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Cross-cultural adaptation, validity, and reliability of the Indonesian version of the Hill-Bone high blood pressure therapy compliance scale

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ABSTRACT

Hypertension is a long-term condition that enables individuals to take an active role in managing their health care— inadequate adherence to medication regimens is a major factor contributing to treatment failure. We translated and updated the Hill-Bone high blood pressure therapy compliance scale for use in Indonesia, where systemic hypertension is becoming increasingly prevalent. This study aims to evaluate the validity and reliability of the Indonesian version of the Hill-Bone high blood pressure therapy compliance scale. The descriptive cross-sectional research was conducted in East Java, Indonesia, during June and July 2021. For the purpose of selecting 144 persons who had hypertension, a convenience sample was utilized. The Hill-Bone high blood pressure therapy compliance instrument was translated from English into Indonesian using a forward-backward translation method, followed by evaluation by an expert panel and pilot testing. To assess its reliability, the Cronbach's alpha coefficient and item-total correlation were utilized. A Kaiser-Meyer-Olkin (KMO) value of 0.945 confirmed the adequacy of the sample for the study. Additionally, the Bartlett's test yielded a significant result ($X^2 = 132.41$; $p < 0.001$), supporting the appropriateness of conducting a factor analysis. Using factor analysis, the Hill-Bone high blood pressure therapy compliance scale revealed a single factor with an eigenvalue >1 that explained 42.13% of the total variation. The Cronbach alpha coefficient of the Hill-Bone high blood pressure therapy compliance scale was 0.901. The Hill-Bone high blood pressure therapy compliance instrument has been successfully translated and tailored for the Indonesian population, with consideration of their cultural context. In order to provide an accurate prediction regarding the impact that this intervention would have on patients' adherence, the Hill-Bone high blood pressure therapy compliance scale could be of assistance.

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1. INTRODUCTION

The medical illness known as hypertension, also known as raised blood pressure, is a dangerous condition that dramatically raises the chance of having a heart attack, stroke, renal failure, and blindness. It is one of the top causes of death that occurs at an early age all over the world [1]. What is known as hypertension is the condition that occurs when a persistently high blood pressure is present [2]. The JNC-8 (Joint National

Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure) defines normal blood pressure as levels below 130/85 mmHg. Blood pressure readings between 130 and 139 mmHg systolic and/or 85 to 89 mmHg diastolic are deemed pre-hypertensive, while readings beyond 140/90 mmHg are categorized as hypertensive [3]. According to estimates, hypertension affects 26% of the world's population, which is equivalent to 972 million people [4]. It is anticipated that the prevalence of hypertension will increase to 29% by the year 2025, with the majority of the increase coming from economically developing nations. The percentage of males who have high blood pressure is higher than the percentage of women who have it, which is 47%. Furthermore, only around one in four persons who have hypertension have their condition under control, which is 24 percent [2], [5]. Increases in the prevalence of hypertension will result in an enormous load being placed on the health of the general population [6].

The major objective of hypertension treatment is to establish control of blood pressure by the use of appropriate therapeutic methods and the modification of any lifestyle choices that are affected by the condition [7]. Approximately fifty percent of hypertension patients do not take their medication as directed, which is a substantial cause of treatment failure [8]. Poor adherence to drug regimens is a key cause of treatment failure. According to the findings of our investigation, a prominent concern among hypertension patients is a lack of adherence to their medication regimen. In the case of hypertension, for instance, more than half (45%) of the population that was investigated is not taking their antihypertensive medication as prescribed. In a study that looked at the adherence of patients with refractory hypertension to their antihypertensive medication, Correa *et al.* found that 57% of patients were taking their medication as prescribed [9]. Patients who have hypertension and do not take their pharmacological prescriptions as prescribed have a negative impact and an increased risk of cardiovascular events and stroke, and other complications [10]. The issue of medication nonadherence is a complicated one; multiple studies have proven a connection between nonadherence and a variety of characteristics, including patients' perspectives, socioeconomic status, health literacy, and race/ethnicity, among others [11]. For individuals who have hypertension to continue to adhere to their treatment regimen, it is necessary for research and clinical experts to possess a valid and accurate instrument that can quantify this behavior. In 2016, researchers in the United States developed the Hill-Bone high blood pressure therapy compliance scale, a self-care assessment tool specifically designed for individuals with hypertension and tailored to their condition [12]. Therefore, this study aims to evaluate the psychometric characteristics—specifically validity and reliability—of the Indonesian adaptation of the Hill-Bone scale.

2. METHOD

2.1. Design and sample

This study was a cross-sectional descriptive investigation carried out in West Java, Indonesia, over the period of June to July 2021. A study was done to assess the psychometric features of an inventory, involving 144 persons between the ages of 35 and 65 who have hypertension. The study participants were individuals diagnosed with hypertension who were prescribed no more than two antihypertensive medications, had an initial blood pressure reading above 140/90 mmHg, were capable of managing their blood pressure and adjusting their medication independently, and were proficient in Bahasa Indonesia. The sample size was determined using a 1:5 ratio for factor analysis purposes [13].

2.2. Instrument

The sociodemographic and clinical survey included a closed-ended question. The demographic and clinical information, such as the patient's age, gender, level of education, marital status, hypertension status, and number of medications. The number of medications was confirmed from medical records. The Hill-Bone high blood pressure therapy compliance measure was subsequently established utilizing a Likert scaling approach. This was done so that participants could answer to each item within the scale, so indicating the frequency with which the item is significant [12]. A compliance with the HBP Therapy Scale that is hill-bone. Four points are awarded for each of the following responses on the scale: (4) all the time, (3) most of the time, (2) sometimes, and (1) never. The scale consists of fourteen items. When the overall score is added up, the total score might range anywhere from 14 (the minimum) to 56 (the maximum) when the objects are deemed to be cumulative. The subscale making appointments has three questions that evaluate appointments for doctor's visits and pill refills, and the subscale medicine contains eight items that measure psychiatric therapy. Both of these subscales are used to evaluate the dietary intake of salty foods. The sodium subscale includes 3 elements that will be measured by individuals from 14 to 56. The scale was used as a self-administered questionnaire as well as an interviewer, and it takes about 5 minutes to complete. An increase in the Compliance Scale score exceeding 20 percent is considered effective.

2.3. Translation process

A nurse specialist in internal illnesses (Ph.D.) and a bilingual professional were the first to adapt the Hill-Bone high blood pressure therapy compliance scale into Indonesian. The translations were evaluated and formalized. We discovered no alternative definitions. This translation was completed by a health expert and linguist who speak both English and Indonesian. The scale was evaluated by an expert in the Indonesian language, a healthcare researcher, and a nursing specialist in internal medicine to assess its sentence structure, syntax, and contextual relevance. No differences in meaning were identified. After careful consideration, it was decided that no changes were necessary.

2.4. Content validity

When it comes to measuring an idea, content validity refers to how well the instrument fits the bill. In order to increase the content validity, there are two ways that can be utilized: i) suitable conception and domain evaluation immediately prior to the development of the items, and ii) evaluation of the necessary information by expert evaluation once the items have been formed [13]. For the purpose of conceptualizing domains and generating things, the theory that underpins the notion was utilized. A panel of five experts, comprising cardiovascular nursing professionals and scientific researchers, was invited to assess the content relevance of each item using a scale from one (irrelevant) to four (very relevant). This evaluation was carried out during the second stage of the process. Additionally, it was requested that experts provide their feedback on matters that need revision as well as the lack of information [14]. Before we eventually began conducting psychometric testing on the scale, the suggestions for minor adjustments that were made by the expert panel were incorporated into the scale. Within the range of 0.80 to 1.00, the content validity index (CVI) was obtained.

2.5. Construct validity

Confirmatory factor analysis (CFA) was used to assess construct validity, with each item expected to have a factor loading above 0.40. The CFA was evaluated using various goodness-of-fit indices, including the Chi-square test (X^2/df), goodness-of-fit index (GFI), non-normed fit index (NNFI), standardized root mean square residual (SRMR), and comparative fit index (CFI). Model fit was considered acceptable if the values met the following criteria: $X^2/df \leq 2.0$, GFI ≥ 0.90, NNFI ≥ 0.90, CFI ≥ 0.90, SRMR < 0.10, and RMSEA ≤ 0.08. Internal consistency of the test was measured using Cronbach's alpha coefficient [15].

2.6. Data collection procedure

Both the patients and the ethics committee (0119/KEPK/STIKEP/PPNI/JABAR/VIII/2021) provided their written consent for the study to proceed. A consideration of the Helsinki Declaration was taken into account when conducting this research. Patients used a web-based survey platform called Google Form to fill out the questionnaires during their routine visits to outpatient clinics and public health centers. The first group of questions comprised the questionnaire, as well as clinical and demographic characteristics. the questionnaire was also included.

2.7. Result

In this particular study, there were a total of 144 individuals that took part in the research. The average age of the patients was 55.67 years at a standard deviation of 10.65 years, 59.7% of them were female, 77.8% were married, and 48.6% had completed secondary education. There was a mean length of 7.38 years, with a standard deviation of 3.55 years. The number of antihypertensive drugs that patients took on average was 3.111.54, as shown in Table 1.

The Kaiser–Meyer–Olkin (KMO) value was 0.945, which indicates that the sample that was representative of the population was suitable for the research experiment. Given that the Bartlett test produced a statistically significant result ($X2 = 132.41$; $p < 0.001$), it is evident that factor analysis was of utmost importance. Using factor analysis, it was discovered that the Hill-Bone high blood pressure therapy compliance scale had a single component with an eigenvalue greater than one, which explained 42.13 percent of the total variance as shown in Table 2.

In light of the fact that the value of KMO was 0.944, the findings of the factor analysis suggested that the sample size was appropriate for factor analysis procedures. The results of the Bartlett test, which indicated a statistically significant result ($X2 = 12390.12$, $p < 0.001$), provide support for the necessity of doing factor analysis. When primary component analyses were performed, it was discovered that a single factor with its own value greater than one was extracted. This factor explained 49.13% of the total variance. A Cronbach alpha coefficient of 0.901 was found to be associated with the Hill-Bone high blood pressure therapy compliance scale, as listed in Table 3.

Table 1. Sociodemographic characteristics of the sample (N = 144)

Variables		n (%)
Age, years, mean±SD		55.67±10.65
Female		88 (59.7%)
Male		56 (40.3)
Married		112 (77.8%)
Unmarried		32 (22.2%)
Education attainment	Primary school	46 (31.9%)
	Secondary school	70 (48.6%)
	Higher than secondary school	28 (19.4%)
Duration of hypertension, years, mean±SD		7.38±3.55
Antihypertensive medication, mean±SD		3.11±1.54

Table 2. Confirmatory factors analysis of Hill-Bone high blood pressure therapy compliance scale (N = 144)

Scale	X^2	X^2/df	RMSEA	SRMR	CFI	NNFI	GFI
Adherence	38.865	1.974	0.072	0.065	0.921	0.925	0.926

Table 3. Reliability of Hill-Bone high blood pressure therapy compliance scale

Scale	Cronbach's Item-total correlation (n = 144)	Item-total correlation (range) (n = 144)
Adherence	0.901	0.521-0.723

3. DISCUSSION

The findings of this study show that the Indonesian version of the Hill-Bone high blood pressure therapy compliance scale is a reliable and valid instrument for assessing self-management in individuals with hypertension. The study revealed strong internal consistency across its three components, indicating that the Indonesian Hill-Bone scale [16], [17] is a trustworthy tool suitable for use in both clinical practice and research settings. Assessing self-care behavior in clinical practice is essential. Nevertheless, the situation appears intricate because patients' accounts of self-care behavior serve as the sole method for acquiring information in regularly scheduled clinical practice [18], [19]. However, there is controversy around the accuracy and consistency of precision and agreement with other sources of information, necessitating further examination into their veracity.

The preliminary validation of the Hill-Bone hypertension therapy adherence measure was performed by [12]. According to the paper, the measurement was deemed credible and showed a correlation with blood pressure management in low-income individuals with hypertension. Nevertheless, the economically disadvantaged patients included in our study constitute a substantial proportion of our hypertension patient cohort. Although their responses cannot be attributed to a lack of understanding caused by retest reliability, they are likely accurate. Identifying individuals with low adherence may be more advantageous for clinical objectives than focusing on those with well-managed blood pressure [18], [20]. Furthermore, due to the potential for a significant number of falsely low adherence rates caused by limited specificity, efforts to improve adherence are usually not accompanied by expensive or risky actions.

To enhance adherence, reduce costs, optimize pharmacological therapy, and achieve effective blood pressure management, it is crucial to recognize patients' difficulties at an early stage and communicate them to healthcare personnel [21]. Nevertheless, certain approaches have undergone thorough testing to improve compliance. It is important to highlight that these interventions have only been applied to the adherence of prescribed medications for blood pressure management [22], [23]. Subsequent studies should investigate the possible advantages of tailoring interventions to specific patients, the correlation between adherence to implementation and long-term outcomes, and patient preferences for how interventions are delivered (such as in-person versus technology-mediated). The interventions were substantiated by Wade [24]. The lack of adherence to medical treatments has substantial economic implications. It diminishes the cost-effectiveness of therapies, leading to less-than-optimal clinical results and higher public health expenditures. Regrettably, clinicians often fail to give sufficient attention to and underestimate the issue of poor adherence, as it is challenging to objectively demonstrate or exclude.

This study had several constraints. Initially, certain psychometric features, such as discriminant validity, were not examined. Furthermore, the restricted generalizability of our findings may be attributed to the fact that the sample was taken only from a single institution. Furthermore, the majority of patients had a limited educational background.

4. CONCLUSION

The Hill-Bone high blood pressure therapy compliance scale has been effectively translated and customized to meet the needs of the Indonesian population in terms of cross-cultural adaptation. It is possible that the Hill-Bone high blood pressure therapy compliance scale could be of assistance in giving an accurate forecast regarding the influence that this intervention would have on the patients' adherence to their treatment. For the purpose of determining whether or not patients follow to their treatment regimens, the Hill-Bone high blood pressure therapy compliance scale can be administered in Indonesian by medical professionals. This scale can be utilized in a range of settings, such as hospitals, nursing homes, home care, and public health centers. Further studies are recommended to evaluate the Hill-Bone high blood pressure therapy compliance scale among hypertensive patient groups from diverse ethnic backgrounds and with different educational levels. In addition, future research should consider assessing the scale using structural equation modeling.

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