

Psychometric Properties of the Polish Version of the Self-care of Hypertension Inventory

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Background: According to evidence-based guidelines, adherence to blood pressure–lowering medication and lifestyle modifications is a crucial part of hypertension management. Self-care is an effective method for secondary prevention. However, patients continue to exhibit major deficits in terms of adherence, self-control, and self-care. Standardized instruments for the effective monitoring of patients' self-care abilities are still lacking. **Objective:** The objectives of this study were to produce a translation and cross-cultural adaptation of the Self-care of Hypertension Inventory (SC-HI) and to evaluate the psychometric properties of its Polish version. **Methods:** The scale underwent translation and psychometric assessment using the standard methodology (forward-backward translation, review, psychometric analysis, criterion validity). The study included 250 patients, with a mean age of 61.23 ± 14.34 years, treated in a hypertension clinic. **Results:** Mean self-care levels were evaluated in 3 domains: self-care maintenance (56.73 ± 18.57), self-care management (64.17 ± 21.18), and self-care confidence (62.47 ± 24.39). The Cronbach α for each domain showed satisfactory parameters: 0.755 for maintenance, 0.746 for management, and 0.892 for confidence. In the Polish version, the 3-factor structure of the SC-HI was not directly confirmed. Therefore, so-called modification indices were applied to obtain a standardized root mean square residual value less than 0.09 and a root mean square error of approximation value less than 0.06. **Conclusions:** The SC-HI has been successfully translated and adapted for Polish settings, and is suitable for application among patients with hypertension.

KEY WORDS: hypertension, psychometrics, self-care, self-management

Hypertension ranks among the most serious public health problems; 9.4 million persons worldwide die each year from hypertension complications. It affects around a third of the adult population, and its incidence is expected to increase.¹ According to the European Society of Cardiology, hypertension is defined as a persistent elevation in office-measured systolic blood pressure of

140 mm Hg or higher and/or diastolic blood pressure of 90 mm Hg or higher, which is equivalent to a 24-hour ambulatory blood pressure monitoring average of greater than or equal to 130/80 mm Hg or a home blood pressure monitoring average of greater than or equal to 135/85 mm Hg.² Despite increasing awareness in society and improved access to new medication, only

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All data and materials used in this research are freely available. References have been provided.

The study was approved by the local bioethics committee (approval no. KB 42/2019). All procedures followed were in accordance with the ethical standards of the responsible committee on human

experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000. Written informed consent was obtained from all individual participants included in the study.

All coauthors have agreed to the submission and publication of this article.

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

The authors have no conflicts of interest to disclose.

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30% to 40% of patients declare they take their medication regularly.³ Worldwide, hypertension affects more than 1.5 billion people; and in Poland, approximately 8.6 million, that is, 35% of adults.⁴ According to NATPOL2011, despite the wealth of knowledge and the advances in pharmaceutical treatment and hypotensive drugs, good control of blood pressure is attained by only 26% of patients.⁴ In groups of older patients 64 years or older, adequate control is attained by 34.8% of patients treated for hypertension.⁵ Hypertension control and maintenance of optimal blood pressure with antihypertensive medication and nonantihypertensive medication are the most effective approaches to reducing premature morbidity and mortality from cardiovascular incidents.⁶

Hypertension treatment should begin with lifestyle modification, followed by the selection of the appropriate medication based on existing cardiovascular risk. Nonpharmaceutical treatment significantly increases the effectiveness of hypertension treatment, decreases blood pressure in those with elevated blood pressure values, prevents the development of hypertension in genetically predisposed individuals, and decreases the risk of cardiovascular complications.⁷ According to evidence-based guidelines, adherence to blood pressure-lowering medication and lifestyle modifications is a crucial part of hypertension management.² The role of self-care in the clinical management of hypertension is well established and incorporated into patient education and intervention strategies.⁸ Therefore, medical personnel should regularly evaluate patients' skills in terms of self-care maintenance, management, and confidence. Moreover, patients showing a low level of self-care should be targeted with educational interventions.

The Polish literature offers standardized instruments for the assessment of health behaviors (Health Behavior Inventory⁹) and adherence (the 8-item Morisky Medication Adherence Scale¹⁰ and the Hill-Bone Compliance to High Blood Pressure Therapy Scale¹¹). However, it lacks a standardized research instrument that would assess the level of self-care in patients with hypertension.

Self-care is a key element in the long-term management of chronic diseases. The Middle-Range Theory of Self-care of Chronic Illness¹² provides a holistic view of how patients with different or multiple chronic diseases take care of themselves. In the Middle-Range Theory of Self-care of Chronic Illness,¹² self-care is defined as a process of maintaining health—the main phenomenon—through health-promoting practices and disease management. These behaviors are performed in both healthy and diseased conditions. Self-care can be seen as an overarching structure built on 3 key concepts of self-care maintenance (eg, observing self-care behaviors such as regular exercise and taking medication as recommended), monitoring (eg, regular change measurements, routine tests), and management (eg, change of diet or

medication dose based on detection and interpretation of symptoms). The 3 concepts of self-care maintenance, monitoring, and management are closely related; therefore, sufficient self-care includes all 3 behaviors.^{8,13}

One of the instruments based on the middle-range theory of self-care and evaluating all 3 self-care domains (maintenance, management, and self-confidence) is the Self-care of Hypertension Inventory (SC-HI) by Dickson et al.⁸ The SC-HI is cross-cultural and has been adapted to Chinese¹⁴ and Brazilian Portuguese.¹⁵ An analysis of the psychometric properties of the English, Brazilian, and Chinese versions demonstrated that the questionnaire is a reliable and valid instrument for self-care assessment in patients with hypertension. The lack of validated instruments measuring the ability of patients with hypertension to manage their disease has slowed down the progress of research in this area. In the Polish literature, studies on self-care and its determinants among patients with hypertension are still lacking. Therefore, we have undertaken to adapt the SC-HI questionnaire for use in Polish settings and to perform a psychometric evaluation of its Polish version. The purpose of this study was to produce the translation and cross-cultural adaptation of the SC-HI into Polish and to evaluate interobserver reliability and temporal stability.

Material and Methods

Design and Setting

The current research has a cross-sectional, observational design. Data were collected from April to October 2019.

Participants

Three hundred patients treated at the hypertension clinic of the University Hospital in Wroclaw (Poland) were recruited. Of the 300 patients, 32 did not meet the inclusion criteria or declined to participate. In the first stage, of the 268 patients included in the study, 18 dropped out without providing a reason, despite having previously consented to participate. Thus, the final study group included 250 patients given a diagnosis of hypertension and who were receiving antihypertensive medication. The patients completed the questionnaire on paper during their control visits. The patients received information about the aim of the study and could ask questions when filling out the questionnaire. The Polish Society of Hypertension guidelines recommend monthly control visits until good blood pressure control is attained and then once every 3 months. The study was implemented by a properly trained team including a physician specializing in hypertension and an internal medicine nurse. The personnel were informed about the aim of the study. A study protocol was prepared for the purpose of the study so that the personnel could collect data in the same way. Sociodemographic and clinical data were collected by the personnel.

Inclusion and Exclusion Criteria

The inclusion criteria were as follows: age of 18 years or older, hypertension diagnosed in accordance with the European Society of Cardiology criteria,³ cognitive status allowing the study to be understood and the surveys to be completed without assistance (Mini Mental State Examination score ≥ 18), chronic treatment with at least 1 antihypertensive drug for at least 6 months, and command of Polish allowing the patient to understand the questionnaire items.

Exclusion criteria were as follows: concurrent cancer, psychological disorders, heart failure exacerbation, ischemic heart disease exacerbation, and acute respiratory disease (requiring urgent and intensive treatment at an intensive care unit), due to the complexity of such patients' clinical status and a risk of comorbidities interfering with the self-care level evaluation; lack of consent to participate; or withdrawing consent at any stage of the study.

Ethical Considerations

The study was approved by the local bioethics committee (approval no. KB 42/2019). Participation was voluntary and anonymous, and all patients were informed about the purpose, methods, and course of the study as well as about their right to decline or discontinue their participation. Written informed consent was obtained from each participant before their inclusion, and the investigation conformed to the principles outlined in the Declaration of Helsinki. Data confidentiality was ensured by using assigned code numbers in lieu of participants' names.

Instruments

The Self-care of Hypertension Inventory

Questionnaire items were designed so as to reflect the constructs of self-care maintenance, monitoring, and management. The self-care maintenance scale reflects the typical behaviors that should be followed by patients with hypertension: measuring one's blood pressure, eating fruits and vegetables, exercising, keeping follow-up appointments, limiting sodium intake both at home and out, taking one's medications and using a medication reminder system, limiting fat in one's diet, and losing weight or maintaining a normal body weight. Recommended behaviors were based on empirical literature, clinical guidelines, and releases by the American Heart Association.^{2,6} Items regarding diet and exercise were included in the maintenance scale twice to increase its internal consistency. Patients rate the frequency of each behavior on an ordinal scale of 1 to 4, with 1 standing for "never or rarely" and 4 standing for "always or daily." An even-numbered scale was used to eliminate the midpoint associated with "undecided" responses.⁸

All patients completed the self-care management scale. To assess patients' self-monitoring skills, they must report how quickly they recognized their high blood pressure (from 1 [not quickly] to 4 [very quickly], or 0 if they did not recognize it) and how likely they were to try one of the recommended actions to control their blood pressure once they recognized it (reducing salt, reducing stress, taking medication more regularly, or consulting with a physician or nurse; from 1 [not likely] to 4 [very likely]). The last item on the subscale regards the patients' ability to evaluate the effectiveness of their self-care actions (from 1 [not sure] to 4 [very sure of whether it was effective], or 0 [did not try anything]).

The self-care confidence scale comprises items referring to specific components of self-care, and patients rate their confidence in these aspects on a scale of 1 (not confident) to 4 (very confident). Although confidence is not strictly a component of self-care, it has been shown to strongly predict the quality of self-care behaviors. All scales (maintenance, management, and confidence) are scored separately, so the questionnaire yields 3 scores. Scores are standardized to a value between 0 and 100 points, and higher scores indicate a higher level of self-care.⁸

Translation and Adaptation Procedure

In accordance with the widely accepted standard methodology,¹⁶ the questionnaire validation procedure comprised obtaining consent from the questionnaire's author, Barbara Riegel; establishing an expert committee; forward translation from English into Polish; synthesis of translation; backward translation; expert committee review; and preliminary pilot testing (Figure).

Translation of the SC-HI into Polish was performed by a team of specialists (2 physicians and 2 nurses) fluent in both languages, whose native language was Polish. The text was then discussed and corrected by a team of medical specialists (1 physician and 1 nurse), and the corrected version was sent to a translation agency. Once the translated text had been proofread by the translation agency, the final suggested version was submitted to an expert panel for approval. The resulting Polish version was submitted to an independent team of medical professionals fluent in both Polish and English, whose native language was English, to translate the text back into English (back-translation). After a discussion between designated experts and a number of minor corrections regarding style, the resulting text was officially approved. The back-translated English version of the translated questionnaire was submitted to the author for approval (backward-forward translation).

During the back-translation, the author of the original version remarked that the back-translation requires some minor grammar correction. To facilitate comprehensibility and application of the questionnaire, questions 3 and 4

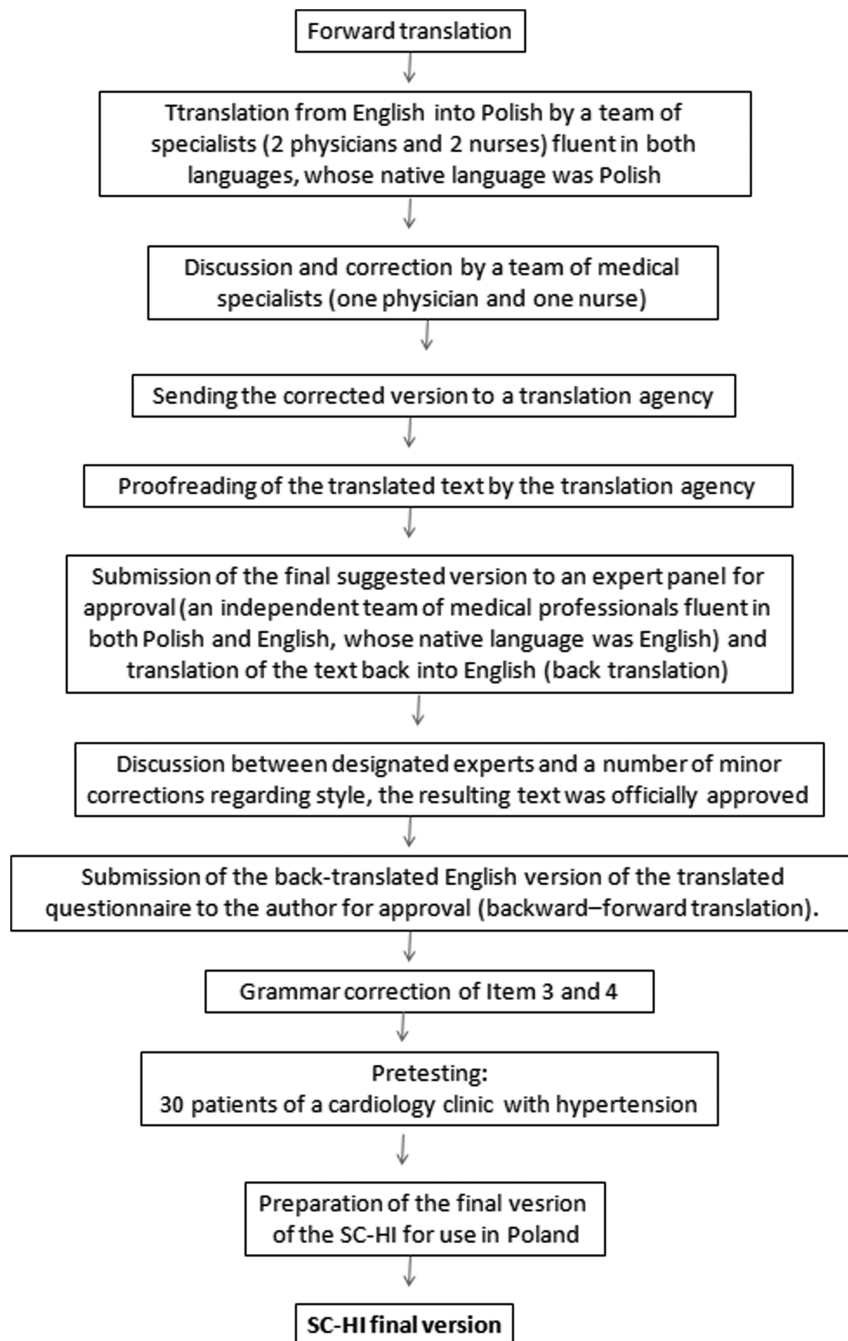


FIGURE . Flowchart of the process of translation and cross-cultural adaptation of the SC-HI in Poland.

were modified. In question 3, the word “exercise” was replaced with “physical activity.” The difference is that physical activity means not being sedentary. It describes walking to the store, taking the stairs, and vacuuming the rug, whereas exercise is more purposeful and intended to get the heart rate elevated. Eventually, the item was phrased as “I do physical activity (eg, walking, going to the shops).” We added the information in brackets, so that it is clear that the activity is not about exercising, because in Polish, it might indeed be confused with doing exercises. In question 4, pertaining to follow-up appointments, we

decided to change the statement “I’m trying to get at keeping an appointment with a doctor or nurse after it is made” to “I keep scheduled appointments with doctor/nurse,” because patients might make an appointment but not necessarily keep it.

After the translation was approved by the author of the original version, a pilot study was conducted to verify patients' understanding of the Polish version of the questionnaire. The pilot study included 30 patients of a cardiology clinic with hypertension. All patients filled in the questionnaire on their own and did not report

any difficulties in understanding or responding to any of the items. The pretested version of SC-HI was used as the final version for psychometric tests in a population of patients with hypertension in Poland. The Polish version of the questionnaire is available at <https://self-care-measures.com/project/patient-version-sc-hi-polish/>.

Statistical methods

Internal consistency was evaluated using Cronbach α and confirmatory factor analysis. In the confirmatory factor analysis, model fit was evaluated using Hu and Bentler's method with 2 indicators. Comparisons of SC-HI scores between 2 groups with differing blood pressure levels were performed using Student *t* test (for normal distributions of a variable in the groups analyzed) or the Mann-Whitney test (otherwise). Comparisons of SC-HI scores in 4 groups differing with regard to the frequency

of physician/nurse appointments were performed using analysis of variance (for normal distributions of a variable in the groups analyzed) or the Kruskal-Wallis test (otherwise). Where statistically significant differences were found, post hoc analysis was performed using Fisher's Least Significant Difference test (for normal distributions) or the Dunn test (for distributions other than normal) to identify groups that were significantly different.

Correlations between SC-HI scores and quantitative variables were analyzed using Pearson correlation coefficient (if the distributions for both were normal) or Spearman correlation coefficient (otherwise).¹⁷

Variable distribution normality was verified using the Shapiro-Wilk test. All analyses used a significance threshold of .05.

The analyses were performed using the R software, version 3.6.0.¹⁸

TABLE 1 Sociodemographic and Clinical Characteristics of the Study Group

Characteristic		Values (n = 250)
Age	Mean (SD)	61.23 (14.34)
Systolic blood pressure, mm Hg	Mean (SD)	139.3 (18.23)
Mean from 2 measurements		
Diastolic blood pressure, mm Hg	Mean (SD)	82.78 (9.77)
Mean from 2 measurements		
Duration of hypertension, y	Mean (SD)	12.1 (10.41)
Gender	Female	140 (56.00%)
	Male	110 (44.00%)
Residence	Rural	57 (22.80%)
	Urban	193 (77.20%)
Living arrangement	Living alone	55 (22%)
	Living with family	195 (78%)
Marital status	Unmarried	74 (29.60%)
	Married	176 (70.40%)
Education	Primary or none	23 (9.20%)
	High school	132 (52.80%)
	College/university	95 (38.00%)
Professional status	Professionally active	85 (34.00%)
	Retirement pensioner	116 (46.40%)
	Disability pensioner	37 (14.80%)
	Unemployed	11 (4.40%)
	No data	1 (0.40%)
Financial standing	Wealthy	12 (4.80%)
	Able to afford all that is needed and save some money	97 (38.80%)
	Able to afford daily expenses, but not any larger ones	110 (44.00%)
	Unable to afford many things	28 (11.20%)
	Unable to afford even the most basic expenses	3 (1.20%)
Frequency of control visits	1	15 (6.00%)
	2–3	43 (17.20%)
	4–5	47 (18.80%)
	>5	142 (56.80%)
	None	3 (1.20%)
BMI	Normal weight (<25)	72 (28.80%)
	Overweight (25–30)	96 (38.40%)
	Obese (>30)	82 (32.80%)
SC-HI	Self-care maintenance	56.73 (18.57)
	Self-care management	64.17 (21.18)
	Self-care confidence	62.47 (24.39)

Abbreviations: BMI, body mass index; N, number of patients; SC-HI, Self-care of Hypertension Inventory.

Results

Sociodemographic and Clinical Characteristics of the Study Group

The study included 250 patients with hypertension, with a mean age of 61.23 ± 14.34 years (Table 1). Most patients were female, well educated, and professionally inactive; lived in urban areas; lived with their family; and were married.

There are, however, no normal ranges or cutoff values for “high” and “low” levels of self-care measured with the SC-HI questionnaire. On the other hand, as all domains are scored in the same range, a patient's level of self-care can be compared between the domains to identify potential deficits in self-care.

The respondents obtained the highest scores for self-care management (64.17) and the lowest scores for self-care maintenance (56.73) (Table 1).

Confirmatory Factor Analysis

The original SC-HI questionnaire has a 3-factor structure, shown in Table 2. As the 3-factor structure of the SC-HI was not directly confirmed, modifications indicated by

the so-called modification indices were applied. In this case, the suggested modifications included augmenting the model with correlations between the following item pairs: 1 and 9, 3 and 6, 6 and 8, 7 and 8, 9 and 11, 13 and 17, 15 and 16, 19 and 20, and 20 and 21. The loadings of each item ranged between 0.231 and 0.902, and were statistically significant ($P < .05$) (Table 2).

For this structure, the root mean square error of approximation (RMSEA), confirmatory fit index, and Tucker-Lewis index fit indices were not satisfactory. Only the standardized root mean square residual (SRMR) value demonstrated a good fit of the model to the data (exact values are listed under model 1 in Table 3).

This resulted in the expected parameter values (SRMR < 0.09 and RMSEA < 0.06 ; model 2 in Table 3). All correlations added to the model connect items belonging to the same subscale, so they do not affect the factor structure of the SC-HI.

Cronbach α

The Cronbach α values for each subscale demonstrated satisfactory, or even very good (for self-care confidence), psychometric qualities: self-care maintenance,

TABLE 2 SC-HI Structure, Loadings, and Cronbach α for Each Item of the SC-HI Questionnaire

Factor	Item ^a	Loading	P	α for the Factor With the Item Included
Self-care maintenance	1. I measure my blood pressure.	0.519	$P < .001$	0.736
	2. I eat plenty of fruit and vegetables.	0.425	$P < .001$	0.741
	3. I do exercise.	0.231	$P = .002$	0.745
	4. I see a doctor/nurse.	0.366	$P < .001$	0.745
	5. I eat a low sodium diet.	0.789	$P < .001$	0.707
	6. I do exercise for 30 minutes.	0.295	$P < .001$	0.739
	7. I take medications prescribed by my doctor.	0.396	$P < .001$	0.755
	8. When I go to a restaurant or visit someone I order or choose dishes with a low salt content.	0.656	$P < .001$	0.715
	9. I use a system which helps me remember to take medication, such as a pill box or reminders.	0.318	$P < .001$	0.771
	10. I eat a low-fat diet.	0.574	$P < .001$	0.728
	11. I am on a diet or I take care to maintain appropriate body weight.	0.606	$P < .001$	0.715
Self-care management	12. How <i>quickly</i> did you manage to notice that you had a high blood pressure?	0.5	$P < .001$	0.737
	13. Reducing salt content in food.	0.794	$P < .001$	0.679
	14. Reducing stress.	0.566	$P < .001$	0.703
	15. Taking the prescribed medications more regularly.	0.417	$P < .001$	0.73
	16. Consulting a doctor/nurse.	0.592	$P < .001$	0.693
	17. How sure are you that what you did was effective or not?	0.619	$P < .001$	0.711
Self-care confidence	18. Maintain a normal blood pressure.	0.59	$P < .001$	0.898
	19. Follow the recommended treatment method.	0.692	$P < .001$	0.883
	20. Recognize a change in your health condition.	0.726	$P < .001$	0.866
	21. Identify a change in your blood pressure.	0.729	$P < .001$	0.871
	22. Act in order to maintain a normal blood pressure.	0.902	$P < .001$	0.858
	23. Assess how effective such actions are.	0.86	$P < .001$	0.86

Abbreviation: SC-HI, Self-care of Hypertension Inventory.

^aThe back-translation to English.

TABLE 3 Fit Index Values for the SC-HI

Model	χ^2 Test			RMSEA	CFI	TLI	SRMR
	χ^2	df	P				
1	510.128	227	0	0.081	0.825	0.805	0.077
2	364.017	218	0	0.059	0.91	0.895	0.068

Abbreviations: CFI, confirmatory fit index; *df*, degrees of freedom; RMSEA, root mean square error of approximation; SC-HI, Self-care of Hypertension Inventory; SRMR, standardized root mean square residual; TLI, Tucker-Lewis index.

0.755; self-care management, 0.746; and self-care confidence, 0.892. The subscales have internal consistency (Table 3).

Criterion Validity (Concurrent and Prognostic)

Comparative analysis showed no association between normal blood pressure values and SC-HI questionnaire scores in each domain. Patients with normal blood pressure did not significantly differ from those with abnormal blood pressure in terms of self-care maintenance, management, and confidence ($P > .05$) (Table 4).

Analysis of Correlations With Sociodemographic and Clinical Factors

The analysis of correlations between selected variables and self-care level demonstrated that the duration of illness had a significant positive correlation with self-care maintenance, management, and confidence ($P < .05$); that is, the longer the patients live with the disease, the better their self-care becomes in these aspects. Self-care maintenance and management were significantly better in women than in men. Self-care maintenance scores were also significantly higher in those patients who came in for follow-up appointments more often (Table 5).

Discussion

This study is the first known report validating the Polish version of the SC-HI questionnaire used for evaluating the self-care abilities of hypertensive patients. It demonstrated that the Polish version of the SC-HI is a reliable instrument, with good psychometric properties in all its domains.

Cross-cultural validation refers to whether measures that were originally generated in a single culture are applicable, meaningful, and thus equivalent in another culture.¹⁹ In the cross-cultural adaptation process for the Polish version, following consultations with the author of the original version, the following items were changed for ease of understanding and to facilitate administration: item 3 (“I do physical activity” [eg, walking, going to the shops]) and item 4 (“I keep scheduled appointments with doctor/nurse”). As was the case with the Chinese¹⁴ and Brazilian¹⁵ questionnaires, we changed “exercise” to “physical activity,” which is associated with daily activities such as walking, shopping, or gardening. Changes in item 4, pertaining to making follow-up appointments with a physician/nurse, were also introduced by the authors of the Brazilian version.¹⁵ What had to be differentiated in this case was “making” and “keeping” an appointment. After introducing these changes in all language versions of the questionnaire during pretesting, patients could understand all items accurately and respond considering their own actual situations.

Validation was based on determining a routine psychometric characteristic—Cronbach α —that measures the instrument's internal consistency. The scale has internal consistency. The Cronbach α values for each subscale were similar to those found in the original questionnaire version (self-care maintenance, 0.76 vs 0.83; self-care management, 0.75 vs 0.75; self-care confidence, 0.89 vs 0.83).⁶ So far, the Chinese and Brazilian versions of the SC-HI have been validated. In the Chinese version, similar Cronbach α values were obtained: self-care maintenance, $\alpha = 0.690$; self-care

TABLE 4 Comparative Analysis of SC-HI Subscale Scores in Patients With Normal and Abnormal BP Values

SC-HI		Normal Blood Pressure (N = 142)	Abnormal Blood Pressure (N = 108)	P
Self-care maintenance	Mean (SD)	56.55 (17.75)	56.96 (19.67)	.864
	Median	54.55	56.06	P
	Quartiles	42.42–66.67	42.42–72.73	
Self-care management	Mean (SD)	63.61 (20.34)	64.92 (22.31)	.493
	Median	65	67.5	NP
	Quartiles	50–75	50–80	
Self-care confidence	Mean (SD)	62.44 (22.5)	62.5 (26.78)	.621
	Median	61.11	66.67	NP
	Quartiles	50–77.78	50–83.33	

Abbreviations: N, number of patients; NP, not normal distribution in groups (Mann-Whitney test); P, normal distribution in groups, Student *t* test; SC-HI, Self-care of Hypertension Inventory.

TABLE 5 Results of Correlation Analysis for SC-HI Scores and Sociodemographic and Clinical Factors

Factor		Self-care of Hypertension Inventory		
		Self-care Maintenance, Mean (SD)	Self-care Management, Mean (SD)	Self-care Confidence, Mean (SD)
Gender	Female (n = 140)	58.96 (19.06)	67.36 (20.8)	64.96 (23.87)
	Male (n = 110)	53.88 (17.59)	60.12 (21.06)	59.29 (24.78)
	<i>P</i> ^a	.032	.007	.06
No. control visits in the past year	1–3 (N = 58), A	53.34 (19.22)	60.95 (22.69)	63.41 (23.62)
	4–5 (N = 47), B	51.97 (15.41)	66.06 (19.66)	61.7 (22.02)
	More than 5 (N = 142), C	59.77 (18.95)	65.04 (21.21)	62.36 (25.78)
	None (N = 3), D	52.53 (7.63)	55.83 (6.29)	61.11 (9.62)
	<i>P</i> ^b	.028	.386	.911
Correlation with Duration of Illness		Self-care Maintenance	Self-care Management	Self-care Confidence
Correlation coefficient		0.15	0.232	0.175
<i>P</i> ^c		<i>P</i> = .018, NP	<i>P</i> < .001, NP	<i>P</i> = .005, NP
Correlation direction		Positive	Positive	Positive
Correlation strength		Very weak	Very weak	Very weak

Abbreviations: N, number of patients; SC-HI, Self-care of Hypertension Inventory.

^a*P* = normal distribution in groups, Student *t* test; NP, not normal distribution in groups, Mann-Whitney test.

^b*P* = normal distribution in groups, analysis of variance + post hoc analysis results (Fisher's LSD test); NP, not normal distribution in groups, Kruskal-Wallis test + post hoc analysis results (Dunn test).

^c*P* = normal distribution of both correlated variables, Pearson correlation coefficient used; NP, distribution not normal for at least one of the correlated variables, Spearman correlation coefficient used.

management, $\alpha = 0.703$; and self-care confidence, $\alpha = 0.891$.¹⁴ The Brazilian Portuguese version of the scale demonstrated substantial to near-perfect agreement coefficients (0.69–1.00), which indicate that the Brazilian version of the SC-HI is reliable and suitable for use by different professionals and retains its characteristics and measurement power even when reapplied to patients at different points in time.¹⁵

The original SC-HI has a 3-factor structure, which could not be confirmed in the Polish version. Therefore, modification indices were used, which suggested augmenting the model with correlations between the following item pairs: 1 (“I measure my blood pressure.”) and 9 (“I use a system which helps me remember to take medication, such as a pill box or reminders.”), 3 (“I do exercise.”) and 6 (“I do exercise for 30 minutes.”), 6 (“I do exercise for 30 minutes.”) and 8 (“When I go to a restaurant or visit someone I order or choose dishes with a low salt content.”), 7 (“I take medications prescribed by my doctor.”) and 8 (“When I go to a restaurant or visit someone I order or choose dishes with a low salt content.”), 9 (“I use a system which helps me remember to take medication, such as a pill box or reminders.”) and 11 (“I am on a diet or I take care to maintain appropriate body weight.”), 13 (Reducing salt content in food.”) and 17 (“How sure are you that what you did was effective or not?”), 15 (“Taking the prescribed medications more regularly.”) and 16 (“Consulting a doctor/nurse.”), 19 (“Follow the recommended treatment

method.”) and 20 (“Recognize a change in your health condition.”), and 20 (“Recognize a change in your health condition.”) and 21 (“Identify a change in your blood pressure.”)—to obtain the required values of the standardized root mean square residual (<0.09) and the root mean square error of approximation (<0.06). Notably, this does not change the factor structure of the SC-HI in the Polish version.

Moreover, the authors of this study examined factors affecting self-care levels in patients with hypertension. Patients who had lived with hypertension for a longer time scored higher in all SC-HI domains: maintenance, management, and confidence. Self-care maintenance scores were significantly higher in those patients who had more follow-up appointments. One reason could be that the longer the duration of hypertension, the more health education these patients get. Hence, those with a long duration of hypertension would acquire more health-related knowledge.¹⁴ In this study, female patients obtained significantly higher scores in self-care maintenance and management than male patients. The discussion on the subject in literature is ongoing, and as yet, there is no consensus on the impact of gender on self-care abilities in patients with hypertension. However, in a study by Ademe et al,²⁰ female patients with hypertension were less likely to practice hypertension self-care. This difference in findings may be explained by differences in selected research instruments, as well as by the lack of assessment of psychosocial factors that could potentially affect self-care.

What's New and Important

- This study was the first attempt at a cross-cultural adaptation of the SC-HI questionnaire for use in Polish patients with hypertension.
- This study serves as a precursor for further study testing the impact of using the Polish version of the SC-HI to monitor and identify teaching and counseling areas for self-care activities among community-dwelling persons living with HTN.

Different findings were reported by Mooi et al,²¹ where self-care in hypertension was significantly better in female than male patients.

In the case of many conditions, poor self-care and nonadherence to treatment constitute an obstacle to benefiting from the latest medical knowledge and achieving treatment objectives. Therefore, medical personnel should regularly evaluate patients' skills in terms of self-care maintenance, management, and confidence. Moreover, patients showing a low level of self-care should be referred for additional education. Considering its good psychometric properties, the SC-HI may be used effectively for evaluating self-care abilities in patients with hypertension.

Conclusions

The Polish version of the SC-HI questionnaire has good psychometric properties and can be used for evaluating self-care in patients with hypertension. Self-care and adherence tests are complementary, and it is recommendable to use them in combination in daily clinical practice. Polish patients obtained the highest scores in self-care management and the lowest in self-care maintenance. Longer duration of illness, female gender, and more follow-up visits are factors associated with better self-care in all the SC-HI domains.

Study Limitations

We are aware of the potential limitations of this study. Another limitation is the use of only a single instrument for evaluating self-care and the lack of comparative analysis. Further research among inpatients would certainly be interesting. The final limitation is the lack of a retest.

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