

# Menopause Rating Scale (MRS) in Bahasa Melayu language- Translation and Validation In Multiethnic Population In Malaysia

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## Research Article

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# Abstract

## Background

The menopause Rating Scale (MRS) is an internationally used tool to measure menopause-related symptoms to date and is unavailable in the Bahasa Melayu language. We aimed to translate and validate the Bahasa Melayu version of the MRS.

## Methods

Translation of the English version of MRS into Bahasa Melayu was done by a bilingual expert and back-translated. Bahasa Melayu MRS was reviewed by a panel to determine the face validity. A total of 321 women aged 40–60 years residing in Klang, Selangor, Malaysia were selected by stratified random sampling method in a house-to-house survey. The Bahasa Melayu MRS was self-administered. Reliability analyses, including test-retest reliability (on 30 women after a two-week interval) were conducted. To ascertain the construct validity, 11 items were analyzed using exploratory factor analyses to determine the factor structure. To further support the psychometric study, confirmatory factor analysis was conducted to evaluate the structural model fit of Bahasa Melayu MRS.

## Results

A total of 294 (91.6%) completed the survey and their mean age was 50.9 years (SD = 6.3). An overall Cronbach's alpha for MRS was 0.904. Cronbach's alpha for psychosomatic, urogenital, and Somatovegetative subscales were 0.889, 0.846, and 0.776 respectively. The corrected item correlations were approximately 0.6 and inter-item correlations were between 0.3 and 0.9. Assumptions for exploratory factor analyses were not violated; Kaiser–Meier–Olkin test revealed a value of 0.883 and Bartlett's test value of sphericity was statistically significant ( $\chi^2 = 2400.483$  and  $p < 0.001$ ). EFA identified three factors accounting for 51.4% of the variance. This study encountered straddling of items. EFA yielded all 4 psychological items in Factor 2. The items which are supposedly falling into Somatic-Vegetative and Urogenital domains are straddled in Factor 1. Two items (heart complications and bladder problems) are grouped in the 3rd Factor. Nevertheless, confirmatory factor analyses showed a good model fit, fitting well into the theoretical constructs.

## Conclusion

The translated English version of the Menopause Rating Scale into the Bahasa Version showed excellent reliability, test-retest reliability, and construct validity. The instrument can be used to assess menopause-related symptoms among Malaysian women.

## Background

Menopause is a natural stage of biological changes in every woman's life with the cessation of menstruation.<sup>1</sup> Declining hormones result in a range of symptoms women experiences during the period of menopause.<sup>2</sup> For the domains of physical, psychological, and urogenital symptoms, the frequency of occurrence and intensity of menopausal symptoms varies across geographical regions<sup>3</sup>. Such variation can be attributed to individual perceptions and psychosocial and cultural factors<sup>4</sup>. Nevertheless, menopausal symptoms are known to affect Health-related quality of life<sup>5</sup>. As life expectancy increases, the absolute number of women surviving into the perimenopausal, and

postmenopausal phases increases<sup>6</sup>. This emphasizes the importance of healthcare providers using reliable and valid tools to assess menopausal symptoms and their severity to provide advice on how to cope with menopausal symptoms and referral services to those in need.<sup>7</sup>

Several measurement scales have been developed to measure menopausal symptoms since the 1990s<sup>8</sup>. Among them, the Greene Climacteric Scale,<sup>9</sup> the Menopausal Symptoms List,<sup>10</sup> the Women's Health Questionnaire,<sup>11</sup> and the Menopause Rating Scale (MRS)<sup>12</sup> have gained widespread acceptance and use throughout the world. The MRS was developed in the early 1990s in the German language.<sup>5</sup> MRS a self-administered questionnaire to assess the frequency and severity of menopausal symptoms among both peri-and post-menopausal women.<sup>13</sup> MRS questionnaire has been used by physicians to assess climacteric symptoms after treatment. MRS has fared well in relation to other questionnaires ( $\alpha = 0.91$ ) making it a reliable and valid questionnaire for measuring the menopausal quality of life and routine evaluation of menopausal symptoms.<sup>14</sup> Following the initial translations from German to English, which demonstrated superior psychometric properties, the English version of MRS has been translated and validated into approximately 30 international languages.<sup>14</sup> Cronbach's alpha indicated overall reliability of 0.83 in several countries.<sup>15</sup> MRS versions in Serbian,<sup>16</sup> traditional Chinese,<sup>17</sup> Urdu,<sup>18</sup> Persian,<sup>19</sup> and Indonesian Bahasa<sup>20</sup> have demonstrated acceptable reliability and validity.

Menopausal symptoms in Malaysian women have been assessed.<sup>21;22</sup> However, none of the Malaysian studies to date have used MRS in Bahasa Melayu language, the country's national language of a multiethnic population. However, neighboring Indonesia has a version of MRS available in the Bahasa Indonesian language.<sup>20</sup> Adopting MRS into the Bahasa Melayu language would enable the identification and assessment of menopause-related symptoms in the local population, as well as comparisons between the prevalence and severity of symptoms in other countries.<sup>15</sup> It would also allow comparisons between the occurrence and severity of menopause symptoms pre-and post-treatment with hormone replacement therapy, non-hormonal therapy, or supplements.<sup>23</sup> As a result, we sought to translate the MRS from English to Bahasa Melayu, as well as to assess the content and construct validity of MRS in Bahasa Melayu (MRS-BM).

## Methods

### Design, setting, and participants

A cross-sectional community-based self-administered interview study was conducted in Klang, Selangor Malaysia. Klang is a district in Selangor. Klang has a mixed population Malay and, Chinese, Indians, and other indigenous ethnicities. Malaysian women between the ages of 40 and 60 who resided in Klang were eligible to participate. Women who had attained artificial menopauses (either medical or surgical), on hormone replacement therapy, pregnant/lactating, who had heart ailments, psychiatric conditions, history of drug or alcohol abuse, on cancer treatment, and those with premature ovarian failure or genital malformation were excluded.

### Sample size and sampling method

The sample size was calculated for 95% confidence limits ( $Z = 1.96$ ), an allowable error of 5%, and an anticipated proportion of 80% for the presence of menopausal symptoms. The minimum sample size was 249 using the formula, and after allowing for a 20% non-response rate, the final sample size was 294 using the formula. A minimum sample of 200 is adequate to perform validation of the questionnaire for meaningful and interpretable values. Three streets in Klang (Taman Petaling, Southern Park, and Taman Chi Liung) were chosen at random from a list of all streets. From a total of 58 rows of houses in these three streets, 14 rows were chosen by simple random sampling. From each row of

houses, it was decided to visit consecutive households until seven eligible women were recruited. Thus, 98 houses were selected from each street to recruit 294 women. Each eligible household member was invited to participate in this study.

## **Instrument**

### **Menopausal Rating Scale**

The MRS (menopausal rating scale) is divided into three domains: 1) somato-vegetative, 2) psychological, and 3) urogenital.<sup>13</sup> 1) Somatovegetative domain: Hot flushes, heart discomfort, sleep problem and muscles, and joint problems. 2) Psychological domain: depression, irritability, anxiety, and physical and mental exhaustion 3) Urogenital domain: Sexual problems, bladder problems, and dryness of the vagina. A five-point scale of severity is used to rate each symptom. Each item can be graded from 0–4, (0 = not present), (1 = mild), (2 = moderate), (3 = severe), (4 = very severe). The scores of the Somatovegetative domain range from 0 to 16, the urogenital domain 0 to 12, and the psychological domain 0 to 16. The composite score ranges from 0 to 44.<sup>24</sup>

### **Translation Process**

The self-administered original menopause rating scale in English was translated into Bahasa Melayu using forward and backward translation methods. The forward translation was conducted by a bilingual expert. The translated Bahasa Melayu version was again reviewed by the researcher who is also proficient in Bahasa Melayu conversant with the Malaysian socio-cultural context. A blind bilingual expert translated the BM version into the English language. All translators approved the final version. The final translated version was reviewed by a panel of health educators, gynecologists, and a family medicine expert familiar with dealing with women of menopausal and postmenopausal age. The panel members were tasked with reviewing and evaluating the items, as well as determining their relevance and appropriateness for the Malaysian context.

### **Data collection procedures**

The respondents were chosen using the sampling procedure through a house-to-house survey. Each woman who met the criteria for participation was invited to take part. The purpose of the survey was explained, anonymity and confidentiality were assured, and consent was sought for participation. Participants were provided with a study/participant information sheet, and participants were allowed to clarify on the questionnaire. The questionnaire was distributed to the consenting women and a completed form were collected. Consent was sought to complete the same questionnaire after an interval of two weeks. Thirty eligible women were recruited for test-retest. The study was approved by the International Medical University Joint committee for ethical concerns.

### **Statistical analyses**

Data was analyzed using Statistical Package for Social Sciences (SPSS) version 25. Descriptive statistics were computed. The mean, standard deviation, range, skewness, and kurtosis for the scores of the questionnaire were computed. Normality of data distribution was tested by one-sample Kolmogorov–Smirnov tests. Cronbach's alpha, scale variance if item deleted, inter-item correlation, and corrected item-total correlation, were estimated for reliability analysis. Cronbach's alpha measures internal consistency and a value greater than 0.7 indicates adequate internal consistency.<sup>25</sup> For the test-retest validity, we estimated to examine the test-retest reliability Pearson's correlation coefficients and intraclass correlation coefficients (ICC) were estimated and a value greater than 0.75 indicates stability or acceptable test-retest reliability.<sup>26</sup> Convergent and divergent validity among the subscales in each of the three domains of MRS-BM was estimated.

### **Exploratory Factor Analysis**

An exploratory factor analysis was conducted for all the 11 items of MRS-BM. The sample size of 294 respondents is adequate for conducting an exploratory factor analysis.<sup>27</sup> In order to determine sampling adequacy of the data for the EFA, Kaiser–Meyer–Olkin (KMO) and Bartlett Tests were conducted. All the assumption were not violated. Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was estimated to test the appropriateness of factor analyses. An index ranging from 0 to 1 is determined by KMO, indicating that each variable is predicted without error by other variables. A KMO value closer to 1 indicates that patterns of correlation are relatively compact.<sup>28</sup> In this study KMO yielded a value of 0.883, indicating that the proportion of variance causes meritorious underlying factor structure, and hence an exploratory factor analysis is possible to be conducted. Bartlett's test of sphericity was analyzed to determine the presence of correlations among the 11 items of MRS-BM. A good underlying structure indicates statistical significance at a level  $< 0.05$ . In this study, Bartlett's test of sphericity showed a statistical significance ( $\chi^2 = 2400.483$ ,  $df (55)$ ,  $p < 0.0001$ ). These findings ensured that the probability of the correlation matrix has significant correlations which are a prerequisite for performing exploratory factor analysis. As the correlation between the factors was not anticipated an orthogonal rotation (namely varimax) was decided as the optimal analysis model. This model attempts to maximize the dispersion of loadings within factors and loads on a smaller number of variables highly into each factor resulting in more interpretable clusters of factors. The criterion set for inclusion of items in the model were, 1) a limit for loading ( $> 0.5$ ) retained; 2) cross loading was set at  $\geq 0.5$ ; 3) only stable factors with at least three items and eigenvalue more than one were retained.

## Results

### Descriptive Statistics

A total of 321 eligible participants were invited to participate, of whom 27 declined, giving a response rate of 91.6%. Sociodemographic characteristics of the respondents are shown in Table 1. The mean age for respondents is 50.93(SD = 6.25) years and approximately 57% of them were aged between 50 and 60 years. All three ethnic groups namely Malays (35.4%), Indians (33.7%) and Chinese (31.0%) were equitably represented. The majority ( $> 80\%$ ) were educated at a secondary level and were currently married. Nearly a third of them were housewives or retired and another third were professionals (Nurse, teachers, lawyers, etc.). The three most frequently reported symptoms were 'sleep problems' 111(37.8%), 'physical and mental exhaustion 110 (37.4%), and sexual problems 106 (36.1%) which were rated as 'moderate', 'mild' and 'moderate' respectively in terms of severity.

Table 1  
Sociodemographic characteristics of  
the survey participants

	Number (%)
<b>Age</b>	
40-44years	56 (19.0)
45-49years	69 (23.5)
50-54years	63 (21.4)
55-60years	106 (36.1)
<b>Race</b>	
Malay	104(35.4)
Indian	99(33.7)
Chinese	91(31.0)
<b>Education</b>	
Primary	51(17.3)
Secondary	133(45.2)
Tertiary	110(37.4)
<b>Employment categories</b>	
Housewife/Retired	104(35.4)
Business	54(18.4)
Professional	100(34.0)
Other jobs	36(12.2)
<b>Average family income</b>	
<RM 3000	116(39.5)
RM3000-RM 5000	105(35.7)
RM5000-RM 8000	50(17.0)
RM8000and above	23(7.8)
<b>Marital Status</b>	
Married	261(88.8)
Separated/Divorce	14(4.8)
Single	19(6.5)

The average scores of MRS-BM items and sub-scales are shown in Table 2. The overall mean MRS score was 13.7(8.7) and the means for subscales were 5.2, (4.0), 5.1 (3.3), and 3.6 (2.8) for psychological, Somatovegetative, and

urogenital domains respectively. Among the MRS items 'hot flushes', 'physical exhaustion and sleep problems' scored the highest (Table 2).

Table 2  
Descriptive statistics and reliability statistics of the 11 items of MRS-BM

Items (Bahasa Melayu)	Item (English)	Mean	Standard deviation	Scale variance if item deleted	Corrected Item-Total Correlation	Squared multiple correlations	Cronbach's alpha if item deleted
Rasa panas, berpeluh	Sweating/flushes	1.64	1.14	61.41	0.707	0.671	0.892
Ketidakselesaian jantung	Heart discomfort	0.35	0.72	70.37	0.372	0.223	0.908
Masalah tidur	Sleep problems	1.54	1.12	61.39	0.723	0.583	0.891
Mood kemurungan	Depressive mood	0.93	1.15	61.56	0.694	0.710	0.893
Cepat marah	Irritability	1.46	1.22	61.00	0.679	0.653	0.894
Kebimbangan	Anxiety	1.13	1.23	61.87	0.619	0.707	0.898
Keletihan fizikal dan mental	Exhaustion	1.69	1.02	62.76	0.718	0.575	0.892
Masalah seksual	Sexual problems	1.41	1.13	61.62	0.700	0.830	0.893
Masalah pundi kencing	Bladder problems	0.72	0.98	66.32	0.505	0.342	0.903
Kekeringan vagina	Vaginal dryness	1.42	1.14	61.59	0.694	0.832	0.893
Ketidakselesaian sendi dan otot	Joint and muscle discomfort	1.51	1.20	61.67	0.650	0.495	0.896

## Reliability statistics

The item-wise reliability statistics are shown in Table 2 whereas the overall and subscale reliability statistics along with test-retest reliability are shown in Table 3. An overall Cronbach's alpha for MRS-BM was 0.904 indicating that it was appropriate as a Bahasa Melayu translation of MRS. However, Cronbach's alpha was slightly lower for urogenital and Somatovegetative subscales than psychosomatic (Table 3). The corrected item-total correlations were beyond 0.60 except for two items namely 'heart discomfort' (0.37) and 'bladder problems' (0.51) which is higher than recommended threshold 0.30<sup>27</sup> and inter-item correlations were within an acceptable range 0.30–0.90.<sup>29</sup> In addition, the Cronbach Alpha if Item Deleted values were about 0.9 for all items indicating that all items can be retained (Table 2). Correlations between the initial test-retest ranged from moderate to strong but the intra-class correlation was very high (0.88–0.98) indicating a high concordance for the responses given by the respondents at two-week intervals. In addition, the subscales had close correlations with their own scales rather than with other domains.

Table 3

Internal consistency, convergent, and discriminant validity of Menopause Rating Scale Questionnaire.

Dimension	Cronbach's alpha	Range of inter-item correlation	Convergent validity	Discriminant validity	Intra-class correlation coefficient (95% CI)
Psychological (4,5,6 & 7)	0.889	0.577–0.776	4/4	12/12	0.941 (0.877–0.972)
Somatovegetative (1,2,3 & 11)	0.776	0.248–0.666	4/4	12/12	0.974 (0.946–0.988)
Urogenital (8,9 & 10)	0.846	0.485–0.899	3/3	9/9	0.959 (0.916–0.981)
Overall	0.904				0.968 (0.933–0.985)

## Exploratory factor analysis

Exploratory factor analysis showed that the value for the Kaiser–Meier–Olkin test was 0.883 and Bartlett's test value of sphericity was statistically significant ( $\chi^2 = 2400.483$ , df (55),  $p < 0.001$ ). ECA of 11 items using orthogonal rotation (namely varimax) resulted in the extraction of three factors from the scree plot (Fig. 1) and total variance explained (Table 4), with eigenvalues between 0.928 5.662. The cumulative percentage for both factors was 51.48. Factor loading derived from the rotated component matrix is shown in Table 4. The factor of sexual problems and dryness of the vagina changed its factorial belongings to somatic symptoms (Rotated factor pattern coefficients:  $-0.365$ ) whereas heart problems changed to urogenital (Rotated factor pattern coefficients:  $-0.365$ ). A confirmatory analysis was conducted among 11 items. None of the items were discarded.

Table 4

<i>Items</i>	<b>Factor Loading</b>			<i>Variance Explained</i>	<i>Cumulative %</i>	<i>Cronbach Alpha</i>
	<i>Factor 1</i>	<i>Factor 2</i>	<i>Factor 3</i>			
<i>Factor 1</i>						
Hot flushes, sweating	0.829	0.257	0.102	51.477	51.477	0.899
Sleep problems	0.650	0.443	0.160			
Sexual problems	0.897	0.173	0.091			
Dryness of vagina	0.897	0.190	0.047			
Joint and muscular discomfort	0.618	0.215	0.463			
<i>Factor 2</i>						
Depressive mood	0.217	0.857	0.188	14.983	66.460	0.897
Irritability	0.281	0.852	0.035			
Anxiety	0.095	0.881	0.214			
Physical and mental exhaustion	0.396	0.672	0.231			
<i>Factor 3</i>						
unusual awareness of heartbeat, heart skipping, heart racing, tightness	-0.040	0.316	0.800	8.432	74.892	0.419
Bladder problems	0.483	0.045	0.640			
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.						
a. Rotation converged in 6 iterations.						

## Confirmatory Factor Analysis

A measurement model was analysed using Structural Equation Modelling (SEM). SEM is a confirmatory method providing the means for assessing and modifying the measurement model of latent constructs. The validity was evaluated through an assessment of model fit indices for construct validity. Several model fit indices were used to select the best model fit. The Chi Square Test of Goodness of Fit yielded a significant value;  $\chi^2 = 228.741$ ,  $< 0.001$ , which was below the threshold of 0.05 (reported if  $N > 200$ ). Additionally, the value of Comparative Fit Index (CFI) = 0.921, Tucker-Lewis Index (TLI) = 0.894, Normed Fit Index (NFI) = 0.906 showed a good fit to the model. The results infer that construct validity was well established for this questionnaire Fig. 2.

## Discussion

The MRS originally developed in German and later translated into English was used to translate and validated into Bahasa Melayu. The survey, which utilized the MRS BM version and was administered to a representative sample of Malaysia's multiethnic population, demonstrated acceptable psychometric properties for assessing menopausal symptoms in Malaysian women. The MRS BM version demonstrated high content validity, as well as an appropriate model structure and fit. The reliability index including repeatability was also high. Malaysian women expressed no

concern about the MRS-BM version's ambiguous words or phrases. CFA shows two items were loaded under a domain different from that of the original MRS English version.

This study confirms that the overall reliability of the MRS-BM version was as good as previously reported, with a Cronbach's alpha of greater than 0.80.<sup>16-20</sup> However, in a multi-national methodological study of MRS, Heinman et al. reported a Cronbach's alpha range of 0.60 to 0.90.<sup>15</sup> Comparable reliability statistics were reported for Persian, Urdu, and Indonesian Bahasa versions conducted in similar socio-cultural contexts.<sup>18-20</sup> A relatively lower Cronbach alpha for urogenital and somatic compared to the psychological domain was observed in studies on validation of Chinese, Serbian and Urdu MRS versions.<sup>16-18</sup> However, in a validation study of the Indonesian Bahasa version, the CFA for all domains was consistently above 0.90.<sup>20</sup>

As with the Czech version,<sup>30</sup> only two factors were loaded in this study, as opposed to the three factors in the original version, namely psychological, Somatovegetative, and urogenital. Since MRS is a tool that is easy to administer for clinical decision-making about an alternative diagnostic or treatment approach in outpatient settings we maintain three factors for confirmatory factor analyses.<sup>23</sup> However, the structure of the MRS questionnaire differs in this study as well. For instance, sexual problems and vaginal dryness were classified as somatic, whereas heart problems were classified as urogenital. In the validation studies conducted on the Czech, Chinese, and Persian versions of MRS, this loading of domain items was observed to be different from the original version.<sup>17;19;30</sup> Such instability in factor structure was noted in a multi-country evaluation study by the authors of the original MRS questionnaire.<sup>15</sup> The authors attributed possible moderate correlations between the different domains of MRS since the 11 items of MRS are not independent of each other<sup>15</sup>. It has been well documented that menopause symptoms vary across countries and cultures based on the women's perception of the symptoms.

The validated MRS-BM version is comparable in terms of reliability and validity to the Indonesian version. Indonesian version had much higher internal consistency overall and for individual domains (Cronbachs Alpha > 0.90).<sup>20</sup> In the Indonesian version, the three-factor model structure was adequate, but in the MRS-BM version, some items loaded under different domains on confirmatory factor analyses. Such differences may be attributed to the different socio-cultural milieu of the multi-ethnic Malaysian population. Though the Malaysian national language is Malay language, Indian original Malaysians mainly speak Tamil and the Chinese origin Malaysians speaks Mandarin, and the three ethnic groups are socioculturally distinct. Such differences may be attributed to the multi-ethnic Malaysian population's diverse socio-cultural milieu, with the major and other minority groups speaking in their preferred dialects even though Bahasa Melayu is the national language. Despite similarities, the Malay Language spoken in Malaysia and Indonesia is distinct in terms of spelling, grammar, pronunciation, and vocabulary. As a result, a distinct MRS-BM version is justifiable.

## Limitations

This study used a representative sample that included members of Malaysia's three major ethnic groups. The sample was drawn from a suburban community. The findings may have to be confirmed in other populations such as rural and indigenous communities. MRS-BM was self-administered, and self-reported symptoms weeks prior are subject to recall bias. The emotional status and circumstance would have resulted in misreporting. Misconceptions of sexuality and perceptions of the symptoms such as 'hot flushes' in hot and humid weather conditions prevailing in Malaysia.

## Conclusion

The MRS-BM version has excellent reliability and constructs validity. MRS-BM version has potential for application in clinical and research settings to assess menopausal symptoms among Malaysian women.

## Abbreviations

### **MRS**

Menopause Rating Scale

### **MRS-BM**

BM- Menopause Rating Scale Bahasa Melayu

### **SEM**

Structural Equation Modelling

### **NFI**

Normed Fit Index

### **TLI**

Tucker-Lewis Index

### **CFI**

Comparative Fit Index

### **EFA**

Exploratory factor analysis

### **CFA**

Exploratory factor analysis

### **KMO**

Kaiser-Meyer-Olkin

## Declarations

### **Ethics approval and consent to participate**

The international medical University joint committee on research ethics approved this study. All study participants provided informed consent to participate. The methods of this research were in accordance with the relevant guidelines and ethical standards (declaration of Helsinki).

### **Consent for publication**

Not applicable.

### **Availability of data and materials**

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

### **Competing interests**

The authors declare that there are no conflicts of interest.

### **Funding**

No funding was received to conduct this research.

## Authors contribution

SM, SR, KN, SWF and CTS conceptualized the study. SM collected the data. SR, KN, and SWF analysed and KN and SWF interpreted the data. SM, SR and CTS co-drafted the manuscript. KN, and SWF provided critical feedback comments and did revisions to the draft manuscript. All authors read and approved the final manuscript.

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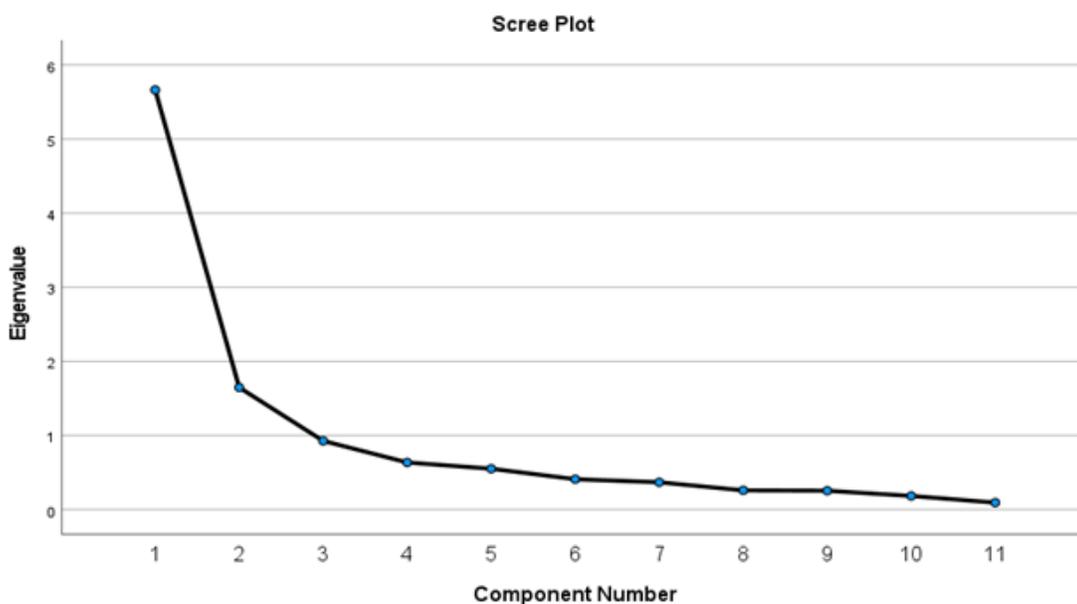
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## Figures



**Figure 1**

Scree Plot obtained for exploratory factor analyses.

Chi-Square=228.741  
 df=41  
 P=0.000  
 CFI=0.921  
 NFI=0.906  
 TLI=0.894  
 RMSEA=0.119

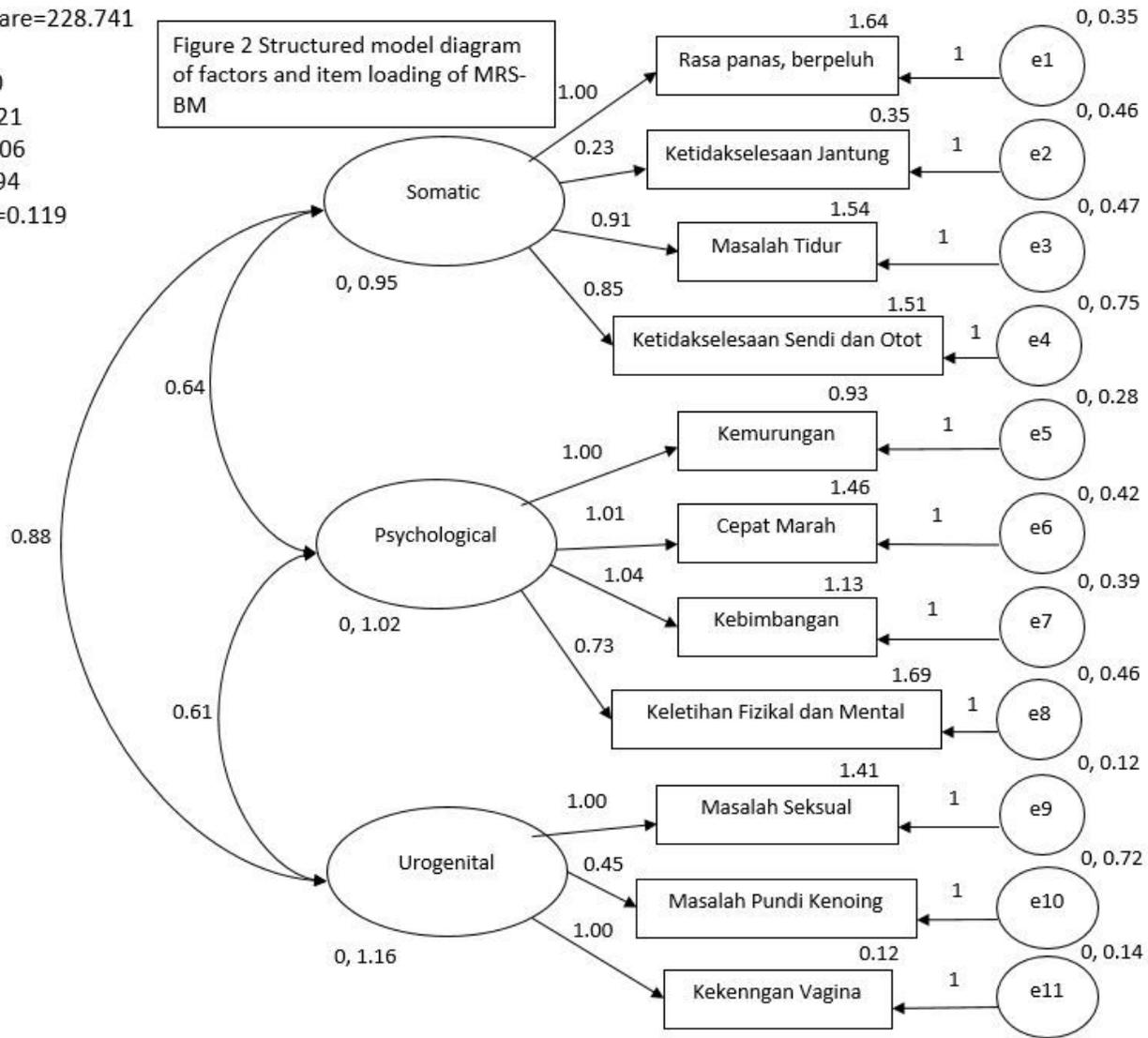


Figure 2

Structured model diagram of factors and item loading of MRS-BM

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [MenopauseRatingScaleMRSBahasaMelayu.pdf](#)