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# AN OBSERVATIONAL STUDY TO ANALYSE TWAK IN SUBJECTS WITH DIFFERENT PRAKRITI IN RELATION TO TWAKSARATA USING MOISTURE METER AND PH METER

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## ABSTRACT

This observational study investigates the condition of skin (twak) in subjects with different *Prakriti* types, specifically focusing on its relationship with Twaksarata. *Twaksarata* denotes the quality of the skin. This observational study investigates the condition of skin (*Twak*) in subjects with different *Prakriti* types, specifically focusing on its relationship with *Twaksarata*, which refers to skin quality in terms of hydration and pH balance. A total of 200 healthy participants, aged 20 to 30 years, were categorized into groups based on their *Prakriti*. Subjects were selected randomly but data were collected in a controlled environment to minimize external factors affecting skin properties. Using moisture and pH meters, skin moisture levels at cheeks and pH were measured at standardized sites on the forearm of each participant. Further, for this study the *Prakritis* of the 200 participants were determined by using approved CCRAS Performa. The collected data was then analyzed and result was concluded using suitable statistical test. These findings underscore the influence of *Prakriti* on *Twaksarata*, aligning with *Ayurvedic* principles that advocate for individualized approaches to skincare and health management. Hence this small study accounts that whether Moisture meter and pH meter can be as standardized tools to measure *Twaksarata* in individuals having different *Prakritis*. Also, this study contributes to the understanding of how different constitutional types can affect skin health and emphasizes the need for personalized strategies in holistic skincare practices. Future research may

explore the implications of these differences for preventive and therapeutic dermatological approaches.

**KEYWORDS:** *Twak, Twaksarata, Prakriti,* Moisture meter, pH meter.

## INTRODUCTION

In Ayurveda, the skin (*Twak*) is considered a vital organ reflecting overall health and well-being. The concept of *Prakriti*, or an individual's constitutional type, plays a significant role in determining various physiological and psychological characteristics, including skin health. *Sara* determines the state of excellence of body constitutes. *Twaksarata* denotes the quality of skin, encompasses parameters such as hydration, texture, and pH balance.

Stratum corneum has around or more than 10%. optimal hydration which makes the skin resistant, supple, luminous, soft and smoother. If the water content of corneum is lost skin appears rough, lacks flexibility, dehydration line may present and moisture is restored from the lower epidermal layer and dermis. Thus, to maintain healthy skin, the phenomenon of water loss and replenishment should be balanced. Water content of stratum corneum depends on 4 key points –barrier properties of stratum corneum, stratum corneum water binding capacity water content across the stratum corneum and viable epidermal stratum transporter function.

Stratum Corneum has a slightly acidic film called Acid Mantle that act as barrier to the microorganism that might penetrate the skin. So, there is a relation between acid mantle and its antimicrobial activity. Normal value of skin pH ranges from 4.9 to 5.8 due to the presence of acid mantle. The skin hydrogen potential is the measure of $H^+$ ion concentration presents in the watery solution present on the surface. The skin pH can provide information about the skin health and its relation with the microflora. If the pH is basic, the skin balance is altered, skin loses water and starts dehydrating. Change in pH is not immediately compensated, it stimulates the skin deeper layers to produce more acid to restore balance buffer system and send to the surface.

Variation in skin characteristics is found as per the predominance of *Deha Prakriti*. This observational study aims to analyze the condition of *Twak* in subjects with different *Prakriti* types in relation to *Twaksarata*, utilizing moisture and pH meters for accurate assessment.

## AIM AND OBJECTIVES

### Aim

To analyse the *Twak* in the subjects with different *Prakriti*.

### Objectives

1. To analyse the *Twak* using Moisture meter and pH meter.
2. To find a probable relation between the *Prakriti* and the *Twak*.
3. To establish whether Moisture Meter and pH Meter can be used as a precise tool to understand the influence of *Prakriti* on the *Twak*.

## MATERIALS AND METHODS

### Selection of subjects

1. The subjects with the mean age of 20 - 30 years from *Patanjali Bhartiya Ayurvigyan Evum Anusandhan Sansthan, Haridwar* and *Periphery* shall be selected for the purpose of study, irrespective of their religion, occupation etc.
2. A detailed Performa shall be made using modern and *Ayurvedic* text.
3. The subjects fulfilling the inclusion and exclusion criteria shall be registered for study.

### Inclusion criteria

1. Subjects within the age group of 20 to 30 years
2. Healthy subject

### Exclusion criteria

1. Subjects suffering from metabolic disorders
2. Subject suffering from nutritional disorders
3. Subjects who have undergone any kind of skin or cosmetic surgery
4. Subjects who are under the influence of steroids
5. Subjects using advanced cosmetic products
6. Subjects having any underlying skin condition
7. Subjects below 20 years of age and above 30 years of age
8. Pregnant females, nursing mothers and those under treatment with oral contraception.

### Methods

For the purpose of the present study, 200 healthy subjects between the age group of 20-30 years of age. As in the age below 20 *Dhatus* are still forming, between 20-30 *Dhatus* are

stable and after 30 Dhatus starts deteriorating. All the subjects were from *Patanjali Bhartiya Ayurvigyan* and *Anusandhan Sansthan* and periphery itself to avoid involvement of the external factors like food, different academic stress level etc and to create awareness of skin health among the students were selected randomly irrespective of their gender. A Performa was prepared containing questions regarding the *Twak* and *Twaksarata* as described in Samhitas and modern study. Skin moisture and pH levels were measured using a miLi moisture meter and a Ketsicart pH meter respectively. Moisture content was measured at the cheeks and pH was measured at forearm of the subjects. Measurement was taken after wiping the areas to be measured with distilled water to avoid the involvement of external factors like moisturizer etc., and measurement were taken after several minutes of drying. Measurements were taken three times at the locations of each participant to ensure consistency. pH of the skin was measured by adding water droplets to the skin surface because some lipids (free fatty acid) are amphiphilic, they release $H^+$ ions into the waters. Data were collected in a controlled environment to minimize external factors affecting skin properties. After that the *Prakriti* of the subjects were recorded online on the standardized *Prakriti* Performa made by CCRAS Delhi. Subjects were encouraged to the questions with honesty to avoid any biasness.

**Statistical analysis**

In this study 200 individuals were enrolled. Demographic data is presented in the form of frequency and percentage along with graphical representation. ANOVA test is carried out for comparison of mean among six different *Prakritis*. Chi-Square Test is carried out to test the association. P-Value less than 0.05 considered significant and P-Value greater than 0.05 considered not significant. Statistical analysis is performed using SPSS 20.0 software.

**Table no. 1: Showing Prakriti distribution of 200 subjects.**

| ***Prakriti*** | **Frequency** | **Percentage** |
|---|---|---|
| KP | 34 | 17.00% |
| KV | 25 | 12.50% |
| PK | 14 | 7.00% |
| PV | 37 | 18.50% |
| VK | 29 | 14.50% |
| VP | 61 | 30.50% |
| TOTAL | 200 | 100.00% |

Out of 200 subjects, 34 were having *Kapha Pitta Prakriti*, 25 were having *Kapha Vata Prakriti*, 14 were having *Pitta Kapha Prakriti*, 37 were having *Pitta Vata Prakriti*, 29 were having *Vata Kapha Prakriti* and 61 were having *Vata Pitta Prakriti*.

**Diagram no. 1**

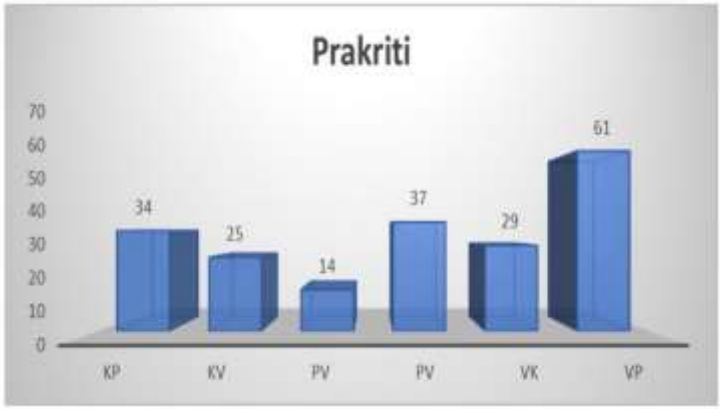



**Table No. 2: Showing association between *Prakriti* and pH of skin using ANOVA test.**

| Skin pH | N | Mean | SD | SE | F-Value | P-Value | Result |
|---|---|---|---|---|---|---|---|
| KP | 34 | 4.92 | 1.07 | 0.18 | 3.2347 | 0.0079 | Sig |
| KV | 25 | 4.94 | 0.93 | 0.19 | | | |
| PK | 14 | 4.86 | 1.08 | 0.29 | | | |
| PV | 37 | 4.62 | 0.98 | 0.16 | | | |
| VK | 29 | 5.29 | 0.52 | 0.10 | | | |
| VP | 61 | 4.96 | 0.70 | 0.09 | | | |

Since observations are quantitative, ANOVA test was carried out from comparison of mean skin pH among different *Prakriti*. From above table, it can be observed that, P-Value is less than 0.05. Hence, we can conclude that, there is significant difference in mean pH levels according to *Prakriti*.

**Diagram no. 2**

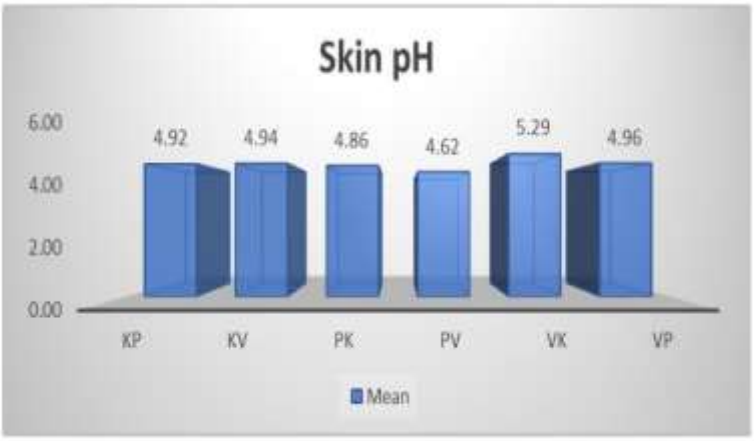


**Table no. 3: Showing association between *Prakriti* and Skin Moisture using ANOVA Test.**

| Skin Moisture | N | Mean | SD | SE | F-Value | P-Value | Result |
|---|---|---|---|---|---|---|---|
| KP | 34 | 36.45 | 2.71 | 0.46 | 2.3112 | 0.0456 | Sig |
| KV | 25 | 35.34 | 2.74 | 0.55 | | | |
| PK | 14 | 35.79 | 1.95 | 0.52 | | | |
| PV | 37 | 36.40 | 2.93 | 0.48 | | | |
| VK | 29 | 35.69 | 2.80 | 0.52 | | | |
| VP | 61 | 35.86 | 2.44 | 0.31 | | | |

Since observations are quantitative, ANOVA test was carried out from comparison of mean skin Moisture % among different *Prakriti*. From above table, it can be observed that, P-Value is less than 0.05. Hence, we can conclude that, there is significant difference in mean skin moisture % according to *Prakriti*.

**Diagram no. 3**

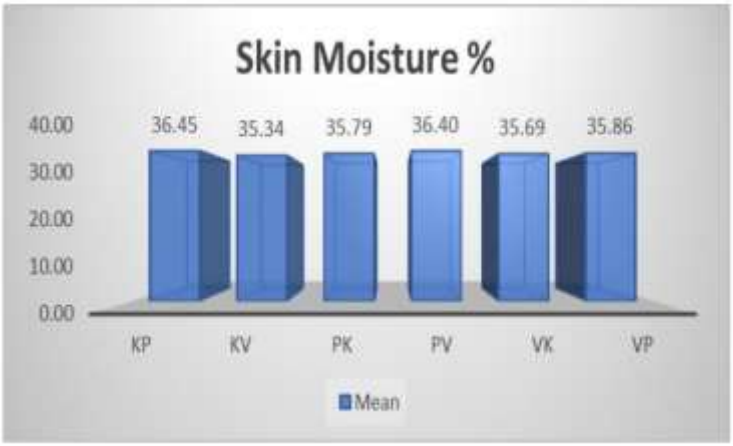



**Table No. 4: Showing association between *Prakriti* and pH of skin using Chi-Square test.**

| | | | Prakriti | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | | | KP | KV | PK | PV | VK | VP | |
| Skin pH | Zero (< 4.9) | Count | 15 | 8 | 5 | 18 | 5 | 22 | 73 |
| | | % | 44.1% | 32.0% | 35.7% | 48.6% | 17.2% | 36.7% | 36.5% |
| | Average (4.9 to 5.8) | Count | 12 | 14 | 8 | 17 | 21 | 35 | 107 |
| | | % | 35.3% | 56.0% | 57.1% | 45.9% | 72.4% | 58.3% | 53.5% |
| | High (> 5.8) | Count | 7 | 3 | 1 | 2 | 3 | 4 | 20 |
| | | % | 20.6% | 12.0% | 7.1% | 5.4% | 10.3% | 6.7% | 10.0% |
| Total | | Count | 34 | 25 | 14 | 37 | 29 | 61 | 200 |
| | | % | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

| Chi-Square Tests | | | |
|---|---|---|---|
| | Value | df | P-Value |
| Pearson Chi-Square | 22.137 | 10 | 0.014 |
| N of Valid Cases | 200 | | |

Chi-Square test is carried out to test association between *Prakriti* and skin pH. From above table, we can observe that, P-Value is less than 0.05. Hence, we can conclude that, there is significant association observed between *Prakriti* and skin pH.

**Diagram no.4**

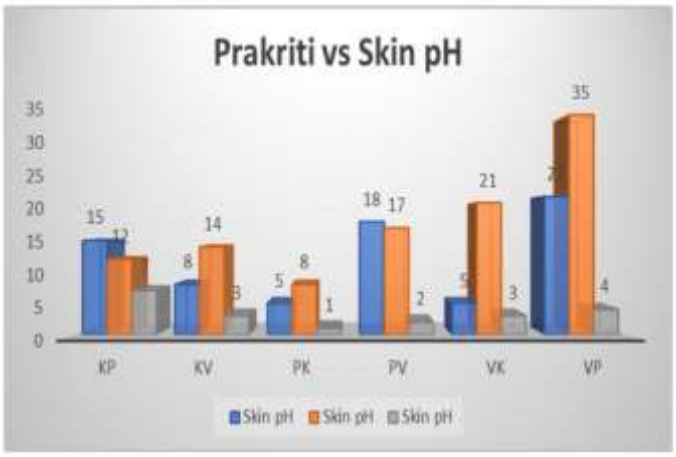


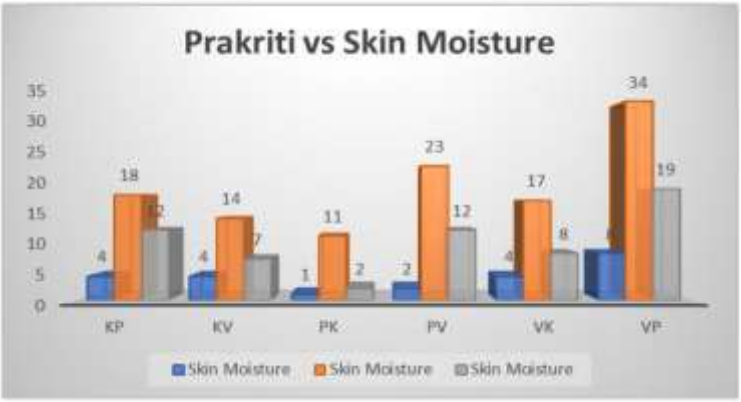

**Table no. 5: Showing association between *Prakriti* and Skin Moisture using Chi-Square Test.**

| | | | Prakriti | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | | | KP | KV | PK | PV | VK | VP | |
| Skin Moisture | < 33% (Very Dry) | Count | 4 | 4 | 1 | 2 | 4 | 8 | 23 |
| | | % | 11.8% | 16.0% | 7.1% | 5.4% | 13.8% | 13.3% | 11.5% |
| | 34-37 % (Dry) | Count | 18 | 14 | 11 | 23 | 17 | 34 | 117 |
| | | % | 52.9% | 56.0% | 78.6% | 62.2% | 58.6% | 56.7% | 58.5% |
| | 38-45 % (Normal) | Count | 12 | 7 | 2 | 12 | 8 | 19 | 60 |
| | | % | 35.3% | 28.0% | 14.3% | 32.4% | 27.6% | 31.7% | 30.0% |
| Total | | Count | 34 | 25 | 14 | 37 | 29 | 61 | 200 |
| | | % | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

| Chi-Square Tests | | | |
|---|---|---|---|
| | Value | df | P-Value |
| Pearson Chi-Square | 19.738 | 10 | 0.032 |
| N of Valid Cases | 200 | | |

Chi-Square test is carried out to test association between *Prakriti* and skin moisture%. From above table, we can observe that, P-Value is less than 0.05. Hence, we can conclude that, there is significant association observed between *Prakriti* and skin moisture %.

**Diagram no. 5**




## RESULTS

After studying all the observation and statistical data, we can say that there is a significant association found between the chosen variables i.e. *Prakriti* as per CCRAS format and both pH and Moisture levels, as an attempt to test the association between *Twak* and *Prakriti* in relation to *Twaksarata*. ANOVA test is carried out for comparison of mean among six different *Prakritis*. Chi-Square Test is carried out to test the association.

ANOVA test was carried out from comparison of mean skin Moisture % among different *Prakriti* and comparison of mean skin pH among different *Prakriti*. Both has P-Value is less than 0.05. Hence, we can conclude that, there is significant difference in mean skin moisture % and mean skin pH according to *Prakriti*.

Chi-Square test is carried out to test association between *Prakriti* and skin moisture% and association between *Prakriti* and skin pH. Both has P-Value is less than 0.05. Hence, we can conclude that, there is significant association in skin moisture % and skin pH with *Prakriti*.

## DISCUSSION

For thesis study 200 healthy subjects were selected randomly. *Prakriti*, Moisture content and pH content of the skin. After filling the master table, the data was analysed statistically to conclude the result.

For the better understandings skin pH is categorized into three ranges (low < 4.9, average 4.9 to 5.8, and high > 5.8) and skin moisture categorized into three ranges (very dry < 33%, dry 34-37%, and normal 38-45%).

1. Table 2-3 and corresponding bar diagram shows the comparison between *Prakriti* and both mean skin pH and mean moisture level using ANOVA test. The P-Value is less than 0.05. Hence, we can conclude that there is significant association between selected parameters.
2. Table 4-5 and corresponding bar diagram shows the association between *Prakriti* and both skin pH and moisture level using Chi-Square test. The P-Value is less than 0.05. Hence, we can conclude that, there is significant association between the selected parameters.

**Skin moisture**

KP have a higher moisture level with a mean of 36.45%, with the presence 52.9% of cases in the dry category denotes that even having high moisture level this constitution may experience hydration challenges due to environmental or lifestyle factors.

PK has a greater number of individuals in dry category.

PV and VP demonstrated the highest incidence of dry skin (23 and 34 cases) suggesting that it may led to vulnerability to skin dryness and irritation.

VK and KV showed a mixed distribution

**Skin pH**

VP has the highest count of individuals with an average range of skin pH i.e., 35.

VK and KV also show high average pH counts suggests a healthier skin barrier, it's more likely benefiting from the moisture retaining quality of K.

- PV shows a higher number of individuals with lower skin pH (< 4.9) compared to other types i.e., 18 emphasizes the need for skincare regimens that support a more acidic environment.
- KP has a more even distribution across the three pH categories but higher number of individuals having high pH is more than other groups i.e., 7 suggesting potential issues with skin barrier integrity, that may lead to dryness, irritation or infections.

## CONCLUSION

- *Prakriti* is the one of the important tools to decide the normal physiology of the body.
- *Twaksarata* is a physiological process which vary in different *Daihik Prakriti* combinations with respect to their age time and situation. It is difficult to mention one's *Twaksarata* on the basis of subjective parameters. So, Moisture level and ph level selected as the parameter to measure *Twaksarata* in an individual.
- Data collected in this study underscore the significant relationship between *Daihik Prakriti* and both Moisture and pH levels.
- ANOVA test was applied to the collected data to find difference between mean moisture content and different *Daihik Prakriti* as well as mean pH and different *Daihik Prakriti* and a strong association was found between the two.
- Chi-Square test was applied to the data collected for different *Prakriti* and *Twak*. A strong association was found between the two, considering the moisture and pH values.
- On the basis of the results and after discussing the facts we can conclude that Moisture meter and pH Meter can be used as a standradised tool to analyse *Twak* in relation to *Twaksarata.*

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