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Development and Validation of a Clinician-Administered Questionnaire for Evaluating Arista Lakshana (Fatal Signs) in Critically Ill Patients

Validation of the Arista Lakshana Questionnaire

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ABSTRACT: Ancient Ayurvedic scriptures describe *Arista Lakshana* (fatal signs) as indicators of poor prognosis and impending death, but their relevance in modern clinical practice remains uncertain. Previous studies relied on unstructured bedside observations and retrospective chart reviews without using a validated assessment framework. This study aimed to design, develop, and evaluate a clinician-administered questionnaire for assessing *Varna* (color) and *Sparsha* (touch) *Arista Lakshana* in critically ill patients. A prospective study was conducted in the Medical Intensive Care Unit (MICU) of a tertiary care hospital from May 2023 to May 2025. The questionnaire was developed through literature review and expert consultation, covering *Varna* categories, *Sparsha* parameters, and anatomical sites. Content validity was established by expert evaluation. Predictive validity was assessed using mortality at 7, 15, 28, 90, 180, and 365 days, while construct validity was evaluated through hypothesis testing based on expected dose-response gradients. Robustness and interpretability were examined using data completeness and risk stratification. High-intensity *Varna* abnormalities (blue, reddish) and *Sparsha* findings (tachypnoea, tachycardia) were associated with increased early and late mortality. Combined *Varna-Sparsha* abnormalities showed stronger prognostic value than isolated findings. The questionnaire demonstrated strong validity, feasibility, and clinical utility for mortality prediction in critically ill patients.

1. INTRODUCTION

Ayurvedic diagnosis and forecasting are performed through structured clinical examination methods such as *Trividha*, *Ashtavidha*, and *Dashavidha Pariksha*, along with disease staging (*Shadkeriyakala*) and prognostic indicators like *Arishta Lakshana*.¹ Acharyas employed keen observational skills to detect disease states and forecast results. They listed certain characteristics of impending death that suggest that these are irreversible states in which survival is unlikely. It is important to recognize such fatal signs before to start the treatment, as treatment is recommended only in curable disorders. Hence, *Indriya Sthana* is presented before *Chikitsa Sthana* so that doctors can identify which cases are unsuitable for treatment.^{2,3} This paper attempts to fill the gap of standardized assessment by designing and validating the applicability of a structured questionnaire measuring the *Varna* and

Sparsha domains and their association to mortality. Understanding *Arista Lakshana* correctly is very important for making predictions of prognostic outcome. These features are generally divided into two categories: *Purushabhrita* (patient dependent features) and *Purushaanabhrita* (non-patient dependent features), the latter explained by *upadesha* (authoritative knowledge) and *nyukti* (logical thinking).⁴ *Varna* and *Sparsha* are easy to observe and reveal alterations to body functions that are correlated with issues in the circulatory, metabolic, and organ systems. These apparent changes are conceptually correlated with variables included in modern prognostic tools. Thus, a systematic documentation of these indicators may provide a rapid, non-invasive, and clinically understandable approach for risk stratification to augment existing scoring systems such as APACHE II, SOFA, and NEWS.

The aim of this study was to design, standardize, and validate a clinical observation questionnaire for evaluating *Varna* and *Sparsha Arista Lakshana*, as well as to assess its predictive value for mortality over various follow-up periods. This study addresses this gap by systematically evaluating their association with mortality and exploring their role as non-invasive adjuncts to existing prognostic tools.

2. MATERIALS AND METHODS

2.1 Study design

A prospective observational study was carried out to create and validate a clinician-administered questionnaire and evaluated the *Arista Lakshana*, mainly related to *Varna* (color-based changes) and *Sparsha* (touch-based changes). The study was carried out in a tertiary centre medical intensive care unit (MICU) for a smooth observation and systematic documentation of clinical signs and then correlation was done with mortality. The questionnaire was developed based on the description of *Varna* and *Sparsha* related *Arista Lakshanas* as detailed in the *Indriyasthanas* of Charaka Samhita. Relevant clinical features were extracted, categorized, and operationally defined into measurable variables for application in a modern ICU setting.

2.2 Sample Size

In the study for a tool evaluation, validation, clarity and consistency, a total number of 272 participants were included.

2.3 Sampling and Participants

The random sampling technique was used to select the participants.

Inclusion: The patients admitted at MICU, between age group of 16–70 years, having minimum one *arista lakshana* related to *Varna* or *Sparsha*, after their consent to participate in the study were included.

Exclusion: Patients having *arista lakshana* other than related to *Varna* and *Sparsha*, the women who is pregnant or lactating, associated with any psychiatric illness, the participants who discharged against medical advice (DAMA), and those who don't want to follow standard care.

2.4 Data Collection

A case proforma was prepared and clinical data were collected. The colour and touch related signs were documented up to 7 days during the hospital stay. Participants were followed prospectively at 7, 15, 28, 90, 180, and 365 days. Mortality status was recorded at each interval through in-hospital monitoring and post-discharge telephonic follow-up. Baseline *Varna* and *Sparsha* parameters were documented and their association with mortality was analyzed."

The *Arista Lakshana* questionnaire was developed and validated in the following phases

2.4.1 Phase 1: Item generation

The item was generated through a detailed review on classical Ayurvedic text including Charaka Samhita mainly related to description available on *Varna* and *Sparsha* related *Arista Lakshana*

Also, the literature review on contemporary for clinical understanding of prognostic indicators in critically ill patients were incorporated. Informal consultations with Ayurveda practitioners and clinicians of critical care were included to conduct and assess the feasibility of these features in MICU. Based on this an initial pool of items was created to assess the changes in color and touch, changes in different body parts, and in clinical signs.

2.4.2 Phase 2: Questionnaire development

From the literature and clinical practicability, the questionnaire was prepared based on *Varna* and *Sparsha Arista Lakshana*, changes seen in different body-part, progress of the changes in day-wise, and the mortality. The scoring format for anatomical distribution of *Varna* and *Sparsha* manifestations is provided in Appendix 4. All the items were created as clinician-observed variables rather than patient or relatives mentioned measures. The detailed scoring framework for *Sparsha* (touch)-related *Arista Lakshana* parameters is provided in Appendix 1. *Vikruta Varna* (abnormal colour) mentioned in Charaka Samhita was graded using grades, and *Sparsha* related changes and body parts involvement were documented as present or absent. The temporary changes seen in *Varna* were documented on a day-wise basis in case of patient survival and during stay at MICU, and outcomes were noted, the survival status of patient recorded in predefined follow-up of different intervals of time.

The base colour chart was based upon a widely used visual colour guide in the public domain that facilitates the identification of different colour patterns. According to the classical Ayurvedic descriptions, the colours detected, mentioned in *Varna* color scale and developed for *Varna* related *Arista Lakshana*. The scale comprises the abnormal colors such as *Neela* (blue), *Harita* (yellowish green), *Tamra* (reddish brown), *Shukla* (white), and *Shyava* (Black). The colors were divided into 3 grades by comparing with a normal skin colour, taking Fitzpatrick scale as a reference: low, moderate, and high intensity. The detailed *Varna* grading format used for daily assessment is provided in Appendix 2. The appearance grading was performed by matching the observed color on the standardized color scale to that of the relevant body part. Each grade represented 33.21% of the total color scale length Figure 1.

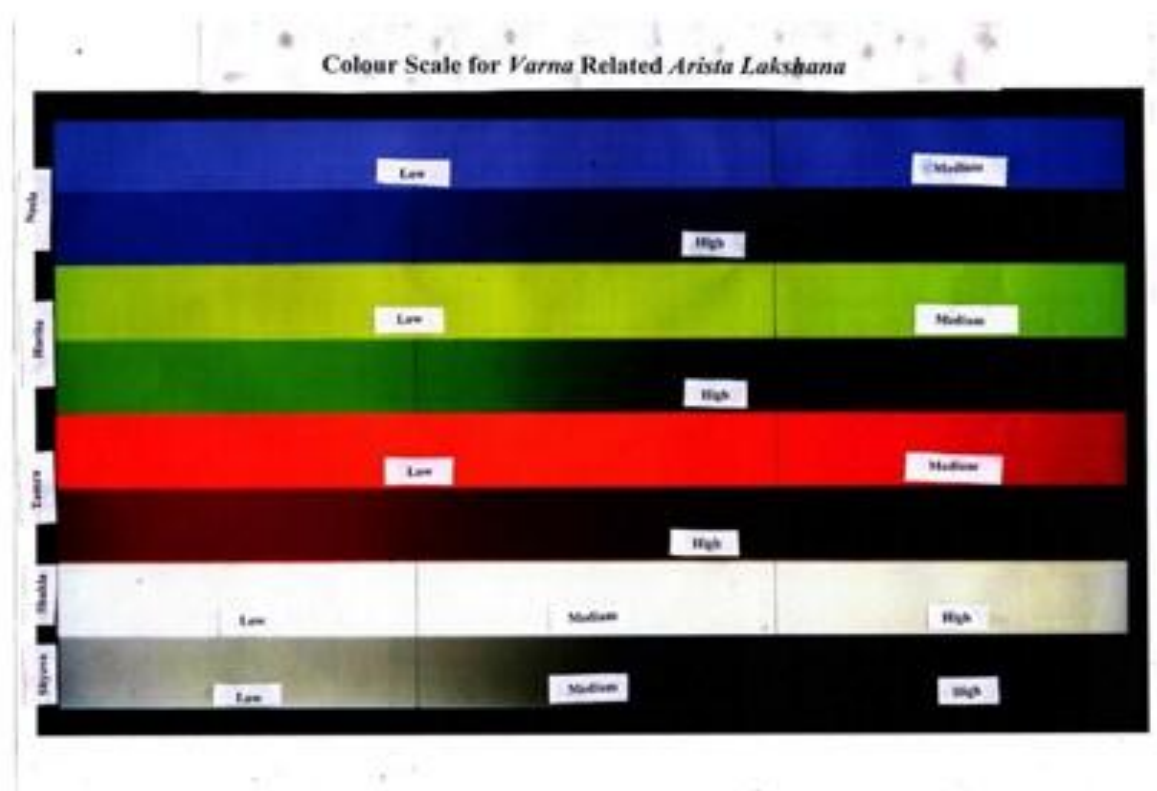


Figure 1. The *Varna* scale related to *Arista Lakshana*

2.4.3 Phase 3: Content validation

The draft questionnaire was shared with a different subject expert from the different areas like Ayurveda, Critical care clinicians and research methodology. Content was validated to check whether the prepared questionnaire items were appropriate and helpful for the purpose of study. They assessed and evaluated each item for its relevance, clarity and applicability in a MICU. Based on their suggestions the required changes were made. Only the items those were considered as relevant and easy in the assessment of predictors of mortality were retained in the final questionnaire

2.4.4 Phase 4: Observational study

The patients admitted to the MICU irrespective of their diagnosis were included in the study. There were no disease-specific limits in place to analyze *Arista Lakshana's* prognostic behaviour over a wide range of clinical presentations. A researcher observed and explained the questionnaire to the critically ill patients if patient is in conscious state, if not to their relatives during their stay at MICU. The colour and touch related changes were evaluated by direct observation and palpation. Body parts involvement was determined by the participation of nails, eyes, palms, feet, urine, and stool. The structured body-part assessment format is provided in Appendix 3.

2.4.5 Phase 5: Reliability assessment

Reliability assessment was conducted in accordance with the nature of the questionnaire. Evaluation of internal consistency reliability was done selectively for the *Varna* severity domain, as this domain contains multiple related items representing colour-based manifestations of *Arista Lakshana*. Cronbach's alpha was adopted to assess internal consistency of *Varna* severity domains. Reliability test was not used to other domains, as they consist mainly categorical variables related to anatomical sites, temporary changes, or outcome measures, for that internal consistency is not appropriate. Test-retest reliability and inter-observer reliability were not evaluated as the clinical signs were dynamic in nature and observations were documented by single researcher.

2.4.6 Phase 6: Construct validity

Evaluation of Construct validity was done by using a hypothesis-based approach. Based on Ayurvedic literature and clinical reasoning, it was expected that increased severity of *Varna* changes, presence of abnormal colours, involvement of different body parts, a greater number of body parts involvement, and worsening temporary progression of colour changes would be associated with higher mortality. It was also noted that from what is earlier that increasing severity in grades of *Varna* for example Absent to Low to Middle to High would be associated with progressively increasing mortality rate across short-term and long-term follow-up periods. Since *Varna* grades are ordinal in nature, mortality was assessed in order across different pre-mentioned timelines like 7-day, 15-day, 28-day, 90-day, 6-month, and 1-year. The association between questionnaire and mortality was analysed and the relation between observations and results was used for proposed hypothesis as a evidence in support of construct validity.

2.4.7 Phase 7: Predictive validity

The evaluation of questionnaire for predictive validity was assessed by examining its ability to predict mortality at different follow-up time lines. Associations between questionnaire domains and mortality was analysed including early out come at the 7th day, 15th day and 28th day, as well as late out come at 90th day, 6 months, up to 1 year. Variables which showed the statistically significant associations with mortality were considered to have prognostic relevance. Both univariate and multivariable analytical approaches were performed to identify independent predictors of mortality.

2.5 Statistical analysis

Statistical analysis was done by using SPSS software. For baseline characteristics and questionnaire responses Descriptive statistics were used. Chi-square tests were used to analyse the associations between categorical variables and mortality. Logistic regression analyses were used to estimate odds ratios with 95% confidence intervals. A p-value of than 0.05 was considered statistically significant. We tested ordinal construct validity using the Cochran–Armitage trend test and an ordinal binomial logistic model. This model estimated odds ratios per one grade increase across colour grades. Some exploratory analyses were done. These included: body part wise colour features, day wise change patterns in colour and touch across 7 days of MICU stay, follow up on 15-day 28-day, 90-day, 6 month and 1-year endpoints. We used chi tests and unadjusted odds ratios for these analyses. We also looked at swelling by site and extent with trend testing for extent. Sparse or zero cells were described. A two-sided p-value of, then 0.05 was considered significant.

3. RESULTS

3.1 Values for measurement properties assessed

Following COSMIN guidelines for clinician-observed prognostic instruments, the evaluation of measurement properties in this study considered feasibility and data completeness, internal consistency (when applicable), construct validity through hypothesis testing, predictive validity, and interpretability of the risk gradients. Because the questionnaire was based on clinical signs rather

than concealed psychological constructs, we did not assess traditional psychometric properties such as factor analysis or test-retest reliability.

3.2 The feasibility of the questionnaire and the completeness of the data

The completed questionnaire was successfully administered to 272 critically ill patients, including detailed documentation across all domains during the ICU stay and subsequent follow-up periods. No systematically missing information on color, touch, body-part involvement, or outcome variables demonstrates that the tool is highly useful and acceptable in a real critical care environment.

3.3 Structural components of the questionnaire domain

The questionnaire included ten defined domains including baseline characteristics, comorbidities, biomedical system involvement, Ayurvedic constitutional influences, colour and touch presentations, anatomical localization, temporal progression of signs, and mortality outcomes (Table 1). Notably, all domains exhibited an adequate degree of variability and distribution which supported their ability to assess prognostic importance. The coverage of target population can be demonstrated through summary findings on baseline characteristics and domain frequencies (Supplementary Table 1).

Table 1. Structural domain and measurement characteristics of the clinician-observed questionnaire

Domain	Variable	No of items	Measurement type
Sociodemographic profile	Age, gender	2	Categorical
Comorbidities	Hypertension, diabetes, others	3	Dichotomous
System involvement	Respiratory, CNS, urinary, GI	5	Categorical
<i>Dosha</i>	<i>Vata–Kapha, Vata–Pitta, Pitta–Kapha, Tridosha</i>	4	Nominal
<i>Srotas</i> (body channels) involvement	Primary, secondary, tertiary <i>Srotas</i>	Multiple	Nominal
<i>Varna</i> severity	Red, yellow, blue, black, copper, green, white	7	Ordinal
<i>Sparsha</i> finding	Pulse, temperature, respiration, texture, swelling	Multiple	Categorical
Body-part involvement	Nails, eyes, palms, feet, urine, stool	Multiple	Dichotomous / Count
Swelling extent	Number of regions involved	7	Ordinal
Outcomes	Mortality (7 d–1 year)	6	Binary

3.4 Internal consistency of severity grading of *Varna*

Internal consistency reliability was assessed in selective fashion in the *Varna* severity grading domain, as it was used for a large number of homogeneous items related to colour-based manifestations of Arista Lakshana. The internal consistency estimates for *Varna* items showed reasonable overall consistency suggesting the significance of severity grading. Other fields were not checked for internal consistency as they were categorical, anatomic or time-dependent (i.e., not conceptually appropriate for such analysis).

3.5 Construct validity or hypothesis evaluation

Hypothesis testing affirmed the anticipated gradient relationship between *Varna* severity and mortality. More specifically, Red colour grading showed a consistent dose–response association with mortality over all follow-up windows (trend $p < 0.01$ at each timepoint). When fitted as ordinal prognostic factors, more severe red grades increased the odds of dying (Table 2). Blue

grading also showed an ordered trend of mortality in early timepoints significantly (7-day $p = 0.004$; 15-day $p = 0.013$; 28-day $p = 0.035$). Meanwhile, the other colour domains did not manifest a consistent monotonic trend across all timepoints.

Table 2. Construct validity (hypothesis testing): association between Red *Varna* severity grade and mortality across follow-up windows

Follow up window	OR per 1 grade increase (Absent → Low → Middle → High)	95% CI	p-value
7 days	1.65	1.27 to 2.14	0.00018
15 days	1.81	1.40 to 2.36	<0.00001
28 days	1.72	1.32 to 2.25	0.00005
90 days	1.65	1.25 to 2.18	0.00040
6 months	1.60	1.20 to 2.13	0.00124
1 year	1.52	1.14 to 2.03	0.00481

OR indicates the odds ratio for mortality per one level increase in ordinal Red *Varna* grade (Absent = 0, Low = 1, Middle = 2, High = 3). p-values reflect hypothesis testing for an ordered increase in mortality with increasing grade.

3.6 Body part-wise analysis

In body part wise analyses, none of the individual anatomical sites demonstrated a consistent statistically significant association with mortality across timepoints (7 day to 1 year). Several sites had very low frequencies of “present” findings, and for a few comparisons the odds ratio could not be estimated due to zero cell counts. Overall, these findings suggest that the prognostic signal is better captured by severity grading (colour grades) rather than location-specific presence or absence alone. Detailed body part wise results across all time horizons are provided in Supplementary Tables S1–S6.

3.7 Day-wise color changes

Day-wise color change analysis demonstrated that CD1 (colour day 1) was consistently associated with mortality across all time horizons. Compared with the “Absent” category, the “Same” category (persistent pattern across serial assessment) showed higher mortality at each follow up window: 7 day OR 2.49 (95% CI 1.40 to 4.41), $p = 0.002$; 15 day OR 2.72 (95% CI 1.59 to 4.66), $p = 0.0001$; 28 day OR 2.20 (95% CI 1.33 to 3.62), $p = 0.002$; 90 day OR 2.04 (95% CI 1.25 to 3.30), $p = 0.004$; 6 month OR 1.70 (95% CI 1.05 to 2.77), $p = 0.030$; and 1 year OR 1.68 (95% CI 1.03 to 2.74), $p = 0.037$. Other day-wise color parameters (CD2 and CD3) did not demonstrate a consistent association across time points, partly due to sparse category counts shown in Table 3.

Table 3. Association of CD1 day-wise pattern with mortality across follow-up windows

Follow up window	OR	95% CI	p value
7 days	2.49	1.40 to 4.41	0.002
15 days	2.72	1.59 to 4.66	0.0001
28 days	2.20	1.33 to 3.62	0.002
90 days	2.04	1.25 to 3.30	0.004
6 months	1.70	1.05 to 2.77	0.030
1 year	1.68	1.03 to 2.74	0.037

3.8 Touch Day-wise changes

In the *Sparsa* day-wise analysis touch day 1 to touch day 7 (TD1–TD7), no parameter demonstrated a consistent association with mortality across all follow-up windows. TD2 showed a statistically significant association with mortality at the 7-day endpoint (overall $p = 0.038$), whereas the remaining touch day-wise parameters did not show significant associations at 7 days. At later time points (15 days to 1 year), TD2 and other touch day-wise parameters were not statistically significant. Several categories had low frequencies, limiting precision for some estimates.

3.9 Swelling and mortality

Swelling showed no consistent association with mortality when analyzed by individual anatomical site (face, feet, abdomen, extremities, genitalia) across follow-up windows from 7 days to 1 year. When the extent of swelling was evaluated using the total number of involved parts (0–4), the association with mortality was weak and not consistent across time points. A statistically significant graded association was observed at the 6-month endpoint (OR 1.30 per additional involved part, 95% CI 1.00 to 1.68; $p = 0.047$), whereas other time points did not reach statistical significance.

3.10 Predictive validity of Varna-based Arista Lakshana

Predictive validity of the questionnaire was evaluated by examining the association between *Varna* severity and mortality across six predefined time points. A clear dose–response relationship was observed, with increasing *Varna* intensity associated with progressively higher short- and long-term mortality. High-intensity red colour demonstrated consistently elevated mortality across all follow-up periods, while high-intensity blue colour was associated with uniformly fatal outcomes. These findings confirm the strong prognostic relevance of *Varna* severity grading as captured by the questionnaire shown in Table 4.

Table 4. Predictive validity of *Varna* in *Arista Lakshana*

<i>Varna</i> Type	Severity Grade	7-day Mortality %	28-day Mortality %	90-day Mortality %	6-month Mortality %	1-year Mortality %	p-value (trend)
Red- Brown (<i>Tamra</i>)	Low	33.3	66.7	66.7	66.7	66.7	<0.001*
	Moderate	40.0	52.5	62.5	67.5	70.0	
	High	58.8	82.4	88.2	88.2	88.2	
Blue (<i>Neela</i>)	High	100.0	100.0	100.0	100.0	100.0	<0.001*
Yellow- Green (<i>Pita/ Harita</i>)	Low	25.0	33.3	33.3	33.3	33.3	0.05
	Moderate	40.0	40.0	35.0	45.0	55.0	
	High	71.4	71.4	71.4	71.4	71.4	
Black (<i>Krishna</i>)	Low–High	40–60	40–60	56.8	59.5	59.5	NS

Table 5 provides evidence for *Sparsa* (physiological changes such as hyperthermia, tachypnoea, and cardiovascular disturbances) as being highly clinically relevant indicators of mortality risk for critically ill patients. Additionally, these results support the predictive validity of the *Sparsa* domain in the *Arista Lakshana* questionnaire, and the importance of bodily sensations and physiological observations in making prognostic assessments.

Table 5. Long-term predictive validity of *Sparsa* abnormalities

<i>Sparsa</i> parameters	Mortality % (1-year)	Trend	Interpretation
Tachycardia	↑↑	Persistent	Strong sustained risk
Irregular rhythm	↑↑	Persistent	Sustained risk
Bounding volume	↑↑	Persistent	Sustained risk

Generalized hyperthermia	↑↑↑	Strong	Highest discrimination
Tachypnoea	↑↑↑	Strong	Highest discrimination
No abnormal findings	↓	Protective	Baseline survival

3.11 Predictive validity of anatomical localisation of Arista Lakshana

The questionnaire demonstrated robust predictive validity through anatomical localization of *Varna* and *Sparsha* manifestations. Mortality varied systematically according to the body part involved, with abnormalities related to urine and foot showing the strongest and most consistent associations with mortality across all follow-up intervals. Palm and stool involvement demonstrated moderate but progressive mortality risk, whereas nail and facial involvement were associated with comparatively lower risk. These gradients support the interpretability and discriminative ability of the anatomical localization domain in Table 6.

Table 6. Predictive validity of anatomical localization in *Arista Lakshana*

Body parts	7 th day	15 th day	28 th day	90 days	6 months	1 year
Nails	0.728	0.530	0.347	0.160	0.103	0.349
Eyes	0.734	0.969	0.465	0.192	0.173	0.477
Palms	0.520	0.289	0.720	0.379	0.644	0.942
Foot	0.015*	0.007*	0.075	0.036*	0.162	0.280
Urine	0.0001*	0.0001*	0.0001*	0.008*	0.024*	0.026*
Stool	0.276	0.906	0.850	0.311	0.079	0.151

3.12 Predictive validity of Sparsha-based clinical indicator

Sparsha-related parameters captured by the questionnaire showed strong and consistent predictive validity. Abnormalities in pulse rate, pulse rhythm, pulse volume, body temperature, and respiratory rate were significantly associated with increased mortality at early and late follow-up points. These findings indicate that tactile and physiological abnormalities documented through the questionnaire reliably identify patients at higher risk of adverse outcomes mentioned in Table 7.

Table 7. Predictive validity of *Sparsha* related clinical indicators in *Arista Lakshana*

<i>Sparsha</i> parameter	Reference Category	Abnormal Category	Mortality % (7-day)	OR (95% CI)	p-value	Interpretation
Pulse rate	Normal	Tachycardia	45.2	3.48	<0.001*	Strong predictor
Pulse rhythm	Regular	Irregular	43.3	3.85	<0.001*	Strong predictor
Pulse volume	Normal	Bounding	54.2	4.47	<0.001*	Strong predictor
Temperature	Normal	Hyperthermia	65.2	5.73	<0.001*	Strong predictor
Respiratory rate	Normal	Tachypnoea	57.4	4.88	<0.001*	Strong predictor
Swelling	Absent	Present	33.3–66.7	—	<0.01*	Dose–response effect

3.13 Interpretability: extent of swelling and mortality gradient

The extent and distribution of swelling documented through the questionnaire provided clear interpretability of risk. Mortality increased progressively with involvement of additional anatomical sites, demonstrating a strong dose–response relationship. Patients with swelling affecting multiple regions exhibited substantially higher mortality compared with those without swelling, reinforcing the questionnaire’s ability to stratify patients according to clinical severity.

4. DISCUSSION

A standardized questionnaire provided by the clinicians and observed in this study has specifically been developed and validated to compare the *Varna* and *Sparsba*-based prognostic manifestations associated with Arista Lakshana in critically ill patients in intensive care settings. The findings of this study contribute to fill a gap in current Ayurvedic prognostic literature, wherein unstructured observations, review of case studies and descriptive reporting have been used.^{5,6}

The questions show good applicability, interpretability, and predictive validity for mortality with respect to a range of 7 days to 1 year. *Sparsba* results such as tachycardia, tachypnoea, hyperthermia and oedema had predictive value. We observed significant correlation between severe changes in *Varna* such as Neela and Tamra and both early and late mortality. Anatomical localization also provided prognostic insight, with urine and foot involvement showing consistent associations with mortality. Combined *Varna–Sparsba* abnormalities were associated with increased mortality risk relative to findings alone, suggesting potentially additive prognostic effects. This result suggests that systematic observation of clinical signs provides valuable prognostic insight to the delivery of critical care.

Arista Lakshana in the past was considered a prognostic science by the time of the medical establishment, specifically focused on imminent death and irreversible physical decline. Arista Lakshana is known to be associated with observable, sensory signs in traditional ayurvedic literature of terminal states, system malfunction, and vitality decline.⁷ These structures are now being reconsidered by researchers in the field for negative outcomes, who speculate Arista Lakshana might contain clinically observable predictors of adverse outcomes. Some previous observational studies focused on the diagnostic or prognostic usefulness of Arista Lakshana in the hospital.^{8,9} Nevertheless, these studies did not employ standardised questionnaires or measuring frameworks and focused on unstructured bedside observations or retrospective chart reviews. Conversely, we addressed methodological considerations for instrument writing in our findings by systematically generating items, standardizing domains, operationalizing response categories, and prospectively validating outcomes. The predictive behaviour of *Sparsba* anomalies followed similar patterns (the tachypnoea and hyperthermia particularly being correlated to early mortality).⁵ They are aligned with the biological literature that demonstrated that pyrexia is associated with infectious or inflammatory states associated with poor health outcomes while tachypnoea, is the best predictor of respiratory failure, sepsis and risk of mortality.¹⁰ An additional dimension provided by anatomical localization was that involvement of the foot and urine was most clearly associated with death, in which it was suggested that both the microcirculatory, vascular, and renal impairment accounted for the roles.¹¹ The notion of differential system participation and that distinct clinical manifestations are interdependent and have differential prognostic significance is confirmed by the fact that palms, stool, and nails had more attenuated prognostic consequences.

Performance measures were evaluated by COSMIN criteria. The instrument validation was explained with the COSMIN model for the clinometric evaluation. Content validity was established with expert-assessment and literature-based items.¹² Hypothesis testing also provided dose-response gradients in severity of *Varna–Sparsba* results and risk of mortality, therefore supporting construct validity. Numerous validated scoring systems such as SOFA, APACHE-II, NEWS2, and SAPS-II are used to predict mortality in acute-phase critical care.¹² These models estimate risk scores at the physiological level and incorporate the parameters such as blood pressure, temperature, respiratory rate, heart rate, platelets, bilirubin, and creatinine. While these systems rely on measurable biomarkers, and physiological indices, they incorporate observable indicators that conceptually overlap with observable Arista Lakshana, such as respiratory effort, skin perfusion, and mental state.¹³ Main components of the current study were the NEWS2 and APACHE-II scoring systems, tachycardia, and tachypnoea, some of the first indicators of decline and critical to *Sparsba* assessments as outlined in the questionnaire. Likewise, perfusion deficiencies and tissue oxygenation measures central to SOFA criteria can correlate with circulatory disturbances manifested in the form of *Varna* changes. Urine involvement is a consequence of renal impairment, which is a quantitatively quantified parameter of SOFA and APACHE-II models.¹⁰ An epistemic association of traditional sensory diagnostic methods and present risk stratification based

on data is advocated by the convergence of observational prognostic theories established by Ayurveda with measurement based prognostic concepts derived from biomedicine.

Revisiting classical Arista Lakshana in modern clinical language is an increasing objective for Ayurvedic researchers. As Mamidi and Gupta (2024) pointed out, Arista Lakshana is "a clinical predictor of mortality in chronic disease," which is a variable category with relevance to historical and current pathophysiology.⁶ We reviewed current data to support the creation of formal assessment frameworks for Arista Lakshana for the sake of reproducibility and for inclusion into research.⁵ Arista Lakshana, based on retrospective observational documentation, was shown to be linked to clinical worsening by,^{8,9} highlighting the inadequacy of defined metrics for prospective assessment and acknowledges the contextual relevance of the assessment in MICU settings. This narrative becomes even more relevant with the present validation, which has embedded Arista Lakshana into quantifiable constructs established to demonstrate predictive validity.¹⁴ Limitations include single-centre design, no inter-rater reliability assessment and no comparison to established ICU scoring systems. Outcomes were limited to mortality and a disease-specific difference was not tested. Future studies should concentrate on multi-centre validation, reliability testing, comparison with extant prognostic models, and assessment of functional outcomes. Integration into digital platforms and early warning systems may increase clinical relevance.

5. CONCLUSION

A validated questionnaire for *Varna-Sparsha* Arista Lakshana assessment was developed, proving its good predictive validity and feasibility as well the clinical interpretability in predicting mortality in hospitalized patients. This work can develop a scientific base for evaluating Arista Lakshana that can be integrated into a modern clinic.

Statement & Declarations:

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Conflict of Interest: The authors declare that they have no competing interests.

Data Availability Statement: The datasets generated and/or analysed during the current study are not publicly available, but are available from the corresponding author on reasonable request.

Ethical Approval Statement: The study was approved by the Institutional Ethics Committee of Yenepoya, Approval Number YEC-1/2022/059.

CTRI Number: CTRI/2023/04/051429

Author Contribution: All authors contributed to the study's design, analysis, and execution. Dr. Divyarani, conducted data curation, formal analysis, and drafted the original manuscript. Dr. Zenica D'Souza handled conceptualization, methodology, and supervision. Dr. H M Ismail contributed to methodology, visualization, and validation. All authors reviewed and approved the final version.

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Appendix 1 - Arista Lakshana parameters related to Sparsha (Touch)

Sr No.	Features			Scores	D 1	D 2	D 3	D 4	D 5	D 6	D 7
1	Pulse	Rate	Tachycardia	1							
			Normal	2							
			Bradycardia	3							
		Rhythm	Regular	1							
			Irregular	2							
		Volume	Weak	1							
			Normal	2							
			Bounding	3							
2	Temp	Localised	Hypothermia	1							
			Normal	2							
			Hyperthermia	3							
		Generalised	Hypothermia	1							
			Normal	2							
			Hyperthermia	3							

			a								
3	RR	Bradypnea		1							
		Normal		2							
		Tachypnoea		3							
4	Skin Texture	Soft		1							
		Hard		2							
		Smooth		3							
		Rough		4							
5	Swelling	Swelling in face		1							
		Swelling in feet		2							
		Swelling of abdomen		3							
		Swelling of extremities		4							
		Swelling of Genitalia		5							
		General Anasarca		6							
7	Muscles and Blood	Normal		1							
		Excessive diminution of Muscle tissue & blood		2							
8	Perspiration	Absent		1							
		Localized		2							
		Half of the body		3							
		Generalized		4							

*D = Day

Appendix 2 - Arista Lakshana related to Varna (colour)

SI. No.	Colour	Grades	Scores	D 1	D2	D 3	D 4	D 5	D 6	D 7
1.	Blue	Low	1							
		Middle	2							
		High	3							
2.	Black	Low	1							
		Middle	2							
		High	3							
3.	Copper	Low	1							
		Middle	2							

		High	3							
4.	Green	Low	1							
		Middle	2							
		High	3							
5.	White	Low	1							
		Middle	2							
		High	3							
6.	Yellow	Low	1							
		Middle	2							
		High	3							
7.	Red	Low	1							
		Middle	2							
		High	3							

Appendix 3 - Arista Lakshana related Varna in association with body part

Part of the body	Scores	D 1	D2	D 3	D 4	D 5	D 6	D 7
Nails	1							
Eyes	2							
Face	3							
Lips	4							
Tooth	5							
Abdomen	6							
Palms	7							
Foot	8							
Urine	9							
Stool	10							

Appendix 4 - Arista Lakshana of Varna & Sparsha related to the distribution of body parts

Distributions of the body part	Scores	D 1	D2	D 3	D 4	D 5	D 6	D 7
Localised	1							
Generalized	2							
Half of the body part	3							