Validity and Reliability Test of the Short Form-36 (SF-36) Item Health Survey in Indonesian Version of Post-Heart Attack Patients in Mataram City

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ABSTRACT
The Indonesian version of the SF-36 Item Health Survey instrument measured quality of life in patients with chronic diseases. However, the validity and reliability of this instrument have not been tested in the post-heart attack patient population. This study aimed to assess the construct validity and reliability of the Indonesian version of SF-36 in post-heart attack patients in Mataram, Indonesia. This study was a cross-sectional study. Thirty participants were recruited using consecutive sampling. Confirmatory Factor Analysis using Partial Least Squares Structural Equation Modeling (PLS-SEM) with WarpPLS version 6.0 was carried out to assess convergent and divergent validity, indicator reliability and internal consistency reliability, and evaluating the outer model of the instrument that consisted of three orders. In the first order, 35 items (indicators) constructed eight domains quality of life (PF, RLP, P, FH, RLE, E/F, EWB and SF), and in the second order, the previous eight domains constructed the second-order domains. In the third order, domains in the second order constructed the main construct, Health Status. Two alternative models were tested. The difference of the two models lied on the domains of the second order. In the first order of both models, 12 out of 35 items showed low indicator reliability. All the eight first-order domains had good internal consistencies. Six and seven domains had good convergent validity and good discriminant validity, respectively. Alternative model 2, which had three second-order domains, PCS, MCS, and WB, demonstrated good indicator reliability and convergent validity on more domains in the second order than alternative model 1. Therefore, it was concluded that the Indonesian version of the SF-36 Item Health Survey showed some evidence of construct validity and reliability, although 12 items showed low indicator reliability. In addition, the alternative model that had three second-order domains had better validity and reliability.

Keywords: *Validity, Reliability, CFA, Warppls.*

1. INTRODUCTION

A total of 17.3 million deaths in Indonesia are caused by cardiovascular disease. More than three million deaths occur before the age of 60, and this could have been prevented. Premature death, especially from heart disease, occur in 4% of high-income countries. While in low-income countries, premature death reaches 42%[1]. The 2007 RISKESDAS results showed that 11.6% of the Indonesian population, or as many as 660 452 people aged 15 years and over, experience mental and emotional disorders as an impact of chronic diseases, including heart disease[2]. The incidence of chronic disease in patients has a significant impact on *Health-Related Quality of Life* (HRQoL).

Since 1980s, the concept of quality of life (QoL) has been accepted and used in clinical, research, and policy-making interests in the health sector. The QoL is also effectively used to predict severity, morbidity, mortality, and patient management. Assessing the patient's quality of life and the factors that influence it[3], help doctors to adjust patient management. In addition, QoL is also related to the frequency of re-hospitalization, costs incurred, and it can predict patient morbidity and

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mortality after treatment [4]. QoL assessment is a subjective and multidimensional self-evaluation.

Instruments S*hort Form-36* (SF-36) *Item Health Survey* is a generic instrument consisting of 36 *items of* questions grouped into eight aspects of health-based protocol *International Quality of Life Assessment* (IQOLA). This instrument has been used in various countries in populations with a variety of medical conditions[5]. The Indonesian version of *Short Form-36* (SF-36) has been used in several studies quality of life of patients with chronic diseases such as patients with lung tuberculosis (TB)[6], *urolithiasis*[7], and studies in patients with *rheumatoid arthritis*[8]. So far, the SF-36 instrument has never been used to measure QoL in post-cardiac arrest patients.

Research instruments must be tested for validity and reliability in the population where the sample will be taken[9]. Validity and reliability assessment is to ensure that the data obtained were also valid and reliable. Therefore, to assess the post-heart attack patients' quality of life with the Indonesian version of SF-36, this instrument needs to be tested for validity and reliability in the post-heart attack patient population.

2. METHOD

This study was a cross-sectional study. The study population was post-heart attack patients in the city of Mataram. The targeted population was post-heart attack patients who visited the Cardiology outpatient clinic in the Mataram City General Hospital from November to December 2019. The sample was recruited using a consecutive sampling technique: all patients who met the selection criteria at the time of data collection were recruited[10]. Furthermore, the sample size was determined by taking as many respondents as possible in the data collection period from November to December 2019.

The inclusion criteria were patients with a history of heart attack(s) of more than one month but less than one year from the data collection (January 2019). The exclusion criteria were patients with a history of confirmed mental illness or treated with sedatives and had a disability.

This research was conducted at the Mataram City General Hospital from November to December 2019. The data was collected using the Indonesian version SF-36 instrument *Item Health Survey*. The instrument was translated and adapted by the Division of Cardiology, Department of Internal Medicine, Faculty of Medicine, University of Indonesia[11]. This instrument consists of 36 questions; 35 are classified into eight domains, as shown in Table 1. However, one question that asks about global changes in patient of health (*health transition question*) does not belong to any domain and will not be tested for validity and reliability in this study for the following reasons:

2.1 Assessment of internal consistency reliability, a scale or sub-scale must consist of multiple items, not a single item[12].

2.2 There is a *present state bias* in which the assessment of the subject of changes in his/her health status correlates with his/her current perceived condition[12].

2.3 *The health transition question* is valid to describe the average change in clinical health status at the population level and not at the individual level[12].

Table 1. Eight Domains of SF-36 Health Survey

No.	Domain	Item
1	Physical functioning (PF)	3, 4, 5, 6, 7, 8, 9, 10, 11 dan 12
2	Role limitations due to physical health (RLP)	13, 14, 15 dan 16
3	Role limitations due to emotional problems (RLE)	17, 18 dan 19
4	Energy/fatigue (E/F)	23, 27, 29 dan 31
5	Emotional well-being (EWB)	24, 25, 26, 28 dan 30
6	Social functioning (SF)	20 dan 32
7	Pain (P)	21 dan 22
8	General health (GH)	1, 33, 34, 35 dan 36

The analysis of construct validity and reliability of the SF-36 instrument in this study was carried out using *Partial Least Squares Structural EquationModeling* (PLS-SEM) using *Warp PLS software* version 6.0. *Partial Least Squares Structural Equation Modeling* (PLS-SEM) is an alternative method for structural equation modelling (*Structural Equation Modeling*), which can simultaneously test the relationship between latent constructs in linear or non-linear relationships with many indicators[13].

Validity and reliability analysis with PLS-SEM is a *Confirmatory Factor Analysis* that evaluates the *outer* reflective construct model. A constructor latent variable, in this case, is QoL, which is formed and operationalized by the items or *indicators* (which will be used in this paper), in the QoL instrument[13]. Evaluation of the *outer* model is carried out to the third-order (*third-order construct*). In the first order, the 35 items indicators will be assessed for their validity and reliability in measuring the eight QoL domains. Then, the eight domains will be assessed for their validity and

reliability in measuring the second-order domains in the second-order. Finally, in the third order, the second-order domains will be assessed for their validity and reliability in measuring the final construct: quality of life. There were two alternative models tested in this study. Both were distinguished from the number and components that make up the second-order domains.

In the first alternative, or alternative model 1, (Figure 1), there were two-second order domains: *Physical Component Summary* (PCS) and *Mental Component Summary* (MCS). PCS domain was composed of four domains in the first order: PF, RLP, P, and GH. Meanwhile, the MCS was composed of four other domains, namely E/F, EWB, and SF. In turn, MCS and PCS will compose the Health Status (HS) construct in the third order.

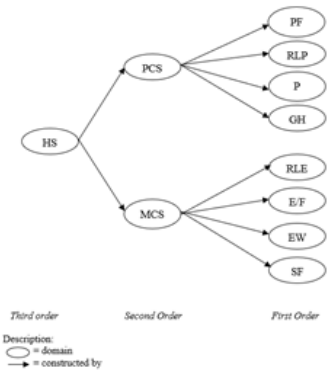

Figure 1. Alternative Model 1

In the second alternative, or alternative model 2 (Figure 2), there were three second-order domains: *Physical Component Summary* (PCS), *Mental Component Summary* (MCS), and *Well-being* (WB). The PCS domain in this model 2 consisted of three first-order domains (PF, RLP, P), while MCS consisted of EWB and SF domains. Lastly, in this model, WB, E/F and GH domains of the first order composed the third second order domain. Hence, the difference between the two models was in the number of domains in their second order and the first-order domains that composed them.

Aspects of validity assessed in this study were *convergent validity* and *discriminant validity*. Convergent validity was determined when the Average Variance Extracted (AVE) > 0,5 (for confirmatory research). Meanwhile, discriminant validity was determined when the square root of AVE > correlation between latent constructs.

Assessment of reliability in this study consisted of *indicator reliability* and *internal consistency reliability*. Indicator reliability was determined when the *loading factor* for each indicator/construct> 0.7 (for confirmatory research). Meanwhile, internal consistency reliability was determined using the value of *composite reliability*. When composite reliability > 0.7 (for *confirmatory research*), the internal consistency reliability was considered good.

Figure 2. Alternative Model 2

3. RESULT AND DISCUSSION

Thirty subjects participated in this study. The mean age of the subjects was 59.43 years and 36.7% of subjects age between 50 to 59 years old. Twenty-seven subjects (90%) were male, and 21 subjects (70%) experienced single event of heart attack, fourteen subjects had normal body mass index (BMI) (18.5 – 22.9 kg/m2). The average BMI was 24.30 kg/m^2.

3.1 The results of the reliability and validity test on the alternative model 1

3.1.1 First order analysis of alternative model 1

3.1.1.1 Indicator reliability

Twelve out of thirty-five indicators showed low indicator reliabilities as indicated by the loading factor < 0.7. These items were item 3, 4, 8, 11, and 12 in the Physical Functioning (PF) domain; item 16 in the Role Limitations due to Physical health (RLP) domains; item 23, 29, and 31 in the Energy/Fatigue (E/F) domain; item 26 in Emotional well-being (EWB) domain; and item 1 and 35 in the GH domain. RLP and PF domains had more items with low indicator reliability compared to the other six domains (consecutively 75% and 50% items with low indicator reliability). The details are provided in table 2.

Table 2. Combine Loading and Cross Loading

Domain, Item	PF	RLP	RLE	E/F	EWB	SF	P	GH	TYPE	SE	P-VALUE
X1.1	(0,577)	-0,721	0,474	0,486	0,228	-0,012	0,188	-0,418	Reflective	0,096	<0,001
X1.2	(0,682)	0,024	-0,200	0,564	0,210	-0,147	0,145	-0,526	Reflective	0,096	<0,001
X1.3	(0,852)	0,025	-0,125	-0,100	0,082	0,115	0,170	0,058	Reflective	0,096	<0,001
X1.4	(0,809)	0,008	-0,017	-0,326	-0,009	0,054	-0,008	0,034	Reflective	0,096	<0,001
X1.5	(0,743)	0,174	0,133	-0,455	0,074	0,089	-0,038	-0,042	Reflective	0,096	<0,001

X1.6	(0,582)	-0,092	-0,158	-0,621	-0,063	0,079	0,055	0,080	Reflective	0,096	<0,001
X1.7	(0,870)	0,221	-0,128	0,251	-0,110	-0,257	0,033	0,010	Reflective	0,096	<0,001
X1.8	(0,759)	0,011	0,036	0,042	-0,114	0,021	-0,266	0,397	Reflective	0,096	<0,001
X1.9	(0,616)	0,109	0,054	0,060	-0,305	0,128	-0,203	0,472	Reflective	0,096	<0,001
X1.10	(0,282)	0,103	0,093	0,336	0,049	-0,067	-0,180	-0,327	Reflective	0,096	0,003
X2.1	-0,107	(0,708)	0,795	-0,064	-0,243	0,215	-0,215	0,260	Reflective	0,096	<0,001
X2.2	-0,164	(0,885)	-0,247	0,017	0,176	0,088	0,048	-0,403	Reflective	0,096	<0,001
X2.3	0,258	(0,800)	-0,819	0,084	0,225	-0,215	0,172	-0,160	Reflective	0,096	<0,001
X2.4	0,024	(0,631)	0,493	-0,060	-0,258	-0,093	-0,043	0,476	Reflective	0,096	<0,001
X3.1	-0,128	-0,652	(0,850)	-0,185	-0,020	0,167	0,081	0,069	Reflective	0,096	<0,001
X3.2	0,010	0,122	(0,965)	-0,085	-0,058	0,102	0,068	0,100	Reflective	0,096	<0,001
X3.3	0,140	0,616	(0,707)	0,337	0,103	-0,340	-0,190	-0,219	Reflective	0,096	<0,001
X4.1	-0,363	0,348	-0,256	(0,677)	-0,304	-0,196	-0,027	0,233	Reflective	0,096	<0,001
X4.2	0,452	0,148	-0,357	(0,744)	0,218	-0,003	0,024	-0,130	Reflective	0,096	<0,001
X4.3	-0,272	-0,471	0,845	(0,540)	0,017	-0,012	-0,037	-0,171	Reflective	0,096	<0,001
X4.4	0,088	-0,141	-0,030	(0,641)	0,052	0,221	0,032	0,050	Reflective	0,096	<0,001
X5.1	-0,109	0,096	-0,020	-0,261	(0,787)	0,233	0,149	0,193	Reflective	0,096	<0,001
X5.2	-0,044	-0,162	0,411	-0,151	(0,705)	0,018	-0,147	0,147	Reflective	0,096	<0,001
X5.3	-0,056	0,415	-0,703	0,471	(0,541)	-0,546	-0,023	-0,766	Reflective	0,096	<0,001
X5.4	0,023	-0,052	0,055	0,049	(0,856)	0,290	-0,277	0,365	Reflective	0,096	<0,001
X5.5	0,181	-0,201	0,085	0,022	(0,701)	-0,212	0,337	-0,219	Reflective	0,096	<0,001
X6.1	0,040	-0,038	0,093	-0,076	0,163	(0,830)	-0,172	-0,223	Reflective	0,096	<0,001
X6.2	-0,040	0,038	-0,093	0,076	-0,163	(0,830)	0,172	0,223	Reflective	0,096	<0,001
X7.1	0,004	-0,193	0,262	-0,181	0,287	-0,144	(0,931)	-0,093	Reflective	0,096	<0,001
X7.2	-0,004	0,193	-0,262	0,181	-0,287	0,144	(0,931)	0,093	Reflective	0,096	<0,001
X8.1	-0,424	0,434	-0,067	0,388	-0,627	-0,500	0,082	(0,621)	Reflective	0,096	<0,001
X8.2	0,009	0,022	-0,080	-0,169	0,277	0,456	0,096	(0,778)	Reflective	0,096	<0,001
X8.3	0,120	-0,084	0,028	-0,368	-0,248	0,134	0,042	(0,744)	Reflective	0,096	<0,001
X8.4	0,110	0,000	-0,289	0,399	0,253	0,123	-0,206	(0,695)	Reflective	0,096	<0,001
X8.5	0,109	-0,268	0,339	-0,135	0,218	-0,273	-0,017	(0,838)	Reflective	0,096	<0,001

Source: Data Processing Result with WarpPLS 6.0

3.1.1.2 Internal consistency reliability

Looking from the composite reliability value in table 3, all the eight domains had a good internal consistency reliability (> 0.7), with values ranging from 0.748 to 0.928.

3.1.1.3 Convergent validity

Based on the AVE in table 3.2, two domains had low convergent validity (AVE < 0.5): Physical Functioning (PF) and Energy/Fatigue (E/F).

Table 3. Latent Variable Coefficient

	PF	RLP	RLE	E/F	EWB	SF	P	GH
Composite reliab.	0,899	0,845	0,883	0,748	0,845	0,816	0,928	0,856
Cronbach's alpha	0,871	0,753	0,795	0,552	0,768	0,549	0,846	0,788
Avg. var. extract.	0,486	0,580	0,718	0,429	0,527	0,689	0,866	0,546

Source: Data Processing Result with WarpPLS 6.0

3.1.1.4 Discriminant validity

In the first order, seven out of eight domains showed good discriminant validity as indicated by the value of AVE square root (yellow cells) exceeded the correlation between latent constructs (all other cells in the same row). As shown in Table 4, only the Role Limitations Due to Physical (RLP) domain showed low discriminant validity.

Table 4. Correlations among I. vs. with sq. rts. of AVEs

Domain	PF	RLP	RLE	E/F	EWB	SF	P	GH
PF	(0,697)	0,458	0,501	0,500	0,109	0,169	0,245	0,088
RLP	0,458	(0,762)	0,790	0,297	0,238	0,343	0,012	0,112
RLE	0,501	0,790	(0,847)	0,347	0,210	0,302	0,046	0,050
E/F	0,500	0,297	0,347	(0,655)	0,467	0,515	0,409	0,437
EWB	0,109	0,238	0,210	0,467	(0,726)	0,504	0,185	0,715
SF	0,169	0,343	0,302	0,515	0,504	(0,830)	0,087	0,339
P	0,245	0,012	0,046	0,409	0,185	0,087	(0,931)	0,354
GH	0,088	0,112	0,050	0,437	0,715	0,339	0,354	(0,739)

Source: Data Processing Result with WarpPLS 6.0

3.1.2 Second order analysis of alternative model 1

3.1.2.1 Indicator reliability

Four out of eight domains that served as indicators for the second order domains showed low indicator reliability (Table 3.4). These indicators were Physical Functioning (PF), Pain (P), and General Health (GH) that composed the Physical Component Summary (PCS), and Role limitation due to emotional problem (RLE) that composed the Mental Summary Component (MCS) domain.

Furthermore, from the p-value in Table 5, it can be inferred that the eight domains in the first order were indeed constructing the second-order domains of PCS and MCS because they have a significant value at p-value <0.001. The PF, RLP, P, and GH domains formed the PCS, while the RLE, E/F, EWB, and SF formed the MCS domain.

Table 5. Combine Loading and Cross Loading

	PCS	MCS	Type	SE	P Value
PF	(0,592)	-0,089	Reflective	0,096	<0,001
RLP	(0,723)	-0,370	Reflective	0,096	<0,001
P	(0,506)	0,026	Reflective	0,096	<0,001
GH	(0,693)	0,443	Reflective	0,096	<0,001
RLE	-0,053	(0,405)	Reflective	0,096	<0,001
EWB	0,000	(0,875)	Reflective	0,096	<0,001
SF	-0,011	(0,731)	Reflective	0,096	<0,001
E/F	0,042	(0,724)	Reflective	0,096	<0,001

Source: Data Processing Result with WarpPLS 6.0

3.1.2.2 Internal consistency reliability

Both PCS and MCS domains of the second order showed a good internal consistency with composite reliability > 0.7, as shown in Table 6

3.1.2.3 Convergent validity

Average variance extract (AVE) for PCS and MCS domain of the second order were 0.402 and 0.487 respectively. Therefore, the convergent validity was low for both domains (AVE < 0.5).

Table 6. Latent Variable Coefficient

	PCS	MCS
Composite reliab.	0.726	0.788
Cronbach's alpha	0.497	0.638
Avg. var. extract.	0.402	0.497

Source: Data Processing Result with WarpPLS 6.0

3.1.2.4 Discriminant validity

The PCS and MCS domains of the second order showed good discriminant validity as indicated by the value of AVE square root and the correlation between latent constructs (Table 7). The value of AVE square root of PCS for the same construct was (0.634), was greater than the correlation between PCS and MCS (0.621). Vice versa, the value of AVE square root of MCS for the same construct was 0.705, greater than the value of AVE square root of PCS (0.621).

Table 7. Correlations among i.vs with sq. Rt. Of aves

Domain	PCS	MCS
PCS	(0,634)	0,621
MCS	0,621	(0,705)

Source: Data Processing Result with WarpPLS 6.0

Table 8. Correlations Among I.vs with SQ. RT. of AVES

Domain	HS	Type	SE	P-Value
PCS	(0,896)	Reflective	0,096	<0,001
MCS	(0,896)	Reflective	0,096	<0,001

Source: Data Processing Result with WarpPLS 6.0

3.1.3 Third order analysis of alternative model 1

3.1.3.1 Indicator reliability

PCS and MCS domains as indicators of the Health Status (HS), the final construct in the third order, showed good reliability indicators, both with loading factors of 0.896 (> 0.7). In addition, the PCS and MCS domains was confirmed to construct the Health Status in the third order as shown by the p value < 0.001. (Table 8).Combine Loading and Cross Loading

3.1.3.2 Internal consistency reliability

The HS domain of the third order had a good internal consistency as shown by the composite reliability value of 0.890 (> 0.7) (Table 9).

3.1.3.3 Convergent validity

The HS domain has good convergent validity because the AVE value > 0.5 (Table 9).

Table 9. Latent Variable Coefficient

	HS
Composite reliab.	0,890
Cronbach's alpha	0,753
Avg. var. extract.	0,802

Source: Data Processing Result with WarpPLS 6.0

3.2 The results of the reliability and validity test on the alternative model 2

3.2.1 First order analysis of alternative model 2

Results of first order analysis in alternative model 1 apply to both alternative models. It means that the results of the analysis first order in alternative model 2 are the same as the analysis first order in alternative model 1

because the items or indicators that make up the first order are items-items the same.

3.2.2. Second Order of alternative model 2

3.2.2.1 Indicator reliability

Three out of eight domains that served as indicators for the second order domains showed low-reliability indicator (loading factor < 0.7). These domains are Physical Functioning (PF) and Pain (P) which constructed the Physical Component Summary (PCS) domain, and Role limitation due to emotion (RLE), which constructed the Mental Component Summary (MCS) domain of the second order.

Table 10. Combine Loading and Cross Loading

Domain	PCS	MCS	WB	Type	SE	P- Value
PF	(0,676)	-0,058	0,065	Reflective	0,096	<0,001
RLP	(0,784)	0,097	-0,209	Reflective	0,096	<0,001
P	(0,529)	-0,069	0,225	Reflective	0,096	<0,001
RLE	0,008	(0,395)	0,031	Reflective	0,096	<0,001
EWB	-0,063	(0,899)	0,223	Reflective	0,096	<0,001
SF	0,066	(0,820)	-0,260	Reflective	0,096	<0,001
E/F	0,076	-0,188	(0,836)	Reflective	0,096	<0,001
GH	-0,076	0,188	(0,836)	Reflective	0,096	<0,001

Source: Data Processing Result with WarpPLS 6.0

Furthermore, from Table 10, it is informed that the eight domains in the first order were true constructs of the second order domains: PCS, MCS, and WB, because each had a significant value at p-value <0.00. Thus, the PF, RLP, and P domains constructed PCS, meanwhile, RLE, EWB, and SF constructed MCS, and lastly, E/F and GH constructed WB.

3.2.2.2 Internal consistency reliability

The composite reliability of PCS, MCS, and WB respectively were 0.706, 0.766 and 0.822 and these indicated good internal consistency reliability (composite reliability > 0.7).

3.2.2.3 Convergent validity

One of three domain in this second order, that is Physical Component Summary (PCS) has a AVE < 0.5 (0.450), therefore indicating a low convergent validity.

Table 11. Latent Variable Coefficient

	PCS	MCS	WB
Composite reliab.	0,706	0,766	0,822
Cronbach's alpha	0,379	0,544	0,568
Avg. var. extract.	0,450	0,546	0,698

Source: Data Processing Result with WarpPLS 6.0

3.2.2.4 Discriminant validity

As shown in Table 12, the three domains of the second order (PCS, MCS and WB) showed good discriminant validity based on the AVE square root value of each construct. All of these domains had AVE square root is greater than the correlation between constructs. (0.671 for PCS, 0.739 for MCS and 0.836 for WB).

Table 12. Correlations among I. vs. with SQ. RTS. of AVE'S

Domain	PCS	MCS	WB
PCS	(0,671)	0,437	0,434
MCS	0,437	(0,739)	0,614
WB	0,434	0,614	(0,836)

Source: Data Processing Result with WarpPLS 6.0

3.2.3 Third order analysis of alternative model 2

3.2.3.1 Indicator reliability

As the indicator for Health Status construct, PCS, MCS and WB showed a good indicator reliability with loading factors of 0.850, 9.743 and 0.949 respectively (loading factor > 0.7). All had a p value of < 0.001 indicating that the three domains were real constructor of the HS.

Table 13. Combine Loading and Cross Loading

Domain	HS	Type	SE	P-Value
PCS	(0,850)	Reflective	0,096	<0,001
MCS	(0,743)	Reflective	0,096	<0,001
WB	(0,849)	Reflective	0,096	<0,001

Source: Data Processing Result with WarpPLS 6.0

3.2.3.2 Internal consistency reliability

The composite reliability of the HS in the third order was 0.856, indicating a good internal consistency reliability (composite reliability > 0.7)

3.2.3.3 Convergent validity

From Table 14 based on the AVE value, it is found that the HS domain has good convergent validity because it shows the AVE value > 0.5 (0.665).

Table 14. Latent Variable Coefficient

	HS
Composite reliab.	0,856
Cronbach's alpha	0,746
Avg. var. extract.	0,665

Source: Data Processing Result with WarpPLS 6.0

3.3 Discussion

This study found that 12 of the 35 items in the Indonesian version of the SF-36 did not show good indicator reliability. The low indicator reliability on these items is possibly due to the fewer heterogenous subjects participating in this study. The subjects in this study were recruited from the outpatient setting. Thus, the patients mostly were in a stable condition. Patients with worse clinical conditions were less likely to be seen in the outpatient setting, but they might be met in an inpatient or home care setting.

This study also found that the alternative model 2 with three domains (PCS, MCS, and WB) in the second-order analysis is more representative of the quality of life than the model consisting of two domains. This model showed better indicator reliability and convergent validity in the second-order analysis. The results of this study are different from a similar study assessing validity and reliability of the Peruvian version of SF-36, which found the alternative model with two second-order domains was more representative than the model consisting of three second-order domains[14]. However, the results of this study are in line with the study conducted by Salazar and Bernabe in Spain, in which the alternative model with three domains in the second order is more representative than the alternative with two domains.

In this study, the researcher only tested two alternative models. In the second order for the three-domain model, the Pain domain has a loading factor < 0.7. The low loading factor is possible because the P domain in post-cardiac arrest patients might not determine the quality of life. PF and RLE domains also had low loading factors. RLE and RLP domains have poor discriminant validity. Combining RLE and RLP domains into one domain may allow getting better AVE results.

In this study, some limitations might affect the results of the study. The activities described in the questionnaire were rarely carried out by respondents, such as pushing a vacuum cleaner, playing bowling, playing golf, and climbing stairs. In addition, some respondents did not speak Indonesian very well, so the researcher had difficulties explaining the items to the participants in their local language. Furthermore, almost all the subjects were male, so the finding might not represent the quality of life of female subjects.

The Indonesian version of the SF-36 instrument can still be employed to research the quality of life in Indonesian patients with a history of heart attacks. However, there are two notes to be taken. First, it is necessary to adjust several statements related to the type of activities or physical activities common for Indonesian people. Second, it is also necessary to recruit subjects from various settings to replicate this study in other contexts.

4. CONCLUSION

The Indonesian version of SF-36 showed some evidence of validity and reliability in post-heart attack patients in Mataram. Twelve out of 35 items had low indicator reliability, particularly for Role Limitation due to Physical health (RLP) and Physical Functioning (PF) domain. This study also found that the SF-36 with three domains (PCS, MCS, and WB) had better indicator reliability and convergent validity than the other model.

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