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Observational Study

Quantitative Assessment of Skin Oiliness during *Shodhana Snehapana* - A Prospective Observational Analytical Study

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ABSTRACT:

Background: *Shodhana Snehapana* is an internal oleation procedure and forms the most crucial component of *Purva Karma* (Preparatory procedures), as the success of subsequent *Shodhana* (Purification) procedures depends upon the adequacy of *Snehana. Twaka Snigdhata* (oiliness of skin) is an important indicator of proper oleation and is traditionally assessed subjectively using *Anumana Pramana* (Inferential reasoning), such as tactile examination or scratching of the skin. However, subjective assessment lacks standardization and may lead to inaccurate clinical decisions. In the present era, there is a growing need for objective tools to quantify classical Ayurvedic parameters. **Objectives**: The present study was undertaken to quantitatively assess *Twaka Snigdhata* during *Shodhana Snehapana* (Purificatory internal oleation) and to evaluate its relationship with the oleation process using a Digital Skin Moisture Meter. **Methods:** The study was conducted at Parul Institute of Ayurveda, Parul University, Vadodara, Gujarat. A total of 53 volunteers fulfilling the inclusion and exclusion criteria were enrolled, of whom 50 completed the study and were included in the final analysis. Skin oiliness was measured using a Digital Skin Moisture Meter at the midpoint of the volar aspect of the forearm from the first day of *Snehapana* until the appearance of *Samyak Snigdha Lakshanas* (clinical features indicating adequate oleation). **Result:** A significant increase in estimated skin-oiliness scores was observed during *Shodhana Snehapana*. Compared with Day 1, skin oiliness did not differ significantly on Day 2 (β = 0.040, 95% CI: −0.272–0.352, p = 0.802), whereas significantly higher estimated skin-oiliness scores were observed on Days 3, 4, 5, and 6 (all $p < 0.001$), indicating progressive increase in oiliness of the skin. **Conclusion:** The findings suggest that quantitative assessment of skin oiliness may have potential utility as an objective adjunct for monitoring *Twaka Snigdhata* (oiliness of the skin) during *Shodhana Snehapana*. Digital assessment of skin oiliness may complement the traditional clinical evaluation of *Samyaka Snigdha Lakshanas*.

KEYWORDS: Digital Skin Moisture Meter, Oiliness of Skin, *Panchakarma, Shodhana Snehapana, Snehana Karma, Twaka Snigdhata.*

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1. INTRODUCTION

Ayurveda emphasizes two principal therapeutic approaches for the management of diseases, namely *Shodhana* (Purificatory therapy) and *Shamana* (Palliative therapy). Among these, *Shodhana Chikitsa* is regarded as superior due to its ability to eliminate vitiated *Doshas* (functional principles) from the body and thereby prevent recurrence of disease. The successful execution of Purificatory therapy depends largely on the proper administration of *Purva Karma* (Preparatory procedures) which includes *Snehana* (Oleation therapy) and *Svedana* (Sudation therapy). [1] These preparatory procedures facilitate the mobilization of morbid *Doshas* from peripheral tissues *(Shakha)* to the gastrointestinal tract *(Kostha*), enabling their effective elimination through procedures such as *Vamana* (Therapeutic emesis) and *Virechana* (Therapeutic purgation). [2, 3]

Snehana is a fundamental *Purva Karma* (preparatory procedures) and plays a decisive role in determining the outcome of *Shodhana therapy*. It induces physiological changes characterized by *Snigdhata* (unctuousness), *Vishyandana* (liquefaction), *Mardavata* (softness), and *Kledana* (moistening), which collectively facilitate *Dosha Utkleshana* (excitation of vitiated *Doshas*) and easy expulsion. [4] Among these features, *Snigdhata* (unctuousness) is considered an important clinical marker of adequate oleation. *Shodhana Snehapana*, a type of internal oleation, is widely practiced prior to major *Shodhana* (Purificatory) procedures and requires careful assessment to avoid inadequate or excessive oleation, both of which may lead to complications and suboptimal therapeutic outcomes. [5, 6]

Oiliness of the skin is one of the most significant and observable manifestations of *Snigdhata* (unctuousness). In the context of *Shodhana Snehapana*, increased skin oiliness is indicative not only of external oleation but also of the proper absorption, systemic circulation, and tissue-level assimilation of *Sneha* (Unctuous substances). Classical Ayurvedic understanding suggests that when *Sneha* is adequately absorbed and distributed through the body tissues (*Dhatus*), it manifests externally as *Twaka Snigdhata*, reflecting successful internal oleation. Unlike several other *Samyaka Snigdha Lakshanas* that are primarily dependent on subjective clinical assessment or patient-reported experiences, skin oiliness can be objectively quantified using non-invasive digital instruments. Furthermore, Oiliness of Skin is routinely considered by *Ayurvedic* physicians while determining the adequacy of *Snehana* and planning subsequent Purificatory therapy as it is regarded as one of the important late manifestations of *Samyaka Snigdha Lakshanas*, indicating adequate systemic oleation. These characteristics make it a suitable parameter for objective and quantitative assessment during *Shodhana Snehapana*.

Classical Ayurvedic texts describe the assessment of *Snehana* predominantly through clinical observation and inferential reasoning (*Anumana Pramana*). *Twaka Snigdhata*, or oiliness of the skin, is one of the most observable and clinically relevant indicators of proper *Snehana*. Traditionally, it has been assessed subjectively through tactile examination or by scratching the skin surface. Although these methods have been used for centuries, they are inherently subjective, dependent on the examiner's perception, and lack uniformity and reproducibility. Such limitations may result in variability in clinical decision-making regarding the timing of *Svedana* and the initiation of *Shodhana* procedures.

In the contemporary era, there is an increasing need to standardize classical *Ayurvedic* parameters using objective and reproducible tools without compromising the foundational principles of *Ayurveda*. The integration of modern diagnostic instruments can help quantify traditionally subjective signs, thereby strengthening evidence-based practice in *Panchakarma*. Digital skin monitoring devices offer a non-invasive, precise, and numerical assessment of skin oiliness and may offer a practical approach for the objective evaluation of *Twaka Snigdhata*.

Although *Twaka Snigdhata* is widely recognized as an important indicator of adequate *Snehana* in classical Ayurvedic literature, its assessment in clinical practice continues to rely predominantly on subjective methods such as observation and tactile examination. These methods are examiner-dependent and may lead to inter-observer variability. Furthermore, the available literature primarily focuses on qualitative assessment of *Samyaka Snigdha Lakshanas*, while objective quantification of skin oiliness during *Shodhana Snehapana* remains inadequately explored. A review of the available literature revealed studies employing objective instruments for the assessment of *Twaka Snigdhata* and related Ayurvedic parameters. [19][20] However, published evidence regarding the quantitative assessment of changes in skin oiliness during *Shodhana Snehapana* using digital instruments remains limited. This lack of a standardized and objective assessment method represents an important research gap. Therefore, the present prospective observational analytical study was undertaken to quantitatively assess skin oiliness during *Shodhana Snehapana* using a Digital Skin Moisture Meter [7] and to explore its utility as an objective adjunct for monitoring the oleation process. Although *Twaka Snigdhata* is recognized in classical Ayurvedic literature as one of the *Samyaka Snigdha Lakshanas*, direct scientific evidence establishing skin oiliness as a surrogate marker of systemic oleation is presently limited. Nevertheless, it remains one of the few classical clinical features that can be objectively and non-invasively quantified using digital instruments. Therefore, the present study was designed to investigate whether quantitative changes in skin oiliness occur in parallel with the progression of classical *Samyaka Snigdha Lakshanas,* thereby exploring its potential utility as an objective indicator of the oleation process rather than attempting to establish skin oiliness as a definitive marker of systemic oleation.

Aim: To assess oiliness of skin quantitatively during *Shodhana Snehapana*.

Objectives:

a) To assess *Samyaka Snigdha lakshana* in individuals undergoing *Shodhana Snehapana*.
b) To assess changes in skin oiliness quantitatively during *Shodhana Snehapana* using a Digital Skin Moisture Meter.
c) To evaluate the association between the duration of *Shodhana Snehapana* and changes in skin oiliness.

Research Hypothesis: *Twaka Snigdhata* (Skin oiliness) demonstrates progressive quantitative changes during *Shodhana Snehapana* and is positively associated with the duration of the oleation procedure.

2. MATERIALS AND METHODS:

Study Design: A Prospective Observational Analytical Study with Repeated Measurements.

Settings of the study: The study was conducted in Parul Institute of Ayurveda, Parul University, Vadodara, Gujarat.

Duration of study: The overall research work, including protocol development, ethical approval, data collection, data analysis and manuscript preparation, was carried out during the period 2019–2022.

Recruitment Period: Eligible participants were recruited from March 2021 to March 2022 from the IPD of the *Swasthavritta, Panchakarma*, and *Kayachikitsa* Departments of Parul Institute of Ayurveda, Parul University, Vadodara, Gujarat.

Ethical Considerations: The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Ethical approval was obtained from the Institutional Ethics Committee for Human Research, Parul Institute of Ayurved, Parul University, Vadodara, Gujarat (IEC No. PU/PIA/IECHR/2020/285, dated 09/10/2020).

Informed Consent: Written informed consent was obtained from all participants prior to enrollment in the study.

Population: Volunteers undergoing Snehapana were taken from IPD of *Swasthavritta, Panchakarma* & *kayachikitsa* department of Parul Institute of Ayurveda, Parul University, Vadodara, Gujarat.

Sample: A total of 53 volunteers were taken based on inclusion as well as exclusion criteria from IPD of

swasthavritta, Panchakarma & *kayachikitsa* department of Parul Institute of Ayurveda, Parul University, Vadodara, Gujarat, through convenience sampling after obtaining written informed consent. Three discontinued the procedure, and the remaining 50 completed the study and were included in the final analysis..

Sample Size Justification: As no prior published data were available on the quantitative assessment of skin oiliness during *Shodhana Snehapana*, a formal a priori sample size calculation was not feasible. Therefore, all eligible participants fulfilling the predefined inclusion and exclusion criteria who were recruited between March 2021 and March 2022 were enrolled according to the prospectively approved study protocol. Recruitment was undertaken during the post-COVID period, when the availability of eligible inpatient participants was limited.

Sampling Method: A non-randomized convenience sampling method was adopted for participant recruitment.

Sampling criteria:

Inclusion criteria: Volunteers undergoing *Snehapana* were recruited from IPD of *swasthavritta, Panchakarma* & *kayachikitsa* department of Parul institute of Ayurveda, Parul University, Vadodara, Gujarat. Age group of 18 – 60 years. Irrespective of gender, caste & religion.

Exclusion criteria: Contraindicated for *Snehapana*. [8, 9, 10] Volunteers unwilling to be admitted.

Procedure of *Shodhana Snehapana*:

Eligible volunteers fulfilling the inclusion and exclusion criteria were selected from the IPD of the *Swasthavritta, Panchakarma* and *Kayachikitsa* Departments of Parul Institute of Ayurveda, Parul University, Vadodara, Gujarat. Appropriate unctuous substance was selected according to the individual's disease condition and clinical assessment. The *Sneha* was administered orally in the early morning on an empty stomach. [21]

Shodhana Snehapana was administered in *Arohana Krama* (gradually increasing dosage pattern). The initial dose and subsequent dose increments were determined according to the participant's *Agni* (digestive capacity), *Kostha* (bowel habit), digestion of the previously administered *Sneha*, and clinical response. Daily dose escalation was carried out only after confirming complete digestion of the previous dose. *Snehapana* was continued until the appearance of *Samyaka Snigdha Lakshanas*.

During the course of therapeutic oleation, participants were advised to follow the prescribed dietary and lifestyle regimen [22] and were monitored daily for digestion of unctuous substance, appearance of *Samyaka Snigdha Lakshanas* and any adverse events.

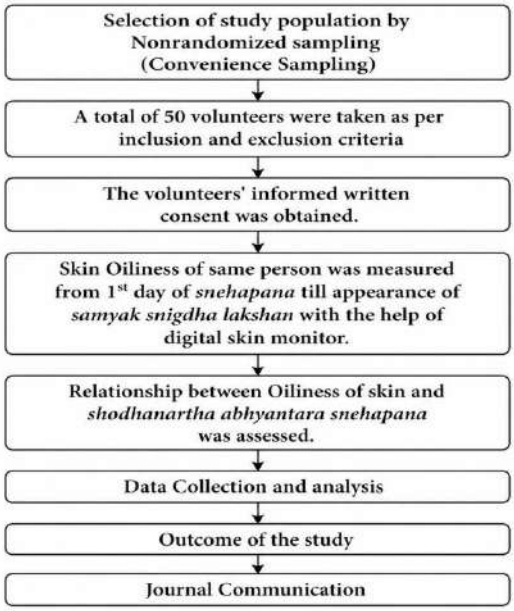


Figure 1: Study workflow illustrating the overall design and sequence of study procedures

Criteria of Assessment:

Subjective Parameter: Subjective assessment was carried out using the *Samyaka Snigdha Lakshana* assessment criteria described by Ramteke et al. (2011), which includes *Vatanulomana, Agnidipti, TwakSnigdhata, Purisha Snigdhata, Snehodvega, Klama*, and *Angalaghavata*. [15] Assessment was performed through *Darshana* (observation) and *Sparshana Pariksha* (tactile examination). The questionnaire incorporates classical signs of *Samyaka Snigdha Lakshana* described in Ayurvedic literature and has been previously used in clinical studies evaluating Purificatory internal oleation. [15] However, formal validation and reliability parameters were not reported in the original publication. Nevertheless, recent efforts have

been made to develop and validate dedicated assessment tools for *Samyaka Snigdha Lakshana* using psychometric principles. [23]

Objective Parameter: Objective assessment of skin oiliness was performed using a Digital Skin Moisture Meter (Model No. B0FF58LC1M) manufactured by Guangzhou Jinpeng Beauty Equipment Co., Ltd., Guangdong, China. The instrument utilizes Bioelectrical Impedance Analysis (BIA) technology, in which a very low-intensity alternating electrical current is applied through the skin and the resulting electrical impedance is measured. The measured impedance is influenced by the electrical properties of the skin and is utilized by the device algorithm to estimate skin parameters. The device dimensions are 122 × 34 × 25 mm: 299 g and it operates on 3V power supplied by two AAA batteries. The instrument is portable, easy to operate, and capable of storing up to 10 measurement records. Measurements were performed according to the manufacturer's operating instructions. The probe sensor was placed in direct contact with the designated assessment site at the midpoint of the volar aspect of the forearm, and readings were recorded after completion of the measurement cycle indicated by an audible beep. The device was operated according to the manufacturer's instructions, and its functioning was checked prior to each assessment session to ensure consistency of measurements.

Previous studies have utilized Digital Moisture Monitors for objective assessment of skin parameters, supporting the feasibility and applicability of such instruments in Ayurvedic research. [7]

Procedure for Skin Oiliness Assessment: Skin oiliness was assessed using a Digital Skin Moisture Meter at the midpoint of the volar aspect of the forearm. This site was selected because it is recommended as a standard reference site for the non-invasive assessment of skin biophysical properties, owing to its relatively uniform skin characteristics and good reproducibility for repeated measurements. [26, 27] The same anatomical site was used throughout the study for all participants to maintain consistency and minimize site-related variations. Measurements were recorded daily from the first day of *Shodhana Snehapana* until the appearance of *Samyak Snigdha Lakshanas.*

To ensure uniformity, the daily *Sneha* dose was administered in the morning at approximately 6:15–6:30 AM, and skin measurements were performed subsequently within a predefined time window between 7:00 AM and 7:30 AM. Thus, the measurements were obtained approximately 30–60 minutes after administration of the daily *Sneha* dose. Assessments were conducted under routine room-temperature conditions in the same room of the IPD ward to maintain similar environmental conditions throughout the study. As all participants were admitted to the IPD, they followed a standardized Purificatory internal oleation protocol, including uniform dietary regimen, daily routine, and supervised inpatient care throughout the study period. Participants were instructed not to apply any cosmetic products, creams, lotions or oils to the assessment site during the study period. The same assessment protocol was followed throughout the study to minimize environmental and procedural variability. Repeated measurements in the same participant, with each participant serving as their own reference, further reduced the influence of inter-individual variability. No specific inclusion criterion related to baseline skin oiliness was applied, as the study was designed to evaluate serial changes in skin oiliness within each participant during purificatory internal oleation, with each participant serving as their own reference. The Digital Skin Moisture Meter used in the present study provides separate readings for skin moisture and oil as specified in the manufacturer's user manual. For the present study, the instrument's oil value reading was recorded and operationally considered the quantitative measure of skin oiliness.

Outcome Measures:

Primary Outcome Measure: The primary outcome measure was the quantitative assessment of skin oiliness *(Twaka*

Snigdhata) during *Shodhana Snehapana*, recorded using a Digital Skin Moisture Meter from the first day of *Snehapana* until the appearance of *Samyaka Snigdha Lakshanas*.

Secondary Outcome Measures: Assessment of *Samyaka Snigdha Lakshanas* using a structured clinical assessment criterion previously used in clinical studies. Evaluation of the relationship between duration of *Shodhana Snehapana* and changes in skin oiliness.

Statistical analysis: A master chart was prepared after compilation of all data collected from the enrolled volunteers. The data were entered and analyzed using IBM SPSS Statistics version 25.0. Descriptive statistical methods such as frequency, percentage, mean, and standard deviation were used to summarize the data. Since skin oiliness was measured repeatedly in the same participants over multiple days and participants achieved *Samyaka Snigdha Lakshanas* at different time points, a linear mixed-effects model was applied to evaluate the effect of duration of *Shodhana Snehapana* on skin oiliness. Skin oiliness was considered the dependent variable; day of *Shodhana Snehapana* was included as a categorical fixed effect, and participant ID was included as the random intercept to account for repeated measurements within individuals. Participants were assessed only until the appearance of *Samyaka Snigdha Lakshanas*; therefore, the number of observations varied across participants. A linear mixed-effects model was selected because it appropriately accommodates repeated measurements with unequal numbers of observations and does not require imputation of post-completion measurements. To assess the assumption of a linear change over time, models treating day of *Shodhana Snehapana* as a continuous linear predictor and as a categorical fixed effect were compared using a likelihood-ratio test. The categorical-day specification provided a significantly better fit to the data (χ^2 (4) = 104.84, $p < 0.001$) and was therefore used in the final analysis. Pairwise comparisons of estimated marginal means were performed for the five consecutive-day comparisons, with p-values adjusted using the Bonferroni method. Normality of model residuals was assessed using the Shapiro–Wilk test. Results are presented as regression coefficients (β), 95% confidence intervals (CI), and p-values. The level of statistical significance was fixed at $p < 0.05$. Necessary tables and graphical representations were generated for better understanding and interpretation of the demographic and observational characteristics of the study participants.

3. OBSERVATIONS AND RESULTS:

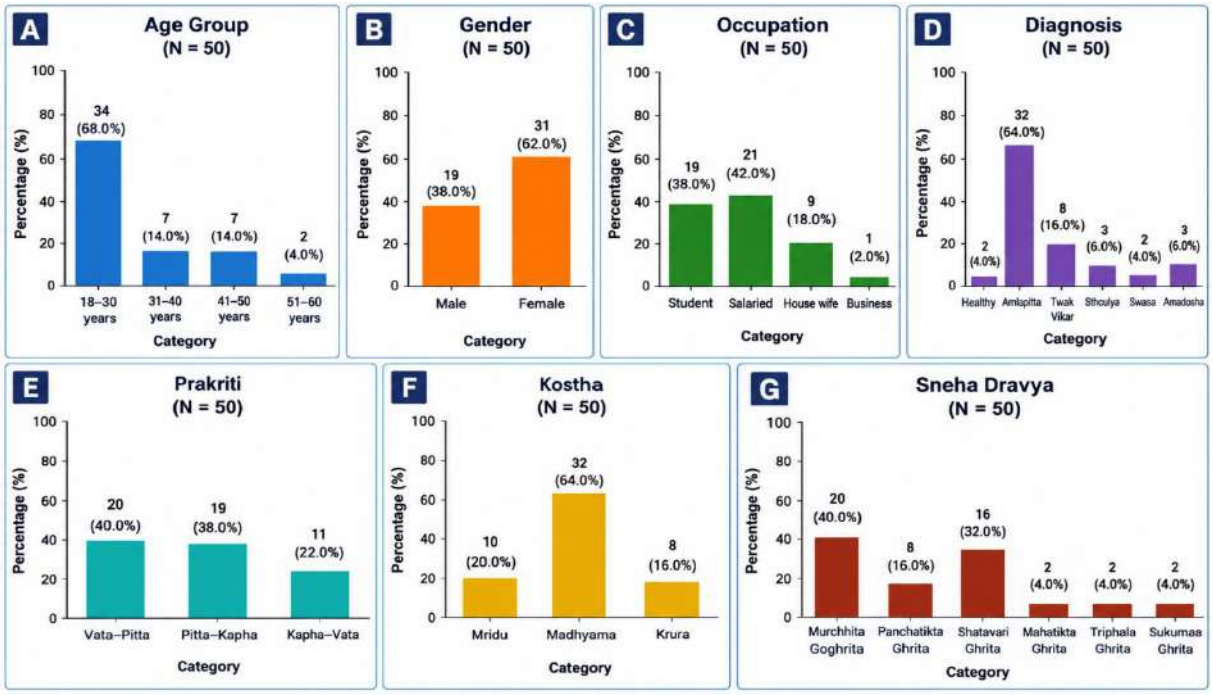


Figure 2: Baseline Demographic and Clinical Characteristics of Participants (n=50):

Note: Values are presented as n (%).

Table 1: *Snehapana* Duration wise distribution of the subjects

Snehapana Duration(Days)	Frequency	Percent
3	3	6.0
4	11	22.0
5	25	50.0
6	11	22.0
Total	50	100.0

Table 2: *Sneha Dravya* wise distribution of subjects

***Sneha Dravya* (unctuous substance)**	**Frequency**	**Percent**
Murchhit Goghrita	20	40
Panchatikta Ghrita	08	16
Shatavari Ghrita	16	32
Mahatikta Ghrita	02	04
Triphala Ghrita	02	04
Sukumar Ghrita	02	04

Note: Values are presented as n (%).

Table 3: Observation on *Samyak Snigdha lakshana*:

LAKSHANA	DAY 1		DAY 2		DAY 3		DAY 4		DAY 5		DAY 6	
Vatanulomana	15	30.0%	40	80.0%	50	100%	47	100%	36	100%	11	100%
Diptagni	0	0.0%	17	34.0%	50	100%	47	100%	36	100%	11	100%
Purisha Snigdhata	0	0.0%	0	0.0%	5	10%	45	95.7%	36	100%	11	100%
Twaka Snigdhata	0	0.0%	0	0.0%	10	20%	47	100%	36	100%	11	100%
Snehodvega	0	0.0%	0	0.0%	3	6.0%	18	38.3%	36	100%	11	100%
Klama	0	0.0%	2	4.0%	49	98%	47	100%	36	100%	11	100%
Adhasta Sneha darshana	0	0.0%	0	0.0%	3	6.0%	8	16.0%	36	100%	11	100%

Note: Values are presented as n (%).

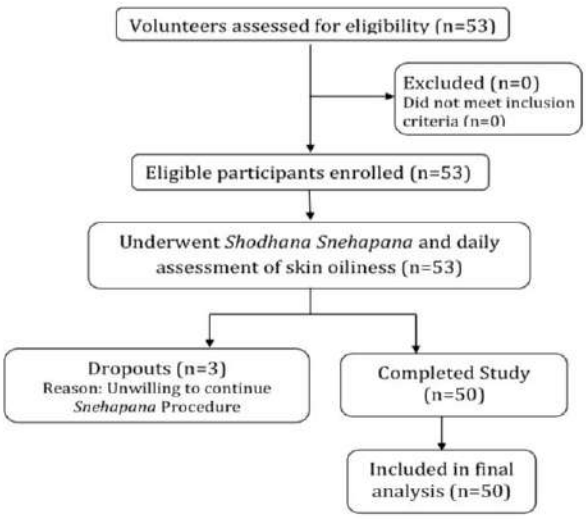


Figure 3: Participant flow diagram showing enrolment, follow-up, and final analysis of the study participants.

Handling of missing data and dropouts: A total of 53 participants were initially screened and enrolled for the study. Of these, 3 participants discontinued the internal oleation procedure due to unwillingness to continue treatment and were considered dropouts. Consequently, data from 50 participants who completed the study were included in the final analysis.

A progressive appearance of *Samyaka Snigdha Lakshanas* was observed during the course of *Shodhana Snehapana*. *Vatanulomana* and *Diptagni* appeared relatively earlier, whereas *Purisha Snigdhata, Twaka Snigdhata, Snehodvega,* and *Adhasta Sneha darshana* were observed more prominently during the later days of *Snehapana.* The overall

findings indicate a gradual attainment of *Samyaka Snigdha Lakshanas* with increasing duration of internal oleation.

The crude mean skin-oiliness score increased from 24.12 ± 4.89 on Day 1 to 30.06 ± 5.29 on Day 5. The crude mean on Day 6 was 28.27 ± 3.80; however, only 11 subjects contributed observations on Day 6. Because the number and composition of subjects differed across assessment days, longitudinal comparisons were performed using a linear mixed-effects model with study day treated as a categorical fixed effect and subject included as a random effect.

Table 4: Oiliness of skin of 50 Subjects

Assessment of Oiliness of skin	Day1	Day2	Day3	Day4	Day5	Day6
N	50	50	50	47	36	11
Mean	24.1200	24.1600	26.6000	28.6809	30.0556	28.2700
Std. Deviation	4.89331	4.90048	5.09101	5.12074	5.29120	3.80713
Minimum	16.00	16.00	16.00	19.00	22.00	25.00
Maximum	37.00	37.00	38.00	39.00	41.00	35.00

Note: Values are expressed as mean and standard deviation.

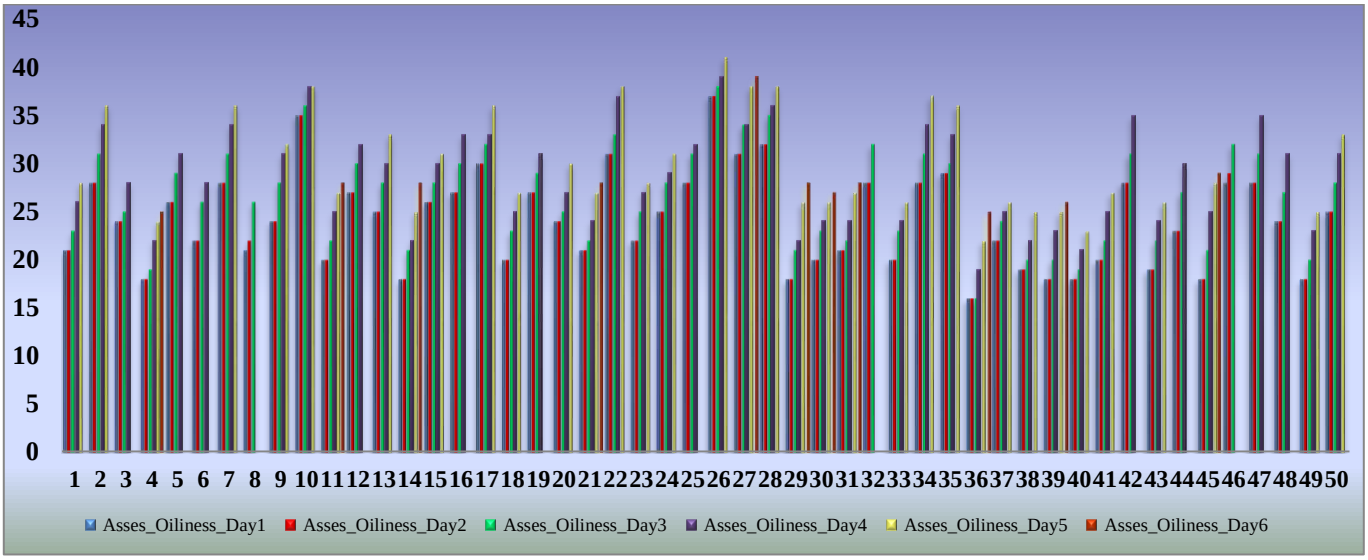


Figure 4: Oiliness of skin of 50 subjects

Table 5:Day-to-day comparison of skin oiliness during *Shodhana Snehapana*

Comparison	Mean Difference	95% CI	Bonferroni-adjusted p-value
Day 1 vs Day 2	0.04	−0.27 to 0.35	1.000
Day 2 vs Day 3	2.44	2.13 to 2.75	<0.001
Day 3 vs Day 4	2.23	1.91 to 2.55	<0.001
Day 4 vs Day 5	2.04	1.68 to 2.39	<0.001
Day 5 vs Day 6	1.79	1.22 to 2.35	<0.001

Note: Mean differences and 95% confidence intervals were obtained from pairwise comparisons of estimated marginal means from the linear mixed-effects model, with study day treated as a categorical fixed effect and subject included as a random effect. Mean difference represents the later assessment day minus the earlier assessment day. P-values were adjusted using the Bonferroni method for the five consecutive-day comparisons.

No statistically significant difference in skin oiliness was observed between Day 1 and Day 2 (Bonferroni-adjusted p = 1.000). In contrast, statistically significant increases in skin oiliness were observed between Day 2 and Day 3, Day 3 and Day 4, Day 4 and Day 5, and Day 5 and Day 6 (Bonferroni-adjusted $p < 0.001$ for all comparisons).

Table 6: Linear mixed-effects model analysis of skin oiliness with study day treated as a categorical variable during *Shodhana Snehapana*

Variable	β coefficient	95% CI	p-value
Day 1 vs Day 2	0.040	−0.27 to 0.35	0.802
Day 1 vs Day 3	2.480	2.16 to 2.79	<0.001
Day 1 vs Day 4	4.711	4.39 to 5.03	<0.001
Day 1 vs Day 5	6.747	6.39 to 7.09	<0.001
Day 1 vs Day 6	8.535	7.98 to 9.08	<0.001

Note: β = regression coefficient; CI = confidence interval. Day 1 was specified as the reference category. Study day was modeled as a categorical fixed effect, and subject was included as a random intercept. The coefficients represent differences in estimated mean skin-oiliness scores relative to Day 1. P-values represent individual tests of the model coefficients and were not adjusted for multiple comparisons.

The linear mixed-effects model, with study day treated as a categorical variable and subject included as a random effect, demonstrated significant differences in skin oiliness across assessment days. Compared with Day 1, skin oiliness did not differ significantly on Day 2 (β = 0.04, 95% CI: −0.27 to 0.35, p = 0.80), whereas significantly higher estimated skin-oiliness scores were observed on Days 3, 4, 5, and 6 (all $p < 0.001$). A likelihood-ratio comparison of the models treating study day as a continuous linear predictor versus a categorical fixed effect demonstrated that the categorical-day specification provided a significantly better fit to the data ($\chi^2(4) = 104.84$, $p < 0.001$). Accordingly, study day was treated as a categorical fixed effect in the final analysis.

Table 7: Normality Testing of Model Residuals

Test	Statistic (W)	p-value	Interpretation
Shapiro–Wilk Test	0.994	0.678	Normally distributed

Note: W = Shapiro–Wilk test statistic.

Normality of the model residuals was assessed using the Shapiro–Wilk test. The residuals did not significantly deviate from normality (W = 0.994, p = 0.678).

4. DISCUSSION:

The title of this research study is “Quantitative Assessment of Skin Oiliness during *Shodhana Snehapana*- A Prospective Observational Analytical Study”. Few studies have assessed *Samyaka Snigdha lakshanas*, but so far, no such work has been done which can assess the oiliness of the skin in the form of digital number. So, Oiliness of Skin which is one of the characteristics of *Samyaka Snigdha lakshanas* was chosen for this research work. To establish a relationship between *Snehapana* and Skin Oiliness, this title was designed. In this research work *Twaka Snigdhata* (Oiliness of Skin) was assessed by using Digital Skin Moisture Meter in the patients who were undergoing *Snehapana* (internal oleation therapy). In ancient *Ayurvedic* texts *Twaka Snigdhata* is said to be assessed on the basis of inferential reasoning. Till now we used to scratch the skin to assess the oiliness of the skin, in the patients who were undergoing internal oleation. But to put research work in front of world, an advanced tool is needed to assess such characteristics. Therefore, Digital Skin Moisture Meter was selected to assess oiliness of skin. In the present study, the assessment of *Samyaka Snigdha Lakshana* was carried out using a structured clinical assessment criterion previously used in clinical studies specifically designed to evaluate the classical clinical features described in Ayurvedic literature. [11-14] In the questionnaire, all of the possible questions for assessing *Samyaka Snigdha lakshanas* of an individual were included. [15] In addition, the oiliness of the skin, which represents an important objective parameter of internal oleation, was measured using a Digital Skin Moisture Meter. This instrumental assessment provided quantitative support to the clinical findings and helped minimize observer bias.

In this study, a total of 50 subjects were examined, all of whom had noted *Samyaka Snigdha Lakshanas* as detailed in Table 3. The presence of these features indicates the attainment of adequate internal oleation following *Snehapana.* Furthermore, as shown in Table 4, the findings demonstrated an overall increase in the device-derived skin-oiliness measurement from the first day to the last observed day of internal oleation. However, the number of observations declined across assessment days because participants were assessed only until the appearance of

Samyaka Snigdha Lakshanas, with only 11 subjects contributing observations on Day 6. These observations suggest that both the subjective clinical features and the objective digital skin oiliness measurements are consistent with the expected physiological response to internal oleation. Since skin oiliness was measured repeatedly in the same participants and attainment of *Samyaka Snigdha Lakshanas* occurred at different time points, a linear mixed-effects model was applied to evaluate the relationship between duration of *Snehapana* and skin oiliness. [16] Study Day was treated as a categorical fixed effect, with participant included as a random intercept to account for repeated measurements within individuals. Compared with Day 1, the estimated mean skin-oiliness score did not differ significantly on Day 2 ($\beta = 0.040$, 95% CI: −0.272 to 0.352, $p = 0.802$), whereas significantly higher estimated skin-oiliness scores were observed on Days 3, 4, 5, and 6 (all $p < 0.001$). A likelihood-ratio comparison of models treating study day as a continuous linear predictor versus a categorical fixed effect demonstrated that the categorical-day specification provided a significantly better fit to the data ($\chi^2(4) = 104.84$, $p < 0.001$). These findings suggest that changes in *Twaka Snigdhata* occurred during the course of *Shodhana Snehapana*, with significant differences relative to Day 1 becoming evident from Day 3 onward. These findings support the objective manifestation of internal oleation in accordance with the classical description of *Samyaka Snigdha Lakshanas*. The clinical relevance of this finding lies in the potential utility of quantitative skin oiliness measurement as an objective and reproducible method for monitoring the progression of *Twaka Snigdhata* during *Shodhana Snehapana*. However, the present study was not designed to establish clinically meaningful cutoff values or diagnostic thresholds for adequate oleation, and further validation studies are required before its routine clinical application.

Snehana(internal oleation therapy) is the process by which *Snigdhata* (unctuousness), *Vishyandana* (liquefaction), *Mardavata* (softness), and *Kledana* (moistening) are achieved.[4] It is essential to understand the importance of these four signs and symptoms of *Snehana* as described by our Acharyas. *Snehana* denotes *Snigdhata* or oiliness, *Vishyandana* indicates dissolution or diffusion, and *mardavata* describes softness, *Kleda* is defined as wetness or moistness. These four should be considered as the cardinal features that can be used to analyse *Snehana Karma*. It can be considered as the tool for producing *Samyaka Snigdha lakshana.* So, oiliness of skin is provided by *Snehana*(internal oleation therapy), *Adhasta Sneha Darshanam* (Appearance of oleaginous substance in the stool) is produced by *Vishyandana* (liquefaction), *Gatra Mardavata* (Softness of the body) is produced by *Mardavta* of *Sneha*, and *Asamhata Varchas* (Loose or unformed stool) is produced by *Kledana*(moistening). All these symptoms do not occur on the same day, however as the *Snehana* process progresses, the *Lakshana* (Clinical features) appear one by one.

The findings of the present study are consistent with previous *Panchakarma* studies evaluating *Samyaka Snigdha Lakshanas* during *Shodhananga Snehapana*. Ramteke et al. [15] and Patil et al. [24] reported a progressive appearance of classical *Lakshanas* with continued *Sneha* administration, with *Vatanulomana* and *Agnidipti* appearing relatively earlier than other features. Similar observations were recorded in the present study, supporting the classical Ayurvedic concept of gradual attainment of adequate oleation. However, unlike these studies, which primarily relied on subjective clinical assessment, the present study incorporated objective quantification of *Twaka Snigdhata* using a Digital Skin Moisture Meter.

Recent studies have emphasized the importance of objective assessment of skin-related *Ayurvedic* parameters. Kaushik et al. [19] employed instrumental methods to evaluate variations in *Twaka Snigdhata* among different *Prakriti* individuals, while Kavita Chambyal et al. [20] developed and validated assessment criteria for *Twaka Sarata*. The present study extends these efforts by quantitatively monitoring changes in skin oiliness during

Shodhana Snehapana, thereby supporting the use of digital assessment methods as a complementary approach for evaluating oiliness of skin.

The observations of the present study demonstrate a progressive increase in skin oiliness and sequential appearance of *Samyaka Snigdha Lakshanas* during *Shodhana Snehapana*. The following explanations are proposed hypotheses based on classical *Ayurvedic* principles and contemporary physiological concepts and should be interpreted as possible mechanisms underlying the observed findings.

***Samanya vishesa siddhanta*:** According to *Acharya Charaka Samanya* is responsible for increase (*Vriddhi*), and *Vishesa* is responsible for decrease (*Hras*). The Tridosha, *Saptadhatu* (tissues), and *Malas* (waste products) are said to increase when homologous substances are used, and decrease when antagonistic substances, i.e. substances with opposite properties, are used. [17] So it can be understood that administration of *Snehapana* increases oiliness in the body.

During the description of *Dhatu Sarata*, the term *Twak Sara* is used instead of *Rasa Sara*. *Acharya Dalhana* explains that *Twak* represents the *Rasa* beneath the skin and that the excellence of *Rasa Dhatu* is best reflected through the skin. [18] The progressive increase in skin oiliness observed in the present study is consistent with this classical concept; however, this interpretation remains theoretical, as the underlying physiological mechanisms were not directly investigated.

From a contemporary physiological perspective, one possible explanation for the increase in skin oiliness observed during *Shodhana Snehapana* is the systemic distribution of lipid components following *Sneha* administration. Fatty acids present in biological cell membranes share physicochemical similarities with *Ghrita* and it has been proposed that they facilitate its interaction at the cellular level and contributing to softness, smoothness, and unctuousness of the body. [25] These changes may be reflected clinically as *Twaka Snigdhata*, one of the classical features of *Samyaka Snigdha Lakshana*. Furthermore, from a dermatological perspective, increased skin surface lipids are associated with improved skin barrier function, reduced transepidermal water loss, and enhanced skin suppleness. The progressive increase in skin oiliness observed in the present study may therefore represent a measurable manifestation of the oleation process during purificatory internal oleation. Although the observed increase in skin oiliness was associated with the duration of *Shodhana Snehapana*, alternative explanations such as disease-related differences, individual physiological variability (e.g., *Prakriti, Agni,* and *Kostha*), and environmental influences cannot be completely excluded. Efforts were made to minimize environmental variability by performing assessments at a fixed time, at the same anatomical site, and under similar inpatient conditions using a standardized assessment protocol. Nevertheless, the influence of these factors cannot be entirely ruled out and should be investigated in future studies with larger, more homogeneous populations and appropriate adjusted analyses.

5. CONCLUSION:

The present study was conducted to quantitatively evaluate changes in oiliness of skin during Purificatory internal oleation using a Digital Skin Moisture Meter. The findings demonstrated an overall increase in the device-derived skin oiliness measurement from the first day to the last observed day of *Snehapana* among the study participants who exhibited *Samyaka Snigdha Lakshana*. Linear mixed effects model analysis demonstrated a significant association between the duration of *Snehapana* and the increase in the device-derived skin measurement ($p < 0.001$). These findings suggest that quantitative device-derived skin measurement may have potential utility as an objective adjunct for monitoring *Twaka Snigdhata* during the oleation process. The Digital Skin Moisture Meter facilitated quantitative, non-invasive, and standardized measurement, using a standardized assessment protocol. Thus, the integration of digital assessment methods with classical Ayurvedic principles may contribute to a more

standardized approach for evaluating changes occurring during Purificatory internal oleation. However, further validation studies evaluating diagnostic accuracy, reliability, sensitivity, specificity, and agreement with appropriate reference standards are required before it can be considered a validated objective tool for assessing oiliness of skin during Purificatory internal oleation.

Sources of Bias: The present study employed a non-randomized convenience sampling method, which may have introduced selection bias. As participants were recruited from a single center, the study population may not fully represent the broader population undergoing Purificatory internal oleation. Observer-related bias during assessment of subjective *Samyaka Snigdha Lakshanas* cannot be completely excluded. Although objective assessment of skin oiliness using a Digital Skin Moisture Meter minimized subjective measurement bias, some measurement variability related to instrument performance and environmental conditions cannot be completely excluded. Disease-related confounding due to the inclusion of participants with different clinical conditions was minimized by obtaining repeated measurements within the same participant, with each participant serving as their own reference. However, residual confounding cannot be completely excluded. However, efforts were made to minimize bias through the use of predefined assessment criteria, standardized measurement procedures, fixed assessment timing, and objective quantification of skin oiliness using a digital skin moisture meter.

Limitations and future scope: The present study was conducted at a single center using convenience sampling and included a relatively small sample size of 50 participants, which may limit the generalizability of the findings. Furthermore, the absence of a control group restricts the ability to compare the observed changes in skin oiliness exclusively with the effects of Purificatory internal oleation. Although measurements were standardized with respect to anatomical site, timing of assessment, instrument used, and participant instructions, environmental parameters such as room temperature and humidity were not objectively monitored; therefore, some degree of measurement variability cannot be completely excluded. As the present study did not include comparison with an established reference standard, sensitivity and specificity of the Digital Skin Moisture Meter could not be determined. Future validation studies are warranted. In addition, the heterogeneous study population comprising healthy individuals and patients with different disease conditions, as well as individual variations in *Prakriti, Agni, Kostha*, hydration status, skin type and unctuous substance administered may have influenced baseline skin oiliness and contributed to variability in the observed outcomes. These variables were not included as covariates in the linear mixed-effects model, as the primary objective of the study was to evaluate within-subject changes in skin oiliness during *Shodhana Snehapana* rather than to compare outcomes across disease categories or unctuous substances. Future studies with larger sample sizes, multicentric designs, homogeneous disease populations, control groups, and standardized protocols are recommended to further strengthen the evidence regarding objective assessment of *Twaka Snigdhata* during Purificatory internal oleation. Additionally, future research may focus on evaluating specific *Ghrita* formulations in particular disease conditions to better understand their targeted therapeutic efficacy.

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