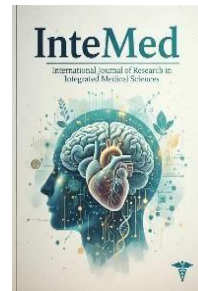




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Review Article

Assessment of Satva Bala Following Ten-Days Residential Vipassana Course in Young Adults: A Prospective Longitudinal Cohort Study Protocol

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Abstract:

Background : Satva Bala describes the functional strength and steadiness of the mind in Ayurveda. A structured residential Vipassana course combines ethical discipline, sustained attention to respiration and bodily sensations, equanimous observation, silence, and a regulated daily routine. These components may influence several capacities represented in Satva Bala, but direct longitudinal evidence is limited.

Objective: To estimate immediate and three-month changes in Satva Bala among first time young adult participants completing a standard ten-day residential Vipassana course.

Methods : This prospective single cohort study will recruit 250 adults aged 18 to 40 years at Dhamma Punna Vipassana Meditation Centre in Pune. Participants with a diagnosed major mental disorder, major physical illness, ongoing psychiatric treatment or psychotropic medication, or previous completion of a ten day Vipassana course will be excluded. The primary outcome is change in the 14 item Ayurveda derived Satva Bala questionnaire score from baseline to course completion. Monthly assessments will continue for three months. Pulse and blood pressure will be recorded before and after the residential course. The main analysis will use a linear mixed effects model with time as a categorical fixed effect and participant as a random intercept. Adjusted mean changes, 95 percent confidence intervals, standardized effect sizes, score distributions,

category transitions, missing data, and adverse experiences will be reported.

Interpretation: The design can describe within person change and its persistence but cannot isolate a causal effect of meditation from self selection, expectancy, the retreat environment, silence, diet, sleep schedule, or other concurrent features. The study is intended to generate a transparent estimate and inform a later controlled trial and psychometric validation of the questionnaire.

Keywords : Ayurveda; longitudinal study; meditation retreat; mental strength; Satva Bala; Vipassana; young adults

Strengths and Limitations

The same participants are assessed at baseline, course completion, and three-monthly follow ups, allowing the trajectory and persistence of change to be described.

The protocol separates the continuous questionnaire score as the primary outcome from the classical categories, which are less sensitive to small but potentially meaningful changes.

A prespecified mixed effects analysis uses all available repeated observations and reports confidence intervals and effect sizes rather than relying only on significance tests.

The absence of a nonretreat comparison group, self selection into an intensive course, and several inseparable retreat components prevent a causal claim about Vipassana meditation alone.

The Satva Bala instrument originates from an Ayurveda dissertation and requires fuller contemporary psychometric evaluation.

Introduction

Ayurveda describes health as a coordinated state of body, sensory faculties, mind, and self. Mental well-being is therefore not treated as an isolated psychological concern.

Satva supports attention, judgment, restraint, and purposeful action, while Satva Bala refers to the strength with which a person tolerates physical and mental adversity. In the clinical examination described in Charaka Samhita, mental strength is considered Pravara, Madhyama, or Avara according to the person's capacity to remain stable when confronted with difficult circumstances.¹ The classical description of health also includes clarity and contentment of mind, senses, and self.² A ten-day residential Vipassana course is an intensive and standardized contemplative setting. In the tradition taught by S N Goenka, participants first observe ethical precepts, then develop concentration through awareness of natural respiration, and subsequently observe bodily sensations without craving or aversion. The course includes approximately ten hours of daily sitting practice, noble silence for most of the retreat, restricted external communication, and a fixed routine.³ The exposure is therefore more than a meditation session. It is a combined programme of attentional training, behavioural restraint, reduced stimulation, and residential structure.

The Vipassana evidence base remains promising but methodologically uneven. An early systematic review found only seven controlled or cross sectional studies and judged most to be of low quality.⁴ A naturalistic study of a ten day course in Muscat reported favourable psychological changes but included only 14 participants.⁵ Another pre and post study of 36 retreat participants found improved well-being and task related changes in heart rate variability, while noting that physiological interpretation was complex.⁶ A later meta-analysis of traditional meditation retreats reported moderate pooled effects but substantial heterogeneity across practices, designs, and outcomes.⁷ Broader reviews of meditation and mindfulness programmes show small to moderate average improvements in selected psychological outcomes, yet findings vary by comparison group, population, and programme.^{8,9}

The proposed study addresses a specific gap: no identified longitudinal study has directly examined whether a first ten day Vipassana course is followed by change in an Ayurveda derived measure of Satva Bala. The construct is not identical to mindfulness, resilience, or emotional regulation. It includes memory, commitment, gratitude, comprehension, cleanliness, enthusiasm, skill, patience, courage, recovery from dejection, orderly conduct, decision making, deliberate action, and social orientation. Modern models of mindfulness suggest possible pathways through attention control, emotion regulation, and self-awareness, but these pathways should be treated as hypotheses rather than translations of the Ayurvedic construct.¹⁰

An intensive retreat can also be difficult for some participants. A systematic review documented meditation

related adverse events across a heterogeneous literature and emphasized the need for active monitoring rather than an assumption of universal benefit.¹¹ The present protocol therefore places outcome interpretation, attrition, and safety reporting within the same analytic framework. The questionnaire proposed in the synopsis operationalizes classical descriptors in 14 graded items.¹²

Research Question

Among first time Vipassana participants aged 18 to 40 years, how does the total Satva Bala score change immediately after a standard ten-day residential course and during the following three months?

Objectives

Primary Objective

To estimate the mean within person, change in total Satva Bala score from baseline to completion of the ten-day Vipassana course.

Secondary Objectives

To estimate whether any observed change is maintained at one, two, and three months after the course.

To describe transitions among Avara, Madhyama, and Pravara Satva Bala categories.

To estimate pre and post course changes in pulse rate and blood pressure.

To examine the internal consistency and score distribution of the 14 item questionnaire in this sample.

To document course discontinuation, loss to follow up, and reported adverse experiences relevant to interpretation.

Hypotheses

The prespecified alternative hypothesis is that the mean total Satva Bala score after course completion will be higher than the baseline means. The null hypothesis is that the mean within person change will be zero. Two-sided testing will be used because deterioration is clinically and ethically relevant even when improvement is expected.

Methods

Study Design

This is a prospective longitudinal observational study with one exposed cohort and five assessment occasions. The report will follow the Strengthening the Reporting of Observational Studies in Epidemiology statement.¹³ The protocol does not assign the exposure. Individuals independently elect to attend a standard Vipassana course, and the research team observes outcomes before and after that course.

Study Setting

Recruitment and the first two assessments will take place at Dhamma Punna Vipassana Meditation Centre in Pune after written institutional permission. Follow up questionnaires will be administered at approximately one, two, and three months by a predefined communication method that protects confidentiality and allows the date and mode of response to be recorded.

Study Population

The study population comprises first time participants in a ten day residential Vipassana course. Young adulthood is operationally defined as 18 to 40 years for this protocol. Enrollment is irrespective of sex, religion, socioeconomic status, education, marital status, or occupation.

Eligibility Criteria

Inclusion criteria are age 18 to 40 years; first attendance at a ten day Vipassana course; willingness to participate; capacity to understand the study procedures; and written informed consent before baseline assessment.

Exclusion criteria are previous completion of a ten day Vipassana course; a diagnosed major mental disorder; a major physical illness that could interfere with course participation or assessment; ongoing psychiatric treatment or psychotropic medication; age outside the defined range; or inability to complete the baseline questionnaire.

A participant may withdraw consent at any time without affecting participation in the meditation course or access to usual care. Participants who leave the course early will not be removed from the study database; their available observations and reason for discontinuation will be retained with permission and described.

Sampling and Recruitment

The target sample is 250 participants. Eligible first time attendees will receive a uniform explanation before any study procedure. If more eligible volunteers are available than can be assessed reliably, selection will use a reproducible simple random sequence. A screening log will record the number assessed for eligibility, excluded with reasons, invited, consented, completing the course, and responding at each follow up. This flow is needed to judge selection and attrition bias.

Sample Size

The synopsis fixes enrollment at 250 participants on the basis of an earlier Vipassana research report rather than an outcome specific power calculation. For interpretability, a paired two sided test with 250 complete pairs has 90 percent power at an alpha of 0.05 to detect a standardized mean change of approximately 0.21. If 20 percent of participants lack the immediate post course assessment, 200 complete pairs retain 90 percent power to detect a change of approximately 0.23. These calculations do not correct design bias and do not substitute for reporting the confidence interval around the observed change.

Exposure

The exposure is completion of the centre's standard ten day residential Vipassana course. The study team will not modify teaching or course administration. For reproducibility, the manuscript will report the course dates, daily schedule, approximate sitting time, sequence of Anapana and Vipassana instruction, period of noble silence, ethical precepts, and any course wide deviation from the standard schedule. Attendance or completion status will be obtained only through an approved procedure that preserves participant privacy.

Outcome Measures

The primary outcome is the total score on the 14 item Satva Bala questionnaire immediately after course completion. The questionnaire was developed from classical characteristics of mental strength and used in a Maharashtra University of Health Sciences dissertation.¹² Each item offers three ordered responses scored 3, 2, or 1. The obtainable total therefore ranges from 14 to 42, with a higher score representing stronger self-reported Satva Bala. The source classification describes 29 to 42 as Pravara, 15 to 28 as Madhyama, and 0 to 14 as Avara.

Because scores below 14 cannot occur under the stated scoring rule, category analysis will be secondary and the original scoring key will be verified before recruitment. The continuous score will remain the primary measure.

Secondary outcomes are total score at one, two, and three months; change in category across time; resting pulse rate; systolic blood pressure; diastolic blood pressure; course completion; follow up retention; and reported meditation related adverse experiences. Pulse and blood pressure are measured only at baseline and course completion. Measurements will be taken after a standardized seated rest, with the same validated device and cuff selection procedure whenever feasible.

Table 1 Schedule of enrollment and assessment

Procedure	B a s e l i n e	D a y 1	M o n t h 1	M o n t h 2	M o n t h 3
Eligibility and consent	Yes	No	No	No	No
Demographic and clinical profile	Yes	Updated	No	No	No
Satva Bala questionnaire	Yes	Yes	Yes	Yes	Yes
Pulse and blood pressure	Yes	Yes	No	No	No
Course completion and withdrawal	No	Yes	No	No	No
Adverse experience check	No	Yes	Yes	Yes	Yes

Table 2 Questionnaire domains and scoring

Item	Classical descriptor	Operational domain
1	Smritimant	Memory and retention
2	Bhaktimant	Commitment and devotion to work
3	Kritadnya	Gratitude

<i>Item</i>	<i>Classical descriptor</i>	<i>Operational domain</i>
4	Pragya	Comprehension and learning
5	Shuchi	Cleanliness and order
6	Mahotsaha	Enthusiasm and courage in action
7	Daksha	Carefulness and competence
8	Dheera	Patience during difficulty
9	Samaravikrantayodhin	Courage in a critical task
10	Tyaktavishada	Recovery from a depressive moment
11	Suvyavasthita gati	Orderly and appropriate conduct
12	Gambhir Buddhi	Firm decision making
13	Gambhir Chesta	Deliberate action after listening
14	Kalyanaabhinivesha	Orientation toward social welfare

Data Collection and Quality Control

Participants will complete the baseline questionnaire before intensive instruction begins and the immediate post course questionnaire after the course has ended but before departure where practicable. The same language version and scoring instructions will be used at every assessment. The date, time, assessor, language, and mode of administration will be recorded. Staff will be trained not to prompt a socially desirable response or discuss expected benefits before the post course assessment.

Each participant will receive a coded study identifier. Identifying details and outcome data will be stored separately. Double entry or independent verification will be used for questionnaire totals and physiological values. Range checks will flag total scores outside 14 to 42, impossible blood pressure values, duplicate records, and assessment dates outside the planned windows. Changes to locked data will be logged.

Bias and Confounding

The main threats to validity are self selection, expectancy, regression to the mean, response shift, social desirability, attrition, and the inability to separate meditation from silence, ethical precepts, diet, sleep timing, group support,

teacher contact, and removal from usual demands. The protocol will not describe observed change as an effect caused by Vipassana. Baseline characteristics of completers and noncompleters will be compared descriptively. Course dates will be included in sensitivity analyses if several cohorts are recruited. The discussion will distinguish a change after the course from a change attributable to the meditation technique.

Self-report measures of meditation related constructs are particularly vulnerable to construct ambiguity and demand characteristics.^{14,15} The use of a culturally grounded questionnaire is valuable for the Ayurveda research question, but it does not remove the need to establish reliability, validity, responsiveness, and measurement invariance.

Statistical Analysis

Analysis will be performed after a prespecified data cleaning and locking procedure. Continuous variables will be summarized by mean and standard deviation when approximately symmetric and by median and interquartile range when skewed. Categorical variables will be reported as counts and percentages. Questionnaire score histograms, floor and ceiling frequencies, item response distributions, and missing item patterns will be inspected before outcome modeling.

The primary estimate will come from a linear mixed effects model containing assessment time as a categorical fixed effect and participant as a random intercept. Baseline is the reference occasion. The model will report the estimated mean change at day 11 and at months 1, 2, and 3 with 95 percent confidence intervals. The day 11 contrast is primary. Later contrasts are secondary and will be interpreted with attention to multiplicity. A standardized paired change will be reported using the baseline standard deviation and, separately, the standard deviation of paired differences.

Model assumptions will be checked using residual plots. If the total score shows severe ceiling effects or nonnormal residuals, the analysis will be repeated with a robust approach and an ordinal mixed model for the three Satva Bala categories. Category transitions will be displayed in a transition matrix rather than reduced to a single percentage improved. Pulse and blood pressure will be analysed with paired mean differences and 95 percent confidence intervals, with Wilcoxon signed rank sensitivity analyses when distributions contain influential outliers.

Internal consistency at each assessment will be summarized using Cronbach alpha and McDonald's omega if item structure supports their use. Item total correlations will be reported. These statistics assess score coherence in the present sample; they do not by themselves establish construct validity.

The mixed model will use all available repeated scores under a missing at random assumption. The number and timing of missing assessments and reasons for withdrawal will be reported. Sensitivity analyses will include complete cases, baseline observation carried forward only as a conservative stress test rather than a preferred analysis, and multiple imputation when the pattern and amount of missing data justify it. A model adjusted for age, sex,

education, marital status, occupation, and recruitment cohort will be secondary because no unexposed group exists.

Table 3 Prespecified outcome and analysis framework

Outcome	Primary time contrast	Summary measure	Main analysis
Satva Bala total score	Baseline to day 11	Adjusted mean change with 95 percent confidence interval	Linear mixed effects model
Persistence of score change	Baseline to months 1 to 3	Time specific mean changes	Same mixed model with categorical time
Satva Bala category	All occasions	Transition counts and proportions	Ordinal or transition analysis
Pulse and blood pressure	Baseline to day 11	Paired mean or median change	Paired test with sensitivity analysis
Retention and adverse experiences	Course and follow up	Counts, rates, timing, description	Descriptive analysis

Ethical Considerations

Recruitment will begin only after institutional ethics approval and written permission from the meditation centre. Written informed consent will describe the observational nature of the study, voluntary participation, data confidentiality, follow up contacts, and the right to withdraw without affecting course participation. The research assessment is not a diagnostic mental health evaluation. Participants reporting significant distress, self-harm thoughts, psychotic symptoms, severe physiological symptoms, or functional impairment will be referred promptly according to an approved safety pathway. Investigators will not discourage a participant from leaving the course or seeking clinical care.

Expected Contribution

Recent reviews continue to find potential psychological benefits from Vipassana and other deconstructive practices,

while also identifying heterogeneous methods, limited controls, and incomplete safety reporting.^{16,17} This study will not resolve those limitations, but it can provide a large, clearly reported longitudinal estimate for an Ayurveda specific outcome. Its most useful products will be the score trajectory, attrition pattern, item behaviour, and feasibility information needed to design a controlled study.

A later trial should compare the residential Vipassana course with a credible control that addresses expectancy, time away from usual duties, social environment, silence, and daily structure. The questionnaire should undergo content validation with Ayurveda and psychometric experts, cognitive interviewing in the intended languages, test retest assessment, factor analysis, convergent and discriminant validation, responsiveness analysis, and definition of a meaningful change threshold before it is used as a definitive outcome.

Conclusion

This protocol evaluates how Satva Bala changes after a first ten day Vipassana course and whether the change persists for three months. Repeated assessment and a prespecified analysis strengthen the study, but the single cohort design supports association and temporal description rather than causation. Transparent reporting of the questionnaire's measurement properties, attrition, retreat context, and adverse experiences is essential to a credible conclusion.

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