ORIGINAL ARTICLE

TRANSLATION, CROSS-CULTURAL ADAPTATION, AND DEVELOPING MALAY QUESTIONNAIRES TO MEASURE HEALTH EMPOWERMENT FOR PATIENTS WITH ISCHAEMIC HEART DISEASE (IHD): A VALIDATION STUDY

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ABSTRACT

A multifaceted approach is needed to treat ischaemic heart disease (IHD) patients and improve their overall quality of life. This study aims to translate, cross-culturally adapt and validate questionnaires exploring the multifactorial health empowerment component among IHD patients. This process involved: 1) Adaptation of conceptualising applicable questionnaires; 2) Translation; 3) Cultural adaptation of forward and backward translations; and 4) Pre-tested validation by experts (n=5) and piloted among participants (n=30). Content validity revealed that I-CVI and S-CVI were both 0.98, indicating that the questionnaire items were understandable and relevant. An FKI of 0.87 supported experts' agreements. Cronbach alpha values ranged from 0.696-0.977 for each construct. Further reinforced by Rasch analysis, an overall Cronbach alpha of 0.87 indicated adequate internal consistency. Data fitted the model, as evidenced by Infit values of mean square (MNSQ) near 1, and Z standard (ZSTD) values near 0. An item reliability of 0.97 indicated that the anticipated items were correctly measured, and an item separation of 5.78 suggests a high degree of separation with precise measurement. A Person separation of 2.38 revealed the capacity to distinguish the participants in the agreement of the questionnaires. Rating scales between -3.54 and 2.77 demonstrated a strong separation of scales. A raw variance explained by measures of 68.3%, unexplained variance in 1st contrast with Eigenvalue 9.98 and noise level of 13.2% demonstrated the instrument is operating as intended. The Perceived Severity to Chronic Disease, Health Consciousness, eHealth Literacy and Patient Adherence questionnaires were valid and reliable tools to be administered and explore the multifactorial component in empowering health among IHD patients.

Keywords: *Malay; eHealth Literacy; Health Consciousness; Patient Adherence; Perceived Severity to Chronic Disease*

INTRODUCTION

Cardiovascular diseases (CVDs), particularly ischemic heart disease (IHD), are the leading cause of death and disability worldwide[1]. IHD contributes significantly to the global disease burden, with grave consequences for human life and health[2]. Since 1990, the number of disability-adjusted life years (DALYs) lost to IHD has steadily increased, reaching 182 million DALYs and 9.14 million deaths in 2019. IHD remains the leading cause of death globally, with an estimated 197 million prevalent cases in 2019[1]. IHD is also a major cause of devastating health expenditures, with a high long-term management cost. Heart failure, the most common complication of IHD, costs the global economy an estimated $108 billion each year[3]. Other South East Asian countries, such as Singapore, Thailand, and the Philippines, have seen a similar trend of IHD as the leading cause of death[4]. Likewise, IHD remains the leading cause of death in Malaysia, accounting for 17% of medically certified deaths in 2020, dominated by those aged 41-59 (20%) and 60 years and above (18%)[5].

An accurate assessment of IHD's current burden and attributable risk factors is required for effective prevention and control strategies. Although IHD prevention and treatment have significantly advanced, IHD accounts for a sizable portion of the global disease burden[6]. Given that IHD is largely preventable and treatable, additional strategies are required to alter modifiable risk factors. The rising prevalence of

IHD is expected to continue, owing to various other factors, including the increasing prevalence of comorbidities (e.g. obesity, diabetes, metabolic syndrome, etc.). Due to the disease's complexity, modern IHD management requires a multifaceted approach focusing on morbidity and mortality reduction and improving the quality of life[7]. Many non-fatal IHD patients suffer from chronic disabilities and have a lower quality of life[8].

The patients' health empowerment is important in managing life with IHD and the possibility of planning, following and adhering to a rehabilitation plan. Empowering IHD patients' health is critical and can be accomplished based on the Transactional Model of eHealth Literacy (TMEHL), in which numerous health empowerment dimensions can be examined and quantified via factors of (1) Personal, in terms of comorbidity; (2) Knowledge, in regards to Perceived Severity to Chronic Disease and Health Consciousness; (3) eHealth Literacy Level; (4) Informed and Empowered, through Patient Adherence[9]. Overall, patients' health beliefs and electronic Health (eHealth) literacy abilities are critical for disease prevention and can assist patients in taking a more active role in healthcare decision-making and self-management[10], as online health information motivates patients to learn more about their condition[11].

To study the plethora of factors affecting a particular population, it is necessary to develop an instrument in their native language to assist healthcare providers in comprehending the community's varied perceptions of chronic disease, health consciousness, eHealth knowledge, and subsequently, implementing strategies for improvement. It is essential to include the local population to contribute to achieving the third Sustainable Development Goal by improving Malaysians' health through non-communicable disease prevention[12]. Failure to do so would render the aforementioned national agenda ineffective. As a result of translation, cultural adaptation, and validation, this study can delve into previously identified factors such as perceptions, knowledge and behaviours[13-16]. Thus, this study aimed to translate and cross-culturally adapt questionnaires on Perceived Severity to Chronic Disease, Health Consciousness, eHealth Literacy and Patient Adherence and assess the reliability and validity of these questionnaire versions among IHD patients.

METHODS

Validation Process

This study's cross-cultural adaptation and evaluation process was designed by adapting the instrument development process[17,18] as shown in Figure 1. The process was conducted on 15th February – 15th December 2021, involving three phases: adaptation, translation, and cultural adaptation and validation. We reported the phases using content validation, i.e., Content Validity Index (CVI), face validation using Fleiss' Kappa Index (FKI), reliability using the internal consistency (Cronbach's alpha) and Rasch analysis.

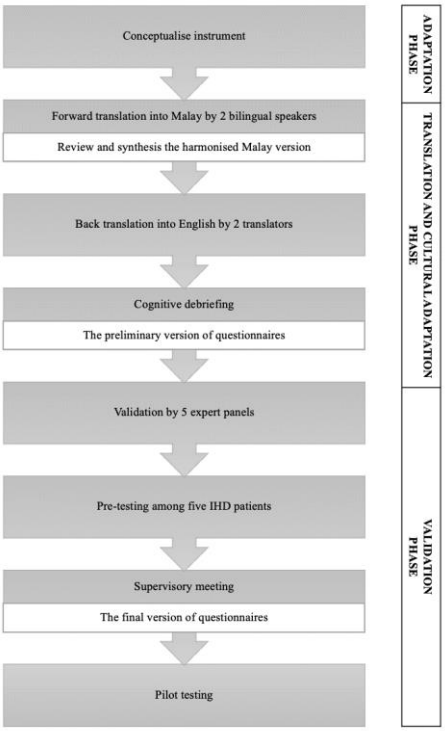


Figure 1: Flowchart of the validation process

Phase 1: Adaptation

Phase 1 involved the process of instrument conception by adapting developed questionnaires. The questionnaires were initially conceptualised based on a comprehensive literature review to identify publications assessing factors contributing to IHD patients' health empowerment based on the dimensions of TMEHL. According to Raykov and Marcoulides[19], constructs should be decided and defined before any item activity. Well-defined constructs will provide knowledge or ideas about the phenomenon to be studied, define construct boundaries and facilitate the process of item generation and content validation[18].

Permission to use the questionnaires was obtained from the developers of the Perceived Severity to Chronic Disease Scale and the eHealth Literacy Scale (via email on February 2021). In the case of Patient Adherence, we adhered to the specifications provided by RAND Health when producing the translation[20]. All translations from English to Malay were carried out in accordance with international standards[21].

Phase 2: Translational and Cultural Adaptation Phase

The questionnaire translation and cultural adaptation phase involved forward and backward translation and the cognitive debriefing process. The cross-cultural adaptation of a health status self-administered questionnaire for use in a new country, culture, and/or language necessitates the use of a unique method to reach equivalence between the source and target versions of the questionnaire to maintain the content validity of the instrument at a conceptual level across different cultures[21].

All questionnaire statements were adapted in two phases. Initially, the scale was independently translated into Malay by two bilingual speakers who can speak and write fluently in Malay and English and hold a Bachelor of Teaching English as a Second Language (TESL). Two independent certified Malay-English translators returned the harmonised Malay version to its original form[22]. The translated version was evaluated in a 'dual-blind' manner by bilingual speakers and back translators unfamiliar with the original text. The forward and backward translation process was completed via email in two weeks. The final step involved all translators in a cognitive debriefing process to ensure the translation's original meaning, comparison, jargon, or any misconceptions reached a consensus. Hence, the preliminary version of the questionnaires was produced.

Phase 3: Validation Phase

The preliminary version of the questionnaires was then validated in terms of its content validity, face validity and reliability (internal consistency). In this context, 27 items were assessed regarding relevance and usability representation.

The term "content validity" refers to the degree to which the content of a health-related patient-reported outcome (HR-PRO) instrument accurately reflects the construct being measured[23, 24]. A panel of five experts evaluated the questionnaires' face and content validity using best practices in scale development (consisting of two public health physicians, two academicians qualified in instrument validation and a cardiologist)[18]. Each panellist received an email explaining the study's purpose, the procedures, and the preliminary translated version questionnaires. Panel members evaluated the appropriateness and provided feedback on the translated versions of the items regarding ease of use, reading level, clarity, item wording, and response formats. They were asked to rate the relevance of the translated items on a scale of 1 (item not relevant) to 4 (item very relevant). Scores of 3 and 4 were reclassified as 1 (relevant), while 1 and 2 were reclassified as 0 (not relevant). The CVI was calculated by calculating the scale average[25]. The item level (I-CVI) score of above 0.78[26] indicates that all questionnaire items are pertinent to the domain, clear, and understandable to the target users[25]. Meanwhile, the scale level (S-CVI) score above 0.8627 indicates the average item quality that received a relevant/representative rating (3 or 4) from all content experts involved. CVI analysis would demonstrate high content validity (I-CVI and S-CVI/Ave) as an informed opinion from experts in a particular field who can provide information, evidence, judgments, and assessments[28].

Meanwhile, face validity using FKI is a statistical measure to determine the reliability of agreement between a fixed number of more than two raters or expert panels when categorising or classifying several items[29]. It computes the degree of classification agreement above and beyond what would be expected by chance. An FKI value of <0.20 represents poor agreement, 0.21–0.40 fair agreement, 0.41–0.60 moderate agreement, 0.61–0.80 substantial agreement, and 0.81–1.00 almost perfect agreement[30]. Face validity is defined as "the extent to which the items in a health-related patient-reported outcome (HR-PRO) instrument appear to adequately represent the construct being measured"[31].

An individual pre-test study was then conducted among five patients with IHD. Volunteers for the pre-test study were excluded from the pilot study. We solicited feedback regarding the items' difficulty of comprehension and made necessary changes. Internal consistency was then carried out and is defined as "the degree to which the items are related"[31]. Cronbach's alpha coefficient was used to determine the extent to which all items in a test measure the same concept[32], which was done throughout the instrument and for its domains. Cronbach's alpha values of <0.70 indicate insufficient internal consistency, while

0.70-0.90 indicate adequate internal consistency[33]. On the other hand, the corrected item-total correlation was used to express the coherence between an item and other items in a test, with the values of 0-0.19 represent not discriminating well, 0.2-0.39 good discrimination, and ≥0.4 very good discrimination[24].

Rasch analysis was subsequently used to elicit empirical evidence of the questionnaire items' validity and reliability. The Rasch Measurement Model is a model formed as a result of factors such as the ability of the candidate or respondent to complete the questionnaires, tests, or instruments and the difficulty of individual test items and overall items[34]. This can be further evidenced by the values of (1) overall Cronbach for internal reliability; (2) Infit values of MNSQ (Mean square) near 1 and Z standard (ZSTD) values near 0, which shows the data fit the model; (3) Item reliability expected value of >0.7 indicates that the anticipated items were correctly measured and Item separation value of around 6 indicates a high degree of separation and measurement precision; (4) Person separation value of around 2 indicates the items are capable of distinguishing between those who agree to disagree in terms of precision, reflective of the items difficulty level; (5) Rating scale with an expected minimum value of 1.5 and maximum value of 5 to determine the accurate segregation of rating scale used; and (6) Standardised Residual Variance in terms of raw variance of ≥40%, unexplained variance in 1st contrast Eigenvalue ≤4 and observed noise level (5-15%) to demonstrate that the instrument is operating as intended[35].

A supervisory meeting was held in November 2021 to reach an overall consensus for items participants appeared to be unsure of. Hence, the final version of the questionnaires was formed.

Study Population

The pilot study was conducted in the cardiology wards and an outpatient clinic of a tertiary hospital in the Klang Valley, Malaysia, among the target population (n=30)[36] of IHD patients. The Universiti Kebangsaan Malaysia Secretariat for Medical Research and Innovation (FF-2021-117) and the Medical Research and Ethics Committee, Ministry of Health Malaysia both granted formal approval (NMRR-21-178-57942). The methods used in this study complied with the Helsinki Declaration[37].

This study employed a consecutive sampling technique[38] on eligible patients at an outpatient cardiology clinic and cardiology wards. The researcher enrolled patients who met the inclusion criteria of being Malaysian citizens above 18 years old with a documented diagnosis of IHD (ST-elevation myocardial infarction, non-ST-elevation myocardial infarction, stable angina and unstable angina) and excluded those who have dementia, underlying psychiatric disease, alcohol intoxication or appears lethargic, confused, restless or delirious. Before beginning the study, each participant signed a written informed consent form.

Instruments Used

The multifactorial components contributing to the health empowerment of IHD patients were conceptualised and derived from TMEHL[9]. The following domains were found applicable and measurable with the following established questionnaires: (1) Knowledge in regards to Perceived Severity to Chronic Disease and Health Consciousness; (2) eHealth Literacy Level; (3) Informed and Empowered via Patient Adherence.

a. Perceived Severity to Chronic Disease

This questionnaire is a four-item version of one that was adapted from Kim and Park[15]. All items within these constructs were rated on a five-point scale, with 1 = strong disagreement, 2 = disagreement, 3 = neutral, 4 = agreement, and 5 = strong agreement. The mean score for Perceived Severity to Chronic Disease ranged between four and twenty[15]. Individuals with a higher perceived health risk are more motivated to change or adopt a health-promoting behaviour, including seeking information and utilising information and communication channels (e.g., the Internet) to meet health-related information and communication needs[23, 39, 40].

b. Health Consciousness

The participants' health consciousness was assessed using a five-item questionnaire adapted from Dutta-Bergman[13]. All items within these constructs were rated on a 5-point scale, where 1 = strong disagreement, 2 = disagreement, 3 = neutral, 4 = agreement, and 5 = strong agreement. The mean score for Health Consciousness ranged from 5 to 25[13]. Higher scores indicate that the individual was health-conscious and concerned about their well-being. As a result, they were motivated to improve and/or maintain their health.

c. eHealth Literacy

The following questionnaire was adapted by Norman and Skinner[41]. Eight components and six-core skills comprise eHealth literacy: (1) traditional literacy, (2) health literacy, (3) information literacy, (4) scientific literacy, (5) media literacy, and (6) computer literacy[42]. Social cognitive and self-efficacy theories underpin the concept of eHealth literacy[43]. Each item in the eHEALS was scored on a 5-point scale, with responses ranging from 'strongly agree' to 'strongly disagree'[41]. The term "eHealth Literacy" refers to an individual's eHEALS score. The sum of the scores ranged from 8 to 40, with higher scores indicating a higher self-perceived level of eHealth literacy[41].

d. Patient Adherence

This questionnaire incorporates both terms of Recommendations and Behaviours, quantified using an adapted version of the Medical Outcome Study Specific Adherence Scale (MOSSAS)[44]. MOSSAS was developed specifically for heart disease patients and was used to assess adherence to various behaviours[14]. Two parallel lists were administered: (1) a list asking patients to recall health recommendations they received by responding 'Yes' or 'No'; (2) a 10-item MOSSAS asking patients to rate their frequency of performing those recommended behaviours over the preceding four weeks on a 6-point rating scale (1=none, 2=rarely, 3=sometimes, 4=a lot of time, 5=most of the time, and 6=all of the time). MOSSAS was used to assess patient adherence in two ways: (1) recommendation, using a 'Yes' or 'No' response; (2) behaviour, using a MOSSAS score ranging from 10 to 60[44]. Increased scores indicate that prescribed medication and lifestyle changes were followed.

Finally, sociodemographic (age, gender, and race) and socioeconomic (average monthly gross personal income from work or pension, occupation, and level of education) data were collected, as well as participants' medical history (comorbidity, recent IHD diagnosis, and year of diagnosis) data, which were descriptively represented in frequency, percentages, mean, and standard deviation.

RESULTS

Descriptive Characteristics of the Participants

Table 1 summarises the descriptive characteristics of the participants. The mean (SD) age was 36.87 (5.11) years. Most participants were males (76.7%) and the remaining were females. Most participants were of Malay ethnicity (50%), followed by Chinese (26.7%), Indian (20%) and Bumiputera Sabah (3.3%). The participants earned a monthly mean (SD) income of approximately RM2630 (2163.99). The majority of participants were working privately (36.7%), in the government sector (26.7%), self-employed (23.3%) and unpaid/homemaker or not working (6.7%). Most participants completed secondary education (50%), had tertiary education (40%), and were primarily educated (10%). Those with comorbidities were equal to those without (50%). Most participants experienced unstable angina (36.7), and most were diagnosed with IHD for over a year (70%).

Table 1: Characteristics of participants (n=30)

Characteristic		Value n (%)	Mean (SD)
Age			36.87 (5.11)
Gender	Male	23 (76.7%)	
	Female	7 (23.3%)	
Race	Malay	15 (50%)	
	Chinese	8 (26.7%)	
	Indian	6 (20%)	
	Bumiputera Sabah	1 (3.3%)	
Average Personal Gross Monthly Income from work (wage/salary) or pension			RM2630 (2163.99)
Occupation	Private employee	11 (36.7%)	
	Government employee	8 (26.7%)	
	Self-employed	7 (23.3%)	
	Unpaid worker/homemaker	2 (6.7%)	
	Not working	2 (6.7%)	
Education level	Primary education	3 (10%)	
	Secondary education	15 (50%)	
	Tertiary education	12 (40%)	
Number of comorbidities	None	15 (50%)	
	More than one	15 (50%)	
IHD diagnosis	Unstable angina	11 (36.7%)	
	NSTEMI	9 (30%)	
	Stable angina	6 (20%)	
	STEMI	4 (13.3%)	
Year since IHD diagnosis	Less than a year	9 (30%)	
	More than a year	21 (70%)	

Adaptation of Questionnaires

Following the questionnaire pre-testing, the item that caused the most concern was "If I face attack or deterioration of the chronic disease, I will be long haunted by resultant problems" from the Perceived Severity to Chronic Disease questionnaire. The term "long-haunted" can mean either "being disturbed or afraid of" or "I will regret any problems that may arise." Thus, for this item, the supervisory meeting unanimously chose the latter for participants to understand the entire sentence in Malay, the same way it was expressed in English. The final version of the questionnaires required only minor adjustments and was used for the pilot study.

Validation

Content and Face Validity

The CVI results were from the questionnaires of Perceived Severity to Chronic Disease, Health Consciousness, eHealth Literacy and Patient Adherence (4 constructs, 27 items). The relevant assessment of the item scaled by a five-expert panels revealed the calculated I-CVI of 0.98 (Table 2), indicating all items were clearly understood. Hence, no item was dropped (I-CVI<0.79). On the other hand, the S-CVI of 0.98 (Table 2) revealed relevance across the five expert panels. Based on the calculations, it can be concluded that I-CVI and S-CVI met satisfactory levels. Thus, the questionnaire scales reached an acceptable level of content validity.

Table 2a: Content validity index and internal consistency of the total-items

Construct	Content validity index			Internal consistency	
	Item	I-CVI	S-CVI / Ave	Cronbach alpha	Corrected item-total correlation
Perceived Severity to Chronic Disease	P1	0.80	0.98	0.816	0.489
	P2	1.00			0.671
	P3	1.00			0.648
	P4	1.00			0.768
Health Consciousness	H1	1.00		0.928	0.758
	H2	1.00			0.833
	H3	0.80			0.882
	H4	1.00			0.756
	H5	1.00			0.861
eHealth Literacy	E1	1.00		0.977	0.943
	E2	1.00			0.951
	E3	1.00			0.953
	E4	1.00			0.807
	E5	0.80			0.920
	E6	1.00			0.953
	E7	1.00			0.958
	E8	1.00			0.809
Patient Adherence (Recommendations)	PR1	1.00		0.696	0.505
	PR2	1.00			0.416
	PR3	1.00			0.656
	PR4	1.00			0.179
	PR5	1.00			0.014
	PR6	1.00			0.276
	PR7	1.00			0.569
	PR8	1.00			0.457
	PR9	1.00			0.318
	PR10	1.00			0.329
Patient Adherence (Behaviours)	PB1	1.00		0.780	0.598
	PB2	1.00			0.169
	PB3	1.00			0.499
	PB4	1.00			0.540

Table 2b: Content validity index and internal consistency of the total-items

PB5	1.00	0.443
PB6	1.00	0.434
PB7	1.00	0.394
PB8	1.00	0.653
PB9	1.00	0.556
PB10	1.00	0.331

I-CVI: Item Content Validity Index, S-CVI: Scale level index

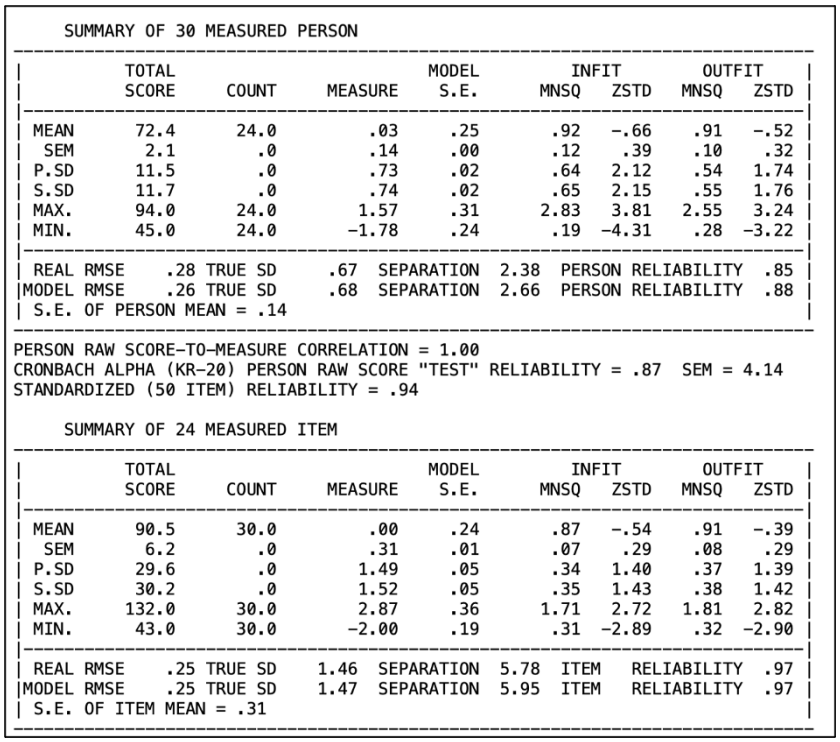
Following the expert panel's review of the instrument's items, the responses were analysed using FKI, which was chosen for its suitability for multiple raters. According to the FKI analysis, k>0.81 indicates excellent inter-rater agreement. Among the feedback received from the panel experts, avoiding using similar words and rephrasing jargon or sentence structures with more straightforward terms was suggested. Overall, the inter-rater agreement resulted in an FKI value of 0.87, indicating excellent agreement. Additionally, the consolidated responses of the experts endorsed the retention of the four constructs with 27 items for further validity evaluation.

Internal Consistency

Cronbach's alpha was determined to be between 0.696 and 0.977 for the questionnaire items. A higher alpha value indicates that the questionnaire has higher internal reliability, and a value greater than 0.70 indicates satisfactory internal reliability[45]. Cronbach's alpha for the questionnaire remains constant when an item is deleted, indicating that the developed questionnaire has high internal reliability (Table 2). However, it was noted that some items in the construct of Patient Adherence did not correlate well with the scale overall, with the corrected item-total correlation of below 0.2.

Rasch Analysis

The overall summary in Figure 2 demonstrates that the questionnaires are valid, further reinforced and supported the previous Cronbach alpha findings (Table 2), with overall Cronbach alpha (KR-20) of 0.87. Data was found to fit the model as evidenced by Infit values of MNSQ near 1 and ZSTD near 0. The Item reliability is 0.97, indicating that the anticipated items were correctly measured. Meanwhile, Item separation revealed that it could be classified into six groups or constructs, meaning a higher degree of separation and that the measurement is more precise. Meanwhile, the Person separation value of 2.38 indicates that the questionnaire can classify respondents into two groups, which is more than sufficient to distinguish between those who agree and those who disagree.



SUMMARY OF 30 MEASURED PERSON

	TOTAL SCORE	COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD
MEAN	72.4	24.0	.03	.25	.92	-.66	.91	-.52
SEM	2.1	.0	.14	.00	.12	.39	.10	.32
P.SD	11.5	.0	.73	.02	.64	2.12	.54	1.74
S.SD	11.7	.0	.74	.02	.65	2.15	.55	1.76
MAX.	94.0	24.0	1.57	.31	2.83	3.81	2.55	3.24
MIN.	45.0	24.0	-1.78	.24	.19	-4.31	.28	-3.22

REAL RMSE .28 TRUE SD .67 SEPARATION 2.38 PERSON RELIABILITY .85
MODEL RMSE .26 TRUE SD .68 SEPARATION 2.66 PERSON RELIABILITY .88
S.E. OF PERSON MEAN = .14

PERSON RAW SCORE-TO-MEASURE CORRELATION = 1.00
CRONBACH ALPHA (KR-20) PERSON RAW SCORE "TEST" RELIABILITY = .87 SEM = 4.14
STANDARDIZED (50 ITEM) RELIABILITY = .94

SUMMARY OF 24 MEASURED ITEM

	TOTAL SCORE	COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD
MEAN	90.5	30.0	.00	.24	.87	-.54	.91	-.39
SEM	6.2	.0	.31	.01	.07	.29	.08	.29
P.SD	29.6	.0	1.49	.05	.34	1.40	.37	1.39
S.SD	30.2	.0	1.52	.05	.35	1.43	.38	1.42
MAX.	132.0	30.0	2.87	.36	1.71	2.72	1.81	2.82
MIN.	43.0	30.0	-2.00	.19	.31	-2.89	.32	-2.90

REAL RMSE .25 TRUE SD 1.46 SEPARATION 5.78 ITEM RELIABILITY .97
MODEL RMSE .25 TRUE SD 1.47 SEPARATION 5.95 ITEM RELIABILITY .97
S.E. OF ITEM MEAN = .31

Figure 2: Summary statistics

Figure 3 shows the rating scale used to determine separation. Ratings 3 and 4 are perceived as being merged, but the category measure demonstrates a strong separation of the scales, with a difference of as low as 3.54 and as high as 2.77. This also indicates that there is no reason to collapse or introduce additional scales. Thus, the current rating scale used in the questionnaire was maintained.

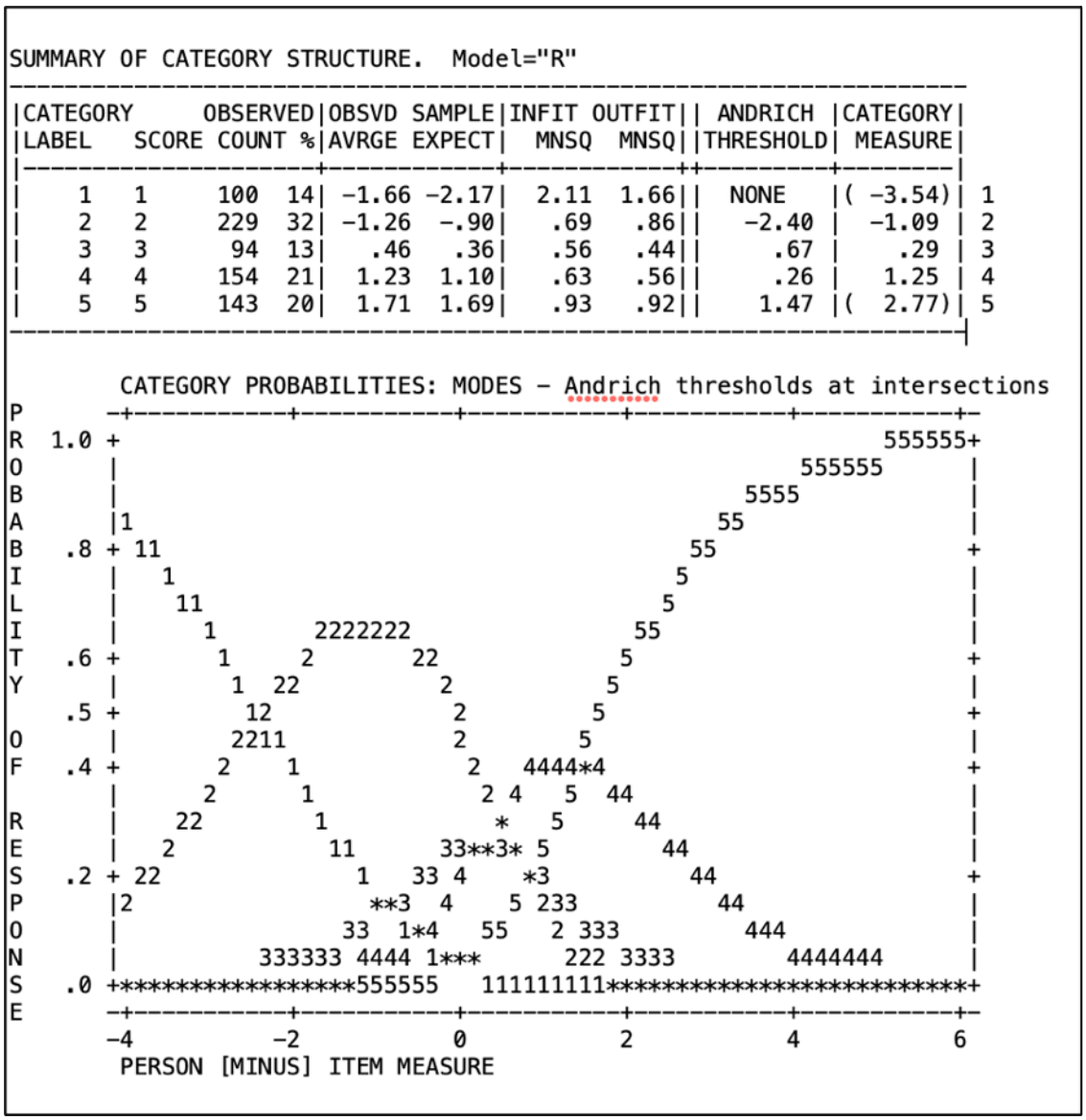


Figure 3: Probability curves for rating scale

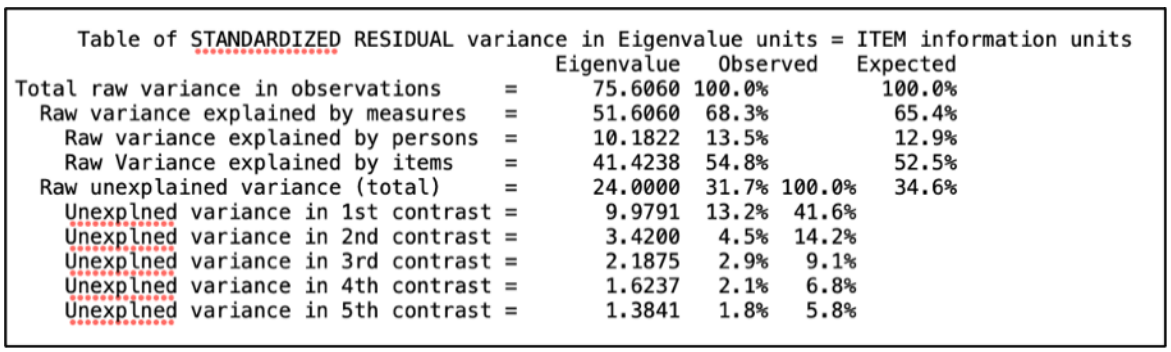


Figure 4: Item information units

Figure 4 shows 68.3% explained raw variance. The unexplained variance in the first contrast shows a slightly increased Eigenvalue of 9.98 with an observed noise level of 13.2%, indicating that the instrument operated as intended.

DISCUSSION

The Malay versions of the Perceived Severity to Chronic Disease, Health Consciousness, eHealth Literacy, and Patient Adherence questionnaires were valid and reliable tools for use with IHD

patients. A self-reported instrument must function appropriately across population heterogeneity and be simple to administer and score, which is critical in cardiology practice in Malaysia, where Malay is the most widely spoken language. Thus, the original Perceived Severity to Chronic Disease questionnaire was slightly modified in Malay to accommodate local needs and customs. The translation and back-translation teams successfully developed a final translated version that demonstrated high clarity among the population.

High CVI values indicate that the content has been successfully adapted to the local context with translation using unambiguous and straightforward sentences. Additionally, the results demonstrated the instrument's high reproducibility (FKI=0.87). The overall Cronbach alpha of the Malay version questionnaires was 0.87, whilst the Cronbach alpha of each questionnaire ranged from 0.696–0.977, comparable to previous studies for the following questionnaires: (a) Perceived Severity to Chronic Disease among South Koreans for (0.907)[15]; (b) Health Consciousness among the Americans (0.72)[13], Turkish (0.759)[46] and Chinese (0.835)[47]; (c) eHealth Literacy among the Americans (0.9)[16]; (d) Patient Adherence by utilising Medical Outcome Study Specific Adherence Scale (MOSSAS) among the Caucasians (0.77)[14].

Rasch analysis determined the ability and difficulty of individuals to complete the questionnaire independently using commonly used measurements. Additionally, the Rasch analysis supports using all items in the comprehensive questionnaires because they contribute to the measure by quantifying various aspects of literacy, as indicated by appropriate mean-square estimates, item and person reliability, and residual variance[35].

Strengths

This pioneering study in Malaysia successfully translated, cross-culturally adapted, and validated multiple questionnaires on factors that empower health for young patients with IHD. Through methodological tenacity, the study ensured that the data collected were representative, as evidenced by the diverse age, gender, occupation, and educational level of the participants, all 45 years or younger. Despite the challenges posed by the COVID-19 pandemic, the study demonstrated methodological rigour and resilience by recruiting and collecting data from a diverse group of young IHD patients. The study's successful translation, cross-cultural adaptation, and validation of multiple questionnaires can serve as a model for future research in the era of COVID-19 and beyond.

Limitations

This pilot study focused exclusively on patients admitted to a general hospital, with no patients from the community or private settings included. Despite the low corrected item-total correlation values, the overall satisfactory Cronbach alpha values supported by Rasch analysis suggest that the adapted Malay version questionnaires are promising for measuring health empowerment in patients with IHD. However, the COVID-19 pandemic presented a significant challenge to the recruitment of patients from community or private settings, limiting the sample size and diversity of the study. Additionally, the pandemic hindered the ability to conduct confirmatory factor analysis, which could have provided more in-depth insights into the psychometric properties of the questionnaires. Therefore, further research with larger and more diverse samples in various settings is needed to investigate the psychometric properties of the questionnaires in more depth, allowing for comparisons across backgrounds and target groups. Future research should also include confirmatory factor analysis to finalise the need to retain or eliminate particular items in the questionnaires.

CONCLUSIONS

In conclusion, the Malay version of the Perceived Severity to Chronic Disease, Health Consciousness, eHealth Literacy, and Patient Adherence questionnaires are reliable tools for future research. Finally, the Rasch model supported this adaptation because each item fits the data well. None of these questionnaires has been validated in Malay. It can be self-administered to assess the multifactorial health empowerment of IHD patients. Due to the Malay population's shared culture and language in South-East Asia, including Malaysia, Singapore, Brunei, and Indonesia, these Malay-version questionnaires are beneficial for Malay-speaking IHD patients.

ACKNOWLEDGEMENT

This study is supported by the Department of Community Health, Universiti Kebangsaan Malaysia (UKM). This publication reflects the authors' views only, and UKM cannot be held liable for any use of the information contained therein. We would like to thank the original questionnaire developers who permitted us to use and translate the questionnaires. We also want to thank all the patients who participated in our study.

Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for this article's research, authorship and/or publication.

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