

Translation and Validation of the Indonesian Version of the Hypertension Knowledge-level Scale

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Abstract

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BACKGROUND: Hypertension is a chronic disease that can cause cardiovascular complications. Hypertension in Indonesia increased from 25.8% in 2013 to 34.1% in 2018. This is an important concern to increase knowledge and understanding of hypertension. Knowledge level of hypertension is one of the factors that influenced adherence to the lifestyle and treatment of hypertension.

AIM: This study aimed to develop a questionnaire instrument to measure the level of hypertension knowledge, namely the Indonesian version of the hypertension knowledge-level scale (HK-LS) questionnaire. HK-LS consisted of 22 statement items which were divided into five dimensions, namely definition, medical treatment, drug compliance, lifestyle, diet, and complication.

METHODS: Data collection was carried out in May 2020 from five community health centers in Surabaya, East Java, with a total of 245 respondents. The HK-LS questionnaire carried out the translation process, including initial translation, expert panel, back translation, expert committee, pre-testing, validity, and reliability of the final version of HKLS.

RESULTS: Based on the validity test, it was known that all HK-LS statement items were valid. For the reliability test, it was known that the Cronbach alpha coefficient of hypertension was 0.758 and non-hypertension was 0.858. The discriminative validity test showed that HKLS scores between the two groups of respondents were statistically significant.

CONCLUSIONS: Translation and validation results show that it was known that the Indonesian version of the HK-LS questionnaire was valid and reliable for the target population.

Introduction

Hypertension is a disease that has risk factors for cardiovascular disease [1]. Hypertension is a chronic disease with an increase in arterial blood pressure [2]. The diagnosis of hypertension is made on twice measurements with intervals of 5 min in a state of rest/calm, and it is considered as hypertension if the systolic blood pressure (SBP) is ≥ 140 mmHg and the diastolic blood pressure (DPB) pressure is greater than or equal to 90 mmHg in patients without diabetes. Meanwhile, the SBP is ≥ 130 mmHg and DPB is ≥ 80 mmHg in patients with diabetes [3]. Based on JNC 8, therapeutic output in the age group ≥ 60 years, the blood pressure value is $<150/90$ mmHg, while in the age group < 60 years, the blood pressure value is $<140/90$ mmHg [4].

Hypertension is able to cause complications such as chronic kidney disease, heart disease, and stroke [1]. At present, hypertension is a big challenge in Indonesia because it is often found in primary health care. Based on a national basic health research survey in 2013, the incidence of hypertension in Indonesia was ranked 6 out of 10 categories of chronic non-communicable diseases. The prevalence

of hypertension in Indonesia, according to national basic health research in 2018, increased from 25.8% to 34.1%. Based on these data, it is very important to increase knowledge and understanding of hypertension in terms of disease, treatment, and lifestyle so that it is expected to provide increasing adherence in consuming drugs and implementing a healthy life. One way to increase understanding is to increase patient and community knowledge about hypertension. A study about knowledge stated that poor knowledge and lack of confidence of patients in the treatment of hypertension were one of the factors that affected the quality of life of patients [5]. The knowledge included the acquisition of information and skills gained from learning and experience [6].

Research from Turkey by Erkoc *et al.* [7] developed the hypertension knowledge level scale (HK-LS) questionnaire to measure/evaluate the level of adherence regarding hypertension. The original version of this questionnaire was published in English in 2012 and had been translated and used in several countries. HK-LS is used in several countries, including Iran, to measure the knowledge of hypertension, treatment, and control of hypertension [8]. Translation and cultural adaptation were able to be done when using

instruments from different countries [9]. HK-LS had been translated into Arabic to measure the adherence of hypertensive patients [6]. The HK-LS instrument had also been adapted in Greek by Chatziefstratiou *et al.* [10], Polish by Jankowska-Polanska [8], and in Brazilian by Arthur *et al.* [9]. As far as the researchers concerned, no one had developed the Indonesian version of the HK-LS questionnaire. The purpose of this study was to translate and evaluate the validity and reliability of the HK-LS (Hypertension Knowledge-Level Scale) so that it could be adapted or used in Indonesia. The development of the Indonesian version of the HK-LS instrument was used to assess respondents' knowledge in understanding what is meant by hypertension, lifestyle, medical care, medication compliance, and hypertension complications.

Participants and Methods

Participants

Participants in this study were hypertension patients and non-hypertension individuals from five community health center in Surabaya, Indonesia. In this study, HK-LS instruments were translated into Bahasa and were validated and tested for reliability; patients medical records, inform consent, and respondent consent were the subject of the study.

Methods

This HK-LS translations and validation study was conducted in May 2020. The subjects of this study were adult hypertension patients (≥ 20 years) from five community health centers in Surabaya, Indonesia. Before the validation test, a pre-test was conducted on 30 respondents, while for the validation and reliability test was for 185 respondents of hypertensive patients and 56 non-hypertensive individuals who were following the inclusion and exclusion criteria. The questionnaire was given online through a link (Google form) or link sent directly to the patient's phone number or WhatsApp application, which had previously been explained about matters relating to the study, on respondents who are willing to participate in this research. This study had received ethical worth from the Ethics Committee of the Faculty of Public Health, Airlangga University, with number: 100/EA/KEPK/2020.

Inclusion criteria

1. Patients receiving antihypertensive drugs (hypertensive patients) and non-hypertensive individuals with age ≥ 20 years
2. Indonesian citizen

3. Having the ability to understand and use the Bahasa fluently
4. Having the ability to read
5. Willing to be contacted by telephone or text message for the research process.

Exclusion criteria

1. Pregnant woman
In this study, researchers had received permission from the author of the HK-LS instrument, the English version of Erkoc *et al.* [7], to carry out language transfer and validation into Bahasa. Based on Erkoc *et al.* [7], consisting of 22 statements which were divided into six sub-dimensions, namely:

Definitions	: Items 1 and 2
Medical treatment	: Items 6, 7, 8, and 9
Drug adherence	: Items 3, 4, 5, and 12
Lifestyle	: Items 10, 11, 13, 16, and 17
Diets	: Items 14 and 15
Complications	: Items 18, 19, 20, 21, and 22

Each statement was designed with an answer Likert-style scale, with three answer choices which are "true," "false," and "do not know." The maximum score was 22, where the score was obtained when the respondent answered all statements correctly [8].

The translation process was adapted to international guidelines [11], [12]. Recommended language transfer stages included in the study:

1. Initial translation (forward translation)
The HK-LS instrument in this study was translated by two translators. The first translator was from a health professional who was familiar with the terminology area discussed in the HK-LS instrument, understood the culture and native language of the instrument (English), and target language (Indonesian language/Bahasa). This initial translation process conducted by translators of a health professional who had lived in English-speaking countries and had experienced developing questionnaires, but the native language is Bahasa. The second translator was a translator who had lived in English-speaking countries but non-health professionals.
2. Expert panel
This process was carried out to discuss the results of the forward translation.
3. Back translation
This process was the process of re-translating the HK-LS instrument from Bahasa to the native language of the instrument (English). Backward translation was done by two translators, including one translator was from the observed instrument area and one independent (sworn) translator.
4. Expert committee
The results of forwarding and backward translation were discussed with expert panels. They

were two translators, two pharmacists, and one clinician to obtain the final translated version of the instrument which was correct semantically, idiomatically, and conceptually.

5. Pre-testing

This step was the first step in testing. In this study, the testing was conducted on 30 (consist of male and female) respondents of hypertensive patients who were willing to take this pre-test and came from different socioeconomic groups. From this pre-test, it was seen that if some difficult words were not equivalent in meaning between the source language and target language in the translated questionnaires, the researchers replaced the words in the Indonesian version that has equivalent meaning with the original instrument.

6. The final version of validity and reliability (use instrument in target language)

The final results of the translation were tested for validity and reliability. In this study, the construct validity test was carried out through statistical methods and discriminative validity. Replenishment of reliability was done through internal testing, test-retest reliability.

Statistical analytics

- a) Test the Pearson correlation product-moment validity
- b) Internal consistency.

Cronbach alpha coefficients were measured to determine instrument reliability.

c) Test-retest reliability.

Test-retest reliability was to assess how stable the instrument to be used at different times. In this study, the test-reliability test was conducted on the same respondent in 2 weeks after the first instrument was given. Spearman rank correlation coefficient was used to assess the level of acceptance between tests and re-tests.

d) Discriminative validity.

Discriminative validity in this study compared the two HKLS group scores of hypertensive and non-hypertensive subjects [7], [10]. It was conducted by comparing scores between groups of subjects with hypertension and non-hypertension. Statistical analysis in this study used SPSS 23 software

Results

Sample

The sociodemographic characteristic of this research showed in Figures 1 and 2.

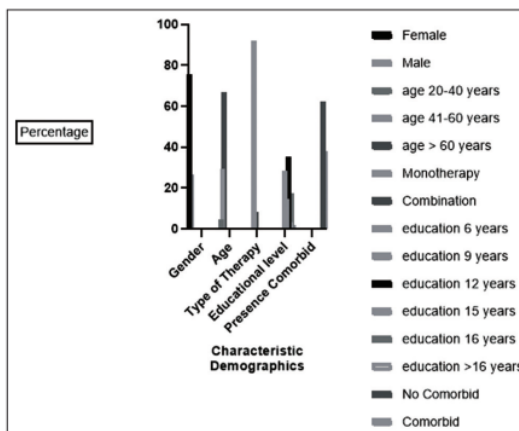


Figure 1: Percentage of baseline characteristic in hypertension patients

Hypertensive sample

The sociodemographic characteristics of each sample showed in Figure 1.

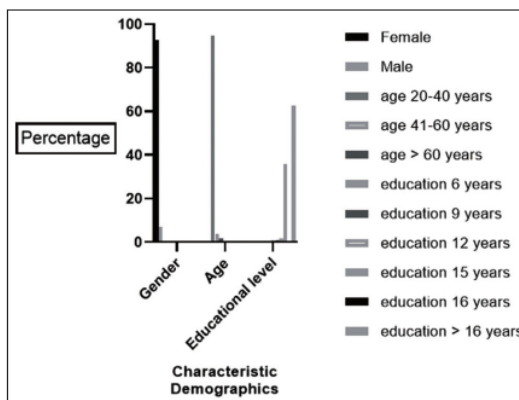


Figure 2: Baseline characteristic of non-hypertensive individuals

Non-hypertensive sample

The sociodemographic characteristics of each non-hypertensive sample is showed in Figure 2.

Concurrent validity

The validity test of the Pearson product-moment correlation used the principle of correlating or linking each statement item score with the total score of respondents' answers to the questionnaires. Statement items were stated valid if the value of the Pearson product-moment correlation (r) was greater than the r table calculated in the Pearson correlation [13]. R table for the number of hypertensive samples 185 (n) was equal to 0.2632 and r table for the number of non-hypertensive subjects 56

Table 1: Pearson correlation product moment

Sub-dimension item	Pearson correlation hypertension samples (r count)	Pearson correlation non-hypertension samples (r count)	Validity with R table hypertensive samples 185 (n) (0.2632) non-hypertensive samples 56 (n) (0.1443) valid (r table < r count)
Definition			
1. Tekanan darah tinggi diastolik atau sistolik mengindikasikan peningkatan tekanan darah.	0.348	0.646	Valid
2. Tekanan darah diastolik yang meningkat juga mengindikasikan peningkatan tekanan darah.	0.307	0.603	Valid
Medical treatment			
3. Individu dengan tekanan darah yang meningkat harus minum obat, karena anda percaya itu adalah cara yang terbaik	0.273	0.603	Valid
4. Obat untuk tekanan darah yang meningkat harus diminum setiap hari	0.328	0.642	Valid
5. Individu dengan tekanan darah yang meningkat harus minum obat mereka hanya ketika mereka merasa sakit.	0.529	0.512	Valid
6. Individu dengan tekanan darah yang meningkat harus minum obat sepanjang hidupnya.	0.479	0.533	Valid
Drug compliance			
7. Tekanan darah yang adalah hasil dari pnuanan, jadi perawatan tidak perlu dilakukan.	0.383	0.467	Valid
8. Jika obat untuk tekanan darah yang meningkat dapat mengontrol tekanan darah, maka tidak perlu mengubah gaya hidup	0.393	0.393	Valid
9. Jika individu dengan tekanan darah yang meningkat mengubah gaya hidup mereka, maka tidak perlu perawatan	0.441	0.733	Valid
10. Individu dengan tekanan darah yang meningkat dapat makan makanan asin selama mereka minum obat secara teratur	0.367	0.383	Valid
Lifestyle			
11. Untuk individu dengan tekanan darah yang meningkat, metode memasak terbaik adalah menggoreng.	0.428	0.433	Valid
12. Untuk individu dengan tekanan darah yang meningkat, metode memasak terbaik adalah merebus atau memanggang.	0.349	0.621	Valid
13. Individu dengan tekanan darah yang meningkat harus sering makan buah dan sayuran	0.285	0.354	Valid
14. Individu dengan tekanan darah yang meningkat tidak boleh merokok.	0.350	0.349	Valid
15. Individu dengan tekanan darah yang meningkat dapat minum minuman beralkohol.	0.277	0.330	Valid
Diet			
16. Jenis daging terbaik untuk individu dengan tekanan darah yang meningkat adalah daging merah (sapi, kambing)	0.181	0.371	Valid
17. Jenis daging terbaik untuk individu dengan tekanan darah yang meningkat adalah daging putih (unggas)	0.244	0.495	Valid
Complications			
18. Tekanan darah yang meningkat dapat menyebabkan stroke, jika tidak ditangani	0.475	0.278	Valid
19. Tekanan darah yang meningkat dapat menyebabkan penyakit jantung, seperti serangan jantung, jika tidak ditangani.	0.408	0.341	Valid
20. Tekanan darah yang meningkat dapat menyebabkan kematian dini jika tidak ditangani.	0.537	0.622	Valid
21. Tekanan darah yang meningkat dapat menyebabkan gagal ginjal, jika tidak ditangani.	0.305	0.603	Valid
22. Tekanan darah yang meningkat dapat menyebabkan gangguan penglihatan, jika tidak ditangani.	0.417	0.644	Valid

(n) was equal to 0.1443 (95% confidence interval). The value of r count Pearson correlation of each item HK-LS statement was more than r table; this showed that each item HKLS statement was valid (Table 1).

Internal consistency

The Cronbach alpha coefficient in this study was 0.758 hypertensive samples and 0.858 non-hypertensive samples ($p < 0.05$), with Cronbach alpha values per item HK-LS instrument, showed in Table 2.

Test-retest reliability

The results of the test-retest reliability HKLS score of hypertensive patients from the first and second reliability testing had a positive correlation. Spearman's test resulted in correlation analysis, obtained r was equal to 0.890, while non-hypertensive respondents obtained r was equal to 0.96 ($p < 0.05$). Scatter plot of the HK-LS test and re-test scores showed in Figure 3.

Discriminative validity

Discriminative validity in this study compared two groups of HK-LS scores, the hypertensive and non-hypertensive respondent groups. From the results of

the Mann–Whitney test conducted, it obtained a Mann–Whitney value of 3805 with $p < 0.05$.

Discussion

According to the study of Sharma *et al.* [14], a patient's ability to adhere to disease management guidelines depends on the patient's educational background and information about disease management. Respondent's knowledge was influenced by many factors such as experience and information facilities. Furthermore, knowledge of hypertension affects the success of the treatment. It involves several non-pharmacological approaches such as dietary adjustments, physical exercise, and blood pressure monitoring [14]. Knowledge of hypertension can affect blood pressure control, such as knowledge on blood pressure target management, dietary habit, lifestyles, exercise, salt intake, complications, and hypertension treatment [15]. Good knowledge of hypertension would affect patient adherence in taking medications. It would affect the patient's blood pressure so that complications, such as coronary heart disease and chronic renal disease, do not occur in the patient. This disease can be prevented when risk factors are controlled. Meanwhile, prevention is

Table 2: Cronbach alpha items of HKLS

Sub-dimension item	Cronbach Alpha per items HK-LS Hypertensive samples	Cronbach Alpha per items HK-LS Non- Hypertensive samples	Reliability (Cronbach alpha > 0.7)
Definition			
1. Tekanan darah tinggi diastolik atau sistolik mengindikasikan peningkatan tekanan darah.	0.76	0.846	Reliable
2. Tekanan darah diastolik yang meningkat juga mengindikasikan peningkatan tekanan darah.	0.765	0.849	Reliable
Medical treatment			
3. Individu dengan tekanan darah yang meningkat harus minum obat, karena anda percaya itu adalah cara yang terbaik	0.739	0.849	Reliable
4. Obat untuk tekanan darah yang meningkat harus diminum setiap hari	0.754	0.847	Reliable
5. Individu dengan tekanan darah yang meningkat harus minum obat mereka hanya ketika mereka merasa sakit.	0.744	0.852	Reliable
6. Individu dengan tekanan darah yang meningkat harus minum obat sepanjang hidupnya.	0.751	0.852	Reliable
Drug compliance			
7. Tekanan darah yang adalah hasil dari penuaan, jadi perawatan tidak perlu dilakukan.	0.747	0.854	Reliable
8. Jika obat untuk tekanan darah yang meningkat dapat mengontrol tekanan darah, maka tidak perlu mengubah gaya hidup	0.732	0.856	Reliable
9. Jika individu dengan tekanan darah yang meningkat mengubah gaya hidup mereka, maka tidak perlu perawatan	0.752	0.843	Reliable
10. Individu dengan tekanan darah yang meningkat dapat makan makanan asin selama mereka minum obat secara teratur	0.748	0.858	Reliable
Lifestyle			
11. Untuk individu dengan tekanan darah yang meningkat, metode memasak terbaik adalah menggoreng.	0.756	0.855	Reliable
12. Untuk individu dengan tekanan darah yang meningkat, metode memasak terbaik adalah merebus atau memanggang.	0.755	0.848	Reliable
13. Individu dengan tekanan darah yang meningkat harus sering makan buah dan sayuran	0.758	0.856	Reliable
14. Individu dengan tekanan darah yang meningkat tidak boleh merokok.	0.758	0.857	Reliable
15. Individu dengan tekanan darah yang meningkat dapat minum minuman beralkohol.	0.761	0.858	Reliable
Diet			
16. Jenis daging terbaik untuk individu dengan tekanan darah yang meningkat adalah daging merah (sapi, kambing)	0.746	0.859	Reliable
17. Jenis daging terbaik untuk individu dengan tekanan darah yang meningkat adalah daging putih (unggas)	0.765	0.854	Reliable
Complications			
18. Tekanan darah yang meningkat dapat menyebabkan stroke, jika tidak ditangani	0.746	0.860	Reliable
19. Tekanan darah yang meningkat dapat menyebabkan penyakit jantung, seperti serangan jantung, jika tidak ditangani.	0.744	0.857	Reliable
20. Tekanan darah yang meningkat dapat menyebabkan kematian dini jika tidak ditangani.	0.736	0.848	Reliable
21. Tekanan darah yang meningkat dapat menyebabkan gagal ginjal, jika tidak ditangani.	0.737	0.849	Reliable
22. Tekanan darah yang meningkat dapat menyebabkan gangguan penglihatan, jika tidak ditangani.	0.732	0.847	Reliable

a mandatory effort in maintaining independent health. To support this, it is necessary to test individual knowledge of hypertension. It needs to develop an instrument to improve understanding of hypertension from both the things needed to be done and avoided (poor lifestyle) as well as adherence to the consumption of antihypertensive drugs in hypertensive patients. Management and control of hypertension are very possible, with a combination of treatments and lifestyle changes [14].

Qualitative adherence measurement can be taken as an initial screening of the adherence level of hypertensive patients. It is not only carried out to check drug-taking behavior but also used to assess beliefs and barriers related to adherence [16]. One of the qualitative method approaches is a questionnaire, which is cheap, feasible, easy to use, and reliable [17]. Therefore, the improved instrument in this research is a questionnaire used to assess the level of knowledge of hypertension to be given a change/intervention on the knowledge. Based on the research done by Nadeem *et al.* [18], knowledge of qualified hypertension is able to improve blood pressure control. Other studies stated that a low level of knowledge triggered the non-adherence of hypertensive patients to consume the hypertension drugs [19].

This study aimed to translate and validate the HK-LS Indonesian version. The translation process for the Indonesian version of the HK-LS questionnaire used the international guidelines recommended by the World Health Organization [12]. Among them, through the forward/initial translation stage which was carried out by at least two independent translators who have the same mother tongue as the target language. The second stage is the expert panel discussion stage, which is the stage to discuss the translation results of the initial translation. The third stage is the backward translation, where the questionnaire was translated back from the target language (Bahasa) to the original language of the questionnaire (English). This stage aimed to find out whether there is a difference in the meaning of the translated language (Indonesian as the target language) and the meaning of each questionnaire item in the original language (English). In this stage, it was found words or sentences that are not clear at the initial translation stage. The choice of words on the questionnaire was adapted to the culture of the target language. The fourth stage is the expert committee. The stage of discussion was conducted between experts who have been experienced in translation and questionnaire development. As the result, the final translation was deemed correct according

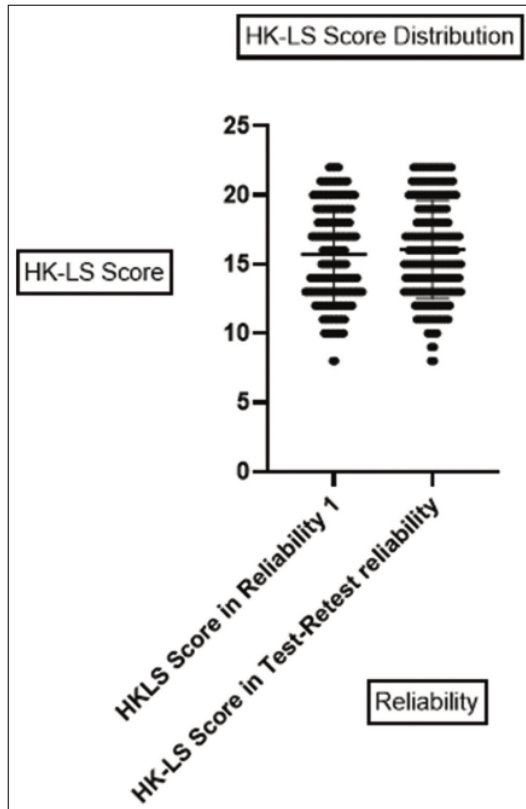


Figure 3: Test and re-test score HK-LS hypertension and non-hypertension samples

to the target culture and language [12]. The next stage was the pre-testing stage, which is the stage of testing the translation result questionnaire from the results of the expert committee discussion.

The most critical process in the translation process is the pre-test process because in this process the choice of words and sentences used was noticed whether it was correct or not. The pre-test process is very important to see if the grammatical improvement and selection of words were appropriate to the culture and the understanding of patients [20]. The next stage is the questionnaire validation process. This stage is to see statistically whether the translated questionnaire is valid and reliable [12].

The translation and validation methods in this study were used to ensure the selection of correct and comprehensive words and sentences. In fact, the results showed that this instrument is usable and understandable [9]. To assure if a questionnaire containing valid and reliable statement items of measurement of behavior or knowledge, validation process is worth conducted [20]. Meanwhile, to assess the consistency of survey results, a reliability test was also taken place. This test needs to be done to check

whether errors in sampling, changes in respondents, and differences between the raters exist. The reliability or consistency of the questionnaire can be evaluated using internal consistency, test-retest reliability, and inter-rater reliability, respectively [20]. This study carried out test and re-test reliability to see whether the questionnaire gave relatively consistent results between different time measurements for each individual [21], [22]. The Indonesian version of the validation and reliability process of HK-LS was followed by 241 respondents consisting of 185 hypertensive patients and 56 non-hypertensive patients with demographic characteristics showed in Figure 1 and Figure 2. The majority of hypertensive respondents who participated in this study were 75.51% female; gender also influenced knowledge because females have ways of thinking and acting as well as focus on addressing problems [23]. Meanwhile, the age group of > 60 years reached 66.48%. Age is also one of the factors affecting the patient's knowledge of a healthy lifestyle. Most of those who suffered from hypertension were caused by unhealthy eating patterns [24]. Furthermore, educational background happens to be one of the causes, where those that received formal education for 12 years were at most 35.13%. Patients without co-morbidities had the highest percentage (62.16%). The co-morbid disease found was diabetes mellitus, heart disease, and stroke. The majority of non-hypertensive patients was women and those who did not have a history of co-morbid disease.

Furthermore, the results of the validity and reliability test can also be used to assess the possibility and feasibility of this instrument for the next target population. Another validity test was to use Pearson correlation product moment, which compared the correlation value of each item of instrument statement with the total of all statement items, where all statement items were valid with r tests in hypertensive patients for all instrument items between 0.181 and 0.537. Meanwhile, for non-hypertensive patients, it was known that the r test obtained was between 0.278 and 0.733. Pearson product-moment correlation value of 2 groups was more than r table. This showed that each item of the HK-LS questionnaire statement is valid.

Internal consistency in this study was to see how reliable HK-LS instrument items are able to be used. Instrument items are said to be reliable and accepted if the value of the alpha Cronbach coefficient is ≥ 0.6 ($p < 0.05$). Based on the results of the reliability test, it was known that the alpha Cronbach total of all instrument items in hypertensive patients was 0.758 and non-hypertension was 0.858. The Cronbach alpha of each HK-LS instrument item is listed in Table 2. These results were different from the original version of Erkoc *et al.* [7], which reached 0.82. However, this result showed that the questionnaire is reliable and able to be used in the target population in Indonesia.

Test-retest reliability was done to give the same questionnaire to the same respondent at different

times. The higher the correlation value, the higher the level of reliability is. Re-test reliability was done after 2 weeks of performing a reliability test to the same respondent. Comparing the results of the HKLS score between reliability 1 and re-test reliability (2) using the Spearman Rank Correlation analysis obtained in hypertensive patients, the value of r was equal to 0.890 and non-hypertension obtained r was equal to 0.965 ($p < 0.05$). These results confirmed that HK-LS instrument items could be used for the target group in Indonesia.

Discriminative validity in this study was carried out by comparing the two groups of HK-LS scores of hypertensive patients with co-morbidities and without co-morbidities. The discriminative validity test used the Mann-Whitney test of 3805 with $p < 0.05$. It indicates that there were significant differences between the two groups of HK-LS scores. The weakness of this study was the limited respondents. In the future, this study can be used as part of the initial research, after which further research could be done to see the level of knowledge about hypertension and the factors that influenced the level of knowledge.

Conclusion

Based on translation and validation, it was known that the Indonesian version of HK-LS was valid and reliable for the target population of hypertensive patients so that this instrument was able to be used such as in community health centers, hospitals, and the general public.

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