric interview.

Statistical Analysis

Data were analyzed with SPSS 10.0 for WINDOWS (SPSS, Inc, Chicago, IL). First, we calculated the mean and standard deviation (SD) for each item and performed a descriptive analysis of participants' demographic data. Second, to assess internal consistency and test-retest reliability, we calculated Cronbach α coefficient and correlation with retested PHQ-15 scores. Third, to verify convergent validity, we assessed the correlation of PHQ-15 scores with BDI and GHQ-12 scores. Simple linear-regression analysis was performed to evaluate the predictability of the number of somatic symptoms or the BDI total score. Finally, we compared the mean total BDI and GHQ scores between PHQ severity subgroups, using one-way analysis of variance (ANOVA) and post-hoc Bonferroni analysis. Power analysis was done with the G*Power 3.0.5 Program.³⁰

RESULTS

Subjects

A total of 57 psychiatric patients completed the survey; of these, 25 (43.9%) were men, and 32 (56.1%) were women. Subjects had a mean age of 38.74 (SD: 1.43) years (range: 18–62 years). All participants were of the same ethnic group (i.e., Korean), and were considered to share a common cultural background. Of all subjects, 31 (12.3%) were diagnosed with a depressive disorder; 20 had a somatoform disorder; and 6 had anxiety disorders (4 had a panic disorder, and 2 had a generalized anxiety disorder). Their mean illness duration was 33.0 (32.7) months. Subjects reported an average of 9.3 (SD: 3.8) somatic symptoms. All subjects were currently under treatment with antidepressants. Table 1 presents the demographic variables of subjects and their prescribed medications. Subjects with a depressive disorder had a lower mean BDI score than other participants, which might be explained by their current treatment and duration of illness. Age was marginally correlated with GHQ-12 scores ($r=0.29$; $p<0.034$) but was not correlated with PHQ-15 or BDI scores ($p>0.05$).

Reliability

Cronbach α was 0.87 ($p<0.001$), and the test-retest reliability was 0.65 ($p<0.001$). The item/total correlation (r) was 0.48.

TABLE 1. Summary of Demographic Variables, N (%)

Sex	
Male	25 (43.9)
Female	32 (56.1)
Diagnosis	
Depression	31 (54.4)
Somatoform disorder	20 (35.1)
Panic disorder	4 (7.0)
Generalized anxiety disorder	2 (3.5)
Medication	
Paroxetine	25 (43.9)
Mirtazapine	11 (19.3)
Fluoxetine	9 (15.8)
Venlafaxine	6 (10.5)
Sertraline	6 (10.5)
Income, \$ (U.S.)	
<2,000/month	10 (17.5)
2,000–4,000/month	46 (80.7)
>4,000/month	1 (1.8)
Education	
<9 years	25 (44.1)
9–12 years	27 (47.4)
>12 years	5 (8.8)

TABLE 2. Mean Scores of the PHQ-15, BDI, and GHQ-12 in Each Diagnostic Subgroup

	Mean (Standard Deviation)	95% Confidence Interval
PHQ-15		
Depression	12.3 (6.2)	10.03–14.61
Somatoform	11.9 (6.1)	9.04–14.76
Panic	11.5 (7.2)	10.06–12.94
GAD	12.0 (4.2)	10.1–13.12
BDI		
Depression	16.7 (11.2)	12.6–20.8
Somatoform	17.2 (13.0)	11.1–23.3
Panic	16.3 (12.4)	3.5–35.97
GAD	19.5 (9.2)	13.1–12.1
GHQ-12		
Depression	13.8 (6.7)	11.2–16.4
Somatoform	15.2 (7.4)	11.5–18.9
Panic	15.3 (5.5)	11.7–19.0
GAD	14.0 (1.4)	8.7–16.7

PHQ: Patient Health Questionnaire; BDI: Beck Depression Inventory; GHQ: General Health Questionnaire; GAD: generalized anxiety disorder.

Validity

The PHQ-15 and other scales revealed no significant differences among diagnostic subgroups (Table 2). PHQ-15 scores exhibited a significant correlation with BDI scores ($r=0.559$; $p<0.01$) and GHQ-12 scores ($r=0.435$; $p<0.01$). BDI scores were significantly correlated with GHQ-12 scores ($r=0.589$; $p<0.01$).

We used simple linear regression to assess whether

the reported number of somatic symptoms or BDI score could predict the severity indicated by PHQ-15 scores. The slope of the regression line for the number of somatic symptoms was greater than zero, indicating that PHQ-15 scores tend to increase as the number of somatic symptoms increases (slope: 1.536; t_{55} : 23.1; $p<0.001$; $y: -1.954 + 1.536x$; $R[2]=0.91$). The slope of the regression line for BDI was greater than zero, indicating that PHQ-15 scores tend to increase as the BDI score increases (slope: 0.289; t_{55} : 5.0; $p<0.001$; $y: 7.259 + 0.289x$; $R[2]=0.31$).

Comparison of BDI and GHQ Scores Among the Somatic Symptom Severity Subgroups

Subjects were classified into one of four severity groups according to their PHQ-15 scores (minimal [$N=4$; 10.5%]; mild [$N=15$; 26.3%]; moderate [$N=11$; 19.3%]; and severe [$N=25$; 43.9%]). Subjects with the highest PHQ-15 scores were classified into the Severe group (18.16; SD: 2.32); subjects with the next-highest scores were classified into the Moderate group (11.55; SD: 1.13), followed by the Mild (6.73; SD: 1.87) and Minimal (2.67; SD: 1.51) groups. As expected, the main group effect ($F=164.68$; df : 3; $p<0.001$), and all paired comparisons were highly significant ($p<0.001$). We also determined the mean BDI and GHQ-12 scores in each severity group. Group main effects were all highly significant ($F=9.25$; df : 3; $p<0.001$ for BDI; $F=4.59$; df : 3; $p=0.007$ for GHQ-12). Significant differences in BDI and GHQ-12 scores appeared only within the Severe group (Table 3).

DISCUSSION

The results of this study revealed that the PHQ-15 is practical for measuring the severity of somatic complaints during the treatment of psychiatric outpatients. To our knowledge, this is the first study to examine the test-retest reliability of the PHQ-15 in a clinical sample with chronic somatic symptoms. The Korean version of the PHQ-15 exhibited good reliability in this study, and its internal-consistency reliability, defined as consistency among items comprising a discrete construct, was adequate. The test-retest stability was relatively high. When the concurrent validity was examined in relation to the BDI and GHQ-12, correlations between the scales further supported the validity of the PHQ-15. Our study did not find a correlation between the severity of somatic symptoms and age, which is consistent with a previous population study.³¹

TABLE 3. Construct Validity of the PHQ-15 Severity Subgroup by BDI and GHQ-12 (post-hoc comparisons)

	F	p	Paired Comparisons					
			Minimal/ Mild	Minimal/ Moderate	Minimal/ Severe	Mild/ Moderate	Mild/ Severe	Moderate/ Severe
BDI	9.25	<0.001	-1.27	-7.85	-16.18**	-6.58	-14.92***	-8.34
GHQ-12	4.59	<0.001	3.49	8.59	9.28*	5.09	5.79	0.70
PHQ-15	164.68	<0.001	-4.07***	-8.88***	-15.49***	-4.81***	-11.43***	-6.62***

PHQ-15: Patient Health Questionnaire-15; BDI: Beck Depression Inventory; GHQ-12: General Health Questionnaire.
 Minimal severity group (0-4); Mild severity group (5-9); Moderate severity group (10-14); Severe severity group (15-30).
 Post-hoc comparison of mean differences (Bonferroni-corrected): * p<0.05; ** p<0.01; *** p<0.001.

Previous research has shown that life satisfaction and perceived health status are closely related to number of somatic symptoms.³² In a study conducted in a psychiatric clinic, an increased number of somatic symptoms was associated with a delayed onset of response to the antidepressant fluoxetine in patients with depression.³³ Therefore, treatment of somatic symptoms is crucial within both primary-care settings and psychiatric outpatient settings. Somatic symptoms in patients are usually measured using scales designed especially for depression or anxiety disorders, partly because somatic symptoms are frequently comorbid with other psychiatric symptoms.⁶

When we compared the BDI and GHQ scores with the PHQ-15 Severity subgroups, we found significant differences only in the Severe group. This result may have been associated with the very long duration of illness (over 30 months) among these subjects, so that their symptoms were no longer related to a mood/anxiety disorder. Also, many patients have chronic, persistent somatic symptoms even after their depression/anxiety is successfully remitted with treatment, so the remaining symptoms cannot be measured appropriately using scales such as the BDI or GHQ-12. Somatic symptoms, especially chronic symptoms, should be measured using a scale designed specifically for somatic symptoms to evaluate treatment efficacy. Studies have already examined the usefulness of the PHQ-15 in primary-care settings.¹⁴ Scales for measuring the severity of somatic symptoms are especially useful in primary-care settings, and studies have already been conducted on the usefulness of the PHQ-15 in primary care settings.¹⁵

One important limitation of the present study is the relatively small number of subjects (overall sample size: N=54; power: 0.296, with two-tailed significance at p=0.05), and thereby the power of subgroup analysis should be much weaker than original power. The sample size should be increased three to four times that of our

current sample size to reach a sufficient power (N=184; power: 0.814, with two-tailed significance at p=0.05) to perform a subgroup analysis. Hence, the subgroup analysis results should be interpreted with caution. Another limitation is the fact that all subjects were being treated for their somatic symptoms. The results might have also been influenced by cultural differences; that is, East Asians often complain of somatic symptoms rather than reveal any depressive feelings.

In conclusion, this study showed that the Korean version of the PHQ-15 is valid and reliable in measuring the severity of somatic symptoms among psychiatric outpatients. The PHQ-15 could be used as an effective, efficient tool in measuring the treatment outcome of somatic symptoms. Moreover, it could be applied in a primary-care setting to detect unexplained somatic symptoms and to monitor changes in their severity. Future research will need to include validation studies for specific age-groups (e.g., elderly patients) and be performed within other medical/surgical patient settings.

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