

DEVELOPMENT AND VALIDATION OF THE PATANJALI YOGA SUTRA INTERVENTION SCALE FOR MEASURING PSYCHOLOGICAL CHANGE IN POST- MENOPAUSAL WOMEN

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Abstract: Menopause is a natural phase in a woman's life that can cause sleep problems, mood swings, forgetfulness and decreased quality of life. Some psychometric measures have been created to quantify these concerns; and in the case of psychological changes after a structured intervention based on Patanjali Yoga Sutra (PYS), only a few instruments have been developed. This study explored the process of developing a PYS Intervention scale and carried out a psychometric validation with a group of post-menopausal women. The products developed through 8 limbs (Ashtanga) of yoga which has been laid down by Patanjali and validated by the expert and also from pilot testing. The scale was validated among 70 post-menopausal women in the psychometric properties by used descriptive and distributional statistics in Minitab. The mean score across all items was 0.73 (SD = 0.14; 95% CI 0.69–0.76), with scores of 0.45 to 0.89, and mild negative skewness (-0.12), suggesting good level of discrimination. Incorporating PSQI, MMQ, MSQ, PHQ-9, GAD-7 and MENQOL, the construct and convergent validity were reviewed. Anderson–Darling tests ($p < 0.05$) were used to test for non-normality, as Mann–Whitney tests were used in the experimental group, significant difference was found on all measures ($p < 0.05$) that further confirmed the preliminary reliability, validity and sensitivity of the scale for psychological change.

Keywords: *Patanjali Yoga Sutra; Scale Development; Psychometric Validation; Post-Menopausal Women; Psychological Change; Sleep Quality; Anxiety; Depression; Quality Of Life.*

1. Introduction

Menopause is when women no longer experience any menstrual periods. It is generally believed that it was achieved at the end of one year of no periods. There is a cascade of known physical changes, the decreased turnover of ovarian hormones that drive changes in sleep patterns, memory, anxiety, depressed mood and a decrease in the overall quality of life, that there also are a set of

known psychological changes (Rachlin, D., 2024). These psychological changes can be as – if not more – problematic for many women than physical changes and, consequently, more under-researched than other changes in them, since the tools used for menopause assessment gravitate to the somatic and vasomotor symptoms (Mobley, B., 2022).

Classical ashta-limbed yoga which includes the Patanjali's yoga sutta has been of interest as a non-pharmacological modality for menopausal symptom management which focuses particularly on yoga (Ahuja, N., 2025). An intervention grounded in the Patanjali Yoga Sutra is different from any other physical-exercise based yogic approach and examines the mental and focus aspects of health and wellbeing in addition to flexibility and strength of the body (Char, S., 2021). Despite their increasing popularity there has been no outcome measure that has been specifically designed for that field which is sensitive to the pattern of change in outcome the intervention is sought to influence (Sivaramakrishnan, D., 2019).

2. Need and Significance of the Study

The Patanjali Yoga Sutra Intervention Scale (PYS), a measure that was seen and validated is beneficial for the following practical reasons. It offers yoga-therapists and researchers an outcome measure that is conceptually congruent with yoga, not solely one created for an altogether different clinical problem (Halpern, J., 2024). It allows combining all effects of the Sutra-based programme as a single 'overall psychological effect' which can be compared between studies, cohorts and time points (Nagarathna, R., 2012). Lastly, by testing the psychometric properties of the new scale in conjunction with a well-established battery of sleep-, memory-, mood-, anxiety-measures, as well as a quality-of-life scale, the current study offers converging, multi-instrument evidence to enhance the evidence-base for the integration of Patanjali Yoga Sutra based practice into menopausal care, as well as psychometric soundness of the scale (Anand, A., 2018).

3. Objectives of the Study

The following goals served as the basis for the research:

- Following the eightfold path of Ashtanga Yoga laid out in the Patanjali Yoga Sutra (PYS) as a basis for the creation of items for the PYS Intervention Scale.
- To examine the distributional properties and psychometric adequacy of the overall PYS Intervention Scale score in a sample of post-menopausal women.
- In order to evaluate the effects of a Patanjali Yoga Sutra intervention on participants' PSQI, MMQ, MSQ, PHQ-9, GAD-7, and MENQOL scores both before and after the intervention.
- To evaluate whether the pattern of change on these established measures supports the construct validity of the newly developed PYS Intervention Scale.

4. Materials and Methods

Research Design and Setting: A quantitative quasi-experimental design with a control group and a pre- and post-test was utilised. Two groups were established: one for women who were no longer in their reproductive years and beginning menopause, and another for women who were not yet in either category. Post-menopausal women were randomly assigned to an experimental group who were given the intervention based on the Patanjali Yoga Sutra (PYS) and a group of women who received their normal health care. The intervention was assessed prior to and following using pre-existing outcome measures and the PYS Intervention Scale.

Development of the PYS Intervention Scale: The physical postures, or asana, are one of eight components of Ashtanga Yoga. The other six components are pranayama, dharana, dhyana, samadhi, and yama. Objects responded to represent psychological and behavioural developments of the limbs. The items were reviewed for relevance, clarity and cultural appropriateness by experts in yoga therapist and psychology. A pilot test and a refinement were performed and then the final scale was administered. Raw scores were summated on a 0–1 continuum with higher scores representing greater positive psychological change.

Sample: Among the 70 post-menopausal women ($N = 70$), Psychometric evaluation of the overall PYS Intervention Scale was performed. For the purpose of comparing pre- and post-test scores, individuals were chosen at random from both the experimental and control groups.

Outcome Measures: PSQI, MMQ, MSQ, PHQ-9, GAD-7, and MENQOL, in addition to the PYS Intervention Scale, were administered at pre-test and post-test to measure sleep quality, memory, menopause-related sleep disturbance, depression, anxiety, and quality of life.

Data Analysis Plan: Statistic analysis carried out in Minitab. The Anderson–Darling test was used for normality test. The data showed that they were strongly deviant from the normal distribution ($p < 0.05$) and so were analyzed non-parametrically. Standard deviations, frequencies, percentages, and averages were the components of the descriptive statistics. The experimental and control groups' median values were compared using the Mann-Whitney U test.

5. Results

Psychometric Validation of the PYS Intervention Scale

This overall score on the PYS Intervention Scale was created for all 70 participants, and distributed using the Anderson–Darling Normality Test in Minitab. The test statistic ($A\text{-squared} = 6.27$, $p < 0.005$) showed that there was a departure from normality that was statistically significant and that non-parametric approaches could be used to make between-group comparisons for the remaining study variables. Table 2 contains descriptive statistics for the scale score reflect overall score.

Table 2. Descriptive and Distributional Statistics of the Overall PYS Intervention Scale Score

Statistic (Overall Scale Score, $N = 70$)	Value
Anderson–Darling (A-Squared)	6.27
P-Value	< 0.005
Mean	0.7278

Standard Deviation	0.1440
Variance	0.0207
Skewness	-0.1160
Kurtosis	-1.7941
Minimum	0.4541
1st Quartile (Q1)	0.5765
Median	0.7423
3rd Quartile (Q3)	0.8707
Maximum	0.8920
95% CI for Mean	0.6934 – 0.7621
95% CI for Median	0.6125 – 0.8604
95% CI for Standard Deviation	0.1235 – 0.1728

The overall scale score was 0.7278 (SD = 0.1440), with central values very close to each other, showing a mild skewness (−0.116) and a flat distribution (−1.794). The range with scores from 0.4541 to 0.8920 shows the meaningful differentiation of participants. The 95% confidence interval (0.6934–0.7621) was reasonably narrow to support estimates' stability. Across the board, the PYS Intervention Scale showed acceptable score range, discrimination, and appropriateness as a composite measure of intervention.

Comparative Analysis of Pre-test and Post-test Scores

Each of the six outcome measures was calculated and presented in Table 3, along with the corresponding Mann-Whitney p values for comparing the pre- and post-test scores within the experimental and control groups. The table also includes the standard deviation and mean of the two sets of data.

Table 3. Comparative Pre-test and Post-test Scores for Experimental and Control Groups

Measure	Group	Pre-test Mean	Pre-test SD	Post-test Mean	Post-test SD	p value
PSQI Score	Experimental	3.71	±0.37	4.78	±0.27	<0.05
	Control	3.52	±0.21	3.35	±0.45	<0.05

MMQ	Experimental	3.12	±0.23	4.42	±0.29	<0.05
	Control	2.92	±0.11	3.16	±0.36	<0.05
MSQ	Experimental	3.05	±0.41	4.39	±0.29	<0.05
	Control	3.01	±0.16	3.15	±0.38	<0.05
PHQ-9	Experimental	3.28	±0.42	4.39	±0.24	<0.05
	Control	3.21	±0.19	2.97	±0.42	<0.05
GAD-7	Experimental	3.16	±0.40	4.11	±0.46	<0.05
	Control	3.54	±0.29	3.29	±0.50	<0.05
MENQOL	Experimental	1.60	±0.44	3.64	±0.38	<0.05
	Control	1.31	±0.13	1.82	±0.56	<0.05

The experimental group demonstrated statistically substantial improvements across all six outcome measures from pre- to post-test after receiving either six weeks of instruction or eleven weeks of came-back training. Scores on PSQI, MMQ, MSQ, PHQ-9, GAD-7, and MENQOL all went up, with PSQI going from 3.71 to 4.78, MMQ from 3.12 to 4.42, MSQ from 3.05 to 4.39, PHQ-9 from 3.28 to 4.39, GAD-7 from 3.16 to 4.11, and MENQOL from 1.60 to 3.64 ($p < 0.05$). The control group, however, showed less change: PSQI for control decreased from 3.52 to 3.35; MMQ for control increased from 2.92 to 3.16; and MSQ for control increased from 3.01 to 3.15. PHQ-9 and GAD-7 declined from 3.21 to 2.97 and 3.54 to 3.29, whereas MENQOL increased from 1.31 to 1.82. The magnitude of these changes, however, were considerably smaller and also were statistically significant ($p < 0.05$).

Experimental group consistently showed higher positive changes, lending convergent evidence to support the psychological benefits after the intervention based on Patanjali Yoga Sutra. The results further confirm the construct validity of the newly developed PYS Intervention Scale as a composite of such psychological changes. Figure 1 shows the differences in pre and post test scores on all measures.

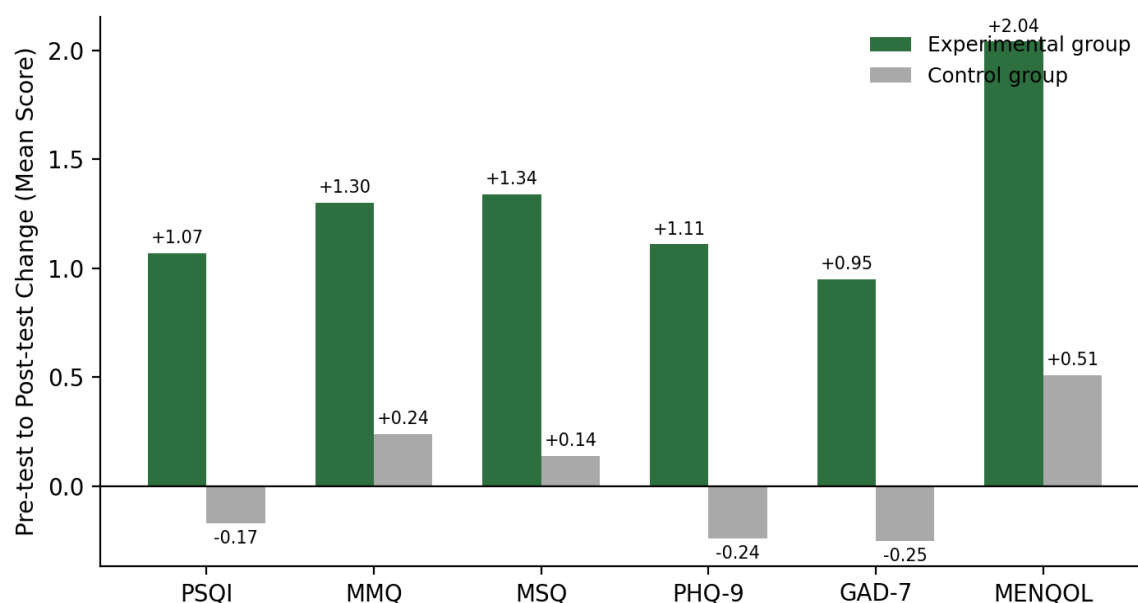


Figure 1. Pre-test to post-test change scores (mean post-test minus mean pre-test) for the experimental and control groups across the six outcome measures

6. Conclusion

This study adds preliminary evidence that the Patanjali Yoga Sutra (PYS) Intervention Scale is a psychometrically promising tool to measure psychological change in post-menopausal women participating in a Patanjali Yoga Sutra intervention. Results from a study including 70 women show that the overall scale has a stable mean and a good range of possible values. The experimental group outperformed the control group on several established measures of sleep, memory, mood, anxiety, and quality of life, suggesting that the new scale is valid and that the underlying intervention is beneficial psychologically. The PYS Intervention Scale validation, with more psychometric development such as reliability testing and factor analysis in a larger sample of middle aged w-e post-menopausal women, can have wide application as a standardized, conceptually developed, outcome scale in future studies and clinical practices with Patanjali Yoga Sutra based intervention with middle aged we post-menopausal women.

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