Psychometric Properties of the Indonesian Version of the Speech Handicap Index

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Abstract

The evaluation of speech is important in dentistry, especially in prosthodontics, due to its impact on quality of life. This study aimed to analyze the psychometric properties of the Indonesian Speech Handicap Index (SHI). A cross-sectional study was conducted, and a self-administered questionnaire was disseminated to dental patients in a dental hospital in Indonesia. Internal consistency, test-retest reliability, discriminant validity, and convergent validity were examined to analyze the questionnaire. Furthermore, Mann–Whitney statistical tests were employed to analyze the data. Data were obtained from 32 subjects with an average age of 52.7 ± 16.1 years. The internal consistency of the Indonesian SHI was excellent (Cronbach's alpha = 0.976). The Indonesian SHI was found to be a reliable and valid clinical tool to measure speech handicap.

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Introduction

People with dentofacial abnormalities, even minor facial abnormalities, face a social stigma and experience social avoidance. Tooth loss is considered a hidden impairment and contributes to stress.[1] The World Health Organization states that individuals who are completely edentulous are analogous to persons who have lost part of their body, and they are considered to be physically impaired.[2–4] Edentulous patients have difficulties in socializing, eating, and speaking, and some of them experience increased levels of psychological and social distress. This condition can interfere with daily and professional activities, especially in professions such as teachers, actors, singers, and aviators.[4,5] Speech production, one of the basic oral cavity functions, is an important form of verbal communication in society.[4,6] Hence, there should be planned sessions to educate people regarding the importance of teeth and the consequences of not replacing the missing teeth.[7]

Disturbed articulation due to tooth loss can interfere with speech outcome; however, prosthetic treatment also leads to impaired articulation.[8] Studies on the role of dentures in speech production are still in development.[6,9,10] The result of speech performance can be assessed using various methods, including speech perception test, aerodynamic and acoustic test, and self-evaluation of speech adequacy in daily activity using questionnaires.[11] The questionnaire, a subjective tool, is used to achieve comprehensive assessment on an individual speech.[11] Subjective methods in speech intelligibility assessment using questionnaires need to be validated and their reproducibility should be precise.[11]

Speech production involves neural, muscular, aerodynamic, and auditory factors that contribute to sophisticated, autonomous, and unconscious activity. Hence, dentists should be aware of prosthetic treatment in relation to speech activity.[12] It is known that speaking with dentures requires practice. Also, speech problems arise in patients after head, neck, and laryngeal cancer therapy. To evaluate speech and psychosocial functions, a speech-specific questionnaire named the Speech Handicap Index (SHI) was developed by Rinkel et al. in 2008.[13] This index has been validated into numerous languages, including Dutch,[13] English,[14] French,[15] Chinese,[16] Korean,[17] Lithuanian,[18] and Italian.[19] Nonetheless, the Indonesian version of

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the SHI has not yet been studied. Therefore, the aim of this study was to test the psychometric properties of the Indonesian version of the SHI.

Materials and methods

The study was carried out according to the guidelines of Declaration of Helsinki. The study was performed in Indonesia and approved by the Ethics Committee of the Faculty of Dentistry, Universitas Indonesia, Jakarta, Indonesia (Protocol No. 070500622). The study reporting is in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guideline. Cross-cultural adaptation of the SHI into Indonesian was performed. Items of the English SHI were forward translated into Indonesia by a prosthodontics specialist dentist. A researcher familiar with instrument validation process examined semantic, idiomatic, and conceptual issues of the translation. Synthesis of an Indonesian version was obtained and was back translate into English. Then expert committee reviewed the instrument and minor modification were being made to improve readability. Furthermore, the internal consistency, test-retest reliability, discriminant validity, and convergent validity of the questionnaire were analyzed.

This questionnaire consists of several sections: informed consent, sociodemographic information, the SHI, a patient global rating question, and a dentist global rating question. Education attainment was categorized into two categories: basic and higher education levels.[20] The SHI originally includes 30 items.[13] However, a previous study stated that item numbers 22 and 23 had less contribution.[19] Thus, this study used 28 items. The SHI questionnaire is divided into two sections: psychosocial and functional aspects. The first 14 items represent psychosocial aspects, while the other 14 illustrate functional aspects. Responses of the SHI comprise five Likert scales (1, never; 2, occasionally; 3, some of the time; 4, most of the time; 5, all of the time). The higher the score, the greater the speaking disturbance recognized. The questionnaire included one global rating question of respondents' opinion regarding their daily speech and another global rating evaluation from the examiner. The respondent opinion was assessed by a five-point Likert scale, while examiner evaluation was rated by a dichotomous scale (i.e., whether the respondent had speech disorder or not).

The inclusion criteria were patients using acrylic or metal base complete denture either in both arch or single complete upper denture. All the respondents were ensured to have no physical, emotional, neurologic, or psychologic impairment. The respondents were recalled patients from the Prosthodontics Specialty Clinic at Dental Hospital, Universitas Sumatera Utara, Medan, Indonesia. A prosthodontics specialist dentist interviewed and conversed with the respondents to assess the global rating scale for voice disturbance, with good intra-examiner agreement (Kappa > 0.8). The self-administered questionnaire was filled out online using a Google form. Cronbach's alpha was used to analyze the internal consistency and correlation between the items. Discriminant validity was analyzed using the Mann–Whitney statistical test, comparing the total SHI score with the dichotomous response of the dentist global rating scale. Furthermore, convergent validity was assessed by correlating the total score of the SHI with the patient's perceived global scale using the Spearman correlation test.

Results

A total of 32 respondents participated in this study, with a response rate of 71%. The mean age of respondents was 56.8 ± 16.1 years, varying from 16 to 81 years old. There was no correlation between SHI and age. Respondents consisted of 43.8% males and 56.3% females. The data showed that most respondents stated their need for voice in their daily activities. Table 1 shows the comparison of SHI scores between the sociodemographic variables of the respondents.

Table 2 shows the results of the internal reliability of the SHI. The Cronbach's alpha was 0.976, indicating excellent internal consistency. All items showed corrected item to total correlation coefficients (CITCCs) greater than 0.3. Thus, all items in the questionnaire were reliable. Furthermore, external reliability using a test–retest analysis on three patients was examined and showed an intraclass correlation coefficient (ICC) of 0.947. Floor and ceiling effects were not apparent.

Variables (*n*, %)	Mean (SD)	*p*-Value*
Gender		
Male (14, 43.8)	1.58 (0.93)	0.560
Female (18, 56.3)	1.73 (0.98)	
Denture time of usage		0.660
More than 6 months of usage (13, 40.6)	1.77 (0.99)	
Less than 6 months of usage (19, 59.4)	1.60 (0.94)	
Education		0.460
Lower (14, 43.8)	1.58 (0.96)	
Higher (18, 56.3)	1.73 (0.96)	
Needs of voice in daily activities		
Sometimes (11, 34.4)	1.64 (1.20)	0.670
Always (21, 65.6)	2.00 (1.54)	

Table 1. Analysis of SHI between sociodemographic variables of the respondents (*N* = 32).
*Mann–Whitney test.

The discriminant validity of the SHI was analyzed by comparing the dichotomous response of the dentist's objective scale to the total SHI score. The Mann–Whitney U test showed a significant difference (p = 0.010) between the categories. Therefore, the SHI was able to discriminate between those who had speech disorders and those who did not. Furthermore, convergent validity was assessed by correlating the total score of SHI and the patient's perceived global scale using the Spearman correlation test. The test showed a strong and statistically significant correlation. The findings of this study showed that the Indonesian version of the SHI is a valid and reliable tool for detecting speech handicap.

Discussion

The SHI, which evaluates speech and psychological functions, is a valid and reliable tool in speech disability assessment.[11,15,19] The SHI has been validated in many languages, yet it has not been performed in Indonesia.[19] Therefore, we aimed to validate the SHI index in Indonesia and to evaluate its reliability and validity. The SHI was initially used for patients with oral or oropharyngeal cancer who underwent surgery or chemoradiation therapy.[15] The respondents in this study included patients who had oropharyngeal surgery and were using obturators as maxillofacial prostheses and patients who had no oropharyngeal surgery but were completely edentulous. To date, there are no speech-specific questionnaires available to diagnose and quantify speech impairment in Indonesian-speaking patients. The Indonesian version would assist clinicians in determining speech disturbances in Indonesian patients.

Internal consistency and test–retest reliability are the two most commonly used measures of reliability.[14] The internal consistency is useful in the construction of new scales or questionnaires and measures the inconsistency or nonequivalence of different questions that are intended to measure the same concept. This study revealed that internal consistency shows a strong relationship of all items with the overall item means score. The finding is in accordance with the French version of the SHI, which stated it as a valid and sensitive tool.[15] The French version of the SHI showed a strong validity of the internal structure.[15] The result of this study is also in accordance with the Chinese version, the Italian version, and the Korean version of the SHI, which also stated it as a reliable, valid, and efficient questionnaire.[16–18]

A speech test instrument should frequently use the oro-motor function, the articulation test, and speech intelligibility. However, patients with disturbed speech expression might occasionally show their frustration in an effort to communicate their discomfort. Clinicians need to have a better understanding of this kind of issue and identify patients' speech disabilities in order to gain a successful treatment plan.[16] The Indonesian version of the SHI will help clinicians determine speech intelligibility disturbances derived from patient-based assessment tools. Some limitations of this study might occur due to some potential biases. The non-probability sampling design and low number of respondents might lower the external validity. Therefore, this study might be unable to represent the population of interest. The results of this study should be interpreted with caution, and further studies are encouraged.

Conclusions

The Indonesian version of the SHI is reliable and valid and may be used to evaluate speech disturbance in patients, especially in prosthodontics patients with full palatal coverage. Further studies using a wider range of populations are deemed essential.

	Mean	SD	Alpha if deleted	CITCC
My speech makes it difficult for people to understand me *Suara saya membuat orang sulit mendengarkan saya*	1.86	1.39	0.974	0.865
I run out of air when I speak *Saya kehabisan udara ketika saya berbicara*	1.71	1.10	0.975	0.759
The intelligibility of my speech varies throughout the day *Bunyi suara saya bervariasi sepanjang hari*	1.61	1.08	0.975	0.707
My speech makes me feel incompetent *Suara saya membuat saya merasa tidak kompeten*	1.71	1.27	0.975	0.776
People ask me why I'm hard to understand *Orang-orang bertanya "apa yang salah dengan suaramu?"*	1.66	1.23	0.974	0.885
I feel annoyed when people ask me to repeat *Saya merasa terganggu ketika orang meminta saya untuk mengulang*	1.74	1.30	0.975	0.686
I avoid using the phone *Saya menggunakan telepon lebih jarang daripada yang saya inginkan*	2.17	1.56	0.978	0.384
I'm tense when talking to others because of my speech *Saya tegang ketika berbicara dengan orang lain karena suara saya*	1.54	1.09	0.976	0.494
My articulation is unclear *Suara saya terdengar serak dan kering*	1.89	1.38	0.975	0.701
People have difficulty understanding me in a noisy room *Orang-orang kesulitan memahami saya di ruangan yang bising*	2.14	1.59	0.975	0.717
I tend to avoid groups of people because of my speech *Saya cenderung menghindari sekelompok orang karena suara saya*	1.97	1.33	0.975	0.804
People seem irritated with my speech *Orang-orang tampak terganggu dengan suara saya*	1.57	1.06	0.975	0.801
People ask me to repeat myself when speaking face-to-face *Orang-orang meminta saya untuk mengulangi diri saya sendiri ketika berbicara tatap muka*	1.74	1.29	0.974	0.860
I speak with friends and neighbors or relatives less often because of my speech *Saya berbicara dengan teman-teman, para tetangga, atau para kerabat lebih jarang karena suara saya*	1.60	1.14	0.974	0.844

I feel as though I have to strain to speak *Saya merasa solah-olah saya harus sangat berusaha untuk menghasilkan suara*	1.89	1.45	0.974	0.951
I find other people don't understand my speaking problem *Saya merasa bahwa orang lain tidak mengerti masalah suara saya*	1.66	1.13	0.975	0.686
My speaking difficulties restrict my personal and social life *Kesulitan suara saya membatasi kehidupan pribadi dan sosial saya*	1.83	1.33	0.974	0.866
The intelligibility is unpredictable *Kejernihan suara saya tidak dapat diprediksi*	1.83	1.27	0.974	0.851
I feel left out of conversations because of my speech *Suara saya berhenti tiba-tiba ketika berbicara*	1.74	1.33	0.974	0.923
I use a great deal of effort to speak *Saya menggunakan banyak sekali upaya untuk berbicara*	2.00	1.45	0.974	0.902
My speech is worse in the evening *Suara saya lebih buruk di sore dan malam hari*	1.60	1.06	0.975	0.764
My speech problem upsets me *Masalah suara saya membuat saya kesal*	1.71	1.34	0.974	0.866
I am less outgoing because of my speech problem *Saya mencoba mengubah suara saya agar terdengar berbeda*	1.51	1.14	0.974	0.866
My family has difficulty understanding me when I call them throughout the house *Keluarga saya mengalami kesulitan mendengar saya ketika saya menelepon mereka sepanjang hari*	1.63	1.21	0.975	0.750
My speech makes me feel handicapped *Suara saya membuat saya merasa kesulitan*	1.97	1.48	0.974	0.886
I have difficulties to continue a conversation because of my speech *Saya merasa seolah-olah saya harus berusaha keras untuk menghasilkan suara*	1.23	0.64	0.976	0.637
I feel embarrassed when people ask me to repeat *Saya merasa malu ketika orang meminta saya untuk mengulang*	1.73	1.29	0.975	0.686
I'm ashamed of my speech problem *Saya malu dengan masalah suara saya*	1.63	1.34	0.975	0.757

Table 2. Item characteristics and internal reliability analysis of the Indonesian SHI questionnaire.

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Declaration of Interest

The authors report no conflict of interest.

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