Clinical Research

Cultural adaptation and validation of the Indonesian version of Composite Autonomic Symptom Score-31

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ABSTRACT

BACKGROUND The prevalence of autonomic nervous system disorders is increasing due to the complications of chronic illnesses that become more severe with age. The Composite Autonomic Symptom Score-31 (COMPASS-31) is a questionnaire that assesses autonomic function and has been utilized globally. This study aimed to conduct cultural adaptation and validation of the COMPASS-31 in Indonesia, particularly for the elderly.

METHODS This cross-sectional study involved elderly individuals aged 60 years and older. The process included translation, cultural adaptation, back-translation, and reliability tests. The COMPASS-31 questionnaire was translated from English to Indonesian by a certified translator, a native Indonesian speaker without medical background. A panel of experts comprising a neurologist, a gerontologist, and a physiologist discussed the translated questionnaire and made cultural adaptations. Facial and content validity tests were conducted on 11 elderly individuals. The inputs for revision are discussed by the expert panel. The questionnaire was then back-translated into English by a native English speaker, professional translator, without a medical background. The questionnaire was checked for reliability in 52 elderly subjects. Reliability testing was conducted separately for the binomial and polynomial questions of the COMPASS-31 questionnaire.

RESULTS The reliability test yielded a Cronbach's alpha of 0.729 for the binomial questions and 0.722 for the polynomial questions, indicating high reliability.

CONCLUSIONS The Indonesian version of COMPASS-31 questionnaire is a valid and reliable symptom assessment tool for use in the elderly.

KEYWORDS aging, autonomic disorders, autonomic nervous system diseases, surveys and questionnaires

Globally, the proportion of the population aged 65 years or older increased from 6% in 1990 to 9.3% in 2020. This proportion is projected to increase by 16% by 2050. In 2021, the Indonesian elderly population accounted for 10.82%, or approximately 29.3 million people. This indicates that Indonesia has entered an aging population phase, defined by individuals aged 60 years and above comprising more than 10% of the total population.[1] Studies have found that the prevalence of autonomic symptoms increases with age, leading to physical and emotional discomfort and declines in quality of life.[2] Therefore, routine evaluation of autonomic nerve function is important for screening and preventing complications in elderly people in the Indonesian population.

One tool for assessing autonomic nerve function is the Composite Autonomic Symptom Score-31 (COMPASS-31) questionnaire,[3] which has been extensively researched, modified, and utilized globally.[4] However, a cultural adaptation of COMPASS-31 has not

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yet been conducted in Indonesia. The availability of the Indonesian version of COMPASS-31 will help clinicians in Indonesia evaluate autonomic disorder symptoms, enabling more comprehensive management. This study aimed to culturally adapt and validate the Indonesian version of COMPASS-31.

METHODS

This study used a cross-sectional design to adapt and culturally validate the Indonesian version of COMPASS-31. Cultural adaptation followed standard procedures based on consensus-based standards for selecting health measurement instruments recommendations for the cross-cultural adaptation of patient-reported outcome measures, including translation, expert review, cultural adjustment, cognitive testing, back-translation, and reliability evaluation.

The study participants were community-dwelling elderly individuals aged 60 years and above without apparent cognitive impairments. Cognitive function was assessed using the clock drawing test (CDT). The tests included face and content validity.

The first stage of the study involved translating the COMPASS-31 questionnaire from English to Indonesian by a certified translator who was a native Indonesian speaker without any medical background, from the Language Training Center (*Pusat Pelatihan Bahasa*, PPB) of Universitas Kristen Duta Wacana. In the second stage, the researchers – neurologists, gerontologists, and physiologists – came together to discuss and reach a consensus on the translated version. The translated version was reviewed and discussed to evaluate the conceptual equivalence and cultural relevance of its translated items.

The third stage involved testing the Indonesian version on 11 respondents. Cognitive interviewing is a qualitative technique used to explore how respondents interpret, understand, and respond to questionnaire items during cross-cultural adaptation. Its primary goal was to perform evaluation in a manner that was easy to understand rather than producing quantitative data.[5] Many studies employ small samples for cognitive interviews, typically around 5–10, and consider this sufficient as long as the respondents are purposively selected to represent the target population.[6] The researchers again discussed the results to assess the face validity of the translated questionnaire.

After revision completion, the questionnaire was back-translated into English by a native English speaker and professional translator (DW) without a medical background, to verify the consistency of meaning between the translated version and the original questionnaire. The reliability of the adapted version of COMPASS-31 was also evaluated.

Formal permission for translation and cultural adaptation was obtained from Dr. Wolfgang Singer at the Mayo Clinic prior to development of the COMPASS-31 questionnaire used in this study. The validated questionnaire consisted of three types of questions: binomial (numbers 1, 5, 9, 10, 16, and 20), polynomial (numbers 8, 11, 12, 13, 14, 15, 24, 25, 26, 27, and 31), and facultative (numbers 2, 3, 4, 6, 7, 17, 18, 19, 21, 22, 23, 28, 29, and 30). The presentation of facultative questions depended on the answers to the preceding questions. Separate reliability tests were conducted using binomial and polynomial sets of questions.

We conducted the Kaiser–Meyer–Olkin (KMO) validity test for dichotomous questions on 52 people, which produced a KMO value of 0.782; thus, the sample size was sufficient for risk analysis. The respondent-to-item ratio was 8.67:1, which exceeded the minimum ratio of 5:1.[7] The KMO validity test for polytomy questions showed a KMO value of 4.73:1. This indicated that the ratio for 52 respondents was close to the minimum value of 5:1. To achieve the minimum respondent-to-item ratio, the expected number of respondents was 55.

The study protocol was approved by The Ethics Committee of Health Research, Faculty of Medicine, Universitas Kristen Duta Wacana Yogyakarta, approved the study protocol (No:1424/C.16/FK/2022). All the participants provided written informed consent.

RESULTS

The COMPASS-31 questionnaire was translated into Indonesian and subsequently reviewed by an expert panel consisting of neurologists, gerontologists, and physiologists. During the cultural adaptation process, several items were evaluated and adjusted to improve their clarity and cultural relevance.

Question 28 was initially modified from "How sensitive are your eyes to bright light?" to "How much does bright light bother you?" considering accuracy and cultural relevance. The Indonesian questionnaire was then tested on 11 elderly individuals who were

asked to provide feedback regarding the questionnaire. The respondents indicated that question 28 was confusing; therefore, it was decided to return to the original version. There was also an inquiry about the term 'colic' in question 15. Researchers decided to replace 'colic' with 'abdominal cramps' or 'intermittent gripping abdominal pain' for better understanding. In the fourth step, sentences or words that were not well understood were discussed. Eleven study participants provided comments on the revised questionnaire and agreed that it was clearer and easier to understand than the previous version. Finally, the questionnaire was back-translated into English by a professional translator who confirmed that the Indonesian version conveyed the same meaning as the original English questionnaire.

A reliability test was conducted for the adapted version of COMPASS-31. A total of 52 participants (aged 60–98 years) successfully completed the CDT screening test and showed no signs of cognitive impairment. The characteristics of the 52 respondents are presented in Table 1. Table 2 presents the results of the reliability tests for each question. The reliability test yielded Cronbach's alpha values of 0.729 and 0.722 for binomial and polynomial questions, respectively, indicating acceptable internal consistency of the Indonesian version of COMPASS-31 questionnaire.

Table 1. Characteristic of respondents

Variables	n (%) (N = 52)
Age (years)	
60–69	21 (40)
70–79	19 (37)
80–98	12 (23)
Sex	
Male	15 (29)
Female	37 (71)
Education	
Elementary school	16 (31)
Junior high school	20 (38)
Senior high school	11 (21)
College	5 (10)
Self-reported diseases	
Yes	36 (69)
No	16 (31)
Comorbidity	
Hypertension	24 (46)
Heart disease	2 (4)
Hyperuricemia	2 (4)
Allergy	1 (2)
>1 comorbidity	6 (11)
>2 comorbidity	17 (33)
Medication	
Taking medication regularly	
Yes	29 (56)
No	23 (44)

DISCUSSION

The findings indicate that the Indonesian version of the questionnaire was generally well understood by the respondents after minor wording adjustments. The reliability analysis also showed acceptable internal consistency, with Cronbach's alpha values of 0.729 and 0.722 for the binomial and polynomial questions, respectively. These results suggest that the Indonesian version of COMPASS-31 is a reliable tool for assessing autonomic symptoms in older Indonesian adults.

COMPASS-31 was created based on the original version, COMPASS, which was created from the autonomic symptom profile. This involved reducing the total number of questions from 169 to 31.[8] After several revisions, the COMPASS-31 questionnaire was found to be internally consistent, extremely succinct, and user-friendly. COMPASS-31 is divided into six domains: four questions on orthostatic disorders, three questions on vasomotor function, four questions on secretomotor function, 12 questions on gastrointestinal function, three questions on bladder function, and five questions on pupillomotor function. COMPASS-31 has been applied to evaluate the autonomic nervous system (ANS) in individuals with various conditions, including polyneuropathy, diabetes mellitus (DM), systemic sclerosis, fibromyalgia, multiple sclerosis, and Parkinson's disease.[10] The COMPASS-31 questionnaire is a self-administered tool for assessing autonomic disorders in both research and clinical settings and assists clinicians in their identification.[11] Buoite Stella et al[12] have reported that COMPASS-31 can monitor symptoms of ANS disorders due to complications in coronavirus disease (COVID) 2019 patients. Additionally, COMPASS-31 has been used to compare patients with and without autonomic disorders. Research by Brinth et al[13] in Denmark, which included validation tests, revealed a strong correlation between the English and Danish versions in all sections. As

Table 2. Reliability test for each question

Question number	Questions	Cronbach's alpha
Binomial questions		
1	Over the past year, have you felt faint, dizzy, or disorientated immediately or soon after getting up from a sitting or lying position? (*Dalam setahun terakhir apakah Anda pernah merasa ingin pingsan, pusing, atau bingung setelah berubah posisi dari duduk atau berbaring ke berdiri*?)	0.746
5	Over the past year, have you noticed any discoloration in your skin e.g., red, white, or purple? (*Dalam setahun terakhir, apakah Anda pernah memperhatikan perubahan warna pada kulit Anda, seperti merah, putih, atau ungu*?)	0.663
9	Do your eyes feel very dry? (*Apakah mata Anda terasa sangat kering*?)	0.685
10	Does your mouth feel very dry? (*Apakah mulut Anda terasa sangat kering*?)	0.664
16	Over the past year, have you had diarrhea? (*Dalam setahun terakhir, pernahkah Anda mengalami diare*?)	0.720
20	Over the past year, have you suffered from constipation? (*Dalam setahun terakhir, pernahkah anda mengalami sulit buang air besar*?)	0.674
Polynomial questions		
8	Over the past 5 years, what kind of changes, if any, have occurred when you sweat? (*Dalam 5 tahun terakhir perubahan apa, jika ada, yang terjadi saat Anda berkeringat*?)	0.701
11	When experiencing dry eyes and dry mouth over a long period of time, how would you describe the symptoms? (*Untuk gejala mata kering atau mulut kering yang telah Anda alami dalam waktu yang paling lama, bagaimana kecenderungan gejala tersebut*?)	0.754
12	Over the past year, have you noticed any changes regarding how soon you become full when eating? (*Dalam setahun terakhir, apakah Anda memperhatikan adanya perubahan terkait seberapa cepat Anda menjadi kenyang saat makan*?)	0.702
13	Over the past year, have you felt very full and/or continued to feel full (bloated) long after eating? (*Dalam setahun terakhir, apakah Anda merasa sangat kenyang atau terus menerus kenyang [begah] setelah makan*?)	0.690
14	Over the past year, have you ever vomited after eating? (*Dalam setahun terakhir, apakah Anda pernah muntah setelah makan*?)	0.690
15	Over the past year, have you had stomach cramps or colicky abdominal pain? (*Dalam setahun terakhir pernahkah Anda mengalami kram perut atau nyeri perut melilit yang hilang timbul dalam satu periode nyeri*?)	0.693
24	Over the past year, have you experienced any loss of bladder control? (*Dalam setahun terakhir, pernahkah Anda tidak mampu menahan kencing*?)	0.689
25	Over the past year, have you experienced any difficulty urinating? (*Dalam setahun terakhir, pernahkah Anda mengalami kesulitan saat buang air kecil*?)	0.689
26	Over the past year, have you experienced difficulty emptying your bladder completely? (*Dalam setahun terakhir, pernahkah Anda mengalami kesulitan untuk mengosongkan kandung kencing secara tuntas*?)	0.690
27	Over the past year, without dark or tinted glasses, have you noticed any sensitivity to bright light? (*Dalam setahun terakhir, tanpa kaca mata hitam atau berwarna, pernahkah cahaya terang menyilaukan mata Anda*?)	0.688
31	How would you describe the most disturbing symptoms (for example sensitivity to bright light or impaired vision)? (*Bagaimana Anda mendeskripsikan kecenderungan gejala yang paling mengganggu pada mata [misalnya sensitivitas terhadap cahaya terang atau gangguan memfokuskan pandangan]?)*	0.761

expected, COMPASS-31 scores were higher for patients than healthy individuals.[13]

The COMPASS-31 questionnaire has been effectively utilized in the evaluation of various autonomic dysfunctions and small nerve fiber disorders, and our research further extends its use to the elderly population without cognitive impairments.[14] The degree to which the measurement of a phenomenon yields consistent results is the focus of reliability testing. Testing for reliability is essential because reliability refers to the consistency of a measuring instrument. If all the scale's items "cohere" and measure the same construct, the scale is said to have high internal consistency reliability. Cronbach's alpha is the most frequently used measure of internal consistency and is commonly interpreted as indicating excellent (0.90 and above), high (0.70–0.90), moderate (0.50–0.70), or low (0.50 and below) reliability.[15]

Several studies have validated COMPASS-31 in different languages and clinical populations. Our research results are comparable to those of a study by Hilz et al[4] on the German version of COMPASS-31, which reported a Cronbach's alpha of 0.865. Similarly, validation studies conducted in other countries have reported good psychometric performance of the translated questionnaire. The Korean version of COMPASS-31 demonstrated good reliability and validity in patients with Parkinson's disease,[9] and studies from Turkey also reported satisfactory internal consistency after translation and cultural adaptation.[16] In our study, the Cronbach's alpha value indicated high reliability, with 0.729 for binomial questions and 0.722 for polynomial questions. This indicates that the instrument performed consistently across different cultural contexts. These findings support the cross-cultural applicability of COMPASS-31.

The Indonesian version of COMPASS-31, which has been culturally adapted and validated, offers several potential benefits. This tool provides an accessible and structured instrument for early detection of autonomic dysfunction in elderly individuals, enabling more comprehensive assessments in both primary and secondary healthcare settings. The validated scale allows for standardized measurements across various studies, thereby facilitating future research on conditions that may affect the ANS, such as DM, Parkinson's disease, neuropathy, and post-COVID syndrome. Additionally, this instrument can assist policymakers in understanding the burden of autonomic symptoms in Indonesia's rapidly aging population, contributing to the better planning of geriatric services. Ultimately, the validated Indonesian questionnaire can help older adults recognize symptoms earlier, potentially reducing the risk of falling, gastrointestinal complications, and bladder issues.

This study had some limitations. First, the adapted questionnaire was only tested on community-dwelling older adults aged 60 years and above; the research did not include inpatients. In the context of inpatient settings, factors such as clinical symptoms and the environment may alter an individual's understanding of certain questions. Second, our study did not include elderly individuals with cognitive impairment because cognitive deficits may interfere with language comprehension. Therefore, further studies are required to evaluate this tool in larger and more diverse populations. Third, we used a small number of respondents, precluding our assessment of test–retest reliability. However, this study provides evidence that the questionnaire is valid.

Conflict of Interest

The authors affirm no conflict of interest in this study.

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