

ASSESSMENT OF *SHUKRA DUSHTI LAKSHANA* AND ITS CORRELATION WITH SEMEN ANALYSIS: A CROSS-SECTIONAL OBSERVATIONAL PILOT STUDY

Dr. Loveena^{*1}, Dr. Sumit Srivastava², Mr. Tarun³

¹PG Scholar, Department of Rog Nidana Evum Vikriti Vigyana, Shri Dhanwantry Ayurvedic College and Hospital, Sector 46, Chandigarh.

²Principal, Professor, Department of Rog Nidana Evum Vikriti Vigyana, Shri Dhanwantry Ayurvedic College and Hospital, Sector 46, Chandigarh.

³Biostatistician, Shri Dhanwantry Ayurvedic College and Hospital, Sector 46, Chandigarh.

Article Received on 05 April 2026,
Article Revised on 25 April 2026,
Article Published on 01 May 2026,
<https://doi.org/10.5281/zenodo.20179410>

*Corresponding Author

Dr. Loveena

PG Scholar, Department of Rog Nidana Evum Vikriti Vigyana, Shri Dhanwantry Ayurvedic College and Hospital, Sector 46, Chandigarh.



How to cite this Article: Dr. Loveena^{*1}, Dr. Sumit Srivastava², Mr. Tarun³. (2026). Assessment of Shukra Dushti Lakshana And Its Correlation With Semen Analysis: A Cross-Sectional Observational Pilot Study. World Journal of Pharmaceutical Research, 15(9), 1675-1687.

This work is licensed under Creative Commons Attribution 4.0 International license.

ABSTRACT

Background: *Shukra dhatu*, the terminal tissue in Ayurvedic physiology, sustains male reproductive health and is vitiated through eight distinct *Lakshanas*: *phenilam*, *tanu*, *ruksham*, *vivarnam*, *puti*, *picchilam*, *anyadhatu upsamsrishtam*, and *avasaadi*, whose correlation with modern semen parameters remains underexplored. Objectives: To develop a standardized operating procedure (SOP) for systematic assessment of all eight *Shukra dushti Lakshanas* during semen examination and to explore their patterns in correlation with semen analysis parameters. Methods: This cross-sectional observational pilot study was conducted at a diagnostic laboratory. Thirty-one men aged 22–60 years were taken for the study. All eight *Shukra dushti Lakshanas* were assessed, alongside routine semen parameters. Descriptive statistics and co-occurrence patterns were analyzed. Results: Among 31 participants (mean age 32.4 ± 8.51 years), 12 were classified as cases (38.7%) and 19 as

controls (61.3%) by WHO 2010 criteria. *Puti* was the most prevalent *lakshana* (23 participants, 77.4%), followed by *tanu* (38.7%), *phenilam* (29%), *picchilam* (22.6%), and *vivarnam* (9.7%). *Puti* frequency was 10 of 12 cases versus 14 of 19 controls, indicating non-

exclusive case association. *Picchilam* appeared exclusively in samples with 60-minute liquefaction time, demonstrating perfect concordance. *Vivarnam* occurred only in severely affected case samples with azoospermia. *Dosha-predominance* patterns showed multi-dosha involvement in cases with multiple concurrent *Lakshanas*. Conclusions: The study demonstrates feasibility of integrating SOP-based Ayurvedic assessment with WHO semen analysis. Certain *Lakshanas* i.e. *tanu*, *puti*, *picchilam*, and *vivarnam* show meaningful associations. Larger studies are needed to validate findings and enhance integrative reproductive assessment.

KEYWORDS: *Shukra dushti*, semen analysis, pilot study.

INTRODUCTION

Ayurveda conceptualizes health through the interplay of *dosha*, *dhatu* and *mala*.^[1] Among the seven *dhatu*s, *Shukra* holds unique significance as the most refined tissue, derived sequentially from *rasa*, *rakta*, *mamsa*, *meda*, *asthi*, and *majja* *dhatu*s.^[2] *Shukra dhatu* is responsible for reproductive capacity, sexual vitality, and the fundamental life force in both sexes, though it is particularly emphasized in male physiology.^[3]

The *Samhitas* describe eight distinct *Lakshanas* that signal vitiation or *dushti* of *Shukra dhatu* as *Phenilam* (Frothiness or bubble formation in ejaculated semen), *Tanu* (Reduced opacity or thin appearance despite normal volume), *Ruksham* (Dryness), *Vivarnam* (Discoloration), *Puti* (Foul or putrid odour), *Picchilam* (Excessive viscosity), *Anyadhātu Upsamsrishtam* (Mixing of extraneous tissues), *Avasaadi* (Tendency toward sedimentation or precipitation when examined).^[4] Ancient texts are great at describing these features but we're still looking for a way to put them into practice today.

The World Health Organization has established standardized laboratory protocols for semen examination, with the 2010 Fifth Edition providing widely accepted reference limits based on the 5th percentile of healthy fertile men.^[5] These guidelines emphasize careful measurement of volume (≥ 1.5 ml), sperm concentration (≥ 15 million/ml), progressive motility ($\geq 32\%$), morphology, pH, and inflammatory cell count. Results are interpreted against these lower reference limits, generating categorical diagnoses such as normozoospermia, oligozoospermia, asthenozoospermia, teratozoospermia and azoospermia.^[6] This quantitative approach has profoundly improved clinical decision-making and fertility counseling. However, it has introduced inherent limitations i.e. reliance on numerical cut-offs that may

obscure subtle qualitative changes, limited attention to subjective features such as semen appearance, colour gradations, and consistency, and variable clinical significance of borderline abnormalities. Furthermore, men with semen parameters falling within the "normal" range may still experience fertility problems or show evidence of underlying reproductive stress not captured by standard metrics.

A growing body of literature has explored potential alignments between *Ayurvedic Shukra dushti* patterns and modern semen abnormalities.^[7] Conceptual reviews propose that *Vataja Shukra dushti* correlates with reduced volume, low motility, or rapid seminal decay; *Pittaja Shukra dushti* may manifest as discoloration, elevated temperature sensations, or putrid odour; *Kaphaja Shukra dushti* manifests through increased viscosity and delayed liquefaction; *Sannipataja Shukra dushti* involves complex, refractory presentations.^[8] However, empirical data systematically correlating operationalized *Shukra dushti Lakshanas* with measured semen parameters in real clinical cohorts stratified by WHO reference limits remain scarce.

To address this important research gap, we designed a pilot cross-sectional study with clearly defined objectives. The primary aim was to develop and validate a standardized operating procedure (SOP) for systematically assessing all eight *Shukra dushti Lakshanas* during routine semen analysis. Secondary objectives included exploring the frequency and co-occurrence patterns of these *Lakshanas* while examining their associations with semen parameters among men stratified by WHO 2010 reference limits. Additionally, we sought to evaluate the practical feasibility of integrating Ayurvedic qualitative assessments with biomedical frameworks within a routine diagnostic laboratory setting.

This pilot addresses a key gap in integrative Ayurveda and andrology by clearly linking classical *Shukra dushti* descriptors with modern semen parameters, using transparent and standardized reporting aligned with STROBE guidelines.^[9]

METHODS

Study design and setting

This is a cross-sectional observational pilot study conducted at a diagnostic laboratory in Panchkula (Haryana, India). Data collection occurred prospectively in July 2025, during which all semen samples were screened for inclusion.

Participant Selection

Inclusion criteria: Male adults aged 21–60 years, semen analysis requested for any indication

Exclusion criteria: Grossly inadequate semen volume (<0.5 ml), participant withdrawal or objection to data use





Based on WHO 2010 reference limits applied to measured parameters only, participants were classified post-hoc as Cases (n=12): Men with ≥ 1 abnormal measured semen parameter (Volume <1.5 ml, OR Sperm concentration <15 million/ml, OR Progressive motility <32%) and Controls (n=19): Men with all measured semen parameters within WHO 2010 normal limits (Volume ≥ 1.5 ml, AND Sperm concentration ≥ 15 million/ml, AND Progressive motility $\geq 32\%$).


Development of *Shukra dushti* SOP

A preliminary SOP for *Shukra dushti* assessment was drafted drawing on classical Ayurvedic texts and published reviews.^[10] The SOP was reviewed by four senior Ayurveda experts (MD Ayurveda, from different regions of India) before implementation. Experts evaluated clarity, clinical feasibility, and consistency of operational definitions. Refinements were incorporated based on feedback.

Operationalization of *Shukra dushti Lakshanas*^[10,11,12,13]

Each of the eight *Lakshanas* was operationalized as follows:

S.no.	Lakshana	Description	Image
1	<i>Phenilam</i>	Presence of visible foam or bubbles on the semen surface within the first 5 minutes of collection, before incubation. Recorded as present (+) or absent (-).	
2	<i>Tanu</i>	Assessed after complete liquefaction. Sample appears translucent or transparent, indicating reduced opacity or altered seminal composition. Recorded as present (+) or absent (-).	
3	<i>Ruksham</i>	Operationalized as pH <7.2 (normal seminal pH is 7.2–7.8). Lower pH indicates reduced alkalinity or acidification.	
4	<i>Vivarnam</i>	Assessed after liquefaction. Any deviation from homogeneous milky-white or opalescent appearance, including pale yellow, brownish, greenish, or reddish discoloration.	

		Recorded as present (+) or absent (-).	
5	<i>Puti</i>	Semen emits an offensive, putrid, or distinctly foul smell beyond usual seminal odour. Recorded after liquefaction. Recorded as present (+) or absent (-).	NA
6	<i>Picchilam</i>	A sample of liquefied semen drawn into a pipette forms a continuous thread >2 cm before breaking. Recorded as present (+) or absent (-).	
7	<i>Anyadhatu upasamsrishtam</i>	Presence of red blood cells (RBCs) Recorded as present (+) or absent (-).	NA
8	<i>Avasaadi</i>	When semen is placed in water or saline, it tends to precipitate or sink rather than remain in suspension. Clotted appearance or rapid sedimentation indicates <i>avasaadi</i> .	NA

Semen Sample Collection and Routine Analysis^[14]

Standard pre-collection counseling included sexual abstinence for 2–7 days, ejaculation by masturbation into a clean, wide-mouthed glass or plastic container, and immediate placement at 37°C incubator during liquefaction.

Routine semen parameters recorded included Appearance and colour (milky-white, pale yellow, other), Volume (ml), Liquefaction time (minutes), pH (measured by pH paper), Total sperm concentration (million/ml), Progressive motility (%), Non-progressive motility (%), Immotility (%), Pus cell count (semi-quantitative: 1–2, 3–4, 5–6, 7–8, 10–12 per high-power field).

Study Size

We designed this pragmatic pilot study to evaluate the feasibility of our approach. Over a one-month collection window, we enrolled 31 consecutive participants. Given its exploratory nature, we bypassed a formal sample size calculation to focus on generating preliminary effect estimates. These results are intended as hypothesis-generating rather than confirmatory.

Statistical methods

Descriptive statistics were computed using frequency distribution and percentage to summarize sample characteristics. Relationship analysis was performed using Pearson correlation to examine associations between variables. All analyses were conducted in SPSS version 27, with no missing values in the dataset.

RESULTS

Participants

Sample composition: 31 men completed semen analysis and *Shukra dushti* assessment.

Age distribution: Mean age: 32.4 ± 8.51 years (range: 22–60 years)

WHO 2010 Group Assignment: Case group (≥ 1 abnormal parameter): 12 participants (38.7%), Control group (all parameters normal): 19 participants (61.3%)

Distribution of Abnormal Parameters in Cases (n=12): Low volume (<1.5 ml) only: 3 participants, Oligozoospermia (<15 million/ml) only: 5 participants, Asthenozoospermia (<32% PM) only: 8 participants, Azoospermia (0 million/ml) with other abnormalities: 3 participants

Semen Parameters (Overall Cohort, n=31): Volume: mean 2.6 ± 1.8 ml (range: 1.0–8.0 ml), Concentration: mean 51.2 ± 32.4 million/ml (range: 0–88 million/ml), Progressive motility: mean $51.3\% \pm 28.1$ (range: 0–85%), Liquefaction time: 30 minutes (n=23; 74.2%) or 60 minutes (n=8; 25.8%), Pus cells: median 3–4 per HPF (range: 1–2 to 10–12 per HPF).

Prevalence of *Shukra dushti Lakshanas*

<i>Lakshanas</i>		Group					
		Case(N=12)		Control(N=19)		Total	
		N	%	N	%	N	%
<i>Phenilam</i>	Absent	9	75.0%	13	68.4%	22	71.0%
	Present	3	25.0%	6	31.6%	9	29.0%
<i>Tanu</i>	Absent	5	41.7%	14	73.7%	19	61.3%
	Present	7	58.3%	5	26.3%	12	38.7%
<i>Ruksham</i>	Absent	12	100.0%	19	100.0%	31	100.0%
<i>Vivarnam</i>	Present	9	75.0%	19	100.0%	28	90.3%
	Absent	3	25.0%	0	0.0%	3	9.7%
<i>Puti</i>	Present	2	16.7%	5	26.3%	7	22.6%
	Absent	10	83.3%	14	73.7%	24	77.4%
<i>Picchilam</i>	Present	9	75.0%	15	78.9%	24	77.4%
	Absent	3	25.0%	4	21.1%	7	22.6%
<i>Anyadhātu upsamsrishtam</i>	Absent	12	100.0%	19	100.0%	31	100.0%
<i>Avasaadi</i>	Absent	12	100.0%	19	100.0%	31	100.0%

Dosha Predominance Patterns

		Group				Total	
		case		control			
		N	%	N	%	N	%
<i>Dosha Dushti</i>	-	0	0.0%	2	10.5%	2	6.5%

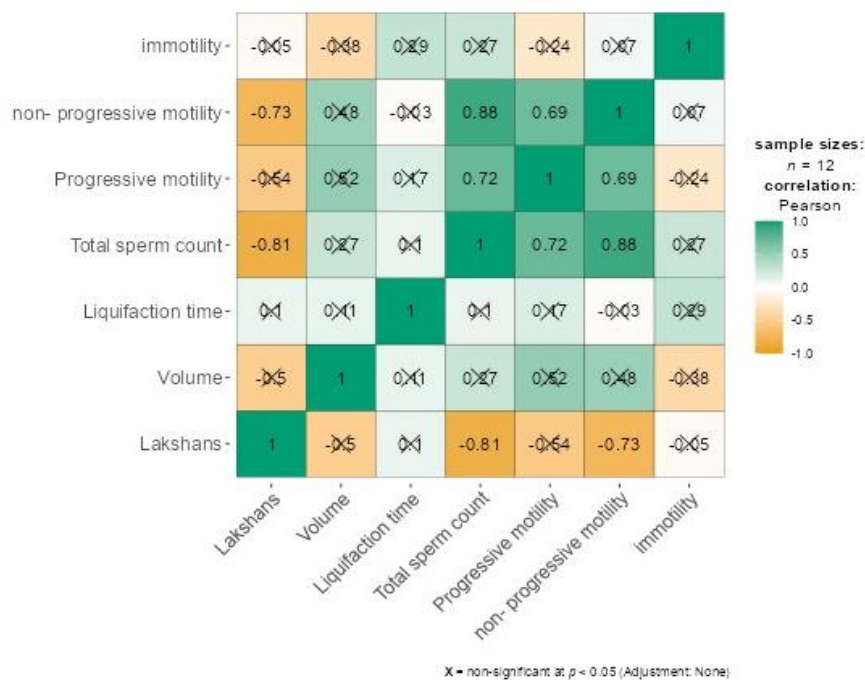
	K	1	8.3%	0	0.0%	1	3.2%
	P	3	25.0%	4	21.1%	7	22.6%
	PK	1	8.3%	3	15.8%	4	12.9%
	V	1	8.3%	3	15.8%	4	12.9%
	VP	5	41.7%	6	31.6%	11	35.5%
	VPK	1	8.3%	1	5.3%	2	6.5%
Total		12	100.0%	19	100.0%	31	100.0%

A. Correlation of *Lakshanas* with Semen Parameters (Cases Only, n = 12)

Parameter	Correlation with <i>Lakshanas</i> (r)	Strength	Interpretation
Total sperm count	-0.81*	Strong(S)	Higher <i>Lakshanas</i> → marked reduction in sperm count
Progressive motility (%)	-0.54*	Moderate(S)	Increased <i>Lakshanas</i> → reduced forward motility
Non-progressive motility (%)	-0.73*	Strong(S)	Higher <i>Lakshanas</i> → impaired motility efficiency
Immotility (%)	+0.45*	Moderate(S)	Trend toward increased immotility
Volume (ml)	-0.35	Weak(NS)	No meaningful association
Liquefaction time (min)	~0	Negligible(NS)	No correlation

*p- value <0.05 by Pearson's correlation is considered statistically significant, S- Significant, NS- Non-Significant

Interpretation: Correlation analysis within the case group further demonstrated a strong negative association between the number of *Shukra dushti Lakshanas* and total sperm count ($r = -0.81$), along with moderate to strong negative correlations with progressive ($r = -0.54$) and non-progressive motility ($r = -0.73$). These results indicate that increasing qualitative derangement of *Shukra* is closely associated with both structural (sperm count) and functional (motility) deterioration. A moderate positive correlation with immotility ($r = 0.45$) suggests a trend toward advanced dysfunction with increasing *lakshana* burden, although not statistically significant in this pilot sample. In contrast, semen volume and liquefaction time showed no meaningful correlation with *Lakshanas*, implying that these parameters are not reflective of overall *Shukra dushti* severity but may correspond to specific qualitative abnormalities.



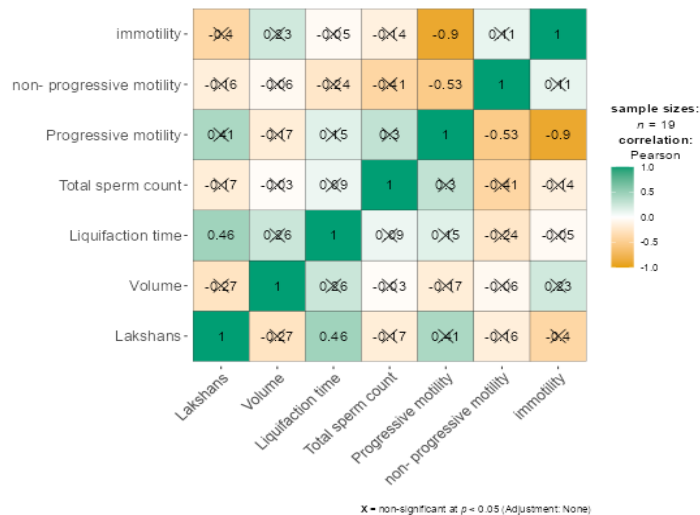
B: Correlation of Lakshanas with Semen Parameters – Control Group

Parameter	Correlation with Lakshanas (r)	Strength	Interpretation
Total sperm count	-0.169	Weak	No meaningful association
Progressive motility (%)	+0.411	Moderate (NS)	Trend toward increased motility with Lakshanas
Non-progressive motility (%)	-0.158	Weak	No meaningful association
Immotility (%)	-0.400	Moderate (NS)	Trend toward reduced immotility
Volume (ml)	-0.274	Weak	No meaningful association
Liquefaction time (min)	+0.456*	Moderate (S)	Increased Lakshanas associated with delayed liquefaction

*p- value <0.05 by Pearson’s correlation is considered statistically significant, S- Significant, NS- Non-Significant

Interpretation (Control Group)

Correlation analysis within the control group revealed a markedly different pattern compared to cases. The only statistically significant association observed was a moderate positive correlation between Lakshanas and liquefaction time (r = 0.456, p = 0.049), indicating that even within WHO-normal samples, increasing Shukra dushti features are associated with subtle functional alterations in seminal plasma dynamics, particularly delayed liquefaction.



Other parameters—including total sperm count, motility indices, and volume—showed weak or non-significant correlations, suggesting that quantitative semen parameters remain within normal limits despite the presence of *Lakshanas*. Interestingly, trends such as a moderate positive association with progressive motility ($r = 0.411$) and negative association with immotility ($r = -0.400$) indicate that these relationships are not pathologic but variable, reflecting physiological heterogeneity rather than dysfunction.

Overall, these findings demonstrate that in the control group, *Shukra dushti Lakshanas* do not correspond to overt impairment in spermatogenesis or motility, but rather may reflect early, subtle, or compensatory qualitative changes not captured by WHO thresholds.

Comparative Interpretation: Case vs Control Correlation

Taken together, the comparative correlation analysis demonstrates a clear gradation in the clinical significance of *Shukra dushti Lakshanas*. In the case group, *Lakshanas* show strong and clinically meaningful correlations with sperm count and motility, confirming their association with established reproductive pathology. In contrast, within the control group, *Lakshanas* persist despite normal WHO parameters and exhibit only limited correlations, primarily with liquefaction time, indicating early functional alterations without overt quantitative impairment.

This finding strongly supports the central hypothesis of the study that:

Ayurvedic *Shukra dushti Lakshanas* are not merely markers of disease but represent a sensitive qualitative assessment tool capable of detecting early and subclinical disturbances in male reproductive health—even in individuals categorized as normal by WHO criteria.

Thus, while WHO-based semen analysis identifies late-stage or threshold-defined abnormalities, Ayurvedic assessment provides a continuum-based, early detection framework, bridging the gap between physiological variation and clinically manifest infertility.

DISCUSSION

This pilot cross-sectional study demonstrates that all eight *Shukra dushti Lakshanas* can be operationalized through a practical, expert-validated SOP and assessed during routine semen analysis in a WHO 2010-stratified population.

Puti emerged as the single most prevalent *lakshana* with strong empirical association to elevated pus cells, providing support for classical *Pittaja* etiology of putrefaction and inflammation. Notably, *puti* appeared equally in WHO-defined cases and controls, suggesting mild inflammatory changes are common in referred populations. *Tanu* appeared in over half the cohort without exclusive WHO-case association. *Picchilam* demonstrated perfect concordance with 60-minute liquefaction time, establishing a clear, reproducible biomedical correlate for this classical descriptor. This represents one of the strongest objective correlations observed. *Vivarnam*, exclusively present in case group (azoospermic samples). High specificity for severe reproductive pathology but limited sensitivity in this small cohort. *Ruksham*, *avasaadi*, and *anyadhatu upsamsrishtam* were absent. *Dosha* predominance aligned conceptually with classical descriptions: *Vata* patterns with reduced motility/volume, *Pitta* with inflammation/odour, *Kapha* with viscosity; VP (*Vata-Pitta*) most common, especially in cases; VPK in most severe presentations.

The study contributes to understanding how *Ayurvedic* qualitative assessment performs relative to WHO quantitative stratification. Unlike prior conceptual reviews, we used objective WHO 2010 reference limits to create a case-control structure, allowing direct comparison of *Ayurvedic* and biomedical classification paradigms.

Expected vs. Actual Associations

Tanu and oligozoospermia: While *tanu* showed lower mean concentration in *tanu*-positive samples, the difference was modest and *tanu* was equally common in WHO-control samples. This suggests *tanu* may detect qualitative seminal plasma alterations independent of spermatogenesis.

Puti and leukocytospermia: The co-occurrence with elevated pus cells strongly supports empirical validity. However, *puti* appeared in of WHO-control group, indicating asymptomatic leukocytospermia is common in referred populations and may not always indicate pathology.

Picchilam and delayed liquefaction: The perfect concordance (100% in both directions between *picchilam* and 60-minute liquefaction) is remarkable and represents the strongest objective correlation observed. This validates the classical concept with biomedical precision.

Vivarnam and severe pathology: The exclusive association with azoospermia and elevated leukocytes, suggests *vivarnam* is a high-specificity marker for severe reproductive compromise, possibly reflecting systemic or chronic inflammatory processes.

Implications of WHO 2010 Classification

By using WHO 2010 reference limits as the case-control stratification method, we directly address a key question: Do Ayurvedic qualitative assessments add discriminatory value to WHO-based quantitative classification? The answer appears nuanced as some *Lakshanas* (*phenilam*, *tanu*, *puti*) appear in both WHO-normal and WHO-abnormal samples, suggesting they may detect subtle, early, or reversible disturbances not captured by threshold-based classification. Some *Lakshanas* (*vivarnam*, *picchilam*) show stronger case-specificity or objective correlates, suggesting they may have higher clinical utility for prognosis or treatment selection. The high prevalence of *Lakshanas* even in WHO-control samples (e.g., 75% of controls have *puti*) suggests that Ayurvedic assessment may reveal qualitative homeostatic stress that precedes quantitative semen abnormality, offering potential for early detection and prevention.

Strengths of This Study

Several methodological strengths enhance the rigor and clinical relevance of this study. Beyond conceptual theory, explicit operational definitions for all eight *Shukra dushti Lakshanas* were developed. The use of WHO 2010 reference limits for stratification eliminated clinical labeling bias, enabling a direct comparison between *Ayurvedic* qualitative assessments and biomedical paradigms. Practical applicability was ensured by conducting data collection within a routine diagnostic laboratory serving referred patients. Future replication is facilitated by a comprehensive standardized operating procedure (SOP). Finally, methodological integrity and transparency were maintained through strict adherence to

STROBE reporting guidelines.

Limitations

While this study provides valuable preliminary insights, several limitations must be acknowledged. The small sample size of 31 participants limits statistical power. Data collection occurred at a single laboratory over one month, limiting generalizability across different geographic regions, seasons, and patient populations. Confounding factors including lifestyle variables (smoking, heat exposure), medications, and systemic illnesses were not systematically documented. The assessment was limited to semen parameters without hormonal (FSH, LH, testosterone) or genetic data, restricting mechanistic understanding.

CONCLUSIONS

This cross-sectional observational pilot study demonstrates the feasibility and validity of assessing *Shukra dushti Lakshanas* through a systematic, expert-validated SOP in a WHO 2010-stratified population. Key *Lakshanas* particularly *tanu*, *puti*, *picchilam*, and *vivarnam* exhibit interpretable and sometimes remarkable (perfect concordance for *picchilam*-liquefaction) associations with modern semen parameters. The finding that *Shukra dushti Lakshanas* are prevalent in both WHO-defined normal and abnormal semen samples supports the hypothesis that *Ayurvedic* assessment detects qualitative disturbances not fully captured by quantitative thresholds alone, offering potential value for early detection, risk stratification, and personalized therapeutic planning. Larger, methodologically rigorous, multi-centre prospective studies with expanded sample size, inter-observer reliability assessment, and clinical outcome linkage are essential to validate these preliminary findings and develop an evidence-based, integrative framework for male reproductive health assessment.

REFERENCES

1. Tripathi B, Ashtanga Hridayam of Shrimadvagbhata, Hindi Commentary, Reprint 2010. Delhi: Chaukhamba Sanskrit Pratishthan, 2010; Sutra Sthana 11/1, 160.
2. Shukla M, Sharma RK, Sharma DC. Physiology of Dhatu Poshan (Tissue Nutrition). J Adv Res Ayur Yoga Unani Sidda Homeo, 2020; 7(1): 2.
3. Choudhary P, Sharma R, Sharma D, Saini M. A physiological study of shukra dhatu wsr sexual hormones. International Ayurvedic Medical Journal, 2021; 9(9): 2165-73.
4. Agnivesha, Charak Samhita with the Ayurveda Dipika Commentary of Chakrapanidutta, edited by Vaidya Yadavji Trikamji Acharya, Chaukhamba krishnadas Academy Varanasi,

- 2023; Sutra Sthana 17/69, 103.
5. Cooper TG, Noonan E, von Eckardstein S, Auger J, Baker HW, Behre HM, Haugen TB, Kruger T, Wang C, Mbizvo MT, Vogelsong KM. World Health Organization reference values for human semen characteristics. *Hum Reprod Update*, May-Jun., 2010; 16(3): 231-45.
 6. Sundram MS, Ready NS, Vembu R, Manjula G, Vettriselvi V, Madhan K. MicroRNA alterations in sperm of infertile men: Insights into oligozoospermia, asthenozoospermia, and teratozoospermia. *Biotechnology Notes*, 2025 Oct 15.
 7. Shinde VA, Marlewar SG. A CONCEPTUAL STUDY OF SEMEN ANALYSIS & It's CO-RELATION WITH SHUKRA-DUSHTI, 2019.
 8. Rakhesh HK, Patil AS, SE SP. AN ETIOPATHOLOGICAL DIAGNOSTIC STUDY ON SHUKRA DUSTI TO ASSESS OLIGO-ASTHENOSPERMIA THROUGH SEMEN ANALYSIS. *Pharmaceutical Research*, 14(23): 1076-97.
 9. Cuschieri S. The STROBE guidelines. *Saudi journal of anaesthesia*, Apr. 1, 2019; 13(1): S31-4.
 10. Buduru SP, Vedantam G. Algorithm of ancient Ayurveda method of semen analysis and integrative approach toward male infertility. *Indian Journal of Health Sciences and Biomedical Research* kleu, Jan. 1, 2016; 9(1): 5-13.
 11. Shastri KP, Chaturvedi G. Vidyotini, Shrimad Agniveshena Praneeta Achaarya Charak And Dridhabala,, Varanasi: Chaukhambha Bharati Academy, Edition 2021, Charak Samhita, 2: Chikitsa Sthana 30/140, 785.
 12. Shastri KP, Chaturvedi G. Vidyotini, Shrimad Agniveshena Praneeta Achaarya Charak And Dridhabala,, Varanasi: Chaukhambha Bharati Academy, Edition 2021, Charak Samhita, Vol 2, Chikitsa Sthana 30/141, 785.
 13. Shastri KP, Chaturvedi G. Vidyotini, Shrimad Agniveshena Praneeta Achaarya Charak And Dridhabala,, Varanasi: Chaukhambha Bharati Academy, Edition 2021, Charak Samhita, 2, Chikitsa Sthana 30/142, 786.
 14. Baskaran S, Finelli R, Agarwal A, Henkel R. Diagnostic value of routine semen analysis in clinical andrology. *Andrologia*, Mar. 2021; 53(2): e13614.