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PSYCHOMETRIC ANALYSIS OF PERCEIVED STRESS SCALE AND BRIEF-COPE INVENTORY SCALE IN MENOPAUSAL WOMEN

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ABSTRACT

Introduction: Menopause is generally considered a stressful experience, with 25% of menopausal women reporting that they experience stress. Using appropriate coping strategies can help reduce stress levels and alleviate other problems in menopausal women. **Aims:** This study aims to analyze the psychometric properties of two questionnaires designed to measure menopausal stress and coping strategies among menopausal women in Sarawak. **Methods:** The content validity of this study was assessed by calculating the I-CVI, S-CVI average, S-CVI universal agreement, and CVR. The face validity was also assessed for comparisons within subgroups. A cross-sectional study was conducted in Subis District, Sarawak, involving 221 menopausal women. Participants were selected using a purposive sampling technique and data were collected from face-to-face interviews. Psychometric analysis was performed using SPSS version 28.0. **Results:** A total of 38 questionnaire items were analyzed by experts for relevance, clarity, simplicity, and ambiguity. After the second modification, the I-CVI, S-CVI/Ave, and CVR for all domains and items were acceptable. Therefore, all items were retained. Face validity was also confimed with an average ICC of 0.979 and a 95% confidence interval between 0.96 and 0.99 ($F(9,261a) = 47.996$, $p < 0.05$). Meanwhile, reliability test with a Cronbach's alpha coefficient of greater than 0.70 indicated a good internal consistency. **Conclusion:** The questionnaires appeared to be a psychometrically sound instrument for measuring menopausal stress and coping strategies in menopausal women.

Keywords: coping, menopausal stress, reliability, validity

INTRODUCTION

Menopause marks the end of a woman's reproductive life (Peacock and Ketvertis, 2022). The changes experienced during this period, including, such as behavioral, physiological, and psychological changes, are associated with the decline in ovarian follicular activity, which leads to a decrease in estrogen and progesterone production (North American Menopause Society, 2017). Menopausal symptoms such as night sweats, fatigue, muscle pain, headache, sleeping difficulty, depression, irritability, and urinary problems can be challenging for many women (Khatoon et al., 2018). These experiences can disrupt their regular routine. As women's life expectancy increases, they are likely to spend a significant portion of their lives in menopause, yet many women still view menopause as a stressful experience. However, women may react differently during this period (Ishak et al., 2021; Alwi et al., 2021). The American Psychological Association (2021) stated that menopause can cause physical and psychological changes that create stressors which can be difficult to cope with. Various coping strategies have been introduced to help menopausal women deal with stress. An appropriate coping mechanism may help reduce stress levels and other existing problems in menopausal women (Ngai, 2019). Therefore, accurate and culturally validated assessment techniques are crucial in identifying coping strategies for

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menopausal women in Sarawak to understand and help them during this period.

Various tools are available to measure the different stress levels in individuals, such as the Perceived Stress Scale (Jatic et al., 2023), Stress Appraisal Measure (Poulus et al., 2020), and Depression Anxiety Stress Scale-21 (Ali et al., 2021). In addition, individuals may use different coping strategies to cope with the challenges of daily life. Three widely used tools for assessing coping strategies in a population setting are the Brief-COPE Inventory Scale (Abdul Rahman et al., 2021), Ways Coping Questionnaire (Algorani and Gupta, 2023), and Coping Inventory for Stressful Situation (CISS) (Veisani et al., 2021). The Perceived Stress Scale (PSS) and Brief-COPE Inventory Scale are two commonly used instruments in the field of psychology and health research (à Ile-Ife et al., 2020; Awoke et al., 2021). The PSS is a self-report questionnaire consisting of multiple items designed to assess an individual's perceptions and emotions related to stressors. The scale has been widely used in studies of menopausal women to assess stress levels in this population (Hossain, 2020; Masoudi et al., 2020). By quantifying responses from the PSS in Sarawak, a standardised and validated tool can be used to capture subjective stress experiences and inform intervention and support strategies tailored for the specific population group. Moreover, the scale has demonstrated good psychometric properties through its translation into several other languages.

The Brief-COPE Inventory Scale is the most commonly used instrument for assessing coping mechanisms used by individuals in stressful situations. The scale can be used to measure different coping mechanisms, including avoidant, problem-focused, and emotion-focused approaches (García et al., 2018; Rahman et al., 2021). This scale has also been used in many studies of menopausal women to assess their coping strategies (Ngai, 2019). In addition to understanding how menopausal women deal with stressors, it is also useful to identify unhealthy coping strategies that may be maladaptive, which may exacerbate stress and lead to adverse effects (Stute and Lozza-Fiacco, 2022). This study can provide health practitioners with the necessary information to assist menopausal women in developing effective coping strategies.

Using these two questionnaires to measure stress levels and coping strategies in menopausal women is appropriate for the research objective and the population of interest. Moreover, using these two questionnaires in a well-established and widely published study related to the field that measures similar constructs underscores their reliability and validity of in assessing the intended concept. Validity refers to the ability of the selected items to accurately represent the variables of the constructs under measurement. It can be divided into content validity and construct validity. The level of agreement and decision to retain an item is determined after calculating its content validity, including face validity, content validity index, and content validity ratio. Reliability is defined as the degree to which the measuring tool produces consistent results when the procedure is repeated. Cronbach's alpha is calculated to test the consistency of the instruments (Elangovan and Sundaravel, 2021). Although these scales have been validated across different populations, it is important to confirm their effectiveness when used in menopausal women in Sarawak. In addition, a standardized tool ensures consistency and comparability across participants and studies. Currently, no research has been conducted in the local setting.

Therefore, this study aims to evaluate the validity and reliability of the Perceived Stress Scale (PSS) and the Brief-COPE Inventory Scale in menopausal women in Sarawak. The validation process includes translation, cultural adaptation, and linguistic validation to maintain the

intended meaning and validity of the instruments across different language groups to ensure linguistic equivalence. This is essential for fair and meaningful comparisons within the local population. The finding of this study will enable researchers to evaluate the suitability of the scales for assessing stress levels and coping strategies in this population group. In addition, it will help to eliminate potential biases or culturally specific elements that may affect the validity and reliability of the instruments.

METHODS

Setting and analysis

A total of 221 menopausal women residing in Subis District participated in this cross-sectional study, which was conducted from January to June 2022. All eligible women were aged between 45 and 60 years and had stopped menstruating for a minimum of one year. The participants were selected using a purposive sampling technique from six villages in Subis District. The data collected from the participants were validated and entered into Microsoft Excel before being imported to SPSS version 28 for analysis. An exploratory data analysis was performed to identify any inconsistencies or missing data. This study received ethical approval from the Ethics Committee of the Faculty of Medicine and Health Sciences, University Malaysia Sarawak (Ref: FME/22/45). Only women who met the predetermined inclusion and exclusion criteria were invited to participate in this study. Prior to data collection, informed consent was obtained from the participants. The information and details about this study are provided in the information sheet. The participants were also informed about the confidentiality of the data and their right to withdraw from this study at any time. The instruments were validated through two activities: (a) adaptation and translation; and (b) validation. **Figure 1** shows the schematic diagram of the validation process.

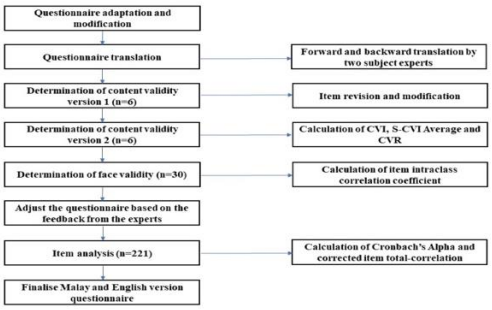

Figure 1. Flowchart of questionnaire validation

Adaptation and translation

The questionnaires were translated from the original English version and subsequently validated in Malay. The questionnaires consist of the Perceived Stress Scale and Brief-COPE Inventory Scale.

Perceived Stress Scale

The Perceived Stress Scale was used to assess the psychological status and stress levels of an individual. The scale consists of 10 items rated on a five-point Likert scale, including six negative statements and four positive statements. Each item is scored from 0 (never), 1 (almost never), 2 (sometimes), 3 (often), and 4 (very often), with a maximum score of 40. A higher score indicates higher stress levels, whereas a lower score indicates positive feelings and better coping abilities (Jatic et al., 2023).

Brief-COPE Inventory Scale

The Brief-COPE Inventory Scale, which consists of 28 items, was used to evaluate coping strategies (Rahman et al., 2021). The coping strategies can be categorized into three subscales: problem-focused coping, emotion-focused coping, and avoidant coping. The items were rated on a four-point Likert scale ranging from 1 (not at all), 2 (a little bit), 3 (a moderate amount), and 4 (a lot). The subscale items are summed up to indicate the use of coping

strategies, with a higher score indicating frequent use (Rahman et al., 2021).

Validation of instruments

The content of the questionnaires was analysed to assess the reliability and validity of the data. Content validity was assessed in two stages, followed by face validity. Based on the feedback from experts, the revised questionnaire was used to calculate the item analysis. The finalised English and Malay versions were determined after all item revisions were completed. A detailed description of each process is provided below.

Content validity

For a qualitative assessment of content validity, six experts with basic knowledge of menopausal health were asked to rate the relevance, clarity, simplicity, and ambiguity of the items. The comments were used as a basis to make modifications to the items. In the quantitative assessment, each item was assessed to determine the Content Validity Index (CVI), Scale Content Validity Index (S-CVI average), and Content Validity Ratio (CVR). The expert panel was asked to rate each scale according to its relevance, clarity, simplicity, and ambiguity using a four-point Likert scale ranging from 1 (not relevant), 2 (needing some revision), 3 (relevant but needing minor revision), to 4 (very relevant). The percentage of items with a rating of 3 or 4 by the experts was used to calculate the I-CVI. The results of the I-CVI analysis showed that more than 79% of the items were considered appropriate, while 70-79% needed revision and less than 70% needed to be eliminated. The S-CVI was calculated by averaging the I-CVI values to determine the overall item quality. The recommended S-CVI value is at least 0.8 (Pandian et al., 2023). In addition, the SCVI/Ave should be 0.90 or greater to represent the overall scale (S-CVI). The content validity ratio was also calculated to determine the degree of validity using the following formula: CVR $=\frac{ne-\frac{N}{2}}{\frac{N}{2}}$, where ***ne*** represents the total number of experts who perceived the statement as necessary or essential and ***N*** represents the overall panel members. Subsequently, the CVR was used to determine whether an item should be retained or removed. According to Lawshe (1975), the minimum CVR value for six experts should be 0.99 (Azhari et al., 2018).

Face validity

The intraclass correlation coefficient was calculated to determine the face validity of the questionnaires across multiple observers. Face validity is an informal and subjective assessment to observe whether the items are appropriate for measuring the intended concept (Rico-Sapena et al., 2022). The face validity was assessed by 30 non-expert respondents from the community setting. The content of the questionnaires consisted of 10 statements to evaluate its relevance, clarity, consistency, understandability, and appropriateness in terms of construct, scale and time, and cultural acceptability. Each criterion was rated on a four-point Likert scale where 1 indicated strong disagreement, 2 indicated disagreement, 3 indicated agreement, and 4 indicated strong agreement. Items with a score of 0.75 or greater were considered good and retained.

Item analysis

For psychometric analysis, the Cronbach's alpha coefficient was calculated from the sample of 221 menopausal women to determine the internal consistency of the scales. The items that had an item-total correlation of less than 0.2 were revised as they suggested a poor correlation with the overall scale (Devisree et al., 2018). The cut-off point for reliability was categorized as follows: 0.9 and above as excellent reliability, between 0.7 and 0.9 as high reliability, between 0.5 and 0.7 as moderate

reliability, and 0.5 and below as low reliability (Vantono, 2022).

RESULTS

This section presents the results of this study, which are divided into content validity, face validity, and item analysis. The findings are summarised in the tables below.

Content validity

The content validity assessment in this study was conducted in two stages. In the first stage, all items had acceptable CVI values between 0.83 and 1.00, and the S-CVI/Ave was greater than 0.97 (Pandian et al., 2023). However, the CVR rated by six experts was poor, ranging from 0.67 to 1.00. Problematic items were rephrased and modified based on the opinions of the experts. None of the items was deleted. Six experts completed the second stage of the content validity assessment using the 38 revised items from the first stage. All items were reassessed for relevance, clarity, simplicity, and ambiguity. Overall, the I-CVI, S-CVI/Ave, and CVR values were 1 for all domains and the items were good. Therefore, a consensus was made by the experts to retain all items (**Table 1).**

Face validity

The results of the face validity showed that the ICC value was 0.979, indicating high reliability between the measurements. The items were deemed relevant and appropriate for each domain, with clear language and wording. It took approximately 10 minutes to answer all the items. The items were modified based on the comments and suggestions from the observers (**Table 2**).

Item analysis across different ethnic groups

All 38 items were analyzed across the five different ethnic groups comprising Malay, Chinese, Iban, Bidayuh and others. Overall, the items showed moderate to high reliability as indicated by the Cronbach's alpha across the ethnic groups. Therefore, all items from the original instrument were kept **(Table 3)**.

Table 3. Cronbach's Alpha of Different Ethnicities

Ethnic Group	N	Cronbach's Alpha
Malay	40	0.56
Chinese	21	0.85
Iban	96	0.76
Bidayuh	25	0.61
Others	39	0.59

Perceived Stress Scale

The Perceiced Stress Scales consistef of 10 items. The overall Cronbach's alpha for the questionnaires was 0.79, indicating good reliability. Two items (6 and 7) showed good discrimination with corrected item-total correlation ranging from 0.22 to 0.28. Other items showed excellent discrimination with scores ranging from 0.31 to 0.66 (George and Mallery, 2019). Items with a score less than 0.2 were revised to improve their performance and alignment with the measured constructs. None of the items were removed (**Table 4)**.

Brief-COPE Inventory Scale

The Brief-COPE Inventory Scale consisted of 28 items with an overall Cronbach's alpha of 0.71, indicating good reliability. Eight items (4, 6, 9, 11, 16, 17, 19, and 26) showed poor discrimination with scores ranging from 0 to 0.19. In addition, two items (13 and 24) had negative values. Items with a score less than 0.2 and negative values were modified and rephrased to improve the discriminatory power and ensure the alignment with the measured constructs. Fourteen items (3, 5, 7, 8, 10, 12, 15, 17, 18, 21, 22, 23, 27, and 28) showed good discrimination with item-total correlation ranging from 0.22 to 0.34.

The remaining five items showed excellent discrimination with scores ranging from 0.43 to 0.52 (**Table 5**).

Table 1. Content Analysis of the Questionnaires

Domain	Total item	I-CVI		S-CVI/Av		CVR	
		Phase1	Phase2	Phase 1	Phase2	Phase 1	Phase 2
Perceived stress	10	0.83-1.00	1.00	0.97-1.00	1.00	0.67-1.00	1.00
Coping strategies	28	0.83-1.00	1.00	0.97-1.00	1.00	0.67-1.00	1.00

Table 2. Intraclass Correlation Coefficient

Measures	Intraclass correlation	95% Confidence Interval		p-value
Average measures	0.979	Lower bound	Upper bound	<0.05
		0.96	0.99	

Table 4. Item Analysis of the Perceived Stress Scale

No.	Questions	Overall Cronbach's alpha (α)	Corrected Item-Total Correlation	Cronbach's alpha (α) if an item is deleted
1.	In the last month, how often have you been upset because of something that happened unexpectedly?	0.79	0.66	0.75
2.	In the last month, how often have you felt that you were unable to control the important things in your life?		0.55	0.76
3.	In the last month, how often have you felt nervous and stressed?		0.66	0.76
4.	In the last month, how often have you felt confident about your ability to handle your personal problems?		0.53	0.76
5.	In the last month, how often have you felt that things were going your way?		0.58	0.76
6.	In the last month, how often have you found that you could not cope with all the things that you had to do?		0.22	0.80
7.	In the last month, how often have you been able to control irritations in your life?		0.28	0.79

No.	Questions	Overall Cronbach's alpha (α)	Corrected Item-Total Correlation	Cronbach's alpha (α) if an item is deleted
8.	In the last month, how often have you felt that you were on top of things?		0.31	0.80
9.	In the last month, how often have you been angered because of things that were outside of your control?		0.43	0.78
10.	In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?		0.62	0.75

Table 5. Item Analysis of the Brief-COPE Inventory Scale

No	Questions	Overall, Cronbach's Alpha (α)	Corrected Item-Total Correlation	Cronbach's Alpha (α) if an item is deleted
1.	I have been turning to work or other activities to take my mind off things.	0.71	0.52	0.69
2.	I have been concentrating my efforts on doing something about the situation I'm in.		0.43	0.69
3.	I have been saying to myself this isn't real.		0.24	0.71
4.	I have been using alcohol or other drugs to make myself feel better.		0.08	0.71
5.	I have been getting emotional support from others.		0.34	0.70
6.	I have been giving up trying to deal with it.		0.03	0.72
7.	I have been taking action to try to make the situation better.		0.28	0.70
8.	I have been refusing to believe that it has happened.		0.24	0.71
9.	I have been saying things to let my unpleasant feelings escape.		0.04	0.72
10.	I have been getting help and advice from other people.		0.34	0.70
11.	I have been using alcohol or other drugs to help me get through it.		0.08	0.71
12.	I have been trying to see it in a different light, to make it seem more positive.		0.32	0.70
13.	I have been criticizing myself.		-0.11	0.73

No	Questions	Overall, Cronbach's Alpha (α)	Corrected Item-Total Correlation	Cronbach's Alpha (α) if an item is deleted
14.	I have been trying to come up with a strategy about what to do.		0.46	0.69
15.	I have been getting comfort and understanding from someone.		0.34	0.70
16.	I have been giving up the attempt to cope.		0.03	0.72
17.	I have been looking for something good in what is happening.		0.14	0.71
18.	I have been making jokes about it.		0.34	0.70
19.	I have been doing something to think less about it, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.		0.03	0.72
20.	I have been accepting the reality of the fact that it has happened.		0.47	0.69
21.	I have been expressing my negative feelings.		0.22	0.71
22.	I have been trying to find comfort in my religion or spiritual beliefs.		0.27	0.70
23.	I have been trying to get advice or help from other people.		0.34	0.70
24.	I have been learning to live with it.		-0.23	0.73
25.	I have been thinking hard about what steps to take.		0.46	0.69
26.	I have been blaming myself for things that happened.		0.15	0.71
27.	I have been praying or meditating.		0.27	0.70
28.	I have been making fun of the situation.		0.34	0.70

DISCUSSION

A validation study is a small-scale study to assess the usefulness and appropriateness of research instruments. Identifying weaknesses in the existing tool by assessing the validity and reliability of the instrument is essential, as this may increase the probability of success in the main study (Clark and Watson, 2019). This study found that the questionnaires for investigating menopausal stress and coping strategies among menopausal women in Sarawak was valid and reliable, as confirmed by the panel of experts. In addition, the face validity showed that all items were easily understandable by the general population (Almanasreh et al., 2019). The problematic items were modified based on suggestions from the panel of experts to ensure acceptability in the local context.

The Malay version of the Perceived Stress Scale was found to be reliable among Malaysian menopausal women, which is consistent with its adaptation into Arabics and Hispanic Americans (Ali et al., 2021; Baik et al., 2019). A previous study conducted among Malaysians during the COVID-19 pandemic also reported good

reliability, indicating the applicability of this scale within the Malaysian culture (Ibrahim et al., 2023). In addition, several studies have reported the validity and reliability of the Brief-COPE Inventory Scale in various stressful events among Malaysians. Consistent with these findings, recent studies involving Turkish students and Chilean women also showed good Cronbach's alpha (García et al., 2018; Kaya et al., 2019). Furthermore, the reliability of this study is consistent with the original version (Tang et al., 2021). The good reliability indicates the consistency of the scale to assess coping strategies among menopausal women across different cultures.

In terms of ethnic groups, the Chinese and Iban ethnic groups had higher Cronbach's alpha values than other ethnic groups. This indicates that this tool produced more consistent results among the Chinese and Iban ethnic groups. As most of the Cronbach's alpha values across different ethnic groups were greater than 0.5, this indicates that this tool can be applied to various ethnic groups in Sarawak (Ibrahim et al., 2023; Jatic et al., 2023).

The findings of this study indicates that the questionnaires have the potential as a preferred tool for assessing menopausal stress and coping strategies. A strength of this study is the high response rate from the participants, indicating that face-to-face interviews was effective for data collection. In addition, the researchers ensured that the participants were given adequate time, information, and consent before participating. In terms of response time, most participants took approximately 10 minutes to complete the process, including providing information, obtaining consent, and answering the questionnaires. The participant recruitment rate is directly related to the duration of this study and the completion of data collection. Sufficient time for participant recruitment may result in good statistical power and valid results (Story and Tait, 2019).

Despite its strengths, this study has several limitations. First, the menopausal women participated in this study were recruited from only six locations where the village head agreed to participate. This may limit the generalizability of the results to different population groups. To increase the credibility of the results, it is recommended to use a cluster sampling technique to ensure population representativeness. Similarly, future studies should include different settings and cultures. Second, most of the participants in this study were illiterate and had lower levels of education. Given that most of the target participants might be middle-aged, it is important to improve the clarity and simplicity of the questionnaires to ensure smooth data collection. Future studies should aim to measure and establish the convergent validity of the translated questionnaire across different ethnic groups with a larger sample size.

CONCLUSION

The results of this study suggested that the instrument is valid and reliable. Higher reliability indicates a good internal consistency and a reliable set of items. Therefore, with the proposed methodology and modification, the questionnaires are reliable sources to investigate menopausal stress and coping strategies in menopausal women in Sarawak.

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