

Translation and Psychometric Evaluation of Meno-D Questionnaire in Marathi in Women with Perimenopausal Symptoms

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Abstract: **Background:** Menopausal transition is associated with physical and psychological symptoms, and depressive symptoms may affect functioning and quality of life. Language may limit the use of an English questionnaire among Marathi-speaking women. The present study translated the MENO-D questionnaire into Marathi and evaluated selected psychometric properties. **Methods:** An observational study was conducted in Jalgaon using convenient sampling. Ninety-four women with perimenopausal symptoms participated. The MENO-D was translated using a forward translation, synthesis, backward translation, expert committee review and pretesting process based on the Beaton framework. Content validity was assessed using the Content Validity Ratio. Test retest reliability was assessed using the intraclass correlation coefficient, and internal consistency using Cronbach alpha. **Results:** Participants had a mean age of 47.09 years with a standard deviation of 2.05 years. The mean Content Validity Ratio across 10 evaluated items was 0.96; nine items had a value of 1.00 and item 7 had a value of 0.60. Test retest reliability between Marathi 1 and Marathi 2 was excellent, with an intraclass correlation coefficient of 0.936 and a Pearson correlation of 0.942 with a probability value less than 0.001. Cronbach alpha for the Marathi 1 scale was 0.967, indicating excellent internal consistency. **Conclusion:** The Marathi MENO-D demonstrated strong content validity and excellent test retest reliability and internal consistency in this sample. It may be useful for assessment among Marathi-speaking women with perimenopausal symptoms.

Keywords: Depression; MENO-D; Marathi; Perimenopause; Psychometric Evaluation; Reliability; Translation; Validity.

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I. INTRODUCTION

According to the World Health Organization (WHO), natural menopause is defined as the permanent cessation of Menstruation resulting from the loss of ovarian follicular activity and is confirmed only after 12 consecutive months of amenorrhea. It commonly occurs between 45 and 55 years of age, although studies in India have reported a comparatively younger age at menopause. Data from the Indian National Family Health Survey (NFHS3, 2005–2006) indicated that about 18% of currently married women aged 30–49 years had reached menopause, finding consistent with the earlier NFHS-2 (1998–1999), which reported 17.7% [1]

Menopause is a natural physiological process that occurs as women age, marked by a rapid decline in the number of primary ovarian follicles. As a result, the ovaries no longer respond effectively to follicle-stimulating hormone (FSH), preventing the luteinizing hormone (LH) surge necessary for ovulation. This leads to decreased estrogen production and the eventual cessation of menstruation.

Without the regulatory effects of estrogen, levels of LH and FSH remain elevated for years after menopause begins. Although the ovaries stop producing significant amounts of estrogen, small amounts may still be formed through the conversion of adrenal testosterone. Because of this, some women may experience few symptoms aside from the end of menstruation. While over 80% of women report symptoms related to menopause, individual experiences vary widely [2].

During the menopausal period, women experience numerous challenges primarily due to hormonal fluctuations, and the intensity of these symptoms varies from person to person. The effects of hormonal changes differ among individuals, but common symptoms include hot flashes, excessive sweating, fatigue, irregular periods, sleep disturbances, breast tenderness, mood swings, anxiety, depression [3].

Depression during the menopausal transition is a mood disorder characterized by persistent low mood, loss of interest or pleasure, and associated emotional, cognitive, and

physical symptoms occurring during the perimenopausal or postmenopausal period. Women are more commonly affected than men. Over 35% of menopausal women experience depressive symptoms.

During the peri-menopausal period, women without any prior history of depression are two to four times more likely to experience depressive symptoms compared to those in the premenopausal stage. The risk is even greater among women with a previous history of depression. This increased vulnerability can lead to significant functional impairment.

Peri-menopause is the transition period before menopause, with fluctuating reproductive hormones and menstrual irregularity. Depressive symptoms may increase during this stage, and studies describe perimenopause as a period of increased vulnerability to depression.

Menopause is reached after 12 consecutive months without menstruation. Around the menopausal transition, women may experience mood changes and depressive symptoms. A SWAN study found increased risk of major depression during perimenopause and early post menopause compared with pre menopause.

Post-menopause is the period after menopause. Depressive symptoms can persist in some women. A longitudinal SWAN study found higher odds of high depressive symptoms during post menopause compared with pre menopause, particularly among women who already had higher depressive symptoms before the final menstrual period [4].

A depressive episode involves a persistently low mood or loss of interest in usual activities, lasting most of the day, nearly every day, for at least two weeks.

Common symptoms include poor concentration, excessive guilt or low self-esteem, hopelessness about the future, thoughts of death or suicide, sleep disturbances, appetite or weight changes, and fatigue or low energy. These symptoms can severely affect functioning at home, work, school, and in the community [5].

Hormonal fluctuations and physiological changes during perimenopause can have a profound impact on women's mental health, often leading to depression and sleep disturbances and a marked decline in overall quality of life [6].

Therefore, assessing depressive symptoms in women experiencing perimenopausal symptoms is important. Several assessment tools are available to evaluate menopausal symptoms and depression. Among them MENO-D is a questionnaire specifically developed to assess symptoms of perimenopausal depression.

The MENO-D is a standardized questionnaire designed to evaluate the severity of depressive symptoms specifically during perimenopause. It covers 12 key domains, including irritability, self-esteem, anxiety, sleep disturbances, and

sexual interest. The MENO-D was originally developed by Jayashri Kulkarni in Australia in English. However, a Marathi version of the MENO-D is not readily available. Therefore, the present study aimed to translate and psychometrically evaluate the MENO-D questionnaire into Marathi for women experiencing perimenopausal symptoms [7].

➤ *Need of the Study*

The accurate assessment of depression in women with peri-menopausal symptoms, psychological well-being, and quality of life will help healthcare professionals to better understand and address the needs of women during perimenopause in the Maharashtrian population.

Marathi is one of the most spoken languages in Maharashtra, accounting for about 68.93% of the population. However, there is currently no available Marathi version of the MENO-D, even though Marathi is one of the most widely spoken languages in Maharashtra, India.

From a physiotherapy perspective, identifying depressive symptoms is important because exercise therapy, physical activity, relaxation techniques, and other physiotherapy-based interventions may support psychological well-being, improve physical function, sleep, and quality of life.

Peri-menopausal women may experience physical and psychological symptoms that can affect daily activities and quality of life. Early identification of depressive symptoms helps healthcare professionals understand the patient's needs and provide appropriate management or referral. For physiotherapists, assessing these symptoms supports a holistic approach rather than focusing only on physical problems.

A Marathi MENO-D questionnaire can make assessment easier for Marathi-speaking women and improve patient–healthcare communication. Therefore, translation and psychometric evaluation of MENO-D is important to provide a valid and reliable tool for assessing depressive symptoms in Marathi-speaking peri-menopausal women.

➤ *Aim*

To translate and psychometrically evaluate the MENO-D questionnaire into the Marathi language to assess depression symptoms among women experiencing menopausal symptoms.

➤ *Objectives*

- To translate the original MENO-D questionnaire from English into the Marathi language using a standardized forward and backward translation process.
- To check the validity and reliability of the Marathi version of the MENO-D questionnaire.

II. MATERIALS AND METHODOLOGY

➤ Materials

- Consent form
- Patient evaluation sheet
- Pen
- Paper
- English version of MENO-D Questionnaire
- Marathi version of MENO-D Questionnaire

➤ Study Design and Methodology

- Study type: An observational study. Method of sampling: Convenient sampling. Sample size: 94 participants.
- Sample size formula: $n = Z^2pq/d^2$, where $Z = 1.96$, $p = 0.42$ and $d = 0.10$; the minimum sample size was 94.
- Sampling population: Peri-menopausal women. Place of study: Jalgaon.
- Study duration: 6 months.

➤ Selection Criteria

• Inclusion Criteria:

- ✓ Women aged 40–50 years and peri-menopausal.
- ✓ Fluent in Marathi language and able to read and understand Marathi.
- ✓ Women experiencing menopause symptoms, including hot flashes, night sweats, mood changes, etc.
- ✓ Women experiencing depressive symptoms, including feelings of sadness, hopelessness and loss of interest in activities, etc.

• Exclusion Criteria:

- ✓ Women with a history of psychiatric illness, including major depressive disorder, bipolar disorder, etc.
- ✓ Women currently receiving treatment for depression, including medication or therapy.

➤ Outcome Measure: MENO-D Questionnaire

The MENO-D is a 12-item questionnaire that measures the severity of depression symptoms specifically related to perimenopause.

It can be self-administered or completed with a clinician and assesses symptoms such as energy levels, irritability, self-esteem, anxiety, sleep disturbances and sexual interest.

Symptom areas assessed include energy, paranoia, irritability, self-esteem, isolation, anxiety, somatic symptoms, sleep, weight changes, sexual interest, social interest, and memory and concentration.

Each of the 12 symptoms is rated on a scale and the total score is calculated. The total score ranges from 0 to 48.

• Interpretation:

Mild depression 20–24 points; moderate depression

24–32 points; severe depression 32 points and above. Reported reliability and validity in the project: reliability 0.802; validity 0.85.

➤ Translation Procedure

After securing permission from Monash University, the English MENO-D was translated into Marathi following the Guidelines for the Process of Translation by Beaton (2007), comprising the following stages.

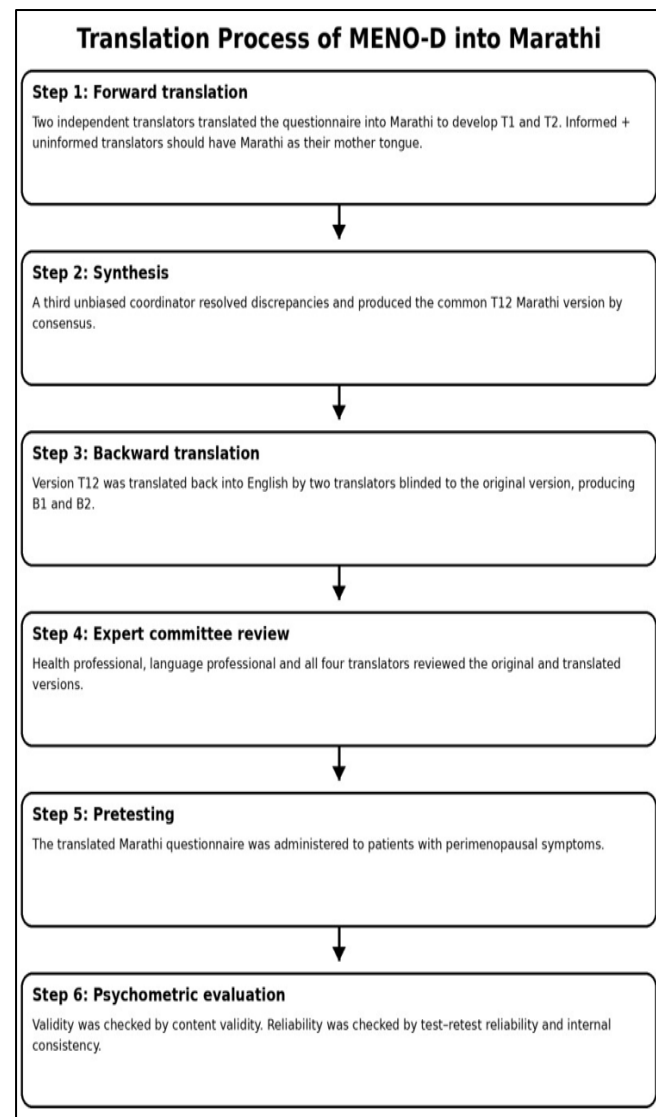


Fig 1 Flow Chart of the Translation Process of the MENO-D Questionnaire into Marathi.

➤ Psychometric Evaluation

- Content and Face Validity: This validity is a qualitative form of validity that evaluates whether the expressions contained in the measuring instrument represent the phenomenon intended to be measured. For determining content validity, expert opinions were taken. Qualified experts/academicians or practitioners evaluated each expression in the questionnaire and rated the questionnaire according to a Likert scale. The project used expert evaluation for content validity.

- **Test-retest Reliability:** Test-retest reliability refers to the consistency of a measure. Participants filled out the Marathi MENO-D on their first study visit and again 24 hours after the first visit. Reliability was assessed by comparing the two administrations, assuming no change in the quality being measured across time.
- **Internal Consistency:** Internal consistency depends on the correlation of the items constituting the measuring instrument and was calculated using Cronbach's alpha.

➤ *Statistical Analysis*

- Data were initially managed using Microsoft Excel (Excel 2019/Excel 2021).
- Further psychometric analysis was conducted using SPSS version 29.
- Descriptive statistics were presented as mean and standard deviation for continuous variables and as frequency and percentage for categorical variables.

➤ *Descriptive Statistics for Age*

Table 1 Descriptive Statistics for Age

Variable	Minimum	Maximum	Mean	SD
Age	43.00	56.00	47.09	2.05

The mean age of participants was 47.09 years with a standard deviation of 2.05 years.

➤ *Content Validity Ratio*

Lawshe CVR formula: $CVR = (Ne - N/2)/(N/2)$.

Table 2 Content Validity Ratio

Item	N	Ne (4/5)	CVR	Result
1	5	5	1.00	Acceptable
2	5	5	1.00	Acceptable
3	5	5	1.00	Acceptable
4	5	5	1.00	Acceptable
5	5	5	1.00	Acceptable
6	5	5	1.00	Acceptable
7	5	4	0.60	Below 0.99
8	5	5	1.00	Acceptable
9	5	5	1.00	Acceptable
10	5	5	1.00	Acceptable

The mean CVR across the 10 items was 0.96. Nine items had a CVR of 1.00, while item 7 had a CVR of 0.60. The project notes that item 7 was below the reported critical

value of approximately 0.99 for five experts and should be reviewed and possibly revised or removed. Overall, the questionnaire demonstrated good content validity.

Table 3 Test-Retest Reliability: Marathi 1 versus Marathi 2

Variable	N	Mean	SD	Minimum	Maximum
Marathi 1	94	23.10	1.06	21	25
Marathi 2	94	23.22	1.09	21	25

The Marathi 1 scale had a mean score of 23.10 (SD = 1.06), with scores ranging from 21 to 25, while Marathi 2 had a mean score of 23.22 (SD = 1.09), with scores ranging from 21 to 25.

Measure	ICC (2,1)	Pearson r	P value
Marathi 1 and Marathi 2	0.936	0.942	1.73e-45

The test-retest reliability between Marathi 1 and Marathi 2 was assessed using ICC. The obtained ICC was

0.936, with Pearson correlation 0.942 ($p < 0.001$). This indicates very high agreement and excellent test-retest

reliability.

➤ *Internal Consistency*

Cronbach's alpha for the Marathi Scale Day 1, consisting of 12 items across 94 responses, was 0.967. This high coefficient indicates excellent internal consistency of the Marathi scale.

➤ *Concurrent Validity*

The project discussion refers to concurrent validity and reports that the mean English score was approximately 20.06, compared with approximately 23.10 and 23.23 for Marathi 1 and Marathi 2. However, the supplied project results do not contain a numerical English–Marathi correlation coefficient. Therefore, no unsupported correlation value has been inserted into this manuscript.

IV. DISCUSSIONS

Menopause is a natural stage of reproductive ageing in women and is associated with a variety of physical, psychological and vasomotor symptoms that may affect daily activities and quality of life. Assessment of menopausal symptoms using standardized questionnaires is important for identifying the severity and impact of these symptoms.

However, language can be an important barrier when an instrument is developed in English and used among women who are more comfortable communicating in Marathi. Translation and cultural adaptation of an established questionnaire can therefore improve its comprehensibility and applicability in the target population.

The aim of the present study was to translate the MENO-D questionnaire into Marathi and to evaluate its psychometric properties in women with menopausal symptoms. The psychometric evaluation included assessment of content validity, test–retest reliability and internal consistency. A total of 94 participants were included in the study.

In the present study, the Marathi version of the MENO-D questionnaire was developed through a systematic translation process. Translation of a questionnaire involves more than simply changing words from one language to another; the translated version should preserve the meaning, clarity and conceptual equivalence of the original questionnaire. The Marathi version was therefore evaluated to determine whether the items were relevant, clear, understandable and appropriate for the target population.

Content validity was assessed using expert evaluation of the translated Marathi questionnaire. The mean Content Validity Ratio (CVR) across the 10 evaluated items was 0.96. Nine items obtained a CVR of 1.00, while item 7 obtained a CVR of 0.60. The high CVR values obtained for the majority of items indicate a high level of agreement among the experts regarding the essentiality and relevance of the translated items. Overall, the high mean CVR of 0.96 suggests that the Marathi version demonstrated strong content validity.

Test–retest reliability was evaluated by administering the Marathi questionnaire on two occasions, referred to as Marathi 1 and Marathi 2, among the same 94 participants. The reliability was assessed using the Intraclass Correlation Coefficient (ICC). The obtained ICC was 0.936, indicating a very high level of agreement between Marathi 1 and Marathi 2 scores. This finding demonstrates that the Marathi questionnaire produced relatively stable results when administered repeatedly to the same participants.

The high ICC indicates that the scores obtained from the Marathi version were consistent across the two administrations. Therefore, the Marathi MENO-D questionnaire demonstrated excellent test–retest reliability in the present sample. The significant association between the two administrations further supports the stability of the translated questionnaire.

The use of a test–retest procedure is particularly relevant for a translated questionnaire because it helps determine whether differences in scores are due to actual differences in participants' responses rather than inconsistency of the measurement instrument.

The difference in the observed mean scores may also be relevant. The mean score for the English version was approximately 20.06, whereas the mean scores for Marathi 1 and Marathi 2 were approximately 23.10 and 23.23, respectively. The difference in mean scores may have contributed to the low agreement observed between the English and Marathi versions. Further examination of item-level responses and translation equivalence may therefore be useful.

The Cronbach's alpha of 0.967 indicates excellent internal consistency of the Marathi version in the present sample. Taken together, the content validity, test–retest reliability and internal consistency findings support the psychometric performance of the translated instrument in this sample.

V. CONCLUSION

The Marathi version of the MENO-D questionnaire demonstrated good content validity and excellent test–retest reliability (ICC = 0.936) and internal consistency (Cronbach's alpha = 0.967). It may be considered a useful tool for assessing peri-menopausal symptoms in Marathi-speaking women.

➤ *Limitations*

- The study was conducted in a limited geographical/clinical setting, so the findings may not represent all Marathi-speaking women.
- Only limited types of validity were assessed in the present study; other forms of validity were not evaluated.
- A numerical concurrent-validity correlation was not available in the supplied project results, limiting interpretation of cross-language equivalence.

➤ *Future Scope*

Further studies can assess the questionnaire in different clinical and community settings. Future research can further assess the cross-language equivalence of the Marathi version and evaluate additional psychometric properties in larger and more diverse samples.

➤ *Clinical Implication*

The Marathi MENO-D questionnaire can help healthcare professionals assess depressive symptoms and menopausal-related concerns more easily, improve communication with Marathi-speaking women, and support appropriate clinical management and referral.

➤ *Funding*

No funding was received for this study.

➤ *Conflict of Interest*

The authors declare no conflict of interest.

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➤ *Meno-D Attribution and Translation Statement*

The Marathi version of the MENO-D is a translated and adapted version of the original MENO-D (Kulkarni et al., 2018) and clearly identifying it as a Marathi translation adopted from the MENO-D. The original MENO-D and its authors are acknowledged in accordance with the CC BY 4.0 License. This Marathi translation has not been audited, certified, endorsed, or officially approved by the original authors, HER Centre Australia, or Monash University.

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