The Adaptation of the Indonesian Version of the Maastricht Vital Exhaustion Questionnaire (MQ) Among Coronary Heart Disease (CHD) Patients: A Rasch Analysis

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Abstrak

Background – The Indonesian version of the Maastricht Vital Exhaustion Questionnaire (MQ) is an instrument for assessing vital exhaustion in CHD patients. However, the psychometric results of this instrument have yet to be identified in the population of CHD patients in Indonesia. This study aims to evaluate the psychometric properties of the Indonesian version of the MQ instrument using Rasch analysis. Methods – The population of this study was all CHD patients undergoing outpatient treatment at a hospital in West Java. There were 97 respondents using convenience sampling. The instrument used is the Indonesian version of MQ. The reliability and validity of the instrument were analyzed using Rasch analysis and the Winsteps application by considering the Cronbach's Alpha value, Mean square fit statistic (MNSQ), Standardized fit statistics (ZSTD), separation of strata (Separation), and unidimensionality. Findings – α-Cronbach 0.78 with item reliability 0.95 indicates very good reliability; person and item strata separation >2.4 and >5.9, indicating the instrument can identify respondent groups well; MNSQ item infit-outfit 1-0.94 is close to ideal (1) as is ZSTD infit-outfit 0.11 – 0.03 (close to 0); Unidimensionality measurements show a total raw variance of 32.4% with unexplained eigenvalues all <10% indicating good validity. Conclusions - The internal consistency of the instrument is reliable. The data fits the model because the items can measure, have logical predictions, and functionally show unidimensionality. Based on the results, the Indonesian version of the MQ was proven valid and reliable for identifying vital exhaustion in CHD patients in Indonesia.

Abstract

Background – The Indonesian version of the Maastricht Vital Exhaustion Questionnaire (MQ) is an instrument for assessing vital exhaustion in CHD patients. However, the psychometric results of this instrument have yet to be identified in the population of CHD patients in Indonesia. This study aims to evaluate the psychometric properties of the Indonesian version of the MQ instrument using Rasch analysis. Methods – The population of this study was all CHD patients undergoing outpatient treatment at a hospital in West Java. There were 97 respondents using convenience sampling. The instrument used is the Indonesian version of MQ. The reliability and validity of the instrument were analyzed using Rasch analysis and the Winsteps application by considering the Cronbach's Alpha value, Mean square fit statistic (MNSQ), Standardized fit statistics (ZSTD), separation of strata (Separation), and unidimensionality. Findings – α-Cronbach 0.78 with item reliability 0.95 indicates very good reliability; person and item strata separation >2.4 and >5.9, indicating the instrument can identify respondent groups well; MNSQ item infit-outfit 1-0.94 is close to ideal (1) as is ZSTD infit-outfit 0.11 – 0.03 (close to 0); Unidimensionality measurements show a total raw variance of 32.4% with unexplained eigenvalues all <10% indicating good validity. Conclusions - The internal consistency of the instrument is reliable. The data fits the model because the items can measure, have logical predictions, and functionally show unidimensionality. Based on the results, the Indonesian version of the MQ was proven valid and reliable for identifying vital exhaustion in CHD patients in Indonesia.

INTRODUCTION

Coronary heart disease (CHD) impacts all aspects of the patient's life, including biological, psychological, and spiritual. Biologically or physically, CHD patients often experience shortness of breath, fatigue, sexual disorders, and chest pain (Rosidawati et al., 2016).

Apart from that, patients with CHD often experience anxiety and depression (Celano & Huffman, 2011; Nuraeni et al., 2019) as well as spiritual distress (Mako et al., 2006; Wahyuni et al., 2020).

CHD patients require continuous adjustments after going through the acute phase of a heart attack. Previous research identified post-acute attack patients who underwent outpatient treatment still experienced physical limitations (42%) and frequent angina (56%). Moreover, most patients' satisfaction with treatment is still low (82%), and patients' perception of the disease was poor (58%) (Nuraeni et al., 2016). The same study revealed that the rates of anxiety and depression in CHD patients undergoing outpatient treatment were relatively high. In addition, CHD patients' overall quality of life is still low.

Based on a review from Saengsiri (2014), the factors influencing the quality of life in CHD patients who have undergone revascularization therapy were social support, depression, vital exhaustion, and cardiac self-efficacy. Of these four factors, vital exhaustion was the factor that had the most significant influence on low quality of life Pedersen et al., (2007) found that high vital exhaustion can be used to predict quality of life.

The previous paragraph explains the importance of identifying vital exhaustion because it can determine the quality of life in patients with CHD. Identification of vital exhaustion can be measured using the Maastricht Vital Exhaustion Questionnaire (MQ). However, not many studies in Indonesia measure vital exhaustion, nor have any psychometric adaptations of the Indonesian version of this instrument that have been identified using the Rasch Model Analysis approach. This approach can provide information regarding item and person reliability and validity so that the information obtained is complete. Hence, this research aims to conduct psychometric tests of The Indonesian Version of the Maastricht Vital Exhaustion Questionnaire (MQ) among CHD Patients.

METHODOLOGY

This research is a quantitative research with a cross-sectional approach. The population of this study was all CHD patients undergoing outpatient treatment at a hospital in West Java. There were 97 respondents using convenience sampling with criteria. The inclusion criteria in this study were: 1) Patients aged > 18 years, 2) Patients having full consciousness, and 3) Willing to carry out research.

The instrument used was the Indonesian version of MQ. Psychometric analysis is tested by identifying reliability, validity, and separation. The reliability and validity of the instrument were analyzed using Rasch analysis and the Winsteps application by considering Cronbach's Alpha value, Mean square fit statistics (MNSQ), Standardized fit statistics (ZSTD), Separation of strata (Separation), and Unidimensionality. This research has received ethical approval with the permission letter LB.02.01/X.6.5/123/2023.

RESULT AND DISCUSSIONS

Results

Person reliability is 0.72 with person separation of 1.59, then we calculated using another equation to see the grouping more thoroughly, called strata separation, using the formula $[(4 \times separation)+1]/1$. Based on this formula, it is known that the person strata separation value is 2.4, which means there are two groups of respondents. Mean-square (MNSQ) value 0.94 – 1.00 (0.5 – 1.5, a good value for measurement). ZSTD or standardized fit statistics value 0.07 – 0.09 (-1.9 – 1.9, data has a logical approximation).

Table I.　Summary statistics of 97 measured person

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-------------------------------------------------------------------
|          TOTAL                MODEL      INFIT        OUTFIT     |
|          SCORE   COUNT MEASURE  S.E.   MNSQ  ZSTD   MNSQ  ZSTD   |
|-----------------------------------------------------------------|
| MEAN     13.0    21.0   -.66    .31   1.00   .07    .94   .09    |
| SEM       .8      .0     .06    .01    .02   .09    .05   .08    |
| P.SD     7.5      .0     .64    .09    .24   .89    .51   .80    |
| S.SD     7.5      .0     .64    .09    .24   .89    .52   .81    |
| MAX.    33.0    21.0     .89    .74   1.86  3.20   3.44  3.04    |
| MIN.     1.0    21.0   -2.23    .25    .58 -1.60    .19 -1.07    |
|-----------------------------------------------------------------|
| REAL RMSE   .34 TRUE SD  .54 SEPARATION 1.59 PERSON RELIABILITY .72 |
| MODEL RMSE  .32 TRUE SD  .55 SEPARATION 1.68 PERSON RELIABILITY .74 |
| S.E. OF PERSON MEAN = .06                                        |
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Table II.　Summary statistics of 21 measured items.

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|          TOTAL                MODEL      INFIT        OUTFIT     |
|          SCORE   COUNT MEASURE  S.E.   MNSQ  ZSTD   MNSQ  ZSTD   |
|-----------------------------------------------------------------|
| MEAN     60.2   100.0    .00    .15   1.00   .11    .94   .03    |
| SEM       7.7     .0     .15    .01    .02   .19    .07   .23    |
| P.SD     34.6     .0     .69    .05    .10   .86    .30  1.03    |
| S.SD     35.5     .0     .70    .05    .10   .88    .31  1.05    |
| MAX.    140.0   100.0   1.26    .27   1.21  2.15   1.83  2.80    |
| MIN.      8.0   100.0  -1.28    .12    .78 -1.94    .43 -1.75    |
|-----------------------------------------------------------------|
| REAL RMSE   .16 TRUE SD  .67 SEPARATION 4.14 ITEM RELIABILITY .94 |
| MODEL RMSE  .16 TRUE SD  .67 SEPARATION 4.21 ITEM RELIABILITY .95 |
| S.E. OF ITEM MEAN = .15                                          |
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Item reliability is 0.94, with item separation of 4.14. Then, we calculate it with another equation to see the grouping more carefully, called strata separation, using the formula [(4xseparation)+1]/1. Based on this formula, it is known that the person strata separation value is 5.9, which means there are six groups of respondents. Mean-square (MNSQ) value 0.94 – 1.00 (0.5 – 1.5, a good value for measurement. ZSTD or standardized fit statistics value 0.03 – 0.11 (-1.9 – 1.9, data has a logical approximation).

Table III.　Unidimensionality (Standardized Residual variance in Eigenvalue unit).

Item information units	Empirical
Raw variance explained by measures	32.4%
Unexplained variance in first contrast	8.7%
Unexplained variance in second contrast	6.1%

Table 3 shows that the Raw variance explained by measure (unidimensional) has a value of 32.4% where the minimum value = 20%, above 40% is considered better, and above 60% is very good (Marpatmawati et al., 2022; Sumintono & Widhiarso, 2014). Next, the variance that the instrument cannot explain is 8.7% in the first contrast and 6.1 in the second contrast, which ideally should be less than 15%.

Discussions

Reliability was tested to identify the consistency of the instrument for respondents. Based on the analysis results in this research, it can be seen that the reliability items for both person and item are categorized as good. This result can be seen from the person and item reliability values of 0.78 and 0.94, respectively. This value shows the interaction between the person and the item (Sumintono, 2018; Sumintono & Widhiarso, 2014). The interaction between person and item in the Indonesian version of MQ shows that the consistency of the respondents' answers is good and that the quality of the items in the instrument is excellent. These results show that the data is steady and consistent between each individual, accompanied by a very good quality of the question items on the instrument. Likewise, with separation, the instrument has a strata separation close to 6 in this study. These findings show that the instrument has good quality based on the logit item distribution. (Marpatmawati et al., 2022).

Furthermore, the infit and outfit Mean Square (MNSQ) values were identified in this research. This infit value measures the item response pattern of the respondent (person) or vice versa. At the same time, outfit means measuring the sensitivity of the response pattern to items with a certain level of difficulty for the respondent. This instrument has ideal MNSQ infit and outfit values; the data is proven to match the model. This meaning is indicated by the MNSQ data for persons and items in the acceptable range, they are 0.5 – 1.5 (Marpatmawati et al., 2022; Sumintono, 2018; Sumintono & Widhiarso, 2014). Likewise with the ZSTD infit and outfit values, the values for this measure are very close to the ideal value (0), where the acceptable range is -2 to +2 (Marpatmawati et al., 2022; Sumintono & Widhiarso, 2014) . These measurements show that the analyzed data is accurate and that the model indices are close to ideal values.

Another data analysis is unidimensionality. This value was measured based on the Raw variance explained by measures showing a value of 32.4%, where the acceptable value is > 20%. In addition, Raw variance explained by persons and items shows a value of < 10%, where this value is an acceptable unidimensionality value. This measure indicates that the instrument can measure VE among CHD patients.

CONCLUSION

Based on Psychometric Properties of The Indonesian Version of Maastricht Vital Exhaustion Questionnaire (MQ) to the CHD patients showed that the internal consistency of the instrument was reliable. The data fits the model because the items can measure, have logical predictions, and functionally show unidimensionality. Based on the results, the Indonesian version of the MQ was proven valid and reliable for identifying vital exhaustion in CHD patients in Indonesia.

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REFERENCES

Cahyani, R., & Irawati, D. 2020. Hubungan Kualitas Tidur terhadap Vital Exhaustion pada Pasien Coronary Artery Disease di Poliklinik Jantung Rumah Sakit Islam Jakarta Cempaka Putih. *Indonesian Journal of Nursing Sciences and Practice*, 3(1), 23–28.

Celano, C. M., & Huffman, J. C. 2011. Depression and cardiac disease: A review. *Cardiology in Review*, 19(3), 130–142. https://doi.org/10.1097/CRD.0b013e31820e8106

Frestad, D., & Prescott, E. 2017. Vital Exhaustion and Coronary Heart Disease Risk: A Systematic Review and Meta-Analysis. *Psychosomatic Medicine*, 79(3). https://journals.lww.com/psychosomaticmedicine/fulltext/2017/04000/vital_exhaustion_and_coronary_heart_disease_risk_.3.aspx

Igna, C. V., Julkunen, J., & Vanhanen, H. 2011. Vital exhaustion, depressive symptoms and serum triglyceride levels in high-risk middle-aged men. *Psychiatry Research*, 187(3), 363–369.

Mako, C., Galek, K., & Poppito, S. R. 2006. Spiritual pain among patients with advanced cancer in palliative care. *Journal of Palliative Medicine*, 9(5), 1106–1113. https://doi.org/10.1089/jpm.2006.9.1106

Marpatmawati, I., Suryani, S., & Widianti, E. 2022. Adaptation of Validity and Reliability of Indonesian Instruments of Attitudes Toward Suicide with The Rasch Model Approach. *Jurnal Keperawatan Padjadjaran*, 10(1), 66–72. https://doi.org/10.24198/jkp.v10i1.1714

Nuraeni, A., Mirwanti, R., Anna, A., & Nurhidayah, I. 2019. Determinant Factors of Depression in Patients with Coronary Heart Disease. *Padjadjaran Nursing Journal*, 7(3), 246–254. https://doi.org/DOI : 10.24198/jkp

Nuraeni, A., Mirwanti, R., Anna, A., Prawesti, A., & Emaliyawati, E. 2016. Faktor yang Memengaruhi Kualitas Hidup Pasien dengan Penyakit Jantung Koroner [Factors Affecting Quality of Life of Patients with Coronary Heart Disease]. *Jurnal Keperawatan Padjadjaran*, 4(2), 107–116.

Pedersen, S. S., Daemen, J., van de Sande, M., Sonnenschein, K., Serruys, P. W., Erdman, R. A. M., & van Domburg, R. T. 2007. Type-D personality exerts a stable, adverse effect on vital exhaustion in PCI patients treated with paclitaxel-eluting stents. *Journal of Psychosomatic Research*, 62(4), 447–453.

Rahayu, U. 2008. *Faktor-faktor yang berhubungan dengan vital exhaustion pada pasien Penyakit Jantung Koroner (PJK) di RSU. Cibabat Cimahi dan RS. Rajawali Bandung= Factors that related to vital exhaustion in Patient with Coronary Heart Disease (CHD) at Cibabat Cimahi Gene*.

Rosidawati, I., Ibrahim, K., Nuraeni, A., Muhammadiyah, U., Keperawatan, F., & Padjadjaran, U. 2016. Kualitas Hidup Pasien Pasca Bedah Pintas Arteri Koroner (BPAK) Quality of Life among Patients with Post Coronary Artery Bypass Surgery. *Jurnal Keperawatan Padjadjaran*, 4, 151–161.

Saengsiri, A. O., Thanasilp, S., & Preechawong, S. 2014. Factors predicting quality of life for coronary artery disease patients after percutaneous coronary intervention. *Asian Biomedicine*, 8(1), 31–42. https://doi.org/10.5372/1905-7415.0801.259

Schuitemaker, G. E., Dinant, G.-J., Van Der Pol, G. A., & Appels, A. 2004. Assessment of vital

exhaustion and identification of subjects at increased risk of myocardial infarction in general practice. *Psychosomatics*, *45*(5), 414–418.

Smith, O. R. F., Gidron, Y., Kupper, N., Winter, J. B., & Denollet, J. 2009. Vital exhaustion in chronic heart failure: symptom profiles and clinical outcome. *Journal of Psychosomatic Research*, *66*(3), 195–201.

Sumintono, B. 2018. *Rasch Model Measurements as Tools in Assesment for Learning*. *173*(Icei 2017), 38–42. https://doi.org/10.2991/icei-17.2018.11

Sumintono, B., & Widhiarso, W. 2014. *Aplikasi model Rasch untuk penelitian ilmu-ilmu sosial (edisi revisi)*. Trim Komunikata Publishing House.

Wahyuni, H. F., Nur'aeni, A., & Amirullah, A. A. 2020. Spiritual Distress among Patients with Acute Coronary Syndrome in Cardiac Intensive Care Unit. *Padjadjaran Acute Care Nursing Journal*, *2*(1), 1–6.