

Validity and Reliability Studies of the Indonesian Version of the Minnesota Living with Heart Failure Questionnaire (MLHFQ): Quality of Life Questionnaire for Patients with Chronic Heart Failure

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ABSTRAK

Latar belakang: *Minnesota Living with Heart Failure Questionnaire (MLHFQ) adalah kuesioner yang paling umum digunakan dan memiliki skor EMPRO (Mengevaluasi Pengukuran Hasil Pasien) yang baik. MLHFQ telah diadaptasi dan digunakan oleh berbagai negara di seluruh dunia; Namun, untuk digunakan di Indonesia, diperlukan studi validitas dan reliabilitas. Penelitian ini bertujuan untuk mendapatkan Kuisisioner Gagal Jantung Jantung (MLHFQ) versi Indonesia yang valid dan andal sehingga dapat digunakan di Indonesia. Metode:* penelitian ini adalah penelitian cross sectional dengan 85 subjek (usia rerata 58 (SB 11) tahun; 55% subjek adalah laki-laki) yang mengalami gagal jantung kronis dan dirawat di klinik rawat jalan kardiologi di Rumah Sakit Dr. Cipto Mangunkusumo, Jakarta. Validitas MLHFQ dinilai dengan mengevaluasi validitas konstruk menggunakan analisis multitrait-multimethod dan validitas eksternal dievaluasi dengan membandingkan MLHFQ dengan kuesioner SF-36. Keandalan dinilai menggunakan Cronbach's α dan koefisien korelasi intraclass (ICC). **Hasil:** versi bahasa Indonesia dari MLHFQ memiliki korelasi sedang hingga kuat antara domain dan item dalam kuesioner ($r: 0,571-0,748; p<0,01$) dan memiliki korelasi negatif sedang dengan kuesioner SF-36 ($r -0,595; p<0,001$). Cronbach α dari MLHFQ versi Indonesia adalah 0,887; sedangkan ICCs adalah 0,918. **Kesimpulan:** MLHFQ versi Indonesia memiliki validitas dan reliabilitas yang baik untuk menilai kualitas hidup pasien dengan gagal jantung kronis di Indonesia.

Kata kunci: *gagal jantung kronis, Minnesota Living with Heart Failure Questionnaire (MLHFQ), kualitas hidup, reliabilitas, validitas.*

ABSTRACT

Background: *Minnesota Living with Heart Failure Questionnaire (MLHFQ) is the most commonly used questionnaire and it has a good EMPRO (Evaluating the Measurement of Patient-Reported Outcomes) score. The MLHFQ has been adapted and used by various countries worldwide. However, to be utilized in Indonesia, it needs validity and reliability studies. This study aimed to obtain a valid and reliable Indonesian version of the Minnesota Living with Heart Failure Questionnaire (MLHFQ) so that it can be used in Indonesia. Methods:* the present study was a cross sectional study with 85 subjects (mean age 58 (SD 11) years; 55% subjects were male) who had chronic heart failure and was treated at the outpatient clinic of cardiology in Dr. Cipto Mangunkusumo Hospital, Jakarta. Validity of the MLHFQ was assessed by evaluating the construct validity

using multitrait-multimethod analysis and external validity was evaluated by comparing the MLHFQ with the SF-36 questionnaire. Reliability was assessed using Cronbach's α and intraclass correlation coefficients (ICC). **Results:** the Indonesian version of the MLHFQ had moderate-to-strong correlation between domains and items in questionnaire ($r: 0.571-0.748; p < 0.01$) and it had moderate negative correlation with SF-36 questionnaire ($r -0.595; p < 0.001$). The Cronbach α of Indonesian version of MLHFQ was 0.887; while the ICCs was 0.918. **Conclusion:** the Indonesian version of MLHFQ has good validity and reliability to assess the quality of life of patients with chronic heart failure in Indonesia.

Keywords: chronic heart failure, Minnesota Living with Heart Failure Questionnaire (MLHFQ), quality of life, reliability, validity.

INTRODUCTION

Heart failure has become a great health problem worldwide with an estimation of 26 millions of patients all over the world, including Indonesia.^{1,2} In addition to cause physical problems, it also has psychological, social and economical impacts. As many as 20% of patients with heart failure, both ambulatory and hospitalized patients, experience severe depression. The high rate of depression and anxiety will affect treatment compliance, aggravate functional status, and increase hospitalization and mortality rates.³⁻⁵

The management of chronic heart failure includes physical, emotional, and social aspects. Chronic heart failure treatment, both non-pharmacological and pharmacological treatment, aims to reduce symptoms/signs, to prolong survival, to increase functional capacity, to prevent exacerbation of disease, to prevent hospitalization, to improve quality of life and to reduce mortality rate.⁶⁻⁸ There are two types of instrument for measuring health-related quality of life, i.e. a generic instrument such as SF-36 and specific instrument that can be used to measure the quality of life of patients with heart failure.^{9,10} Specific instruments, which are utilized to evaluate the quality of life of patients with chronic heart failure are Quality of Life in Severe Heart Failure Questionnaire (QLQ-SHF), Chronic Heart Failure Questionnaire (CHQ), Kansas City Cardiomyopathy Questionnaire (KCCQ), Left Ventricular Dysfunction Questionnaire (LVD-36), Chronic Heart Failure Assessment Tool (CHAT) and Minnesota Living with Heart Failure Questionnaire (MLHFQ). Minnesota Living with Heart Failure Questionnaire (MLHFQ) is the

most commonly used questionnaire and it has a good EMPRO (Evaluating the Measurement of Patient-Reported Outcomes) score; therefore, its use has been recommended to evaluate quality of life of patients with chronic heart failure.^{10,11}

The MLHFQ has been adapted and used by various countries worldwide; however, to be utilized in Indonesia, it needs validity and reliability studies. An instrument that has been demonstrated valid and reliable abroad may not be valid and reliable when it is used in Indonesia due to differences in language and culture; therefore, an adaptation is necessary.¹² The present study aimed to perform an adaptation and evaluation on reliability and validity of Indonesian version of MLHFQ.

METHODS

Our study was a cross-sectional study consisted of two stages. The first stage was adapting questionnaire following a method according to the guidelines provided by Beaton DE, et al.¹³ The second stage was validity and reliability studies. Validity of the MLHFQ was assessed by evaluating inter-item correlation in the MLHFQ domains with domains in the Indonesian version of MLHFQ and to evaluate the correlation of the Indonesian version of MLHFQ with the Indonesian version of SF-36 as the gold standard. Reliability study was evaluated by calculating the intraclass correlation coefficient (ICC) and internal consistency (Cronbach's α). The study had been approved by the Ethic Committee of Health Research, Faculty of Medicine, Universitas Indonesia number 189/UN2.F1/ETIK/2017 dated March 6th, 2017.

Subjects

Study subjects were patients with chronic heart failure who sought treatment at the outpatient cardiology clinic of the Integrated Heart Services of Cipto Mangunkusumo Hospital Jakarta with a period of study between March 2017 and July 2017. The number of collected sample was 85 patients with inclusion criteria of adult patients with chronic heart failure who could read and write in Indonesian language and were willing to participate in the study. Patients who had communication barriers or cognitive disorder as well as those with exacerbated condition and those who were not available for re-test were excluded from the study.

Questionnaire

The MLHFQ questionnaire consisted of 21 questions with 6-point Likert Scale (0-5), developed to evaluate the effect of heart failure and treatment on patient's quality of life. There were two domains in the questionnaire which were physical domains (8 questions) and emotional domains (5 questions) and the other 8 questions were not included in both domain categories; however, the questions were added to evaluate the overall scores. The higher the MLHFQ score, the lower the quality of life of the patient.^{14,15}

Adapting Questionnaire

Questionnaire adaptation was performed following the guidelines issued by the Quality of Life Special Interest Group (QoL-SIG)-Translation and Cultural Adaptation Group (TCA Group).¹⁶ The translation was performed by 2 translators of the Indonesian version, 2 translators of English version and 1 linguistic expert in Indonesian and English expert supervised by the researcher team. Results of translation were tested on 30 subjects who gave evaluation on the translation results. The process developed an Indonesian version of the MLHFQ, which was used in the validity and reliability test.

Data Analysis

The collected data were managed using a SPSS statistic program version 20.0 for Windows and the data were presented in tables and figures. Data normality was calculated using Kolmogorov-Smirnov test ($n > 50$). The

correlation of data with normal distribution ($p > 0.05$) was evaluated using Pearson test and when the distribution was abnormal ($p < 0.05$), the data was evaluated using Spearman test. The validity of the questionnaire was calculated by evaluating the inter-item correlation of questions on domains in the questionnaire by using multitrait-multimethod analysis. The further analysis on validity was to evaluate correlation of each study in the MLHFQ with the domain in the gold standard SF-36 questionnaire. Reliability of the questionnaire was calculated using a re-test method by assessing the intraclass correlation coefficient of the MLHFQ on day 1 and day 8. Further reliability study included evaluating internal consistency of the questionnaire by calculating the Cronbach's α of the MLHFQ.

RESULTS

There were 96 patients recruited at the beginning of the study; however, 11 subjects were excluded as they did not follow the re-test on day 8 and therefore, the other 85 patients with chronic heart failure participated as study subjects. There were 55 (61.2%) male subjects with mean age of 58.27 years. Subjects with EF $\leq 40\%$ were 15 (17.6%) individuals and there was a domination of subjects with NYHA FC I and II of 43 (50.6%) and 33 (38.8%) subjects, respectively; moreover, there were 9 (10.6%) patients with NYHA FC III. As many as 62 (72.9%) subjects had concomitant coronary heart disease (**Table 1**).

Table 1. Subject characteristics

Variables	n (%)
Sex, Male, n (%)	55 (61.2)
Age, mean (SD)	58.27 (11.13)
- ≤ 40	7 (8.2)
- 41-50	15 (17.6)
- 51-60	20 (23.5)
- 61-70	33 (38.8)
- > 70	10 (11.8)
Education, n (%)	
- Primary	10 (11.8)
- Junior High	14 (16.5)
- Senior High	36 (42.4)
- University	25 (29.4)

Table 1. Subject characteristics (continued)

Variables	n (%)
Marital status, n (%)	
- Single	4 (4.7)
- Married	69 (81.2)
- Widow/Widower	12 (14.1)
NYHA, n (%)	
- NYHA FC I	43 (50.6)
- NYHA FC II	33 (38.8)
- NYHA FC III	9 (10.6)
Ejection Fraction (%)	
- ≤ 40 %	15 (17.6)
- > 40 %	70 (82.4)
Duration of diagnosis (years)	
- < 1	25 (29.4)
- 1-5	37 (43.5)
- >5	23 (27.1)
CAD, n (%)	
- Present	62 (72.9)
- Absent	23 (27.1)
Therapy, n (%)	
- Diuretics	28 (32.9)
- ACEI/ARB	72 (84.7)
- β-blocker	68 (80)
- MRA	30 (35.3)
- Digitalis	3 (3.5)
- Anti-coagulant	15 (17.6)
- Nitrate	24 (28.2)
- Double anti-platelet	28 (32.9)
- Single anti-platelet	41 (48.2)

Validity Test

Correlation of items of question in physical domain with the physical domain was stronger compared to its correlation with emotional domain ($r: 0.571 - 0.748$ vs. $r: 0.137 - 0.506$). Items of questions in emotional domain also had stronger correlation with emotional domain compared to its correlation with physical domain ($r: 0.676 - 0.718$ vs. $r: 0.188 - 0.499$). The correlation of physical and emotional domain with the total score of MLHFQ had been demonstrated to be strong ($r > 0.6$) (Table 2). The Indonesian version of the MLHFQ had negative correlation between the score of the MLHFQ and SF-36 ($r: -0.595$). It indicates that the higher the score of the MLHFQ (or the lower the quality of life), the lower the score of SF-36 (or the lower the quality of life) (Table 3).

Reliability Study

Results of the study showed that the questionnaire had a good ICC score regarding the inter-item correlation ($r: 0.592 - 0.984$), inter-physical domain ($r: 0.896$), emotional domain ($r: 0.950$) and total correlation ($r: 0.918$). Internal consistency of the questionnaire was good as shown by the value of cronbach α for physical domain of 0.862, for emotional domain of 0.800 and for the total questionnaire score of 0.887.

DISCUSSION

The subject characteristic of the present study is similar to studies in East Asia and South East Asia.¹⁷⁻¹⁹ The validity study on the questionnaire has demonstrated a good result, which is represented by stronger item correlation of questions in physical domain with those in physical domain compared to correlation with the emotional domain ($r: 0.571 - 0.748$ vs. $r: 0.137 - 0.506$). Items of questions in emotional domain also have stronger correlation with emotional domain compared to correlation with physical domain ($r: 0.676 - 0.718$ vs. $r: 0.188 - 0.499$). Correlation of physical and emotional domains with total score of the MLHFQ questionnaire has been demonstrated to be strong ($r > 0.6$). The present study has similar correlation of item-domain compared to the original study that has correlation of physical item-domain ($r: 0.53-0.84$) and emotional item-domain ($r: 0.60-0.81$).²⁰

Similar results on construct validity with other studies have also been observed, which describes greater item correlation of questions in physical domain with physical domain compared with emotional domain and likewise.^{17,21-23} The domain correlation of the MLHFQ with SF-36 domain.

The results of the study have demonstrated that overall we found a negative correlation between MLHFQ score and SF-36 ($r: -0.595$). It indicates that the greater the score of MLHFQ (the lower the quality of life), the lower the SF-36 score (the lower the quality of life). In details, the physical domain of the questionnaire has a strong negative correlation on PCS SF-36 ($r: -0.652$), a moderate negative correlation on MCS SF-36, physical functioning, role physical, role emotional and pain as well as a weak negative

Table 2. Results of validity and reliability studies

Variables	Correlation			ICC	Cronbach α
	Physical Domain	Emotional Domain	Total score		
Physical Domain	1.000	0.425**	0.871**	0.896	0.862
Q2	0.571**	0.271*	0.483**	0.837**	
Q3	0.712**	0.137	0.526**	0.912**	
Q4	0.640**	0.271*	0.602**	0.889**	
Q5	0.627**	0.367**	0.594**	0.774**	
Q6	0.572**	0.369**	0.539**	0.832**	
Q7	0.645**	0.346**	0.635**	0.902**	
Q12	0.748**	0.357**	0.628**	0.808**	
Q13	0.662**	0.506**	0.671**	0.883**	
Emotional Domain	0.425**	1.000	0.688**	0.950	
Q17	0.499**	0.718**	0.678**	0.935**	
Q18	0.377**	0.692**	0.539**	0.984**	
Q19	0.255*	0.676**	0.439**	0.858**	
Q20	0.188	0.687**	0.396**	0.912**	
Q21	0.293**	0.696**	0.488**	0.924**	
Non Domain					0.800
Q1	0.386**	0.020	0.321**	0.868**	
Q8	0.230*	0.378**	0.430**	0.885**	
Q9	0.487**	0.229*	0.541**	0.814**	
Q10	0.160	0.195	0.330**	0.884**	
Q11	0.261*	0.289**	0.454**	0.798**	
Q14	0.170	0.161	0.321**	0.794**	
Q15	0.160	0.320**	0.341**	0.592**	
Q16	0.254*	0.347**	0.385**	0.752**	
Total Score	0.871**	0.688**	1.000	0.918**	

Table 3. Correlation of the Indonesian version of the Minnesota Living with Heart Failure Questionnaire with SF-36 Questionnaire

SF-36 Domain	Physical Domain of the MLHF Questionnaire	Emotional Domain of the MLHF Questionnaire	Total score of the MLHF Questionnaire
Physical functioning	-0.570**	-0.134	-0.428**
Role-physical	-0.466**	-0.239*	-0.463**
Role-emotional	-0.484**	-0.416**	-0.492**
Energy/fatigue	-0.347**	-0.269*	-0.313**
Emotional well-being	-0.229*	-0.466**	-0.306**
Social functioning	-0.337**	-0.340**	-0.439**
Pain	-0.491**	-0.302**	-0.416**
General health	-0.314**	-0.336**	-0.309**
PCS	-0.652**	-0.239*	-0.550**
MCS	-0.480**	-0.524**	-0.519**
Total SF-36	-0.651**	-0.370**	-0.595**

correlation on SF-36 domains of energy/fatigue, emotional well-being, social functioning and general health. Meanwhile the emotional domain has a moderate negative correlation on MCS SF-36 ($r: -0.524$), which includes role emotional and emotional well-being; it also has a weak negative correlation on PCS SF-36 ($r: -0.239$) including role physical, energy/fatigue, social functioning, pain and general health as well as a very weak correlation on physical functional domain (**Figure 1**). The correlation of this study is almost the same with other studies.^{17,19,23}

The present study was performed by calculating inter-item correlation of questions on day 1 and day 8, inter-domain correlation on day 1 and day 8 and total score of the MLHFQ on day 1 and day 8. The results of the study have demonstrated that the questionnaire has a good ICC value on inter-item correlation ($r: 0.592-0.984$), correlation among physical domain ($r: 0.896$), emotional domain ($r: 0.950$) and total correlation ($r: 0.918$). The inter-item correlation of questions in the present study is also consistent with other studies such as a study in Taiwan ($r: 0.55 - 0.80$)¹⁷, Korea ($r: 0.65 - 0.80$)¹⁸, Greece ($r: 0.558 - 0.906$).²⁴ Inter-domain correlation and total score of the MLHFQ in the present study

is relatively the same (physical domain with $r: 0.896$; emotional domain emotional with $r: 0.950$ and total with $r: 0.918$) when it is compared to the original study with correlation on physical domain, emotional domain and total of 0.89 , 0.88 and 0.93 , respectively.²⁵ Similar result has also been found in a study in Thailand with the correlation of 0.84 , 0.84 , 0.88 , respectively.¹⁹ It indicates that the reliability of re-test method for the Indonesian version of MLHFQ is good. The study has calculated the Cronbach's α for physical domain, emotional domain and total score of MLHFQ. Results of the study showed that the Cronbach's α for physical domain was 0.862 ; for the emotional domain was 0.800 and for total score of questionnaire was 0.887 . The Cronbach's α of the Indonesian version of MLHFQ has lower value compared to the original study and several other studies, but the results is still considered good.^{17-20,24} It may be caused by the small sample size in the present study. The fewer number of study subject, the greater the bias on the Cronbach's α .²⁶ In addition to sample size, some factors that may affect the value of Cronbach's α of the questionnaire, which are homogeneity of subjects and question items.²⁷

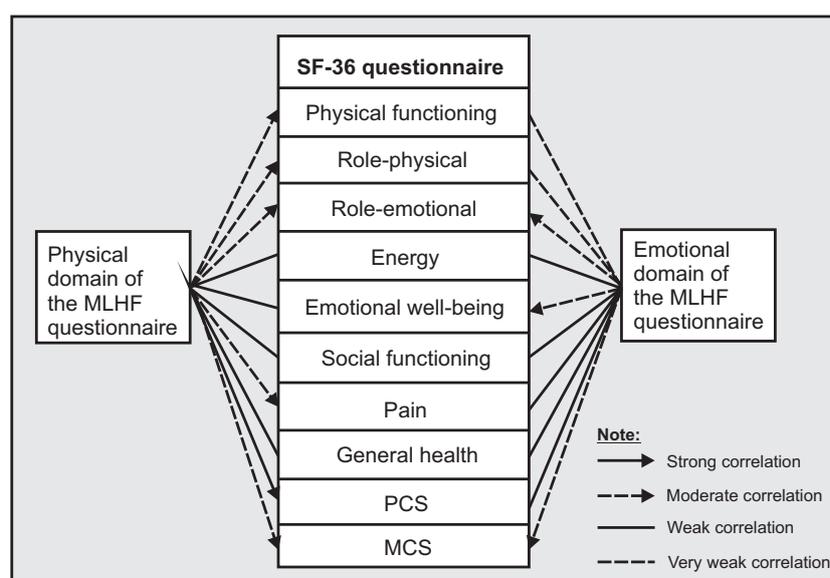


Figure 1. Correlation of the Indonesian version of the Minnesota Living with Heart Failure Questionnaire with the SF-36.

Benefits and Limitation the Study

The present study has developed the Indonesian version of the MLHF quality of life questionnaire with good validity and reliability. The questionnaire is an adaptation of the original questionnaire by considering the rule of cross-lingual adaptation following the standard guidelines compared to other previous translation endeavors.^{28,29} The questionnaire that has been developed in the study can be used in daily clinical practice as well as in further studies to evaluate the quality of life of patients with chronic heart in Indonesia. The limitation of the study is the internal consistency of the study, which is lower than other studies that is caused by the fewer number of subjects in the present study compared to other studies.

CONCLUSION

The Indonesian version of the MLHF questionnaire has good validity and reliability to evaluate the quality of life of patients with chronic heart failure in Indonesia.

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