

The Validity and Reliability of the MacNew Heart Disease Health Related Quality of Life Questionnaire: The Indonesian Version

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ABSTRAK

Latar belakang: kuesener kualitas hidup terkait kesehatan penyakit jantung dari MacNew digunakan secara luas pada penderita jantung untuk mengevaluasi dampak penyakit dan intervensi termasuk rehabilitasi. Selain versi bahasa Inggris, tersedia juga beberapa bahasa lain kecuali bahasa Indonesia. Oleh karena itu, tujuan dari penelitian ini adalah 1) menerjemahkan kuesioner kualitas hidup terkait kesehatan jantung MacNew dari versi bahasa Inggris ke bahasa Indonesia dan 2) untuk memperkirakan validitas dan reliabilitas awal dari MacNew versi bahasa Indonesia untuk pasien penyakit arteri koroner. **Metode:** Prosedur penerjemahan forward dan backward digunakan untuk mengembangkan kuesener MacNew versi bahasa Indonesia. MacNew versi Bahasa Indonesia diberikan kepada 24 pasien satu minggu setelah operasi revaskularisasi. Reliabilitas dinilai dengan konsistensi internal dan reliabilitas tes-retes. Untuk mengevaluasi validitas sewaktu (concurrent validity), dilakukan penilaian terhadap korelasi domain yang kompatibel antara MacNew versi Indonesia dan SF-36. **Hasil:** Macnew versi Indonesia memiliki konsistensi internal yang bagus baik pada skala global maupun pada ketiga subskala nya dengan nilai Cronbach α melebihi 0,95. Hasil evaluasi terhadap reliabilitas tes ulang menunjukkan hasil yang dapat diterima dengan koefisien korelasi intra-kelas 0,66 untuk skor global. Selain itu, korelasi antara MacNew Indonesia dan SF-36 menunjukkan hasil yang signifikan dengan nilai korelasi Pearson berkisar antara 0.47 hingga 0.71. **Kesimpulan:** Hasil penelitian awal kuesener MacNew versi Bahasa Indonesia menunjukkan validitas dan reliabilitas yang dapat diterima sebagai alat ukur untuk menilai kualitas hidup terkait kesehatan pada dengan penyakit arteri koroner di Indonesia.

Kata kunci: Kualitas hidup, validitas, reliabilitas, MacNew versi Indonesia. penyakit arteri koroner.

ABSTRACT

Background: The MacNew heart disease health related quality of life tool is used widely in populations with cardiac comorbidity to evaluate the impact of disease and intervention including rehabilitation. In addition to the English version, it is also available for several other languages except the Indonesian language. Therefore, the

purpose of this study were 1) to translate the MacNew questionnaire from the English version to the Indonesian language and 2) to estimate the preliminary validity and reliability of the Indonesian MacNew for patients with coronary artery disease. **Methods:** Forward and backward translation procedure was used to develop the Indonesian MacNew. The Indonesian MacNew was administered to 24 patients after one week of revascularization surgery. Reliability was assessed by internal consistency and test-retest reliability. To evaluate concurrent validity, the correlation of the compatible domain of the Indonesian MacNew and SF-36 was assessed. **Results:** Internal consistency reliability of the Indonesian MacNew was confirmed with Cronbach's α of the global scale and all three subscales exceeding 0.95. Test-retest reliability was acceptable with intraclass correlation coefficient of 0.66 for the global score. Furthermore, an acceptable concurrent validity was established with statistically significant correlation between Indonesian MacNew and SF-36 (pearson correlation ranging from 0.47 to 0.71). **Conclusions:** The first results of the Indonesian MacNew indicate acceptable validity and reliability as a measurement tool to assess health related quality of life of Indonesian patients with coronary artery disease.

Keywords: Quality of life, validity, reliability, Indonesian MacNew, coronary artery disease.

INTRODUCTION

Currently, traditional clinical outcomes such as morbidity, mortality, and physiological responses to the treatment have been widely investigated, however it is shown to be not quite in line with the patient's perspective on their health status.^{1,2} Health related quality of life (HRQL) is recognized as a more comprehensive assessment of health status perceived by the patients on the impact of disease and medical intervention. HRQL is defined as how well a person functions in their life and his or her perceived wellbeing in physical, mental and social domains of health.³ There are two approaches of measuring HRQL, namely generic HRQL and disease specific HRQL. Generic HRQL is used to assess a wide range of health status. In Indonesia, for example the Short Form 36 (SF-36) questionnaire is a well-known generic instrument used in cardiac patients.⁴

Disease specific HRQL are more relevant and sensitive to change in HRQL than generic HRQL in reflecting the impact of cardiovascular disease and the health status changes during medical treatment and recovery. There are many tools for assessing HRQL in cardiac patients such as the Seattle Angina Questionnaire,^{5,6} Minnesota Living with Heart Failure,^{7,8} and the MacNew heart disease HRQL questionnaire. Globally, the MacNew heart disease questionnaire has been shown to better and more comprehensively reflect the experience of coronary artery disease (CAD) patients in all types of cardiac events

and its items covering the broad spectrum of health.^{1,9} The MacNew consists of 27 items divided into three domains: physical limitation, emotional function and social function which can be combined to give a global HRQL score.¹ This questionnaire has been reported as a valid, reliable and responsive to evaluate the impact of treatment, including cardiac rehabilitation for patients with myocardial infarction, angina pectoris, and heart failure in over 40 languages.^{1,9}

The original MacNew heart disease HRQL was developed in the English language and has been translated into over 40 languages except the Indonesian language. As such, the utility uptake of this tool within the Indonesian health care system to evaluate HRQL is poor. Therefore, the purpose of this study was to translate the MacNew heart disease HRQL from the original English version to the Indonesian language and to evaluate the validity and reliability of the Indonesian MacNew heart disease HRQL for patients with CAD in a domestic Indonesian population.

METHODS

This study was implemented as part of a longitudinal study that aimed to examine the changes in HRQL after cardiac rehabilitation program in CAD patients in Indonesia. Twenty-four adults aged above 18 years with CAD referred to phase II CR in longitudinal research study were recruited from the national cardiovascular center "Harapan Kita" in Jakarta, Indonesia.

The inclusion criteria were: 1) patients who have had myocardial infarction (MI) or who had undergone revascularization (PCI and CABG), 2) can speak, read and comprehend the Indonesian language. Patients with cognitive impairment, impaired vision that cannot be corrected with spectacles were excluded from the study. Ethics was obtained from the Committee of Institutional Review Board/ Health Research Ethics, National cardiac Center “Harapan Kita” Hospital (Ethics number: LB.02.01/VII/284/KEP.051/2018).

MacNew HRQL

The forward and backward translation guideline from macnew.org was used to develop the Indonesian MacNew heart disease HRQL questionnaire from the English version. Two people who were fully bilingual in Indonesian and English have been asked independently to translate the English MacNew to Indonesian, in which one of them is a health care professional and the other one is not health care professional. The translator should use the same questionnaire format as the original English MacNew. The results of the translation from English to Indonesian obtained from two translators were evaluated and cross checked by a third independent person for consistency to obtain one final version of the translation. A further two people were invited to do back-translation into English to attain concurrent validity. The first results of translation process were sent to macnew.org for evaluation of the accuracy of the translation. The questionnaire was then further revised in several iterations until linguistic equivalence was established.

Short Form-36 (SF-36)

The SF-36 consists of 36 items divided into eight domains: physical functioning (PF), role limitations due to physical health (RP), role limitations due to emotional problems (RE), vitality (VT), mental health (MH), social functioning (SF), bodily pain (BP), general health (GH). The SF-36 is widely used in patients with CAD and is available in Indonesian (4). The SF-36 was used to evaluate the validity of Indonesian MacNew HRQL in this study.

Outcome Measurements

All eligible subjects were asked to complete the Indonesian MacNew heart disease HRQL and SF-36 Indonesian version. The order of survey completion was determined by computer generated randomization procedure that was administered by an independent person of the study. Each subject was provided a 15-minutes rest period between the two questionnaires. The first measurement of both questionnaires was conducted one week after revascularization procedure, while the second measurement was conducted between 7-10 days thereafter.

Statistical Analysis

Frequencies and mean (SD) were used to describe subject characteristics. Cronbach's alpha was used to examine the internal consistency reliability, while intra-class correlation coefficient (ICC) was used to evaluate the test-retest reliability. Furthermore, Pearson correlation coefficient was used to assess concurrent validity of the Indonesian MacNew against the Indonesian SF-36 health survey.

RESULTS

Subject Characteristic

Subject characteristics were presented in **Table 1**. Twenty-two male (91.7%) and two female patients (8.3%) participated in this study. The subject age was 57.3 ± 6.8 years. All subjects were married and mostly graduated from university and only 4.2% had a primary level of education. More than half of the subjects had hypertension (54.2%), hypercholesterolemia (62.5%), sedentary (75%) and were current smoker (54.2%). Most of the subjects underwent coronary artery bypass graft (CABG) surgery.

Health Related Quality of Life Outcome Score

The score of Macnew HRQL questionnaire and SF-36 were presented in **Table 1**. The mean score of the Indonesian MacNew global and subscales ranged from 4.42 (SD 1.2) for the social subscale to 4.9 (SD 1.0) for the emotional subscale. The mean value of the physical component scale of the SF-36 was 57.6 (SD 16.8) and the value of the mental component scale of the SF-36 was 63.3 (SD 19.30).

Table 1. Subject characteristics.

Subject characteristics	Mean (SD)	N	%
Age (years)	57.3 (6.8)	24	
Sex			
Male		22	91.7
Female		2	8.3
Family status			
Single		0	0
Married		24	100
Type of work			
Working in sitting \geq 2 hours/day		13	54.2
Working need walking \geq 2 hours/day		11	45.8
Level of Education			
Basic school		1	4.2
Elementary School		0	0
High school		8	33.3
University		15	62.5
BMI	25 (3)	24	
History of exercise			
Regular		6	25
Not Regular		18	75
Smoking status			
Present Smoker		13	54.2
Never smoked		7	29.2
Ex-smoker		3	12.5
Diabetes		6	25
Hypertension		13	54.2
Hypercholesterolemia		15	62.5
Type of surgery			
PCI		1	4.2
CABG multiple vessels		23	95.8
Left Ventricular Ejection Fraction (%)	58.5 (13.2)	24	
MacNew			
Global	4.6 (1.0)		
Physical	4.4 (1.2)		
Emotional	4.9 (1.0)		
Social	4.4 (1.2)		
SF-36			
Physical Component Scale	57.6 (16.8)		
Mental Component Scale	63.3 (19.3)		

BMI, body mass index; PCI, percutaneous coronary intervention; CABG, coronary artery bypass graft; SF-36, short form-36

Table 2. Internal consistency (Cronbach's α), test-retest reliability (ICC 3,2), floor and ceiling effects of the Indonesian MacNew.

	MacNew			
	Global	Physical	Emotional	Social
% Floor	0%	0%	0%	0%
% Ceiling	0%	0%	0%	0%
Cronbach's α	0.95	0.98	0.97	0.98
ICC (3,2)	0.66	0.36	0.82	0.60

ICC, intra-class correlation coefficient

MacNew Psychometric Properties

The Psychometric properties of Indonesian version of MacNew HRQL questionnaire were presented in **Table 2**.

Floor and Ceiling Effects

There are no floor effects (score = 1) and ceiling effects (score = 7) of the MacNew global score as well as in all three domains.

Internal Consistency

The internal consistency of the Indonesian MacNew heart disease HRQL was analyzed separately for the global scale and for each domain. The Cronbach's α coefficient for the global scale and all three domains was high. The Cronbach's α coefficient for global scale was 0.95, while for each domain scale ranging from 0.96 – 0.98.

Test-retest Reliability

Test-retest reliability of the Indonesian version of MacNew heart disease HRQOL was found to be satisfactory. The ICC for the global score was 0.66 demonstrating good reliability. While the ICC score for the subscales were 0.82 for the emotional subscale indicating excellent reliability and 0.60 for the social subscale demonstrating good reliability. The physical subscale was associated with an ICC of 0.36 indicating a poor reliability.¹⁰

Validity

The concurrent validity of the Indonesia version of MacNew heart disease HRQL and SF-36 Indonesian version demonstrated moderate to strong correlation (**Table 3**). This result was interpreted as follows: small $r = 0.10 - 0.29$, medium $r = 0.30 - 0.49$, Large $r = 0.50 - 1.0$.¹¹ Moreover, most of these correlations were significant at 0.05 and some of them were significant at 0.01.

Table 3. Pearson correlation of the association between Indonesian MacNew and SF-36.

MacNew	SF-36	
	Physical Scale	Mental Scale
Global	0.50*	0.63**
Physical	0.47*	
Emotional		0.71**
Social		0.63**

* $p < 0.05$, ** $p < 0.01$

DISCUSSION

This study examined the reliability and validity of the Indonesian version of the MacNew heart disease HRQL questionnaire. The internal consistency of the three domains in the English version of the MacNew heart disease HRQL ranged from 0.93 to 0.95.¹² This compares well to the internal consistency for other language versions of the MacNew, which range from 0.78 to 0.97.^{1,13} Although the present study was limited by its small sample size, the results demonstrated satisfactory psychometric properties concurrent with the English version. Internal consistency reliability in the present study was ≥ 0.95 .

The test-retest reliability was 0.66 in global, 0.82 in emotional and 0.60 in social scale. However, the ICC for the physical subscale was lower (0.36) compared to other language versions. The low test-retest reliability value in physical domain may be due to the fact that we conducted baseline measurement within one week after surgery, while the second measurement conducted 7-10 days after baseline measurement. All patients followed an outpatient cardiac rehabilitation program, therefore their physical function was expected to improve, reflecting improvement in the HRQL. Our findings are similar to those reported in the Farsi version, where patients did not meet the criteria for clinical stability.¹⁴

The validity of the Indonesian MacNew was found to be acceptable with statistically significant Pearson correlation value in all domains ranging from 0.47 to 0.71. The value of the SF36 Mental Component Scale had the highest correlation with the MacNew Emotional sub-scale (0.71). These results are in line with the previous study in China mainland and Sri Lanka.^{15, 16} On the other hand, the correlation between Physical Component Scale of the SF-36 and MacNew physical subscale was lower than the previous reported study.¹⁵⁻¹⁷ Future studies are needed to assess the construct validity using larger sample sizes.

The limitation of this study is that the study was conducted one week after surgery. During this period, patients experienced pain and were still recovering post-operatively. It is suggested

that future studies should include patients at various stages of the post-operative recovery period. Another limitation of this study is that the patients were predominantly male (91.7%) and although this is representative of the population with CAD in that age range, results cannot inform findings for the female population. Furthermore, this study only evaluated concurrent validity and as such future studies should include an evaluation of construct validity. Construct validity will provide evidence to support or refute the theoretical framework behind the concept.

CONCLUSION

The current study gave first indications that the Indonesian MacNew translation has good reliability and acceptable validity as a measurement tool to assess disease specific HRQL of Indonesian patients with CAD. The Indonesian MacNew may be used as a disease-specific instrument to assess and evaluate HRQL in Indonesia.

CONFLICT OF INTEREST

Stefan Höfer is co-developer of the MacNew questionnaire, while the remaining authors declare no competing interest.

CONSENT TO PARTICIPATE

The written informed consent was obtained from all participants.

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