



Original article

Reliability and validity of the Vietnamese menopause rating scale

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Abstract: Introduction: The menopause rating scale (MRS) has been proven to be a reliable tool for quantifying the impact of menopausal symptoms and aiding clinicians in prescribing appropriate treatments worldwide. However, the Vietnamese-MRS (VN-MRS) has not been developed. This research aimed to evaluate the reliability and validity of the VN-MRS, and identify factors that are associated with menopausal symptoms in women aged 50 to 59. **Method:** A cross-sectional study was conducted on a sample of 200 women aged 50 - 59 years in Vietnam from February 2020 to June 2020. The MRS was translated into Vietnamese following the procedure from the Berlin Center for Epidemiology and Health Research and adjusted to fit the local culture. Reliability was assessed by using Cronbach's alpha coefficients and repeatability (using Intra-class Correlation Coefficient (ICC) at 2-week intervals). Validity was assessed by concurrent validity and construct validity. **Results:** Cronbach's alpha for the total score was 0.89. Repeatability (test-retest) was valued as "very good" (ICC = 0.991). The fit indices for construct validity, after adjustment, were: χ^2 (39) = 67.78 with $p = 0.003$; SRMR = 0.042; TLI = 0.971; CFI = 0.979; RMSEA = 0.061 90% confidence interval (CI) (0.035 - 0.084). Concurrent validity demonstrated an inverse correlation with the SF-36 survey ($r = -0.87$; $p < 0.001$). Age, education, and menopausal period were contributed to the menopausal score. **Conclusions:** The VN-MRS has good reliability and validity, making it suitable for assessing the severity of menopausal symptoms in middle-aged Vietnamese women.

Keywords: menopause, reliability, validity, MRS.

1. INTRODUCTION

Vietnamese women typically experience menopausal symptoms for at least one-third of their lives, given that the average age range for menopause is between 48 to 50 years old, and the average life expectancy of Vietnamese women in 2019 was 79.5 years old[1]. Menopause, a natural part of the aging process, marks the end of ovarian function. It occurs when a woman has not had a period for at least 12 months because her ovaries have stopped releasing estrogen[2]. The reduction in estrogen level leads to symptoms in three main areas: somatic, psychological, and urogenital symptoms. The

predominant somatic symptoms are hot flushes, night sweats, discomfort in the chest, sleep problems, and joint-muscle discomfort. Psychological and urogenital symptoms include depression, irritability, anxiety, physical and mental exhaustion, sexual problems, bladder problems, and vagina dryness[3]. Moreover, menopause also increases the risk of cardiovascular disease, osteoporosis, and Alzheimer's disease. These consequences, coupled with a decline in physical health and societal stigma, impair the ability to work and ultimately reduces the quality of life (QoL) of aging women.

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The Menopause Rating Scale is one of the most widely used tools to measure menopausal symptomatology and QoL. Developed by the Epidemiology and Health Research Center in Berlin in 1996, this self-administered scale assesses complaints/symptoms of menopausal women under three subscales, evaluates changes in severity of these symptoms over time, and measures changes in pre and postmenopausal therapy. Although menopausal symptoms vary within individuals, there is currently a lack of tools to quantify the severity of these symptoms in Vietnam[4]. Therefore, this research aimed to address this need by translating the MRS and determining the reliability and validity of the VN-MRS.

2. METHODS

2.1. Sample size and participants

The empirical rule of thumbs recommends at least 5 or 10 participants per observation[5] and a sample size of 200 is considered suitable for factor analysis[6]. To evaluate the scale's repeatability using the intra-group correlation coefficient (ICC - Intra-Class Correlation), the sample size was calculated following Douglas G. Bonett's formula [7]. Assuming an expected ICC of 0.86[4], a type 1 error is 0.05 and a confidence interval width of 0.2, 27 out of 200 participants were asked to answer the same questionnaire for the second time two weeks after the first survey [8-12].

A convenience sampling was used in this cross-sectional study. The inclusion criteria were women aged 50-59 years old who have a uterus and 2 ovaries. Participants with any of the following conditions were excluded: hormonal medication use within the last 6 months, participation in the preliminary study, medical conditions affecting menopausal symptoms, psychiatric conditions impairing conversational ability, inability to speak and write Vietnamese, or leaving any questions unanswered in the survey.

2.2. Instrument

The MRS was translated into Vietnamese following the procedure from the Berlin Center for Epidemiology and Health Research[13-15]. Experts critically reviewed the translation to ensure cultural as well as linguistic equivalence.

VN-MRS version

The scale consists of 11 sections and is divided into three sub-scales: psychological, somatic and urogenital sub-scales. Somatic symptoms encompass flushing, chest discomforts, sleep disorders, joint – muscle problems (sections 1, 2, 3 and 11). Psychological symptoms include depression, irritability, anxiety, physical and mental exhaustion (sections 4, 5, 6 and 7). Urogenital symptoms involve sexual problems, bladder problems and vagina dryness (sections 8, 9 and 10). Responses were classified using a five-point Likert scale, with scores ranging from 0 to 4, where 0 represents no or few complaints, 1 represents minor, 2 is moderate, 3 is severe and 4 is very severe. The MRS score is calculated by summing points from all 11 sections, with the final score ranging from 0 (no symptoms) to 44 (extremely severe).

Quality of life rating scale

The 36-Item Short Form Survey (SF-36) is a generic, self-reported survey that measures QoL. SF-36 is divided into 8

sub-scales: physical functioning (10 items), social role functioning (2 items), physical role functioning (4 items), emotional role functioning (3 items), mental health (5 items), vitality (4 items), bodily pain (2 items) and general health perceptions (5 items). The final score ranges from 0 to 100, with higher scores indicating less disability and a better QoL[16].

2.3. Statistical analysis

The scale's internal consistency was assessed using Cronbach's alpha coefficients, one of the most widely used test scores for consistency, with value ≥ 0.7 recognized as an acceptable level[17]. Repeatability (test-retest) was assessed by Intra-class Correlation Coefficient (ICC). We used STATA (version 14) to calculate ICC's estimates and its 95% confidence intervals based on mean-rating (k = 2), absolute-agreement, two-way mixed-effects models). An ICC greater than 0.9 demonstrates excellent reliability[18].

The scale's validity was assessed using concurrent validity and construct validity. Concurrent validity measures the correlation between test score (severity of menopausal symptoms score) and relevant criteria (QoL of patients). In this study, concurrent validity was measured using Spearman correlation between the new test (VN-MRS) and an existing test (SF-36) to demonstrate whether changes in the severity of menopausal symptoms correlate with changes in QoL. The construct validity confirmed that the VN-MRS measured the construct of menopausal symptoms, and not measuring respondent's mood, self-esteem, or other constructs[19, 20].

Confirmatory Factor Analysis (CFA) was used to assess how well the 3-subscale model fit the collected data. Fit indices included: Chi-squared statistic (χ^2), Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean squared Residual (SRMR), Tucker-Lewis Index (TLI), Comparative Fit Index (CFI). A p value of $\chi^2 \geq 0.5$ indicates a good model fit. However, the Chi-square statistic is sensitive to sample size, which may lead to model rejection when the sample size is large or lack of power to discriminate between good and poor fitting models when the sample size is small[21]. Therefore, the following indices were used to assess model fit: RMSEA and SRMR less than 0.08, and TLI and CFI greater than or equal to 0.90[21].

3. RESULTS

The participants' mean age was 54.1 ± 2.95 ; 64% of participants were 55 or younger, and all were Kinh (Vietnamese) ethnicity. The majority of participants were non-religious (73%), married (96.5%), and had completed secondary education or higher (78%). The primary occupation of nearly 70% of participants was being a housewife, and almost all participants self-assessed their financial situations as "sufficient to live" (98.5%). Most women were in menopause (50%) or pre-menopause (29%) (Table 1).

The VN-MRS demonstrated a good internal consistency, as evidenced by Cronbach's alpha, and excellent repeatability (ICC = 0.991, 95% CI: 0.981 – 0.996) as seen Table 2. The consistency coefficients for the scale exceeded 0.81, with scores of 0.81, 0.82 and 0.94 for somatic-vegetative, psychological and urogenital symptoms respectively in Table 3.

Table 1. Characteristics of participants

| Characteristic | Participants for construct validity (n = 200) | | | Participants for test–retest reliability (n = 27) | | |
|-------------------------------|---|-----|-------|---|----|-------|
| | Mean (SD) | n | % | Mean (SD) | n | % |
| Age | 54.1 (2.95) | | | 54.2 (2.90) | | |
| Age group | | | | | | |
| 50-55 | | 129 | 64.5 | | 19 | 70.4 |
| >55- 59 | | 71 | 35.5 | | 8 | 29.6 |
| Ethnicity | | | | | | |
| <i>Kinh (Vietnamese)</i> | | 200 | 100.0 | | 27 | 100.0 |
| Religion | | | | | | |
| <i>No religion</i> | | 146 | 73.0 | | 23 | 85.2 |
| <i>Buddhist</i> | | 47 | 23.5 | | 4 | 14.8 |
| <i>Christian</i> | | 7 | 3.5 | | 0 | 0 |
| Marital status | | | | | | |
| <i>Single</i> | | 1 | 0.5 | | 0 | 0 |
| <i>Married</i> | | 193 | 96.5 | | 26 | 96.3 |
| <i>Divorced</i> | | 1 | 0.5 | | 1 | 3.7 |
| <i>Widow</i> | | 5 | 2.5 | | 0 | 0 |
| Level of education | | | | | | |
| <i>Able to read and write</i> | | 6 | 3.0 | | 0 | 0 |
| <i>Primary school</i> | | 38 | 19.0 | | 6 | 22.2 |
| <i>Junior high school</i> | | 103 | 51.5 | | 15 | 55.6 |
| <i>Senior high school</i> | | 42 | 21.0 | | 5 | 18.5 |
| <i>Higher education</i> | | 11 | 5.5 | | 1 | 3.7 |
| Occupation | | | | | | |
| <i>Housewife</i> | | 137 | 68.5 | | 19 | 70.4 |
| <i>Small business owner</i> | | 36 | 18.0 | | 8 | 29.6 |
| <i>Factory worker</i> | | 22 | 11.0 | | 0 | 0 |
| <i>Office worker</i> | | 3 | 1.5 | | 0 | 0 |
| <i>Farmer</i> | | 2 | 1.0 | | 0 | 0 |
| Socio-economic status | | | | | | |
| <i>Very low income</i> | | 1 | 0.5 | | 0 | 0 |
| <i>Low to middle income</i> | | 197 | 98.5 | | 26 | 96.3 |
| <i>High income</i> | | 2 | 1.0 | | 1 | 3.7 |
| Menopausal status | | | | | | |
| <i>Pre-menopause</i> | | 58 | 29.0 | | 9 | 33.3 |
| <i>Menopause</i> | | 42 | 21.0 | | 6 | 22.2 |
| <i>Post-menopause</i> | | 100 | 50.0 | | 12 | 44.5 |

Table 2. Internal reliability and test – retest reliability of the Vietnamese MRS

| MRS dimension | Scale item | Item–test correlation | Cronbach’s alpha | Test–retest reliability | |
|-------------------------------------|-------------------------------|-----------------------|------------------|-------------------------|---------------|
| | | | | ICC | 95% CI |
| Somatic-vegetative dimension | | | 0.81 | 0.964 | 0.922 – 0.983 |
| | Hot flashes, sweating | 1 | 0.68 | | |
| | Heart discomfort | 2 | 0.61 | | |
| | Sleep problems | 3 | 0.74 | | |
| | Joint and muscular discomfort | 11 | 0.66 | | |
| Psychological dimension | | | 0.82 | 0.988 | 0.974 – 0.995 |

| MRS dimension | Scale item | Item–test correlation | Cronbach's alpha | Test–retest reliability | |
|--------------------------------|------------|-----------------------|------------------|-------------------------|---------------|
| | | | | ICC | 95% CI |
| Depressed mood | 4 | 0.74 | | | |
| Irritability | 5 | 0.69 | | | |
| Anxiety | 6 | 0.75 | | | |
| Physical and mental exhaustion | 7 | 0.55 | | | |
| Urogenital dimension | | | 0.94 | 0.985 | 0.968 – 0.993 |
| Sexual problems | 8 | 0.73 | | | |
| Bladder problems | 9 | 0.68 | | | |
| Vaginal dryness | 10 | 0.76 | | | |
| Total MRS score | | | 0.89 | 0.991 | 0.981 – 0.996 |

Table 3. Concurrent validity of the Vietnamese MRS

| | Somatic-vegetative dimension | Psychological dimension | Urogenital dimension | Total MRS score |
|--------------|------------------------------|-------------------------|----------------------|-----------------|
| SF-36 | - 0.86 | - 0.78 | - 0.47 | -0.87 |
| P value* | < 0.001 | < 0.001 | < 0.001 | < 0.001 |

*Spearman's rank correlation coefficient

Table 4. Analysis of the indices for the VN-MRS

| | χ^2 | df | RMSEA (CI 90%) | SRMR | TLI | CFI |
|-------------------------------------|-----------|----|-----------------------|-------|-------|-------|
| Original variable (adjusted) | 3- 67.78 | 39 | 0.061 (0.035 – 0.084) | 0.042 | 0.971 | 0.979 |
| | p = 0.003 | | | | | |

The data from Table 4 suggested that the model aligned with the data collected. The RMSEA ($0.061 < 0.08$, 90% CI: $0.035 - 0.084$) in conjunction with other indicators: SRMR = $0.042 < 0.08$, TLI = $0.971 > 0.9$ and CFI = $0.979 > 0.9$, representing a suitable fit. Diagram 1 reveals that standardized factor loading of variables in the VN-MRS ranged from 0.51 to 0.97, indicating that the scale is suitable to use for Vietnamese menopausal women (Figure 1).

Factors associated with MRS score

There was a statistically significant correlation between age group and MRS score is ($p < 0.001$) in Table 5; specifically, people that were 55 or older had higher MRS scores (more severe symptoms) than their peers aged 50 – 55 years. Additionally, a strong inverse correlation was found between education level and MRS score ($p < 0.001$, $r = -0.68$). Moreover, the VN-MRS score reflected stages in menopause, with higher scores correlating with severe stages ($p < 0.001$ and $r = 0.59$). This study did not identify any correlation between religion, marital status, socio-economic status and MRS scores.

4. DISCUSSION

Consistency

The internal consistency results align with those of the original version and other validated versions: Cronbach's alpha coefficient for the total score in the original version is 0.84, Urdu language version in Pakistan is 0.869[22], Serbian language version is 0.884[23] and the Czech version is 0.87[24]. This indicates good consistency for the VN-MRS and demonstrates cross-cultural applicability of the MRS for assessing menopausal symptoms.

Test-retest reliability (repeatability)

Similar ICC results (ICC ~ 0.9- 0.95) were obtained from a study by H. Susanti and colleagues in Indonesia[3].

Concurrent validity

A strong inverse correlation ($r = -0.87$, $p < 0.001$) was observed between the QoL measured by SF-36 scale and the severity of menopause symptoms measured by MRS. This suggests that as the severity of symptoms increased, the patients' QoL worsened. Specifically, concurrent validity coefficients between the SF-36 score and the score of each dimension of MRS ranged from medium to high level (-0.47 to -0.86). Coefficients were higher in vegetative-somatic and psychological scales than urogenital scales, indicating that vegetative-somatic and psychological symptoms have a

greater effect on patients' QoL than urogenital symptoms. Similar results were reported in previous studies, such as

research by Tatjana et al (2015) in Serbia[23]. The SF-36 was validated for its reliability and validity in measuring QoL [25].

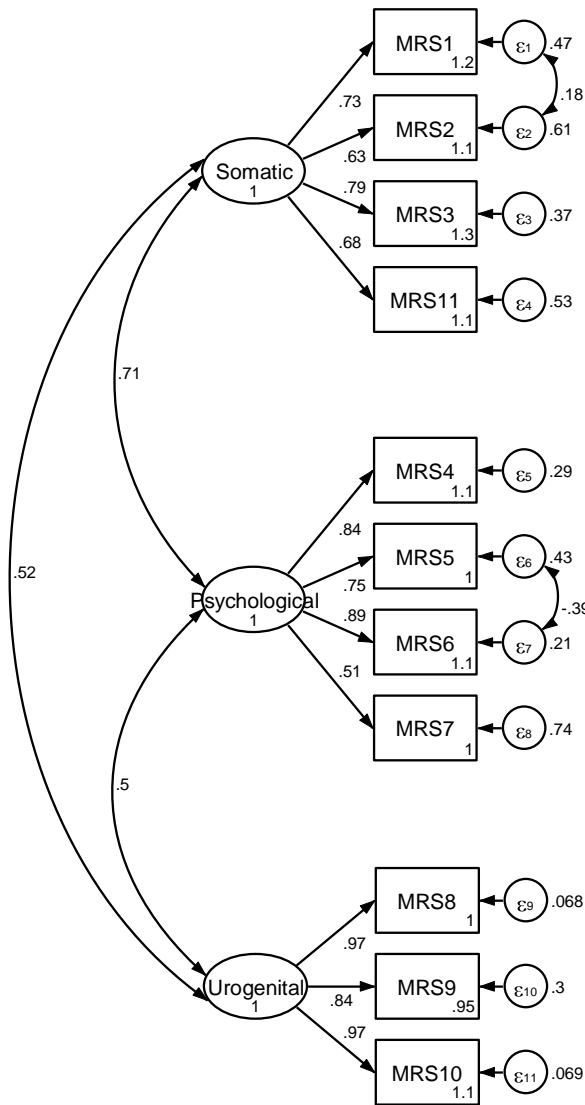


Figure 1. Structure of items in the Vietnamese MRS

Table 5. Correlation between MRS score and population characteristics and menopausal status (n=200)

| Characteristics | Frequency (%) | MRS-VN score | p values |
|------------------|---------------|--------------|---------------------|
| Age** | | | p < 0.001 |
| 50- 55 | 129 (64.5) | 9 (5 – 13) | |
| >55- 59 | 71 (35.5) | 16 (11 – 21) | |
| Religion* | | | p = 0.684 |
| No religion | 146 (73.0) | 11 (5 – 17) | |
| Buddhist | 47 (23.5) | 10 (7 – 19) | |
| Christian | 7 (3.5) | 11 (6 – 15) | |

| Characteristics | Frequency (%) | MRS-VN score | p values |
|---------------------------------|---------------|----------------|----------------------|
| Occupation* | | | p = 0.069 |
| Housewife | 137 (68.5) | 10 (7 – 17) | |
| Small business owner | 36 (18.0) | 11 (5 – 18.5) | |
| Factory worker | 22 (11.0) | 13 (9 – 16) | |
| Office worker | 3 (1.5) | 1 (0 – 2) | |
| Farmer | 2 (1.0) | 11.5 (11 – 12) | |
| Level of education*** | | | |
| Able to read and write | 6 (3.0) | 22 (19 – 24) | p < 0.001 |
| Primary school | 38 (19.0) | 18 (14 – 21) | r = -0.68 |
| Junior high school | 103 (51.5) | 10 (9 – 15) | |
| Senior high school | 42 (21.0) | 4 (2 – 7) | |
| Higher education | 11 (5.5) | 2 (0 – 3) | |
| Marital status** | | | p = 0.625 |
| Married | 193 (96.5) | 11 (7 – 15) | |
| Single/Divorced/widow | 7 (3.5) | 11 (6 – 17) | |
| Socio-economic status*** | | | p = 0.535 |
| Very-low income | 1 (0.5) | 17 (17 – 17) | r = -0.04 |
| Low to middle income | 197 (98.5) | 11 (6 – 17) | |
| High income | 2 (1.0) | 10.5 (7 – 14) | |
| Menopausal status*** | | | |
| Pre-menopause | 58 (29.0) | 7 (3 – 9) | p < 0.001* |
| Menopause | 42 (21.0) | 10 (7 – 14) | r = 0.59 |
| Post-menopause | 100 (50.0) | 15 (11 – 21) | |

*: Kruskal Wallis; **:Mann – Whitney; ***: Spearman's rank correlation coefficient

Construct validity

Standardized factor loadings of this research were similar to the results of the original version in Germany[26]. Correlation coefficient between subscales in the Vietnamese MRS ranged from 0.50 to 0.71, which is consistent with studies from four European countries (coefficient ranged from 0.5-0.6), a North American study (from 0.5 to 0.7), a South American study (from 0.5 to 0.7), and in Asia, especially an Indonesia study that its results ranged from 0.4 to 0.7) [22]. In addition, model's fitness was also demonstrated through other fit indices: SRMR, CFI, TLI and RMSEA. Thus, we concluded that the Vietnamese MRS exhibits a similar internal structure to the original MRS and is an appropriate tool for measuring the severity of menopausal symptoms.

Factors that are associated with menopausal symptoms

Women with higher level of education from the study experienced fewer and less severe symptoms during menopause, which is consistent with findings from Jaana M Moilanen and colleagues in Finland on 1165 women aged 45 – 64 [27], and Hoang Thi Lien in Vietnam on 470 women aged 50 - 60 years [28]. This may be attributed to the possibility that women with higher education levels have greater access to healthcare service and more likely to adhere to doctor's recommendation. Additionally, educated women may be more likely to adopt lifestyle changes, such as diet modifications, based on menopausal symptoms.

In this study, postmenopausal women had higher scores than perimenopausal and premenopausal women. VN-MRS scores increased significantly in correlation to age and menopausal stage, an observation reflected in a study in Ecuador [29] and in Ethiopia [30]. This can be explained by

the fluctuating estrogen levels during perimenopause and the decline to deficiency status in the postmenopausal period, causing symptoms to gradually increase. Moreover, menopausal-related changes are negatively impacted by the natural aging process, characterized by a decline in the organ system functions. Therefore, in general, postmenopausal women experience more menopausal symptoms and higher symptom severity.

Previous studies, in Vietnam, have shown associations between factors such as ethnicity, occupation, marriage, economic status and health-related QoL in middle-aged women[31]. However, our study did not reveal an association between menopausal symptoms and these factors. This could be partly due to the homogeneity of our population, as all participants belonged to the Kinh ethnic group, and only a relatively low proportion (only 3.5%) of women were not living with their partners. Menopausal disorder variations are thought to be influenced by regions, living habits and cultures. Therefore, future studies should delve deeper to confirm these associations with menopausal health status.

Limitations

The research had certain limitations. Firstly, none of the translators in the backward translation process is English native. Secondly, the MRS is a self-reported scale, and the data collection process relies on participants' memory recall, which can lead to self-report bias and recall bias. In addition, hot weather in the South of Vietnam can influence the accurate assessment of vasomotor disorder symptoms in menopausal women.

Conclusion

This study aimed to validate the validity and reliability of the Vietnamese MRS to assist Vietnamese physicians in classifying the severity of menopausal symptoms. The Vietnamese MRS demonstrates good reliability (assessed by Cronbach's alpha and ICC) and validity (assessed by concurrent and construct validity), proving its utility as a useful tool for Vietnamese healthcare professionals to make appropriate interventions. Ultimately, the scale's usefulness lies in its adoption by healthcare professionals and patients. However, it is a common occurrence for aging women in Vietnam to silently suffer from menopausal symptoms. Further studies should be conducted to assess patients' perception on menopausal symptoms.

LIST OF ABBREVIATIONS

CFA-Confirmatory Factor Analysis
 CFI-Comparative Fit Index
 ICC-Intraclass Correlation Coefficient
 MRS-Menopause Rating Scale
 MI-Modification Indices
 NNFI-Non-Normed Fit Index
 RMSEA-Root Mean Square Error of Approximation
 SF36-Short Form- 36
 SRMR-Standardized Root Mean squared Residual
 TLI-Tucker-Lewis Index
 ICC-Intraclass Correlation Coefficient
 QoL-Quality of Life

ETHICAL STATEMENT

The study was approved by the Institutional Review Board of University of Medicine and Pharmacy at Ho Chi Minh City according to Decision No. 126/HĐĐĐ date February 26, 2020.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.





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AUTHORS' CONTRIBUTION

Hanh Thi My Nguyen, Nga Thi Tuyet Tran, and Dung Van Do presented the conception of the study. All authors participated in the design of the protocol, and methods. Hanh was primarily responsible for data collection, data analysis, and interpretation of the results. The draft report was written by Hanh and Minh-Ha. All authors participated in reading, editing, and approving the final manuscript.

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