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Orginal Article:

Cultural Adaptation, Validity, and Reliability of the Persian Version of Wexner Constipation Scoring System

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Conflict of interest

The authors declared no conflict of interest.

ABSTRACT

Background and Objectives: Chronic functional constipation is a prevalent and symptom-based disorder of the gastrointestinal tract. Constipation takes several different forms among patients. The Wexner Constipation Scoring System (WCSS) was developed to present a uniform tool for the assessment of chronic functional constipation. The purpose of this study was to provide the Persian version of WCSS and assess its validity and reliability.

Methods: WCSS was translated into Farsi. After being linguistically validated, the Persian version of the WCSS was administered to a sample of 76 patients with chronic functional constipation. Reliability tests were used to evaluate the internal consistency (the Cronbach alpha) and reproducibility (Intraclass Coefficient Correlation [ICC]) of the tool. The validation studies were conducted to assess the convergent validity (Correlated with the Patient Assessment of Constipation Symptom [PAC-SYM]) and Concurrent Validity (Correlated with Patient Assessment of Constipation Quality of Life [PAC-QOL]) of the tool, too.

Results: The Cronbach alpha for total scores was 0.66 and the ICC was 0.85 (0.77-0.90, 95% CI). The total score of WCSS was significantly correlated with the total scores of PAC-SYM (r=0.67) and PAC-QOL (r=0.61).

Conclusion: The linguistic and psychometric evaluation demonstrated good validity and reproducibility of the Persian version of WCSS.

Keywords: Constipation severity, Persian version, Reliability, Validity

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What is "already known" in this topic:

Several outcome measures developed for assessment of constipation. Wexner Constipation Scoring System is one of the suitable tool for using in clinical settings.

What this article adds:

Wexner Constipation scoring System is valid and reliable tool for Persian speaking people and can be used in in clinical practice.

1. Introduction

Chronic functional constipation is a prevalent gastrointestinal disorder, which makes it an important component of clinical gastroenterology practice. It is markedly associated with impaired quality of life and consequently imposes a significant financial burden on the healthcare system [1, 2].

The prevalence of chronic functional constipation is varied widely, ranging from 0.7% to 14% globally according to a previous meta-analysis across 45 population-based studies [3], and from 1.4% to 37% in the Iranian population [4, 5]. Both sexes in all age groups may suffer from chronic functional constipation, but the incidence is higher in the female gender, and also rises dramatically with aging and lower socioeconomic status [3, 6].

According to Rome III diagnostic criteria, functional constipation is characterized by loose stools rarely present without the use of laxatives and insufficient criteria for irritable bowel syndrome along with at least two of the six following symptoms: straining during at least 25% of defecations, lumpy or hard stools in at least 25% of defecations, the sensation of incomplete evacuation for at least 25% of defecations, the sensation of anorectal obstruction/blockage for at least 25% of defecations, manual maneuvers to facilitate defecation and fewer than three defecations per week [7, 8]. However, chronic functional constipation is a symptom-based disorder with several different conditions among patients. In many clinical trials, the severity of symptoms and treatment outcomes cannot be accurately evaluated by the Rome III criteria, hence several Patient-Reported Outcome Measures (PROMs) have been developed to provide uniform objective assessments. Some of these scoring systems include the symptom severity score, Knowles-Eccersley-Scott symptom score, Longo scoring systems for ODS, Patient Assessment of Constipation Symptom (PAC-SYM), and Wexner Constipation Scoring System [9-11].

Wexner Constipation Scoring System (WCSS) consists of 8 items of the frequency of bowel movements, painful evacuation, incomplete evacuation, abdominal pain, length of time per attempt, type of assistance for defecation, unsuccessful attempts for evacuation per 24 hours, and duration of constipation. All items are scored from 0 to 4 except for the "assistance for defecation" item which is scored from 0 to 2. The total score is calculated by summing all item scores [12].

The developed and validated original version of WCSS was in English (Table 1). To the best of our knowledge, this questionnaire has not been translated into Farsi.

As a key outcome measure in research and clinical evaluation of functional constipation [13], it seems necessary to have this questionnaire translated into Farsi for Farsi speaking population. This study aimed to provide the Persian version of the Wexner Constipation Scoring System and assessed its validity and reliability properties.

Table 1. The original version of the Wexner Constipation Scoring System

Items	Scores
Frequency of bowel movements	
1-2 times per 1-2 days	0
2 times per week	1
Once per week	2
Less than once per week	3
Less than once per month	4
Difficulty: Painful evacuation effort	
Never	0
Rarely	1
Sometimes	2
Usually	3
Always	4

Items	Scores
Completeness: Feeling incomplete evacuation	-
Never	0
Rarely	1
Sometimes	2
Usually	3
Always	4
Pain: Abdominal pain	-
Never	0
Rarely	1
Sometimes	2
Usually	3
Always	4
Time: Minutes in lavatory per attempt	-
Less than 5	0
5-10	1
10-20	2
20-30	3
> 30	4
Assistance: Type of assistance	-
Without assistance	0
Stimulant laxatives	1
Digital assistance or enema	2
Failure: Unsuccessful attempts for evacuation per 24 hours	-
Never	0
1-3	1
3-6	2
6-9	3
> 9	4
History: Duration of constipation (y)	-
0	0
1-5	1
5-10	2
10-20	3
> 20	4

2. Materials and Methods

This study took place in two centers in Iran, Tehran (Colorectal Surgery Department: Rasoul Akram General Hospital and Pelvic Floor Rehabilitation Clinic: Rehabilitation School of Iran University of Medical Sciences) between May 2019, and August 2019.

The sampling method was convenient and non-probability and the study population consisted of 76 patients (59 female, 17 male) aged between 20 and 70 years. The inclusion criteria were adult patients (≥20 years old) who fulfilled the Rome III criteria for chronic functional constipation and have the ability to read and speak Farsi [8]. The exclusion criteria were patients with the secondary constipation, any systemic disease and psychological disorders, previous pelvic surgery, and patients without the mental capacity to complete the questionnaire [9, 12].

There is no consensus over how to measure an adequate sample size for validating a PRO and the approaches vary considerably by the type and purpose of study analyses. According to the literature recommending a subject to item ratio of two or greater [14], we used 9 subjects per item as an adequate size. Authorization was granted to use and translate the original WCSS developed by Agachan et al. (1996) [12]. The written informed consent was obtained from all eligible participants.

Cultural adaptation

The cross-cultural adaptation of WCSS was performed as recommended by others in the literature [15-17] with the following five steps: 1. Forward translation of the original version from English to Farsi by two translators whose native language was Farsi and were fluent in English (T1 and T2); 2. T1 and T2 were compared to form a single agreed-upon version (T12). It was made by a methodologist not involved in the translation process to resolve any discrepancies. Backward translation of the T12 version was done from Farsi to English by an English native speaker who was fluent in Farsi. This translator was blind to the original English version of the questionnaire and not linked to the medical domain; 3. A consensus meeting was arranged with all translators, methodologist, gastroenterologist, and pelvic floor physiotherapy specialists to resolve any controversy during the process of translation to establish the pre-final Persian version; 4. The pre-final Persian version was filled by native Farsi speaking patients suffering from chronic functional constipation. They were asked to comment on the difficulty and comprehension of the questionnaire; 5. The final Persian version of WCSS was approved through a second consensus meeting.

Reliability

Reproducibility and internal consistency were used to evaluate the reliability of the final Persian version of WCSS. The internal consistency of the scores was measured by the Cronbach alpha coefficient at the baseline. The Cronbach alpha coefficient ranges from 0 (no internal consistency) to 1 (perfect internal consistency), indicating the homogeneity between the items. Values greater than 0.7 are considered acceptable [18, 19].

The reproducibility of the scores was estimated by performing the test-retest process. A sample of 20 patients completed the final Persian version of WCSS twice within two weeks. The Intraclass Correlation Coefficient (ICC) between the baseline and the second-week scores were used as the reliability parameter. It was computed by a 2-way mixed-effect model, based on a single measurement protocol with absolute agreement consideration, as systematic differences are not considered to be part of the measurement error, according to McGraw and Wong [20]. The greater the reproducibility between the scores, the larger ICC we achieve. ICC equal to 1.0 indicates perfect reproducibility [21].

Validity

The final Persian version of the WCSS was administered to 76 patients. They also completed the Patient Assessment of Constipation Symptom (PAC-SYM) and the validated Persian version of the Patient Assessment of Constipation Quality of Life (PAC-QOL) questionnaires. The PAC-SYM was developed by Frank et al. [9] to measure the patient's experience of symptoms and symptom severity in constipation over the past two weeks. It consists of 12 items assigned to three subscales: stool symptoms, rectal symptoms, and abdominal symptoms. Each item is scored on a 5-point Likert scale with a maximum total score of 60 points. The lower the total score, the lower the symptom burden [22].

PAC-QOL is a brief but comprehensive patient-reported questionnaire to evaluate the burden of constipation on patient's everyday functioning and wellbeing. The 28 items of the PAC-QOL are divided into four scales: worries and concerns (11 items), physical discomfort (4 items), psychosocial discomfort (8 items), and satisfaction (5 items). Each item is scored on a scale of 0 to 4 (least to the greatest effect), and a higher total score indicates a worse quality of life. However, questions 25,

26, 27, and 28 require reverse coding because they are positive questions, whereas the other 24 questions are negative ones [9].

Convergent validity was used to estimate how well the WCSS measures what it intends to (construct validity). It was assessed by measuring the Pearson correlation coefficient (r) between WCSS and PAC-SYM total scale scores [18, 19].

Concurrent validity was used to evaluate how much the WCSS score, as a measurement of constipation symptom severity, is related to PAC-QOL, as a measurement of constipation outcomes (criterion validity). For this purpose, the Pearson correlation coefficient between total sale scores of WCSS and PAC-QOL is calculated [18].

All statistical analyses were performed in SPSS version 23.0 and JASP version 0.9.0. Each participant was briefed on the importance and the procedure of the study. Fortunately, all participants cooperated adequately which helped us manage to gather all data.

3. Results

An expert committee compared the translated version of WCSS with its original version and no changes were applied to the final translated version. A total of 76 native Farsi speakers signed the consent form and participated in the study. Their Mean±SD of age was 36.96±12.67 years and the majority of the patients were female (77%). All patients had chronic functional constipation based on the Rome III criteria. Most of the patients (60.53%) reported experiencing constipation for more than five years and the Mean±SD of severity of constipation, according to the PAC-SYM, was 19.37±7.90.

Cross-cultural adaptation

The Farsi translation and cross-cultural adaptation of the WCSS were made based on the usual guidelines [16]. No significant difficulty was observed during the translation process. The pre-final Persian version of the questionnaire was tested in a sample of patients with chronic constipation and well accepted by them.

Reliability

An internal consistency analysis was performed by calculating the Cronbach alpha for each of the 8 items as well as for the total WCSS scale scores based on average inter-item correlations and the number of items. The statistics of overall scores from WCSS, PAC-SYM, and PAC-QOL are reported in Table 2 and the statistics of each item of WCSS are reported in Table 3. For the items scores, the Cronbach alpha coefficients ranged from 0.58 to 0.67, and for the overall scale, the score was 0.66 (Table 4). A coefficient value between 0.70 and 0.95 is considered as satisfying consistency and a very high value (between 0.95 and 1) would indicate redundancy of one or more items which is not desirable [19]. Accordingly, the WCSS scale demonstrated questionable internal consistency.

A test-retest procedure was used under changing conditions (measurements were made by different observers at different places with two weeks interval) to estimate the reproducibility of WCSS [23]. The ICC value of the total scale score of WCSS was 0.85 and its 95% confidence interval ranged between 0.77 and 0.90 (Table 5). As suggested, ICC values less than 0.50, between 0.50 and 0.75, between 0.75 and 0.90, and greater than 0.95 indicate poor, moderate, good, and excellent reliability, respectively [21]. The ICC estimate of WCSS indicated good reproducibility.

Validity

To assess the validity of WCSS, correlations between the total score scale of WCSS and the other questionnaires were calculated. We used the Pearson correlation coefficient (r), which is the most common measure of correlation in statistics and shows the linear relationship between two sets of data. It was considered an excellent correlation if r >0.90, medium if r is between

Table 2. Questionnaires total item

Questionnaires	No.	Possible Values	Mean±SD
WCSS	76	0-30	12.25±4.38
PAC-SYM	76	0-60	19.37±7.90
PAC-QOL	76	4-111	59.09±21.86

WCSS: Wexner Constipation Scoring System; PAC-SYM: Patient Assessment of Constipation Symptom; PAC-QOL: Patient Assessment of Constipation Quality of Life.

Table 3. Items scores of Wexner Constipation Scoring System

Items	No.	Mean±SD
Frequency of bowel movements	76	0.58±0.82
Difficulty: Painful evacuation effort	76	2.17±1.10
Completeness: Feeling incomplete evacuation	76	2.75±1.04
Pain: Abdominal pain	76	1.41±1.14
Time: Minutes in lavatory per attempt	76	1.37±1.08
Assistance: Type of assistance	76	1.16±0.84
Failure: Unsuccessful attempts for evacuation per 24 hours	76	0.96±0.82
History: Duration of constipation (yr.)	76	1.86±1.12
Total score	8	12.25±4.40

Table 4. Internal consistency of Wexner Constipation Scoring System

Items	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-total Correlation	Squared Multiple Correlations	The Cronbach Alpha if Item Deleted
WQ1	11.67	17.05	0.24	0.28	0.65
WQ2	10.08	14.84	0.39	0.20	0.62
WQ3	9.50	14.62	0.45	0.29	0.60
WQ4	10.84	14.45	0.41	0.34	0.61
WQ5	10.88	14.05	0.51	0.31	0.58
WQ6	11.09	16.77	0.26	0.25	0.65
WQ7	11.29	16.26	0.36	0.29	0.63
WQ8	10.39	16.24	0.20	0.18	0.67

Table 5. The intraclass correlation coefficient of Wexner Constipation Scoring System

Items	No.	Mean±SD	ICC	95% Confidence Interval	
				Lower Bound	Upper Bound
WCSS score 1 (test)	76	12.24±4.409			
WCSS score 2 (re-test)	76	11.82±5.715	0.85	0.77	0.90
Valid No. (listwise)	76	-			

0.51 and 0.70, and poor if r is between 0.31 and 0.50. The correlation would be regarded as not significant if r<0.30 [18]. As shown in Table 6, the Pearson correlation coefficient between total scale scores of WCSS and PAC-SYM was 0.67 confirming that the WCSS processes an adequate convergent validity compared with an instrument of a proven sensitivity such as PAC-SYM. The correlation between total scale scores of WCSS and PAC-QOL was 0.61, which provides evidence of concurrent validity in a moderate range. This finding can prove the assumption that patients with higher scores of WCSS would have a lower quality of life which is equivalent to higher total PAC-QOL scores.

Table 6. The validity of the Wexner Constipation Scoring System

Variables		WCSS	PAC-SYM	PAC-QOL
WCSS	Pearson correlation	1	0.67*	0.61*
	Sig. (2-tailed)	-	0.00	0.00
	No.	76	76	76

* Correlation is significant at the 0.01 level (2-tailed).

4. Discussion

Today, chronic functional constipation is considered a common but complex syndrome [1]. A clinical severity index, as proposed by Agachan et al. could be a useful tool in the diagnostic procedure and the evaluation of changes after treatment [12]. The original WCSS was successfully validated in English, showing good power to identify functional constipation and changes in patients over time [12]. As confirmed by the developer, this is the first study intended to make a cross-culturally adapted version of this questionnaire for the Farsi speaking population. Most patients in this study were female (77%) which is close to the subject demographic of the original study by Agachan et al. (88%). This selection is supported by a meta-analysis by Suares et al. reporting that the prevalence of chronic functional constipation was indeed higher in female subjects [24].

Regarding cross-cultural validity, instructions for a correct translation and cultural adaptation were carried out without considerable constraints. Since this is a straightforward questionnaire, it was well-received by the patients.

Based on the reliability test, the Cronbach alpha coefficient was lower than 0.70 (0.66) which makes the internal consistency of WCSS questionable. But this outcome results from the sensitivity of the alpha coefficient to both interrelatedness and the number of items, in such a way that a smaller number of items can result in a lower value of alpha [25]. Moreover, the nature of chronic functional constipation as a symptom-based disorder is complex with three different types: Slow transit constipation, obstructive defecation syndrome, and mixed. The clinical symptoms are different among patients. Hence, the original WCSS tries to use the most common symptoms of all types of functional constipation to provide a uniform assessment tool for symptom severity. Similar to the original study, a group of patients with different types of functional constipation was enrolled [12], and accordingly, achieving a low value of inter-item correlation is predictable.

Based on the previously shown results, the reproducibility of the WCSS overt ime was good, with high intraclass correlations (0.85) for total scores.

The validity of the WCSS was assessed through convergent and concurrent criterion validity tests. The convergent validity of the WCSS, when compared with the corresponding scales of the PAC-SYM, demonstrated a significant correlation between total scores. Regarding the concurrent validity, there is no gold standard constipation-specific symptom questionnaire that can be compared with the WCSS. In the present study, we determined the concurrent validity of the WCSS by comparing it with the PAC-QOL score, which is a well-established and useful indicator of the burden implies by constipation on the quality of life, both in clinical and research settings [22]. The correlation coefficient confirmed that individuals with more severe constipation symptoms will represent higher scores of PAC-QOL which is consistent with the results of PAC-QOL developing study [22].

Despite achieving significant results, this study has some minor limitations. First, in the original study of WCSS, 232 patients were enrolled, which is considerably greater than the sample size of the current study. A greater sample size, would strengthen statistical analyses in the validation of the scores and would probably minimize measurement errors to achieve interpretability at the individual level [26]. The test-retest sample size was also relatively small. The confirmation of clinical stability is an important factor in PRO validation studies, and larger sample size would lead to a more reliable result.

5. Conclusions

Our study showed that the Persian version of the Wexner Constipation Scoring System was valid and reproducible in assessing the presence and severity of chronic functional constipation. In future studies, the responsiveness and minimally important difference of this version of WCSS could also be assessed and calculated.

0Ethical Considerations

Compliance with ethical guidelines

All ethical principles were considered in this article.

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Authors' contributions

All authors contributed equally in preparing all parts of the research.

Conflict of interest

The authors declared no conflicts of interest.

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تطابق فرهنگی، روایی و پایایی نسخه فارسی سیستم نمره‌دهی یبوست وکسنر

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چکیده

مقدمه یبوست عملکردی مزمن یک اختلال شایع دستگاه گوارش است که در بیماران مختلف با علایم متنوعی بروز می کند. سیستم نمره دهی یبوست وکسنر (WCSS) برای فراهم کردن یک ابزار یکسان جهت ارزیابی شدت علایم یبوست عملکردی مزمن تدوین شده است. هدف از مطالعه حاضر ارائه‌ی نسخه فارسی WCSS و ارزیابی روایی و پایایی آن بوده است.

مواد و روش ها ابتدا نسخه اصلی WCSS به فارسی ترجمه شد؛ این نسخه فارسی پس از تأیید اعتبار زبانی، توسط ۷۶ بیمار با یبوست عملکردی مزمن تکمیل شد و برای ارزیابی همخوانی درونی (آلفای کرونباخ) و تکرارپذیری (ICC) از آزمون‌های پایایی استفاده شد. همچنین برای ارزیابی اعتبار، همبستگی نسخه فارسی WCSS با پرسشنامه های PAC-SYM و PAC-QOL (برای بررسی به ترتیب روایی همگرا و اعتبار همزمان) استفاده شد.

یافته‌ها آلفای کرونباخ برای نمرات کل ۰/۶۶ و ۰/۸۵ :ICC (با فاصله اطمینان ۹۵ درصد۰/۷۷-۰/۹۰) محاسبه شد. از نظر آماری، ارتباط معناداری بین نمره‌ی کلی WCSS با نمره‌ی کلی PAC-SYM (با ضریب همبستگی ۰/۶۷) و نمره‌ی کلی PAC-QOL (با ضریب همبستگی ۰/۶۱) بدست آمد.

نتیجه گیری نتایج حاصل از این مطالعه، روایی و تکرارپذیری نسخه فارسی سیستم نمره‌دهی یبوست وکسنر را نشان داد.

کلیدواژه‌ها:
شدت یبوست، نسخه فارسی، پایایی، روایی

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