Research Article

www.ijrap.net (ISSN:2229–3566)

# SKIN BACTERIAL MICROFLORA AMONG DIFFERENT DEHA PRAKRITI HEALTHY FEMALE STUDENTS: A CROSS SECTIONAL STUDY

Vyas Suwarna D. [1]*, Vyas Deepak M. [2]

[1] Ph.D., Department of Kriya Sharir, Government Ayurved College, Nagpur, Maharashtra, India

[2] Ph.D., Department of Kriya Sharir, L.N. Ayurved College and Hospital, Bhopal, Madhya Pradesh, India

Received on: 22/09/20 Accepted on: 19/11/20

***Corresponding author**

E-mail: dr.deepakmvyas@gmail.com

**DOI: 10.7897/2277-4343.1106180**

**ABSTRACT**

Ayurveda attributes primary importance for prevention and the maintenance of health. A healthy lifestyle is emphasized as the determinant of longevity of life, which depends on the Prakriti (bio-identity i.e. body-mind constitution) of an individual. Proper understanding of Prakriti leads the physician in making the right diagnosis, treatment plan and prognosis and also in guiding how to stay disease-free, what to do for restoration and maintenance of health. Normal microbiota provides the first-line defence against microbial pathogens plays a role in toxin degradation and contribute to maturation of immune system. There is variation in skin qualities according to different Deha Prakriti. So here is an attempt to study skin microbial flora in healthy female students according to different Deha Prakriti. It was a cross-sectional study conducted on unmarried healthy female students (21-30 years) who were willing to participate in the study. Total 1187 volunteers were screened with screening form. 904 volunteers fulfilled screening criteria were further examined for Deha Prakriti Pariksha until getting single dominant Prakriti (single Prakriti Lakshana more than 65%). 58 Vata dominant Prakriti volunteers, 70 Pitta dominant Prakriti and 61 Kapha dominant Prakriti volunteers were eligible for further study. 150 volunteers having single dominant Prakriti (50 volunteers from each dominant Prakriti Group) were randomly selected for further study. The whole study was carried out only in Visarga Kala to avoid the effect of weather. The Microbial study showed the distribution of microorganisms as per normal distribution in all three groups of Prakriti. But the variation of microorganisms according to different Deha Prakriti did not show any association.

**Keywords:** Prakriti, Vata. Pitta, Kapha, Microflora

## INTRODUCTION

Ayurveda is the science of life. It is a comprehensive system of health care. It is mainly based on experimental knowledge which passed from family to family or from teacher to student. The knowledge expanded further with lying down of fundamental concepts of Ayurveda and systematized in classical texts like Charaka Samhita, Sushruta Samhita and Ashtanga Sangraha. Present form of Ayurveda is the outcome of continue scientific inputs that have gone into the evolution of its principles, theories and guidelines of healthy living and disease management; this reflects the pragmatic aspect of Ayurveda.

Ayurveda attributes primary importance for prevention and the maintenance of health. Healthy lifestyle is emphasized as the determinant of longevity of life, which depends on the Prakriti (bio-identity i.e. body - mind constitution) of an individual. Proper understanding of Prakriti leads the physician in making right diagnosis, treatment plan and prognosis and also in guiding how to stay disease-free, what to do for restoration and maintenance of health. A different characteristic of skin according to Prakriti is mentioned in Ayurvedic literature.[1] The Method of Twacha Parikshana according to Prakriti is mentioned in Ayurveda.[2,3]

The term normal microbial flora or micro biota denotes the population of micro-organisms that inhibit the skin and mucous membrane of healthy person. The Human body itself contains thousands of specious of bacteria and a smaller number of viruses, fungi and protozoa. Normal micro biota provides a first line defence against microbial pathogens, plays a role in toxin degradation and contribute to maturation of immune system. So here is an attempt to study skin microbial flora in healthy women according to different Deha Prakriti.

**Aim:** To Study skin bacterial Microflora among different Deha Prakriti healthy female students.

**Objective:** Objective: To study skin Microflora by skin swab culture technique.

### Literature review

According to Ayurveda every individual is different and hence should be considered as a different entity called Prakriti. Prakriti means Swabhav or nature of an individual.[4] According to Vagbhata the Prakriti remains unchanged throughout the life prior to death. Ayurveda categorizes human population into sub population such as Vata Prakriti, Pitta Prakriti and Kapha Prakriti or their combination on the basis of anatomical, physiological and psychological characteristics with completely avoidance of racial, ethical and geographical consideration. Ayurveda has categorized Prakriti such as Vata, Pitta and Kapha or combination of either two or three of them.[5] In Ayurvedic literatures it has mentioned that different Prakriti will have different characteristics. They have mentioned special characteristics of skin. Due to dominance of the Vata Dosha Vata Prakriti person shows lustreless skin. Due to Parusha Guna hairs, skin is rough in texture.[6] Pitta Prakriti person has fair body colour; they have reddish black spots on their body. They have moles and have a tendency for wrinkles, acne and the hairs to turn gray at an early age. Generally the hairs are soft, feeble and are golden coloured. The complexion of Kapha Prakriti has oily skin. There were few research works done on skin according to Deha Prakriti. The Fitzpatrick skin type

classification shows the skin of Pitta Prakriti volunteers were sun sensitive, sometimes burn and slowly tans to light brown. The skin of Vata Prakriti volunteers were minimal sensitive while skin of Kapha Prakriti volunteer's skin was sun insensitive and rarely burn.[7] The skin of Vata and Pitta dominant Prakriti individuals were less hydrated skin while the skin of Kapha dominant Prakriti is well hydrated.[8]

Human always coexist with microorganisms. The presence of normal flora is beneficial to each individual and it is responsible for immune stimulation and plays a major role in human nutrition and metabolism. Normal flora is also a common source of infection and also initiates the mechanism that give rise to allergic disorders and inflammatory bowel disease.[9] The density and composition of the normal flora vary with anatomical location. The makeup of the normal flora depends upon various factor including genetic, sex, age, stress, nutrition and diet of an individual. The ancient Indian Acharya was very well aware about the science of microbes. Rigveda also highlights the concept of microbes as invisible organism having specific unique characteristics. This is a very clear evidence of the existence of microscopic field in ancienttime.[10] There are two types of flora, resident flora and transient flora. Resident flora is constantly present in or on the body and cannot be removed permanently. These prevent permanent colonization of the body by the other organisms. Transient flora are transiently present (present for a short time) in or on the body and can be removed permanently, they only partially prevent permanent colonization of the body by the other organism. The microbes of normal resident flora are harmless and may be beneficial in their normal location in the host and in the absence of coincident abnormalities. In human various parts of body that normally contain many micro-organisms are the skin, nose oropharynx, mouth, large intestine, anterior parts of urethra and vagina. The non-pathogenic resistant bacteria occupy attachment sites on the skin and mucosa that can interfere with colonization by pathogenic bacteria. The ability of members of the normal flora to limit the growth of pathogens is called colonization résistance. If the normal flora is suppressing pathogens may grow and cause disease. They may serve a nutrition function.

**Normal flora of the skin**

Human skin is covered with a continuous layer of microbes, which reside within epidermis, dermis and the skin-associated glands and follicles, forming a diverse multicellular community known as the normal skin micro biota. The Skin microbiota constitutes mainly of different bacteria but also of fungal species. The Total number of microbes on the skin surface is typically within the range of $10^4$–$10^6$ cells/cm$^2$. The Healthy skin microbiota contributes to skin homeostasis and plays a role in both health and disease. The composition of the normal microbiota of the human skin is diverse and differences between the skin microbiota of different individuals are high although some studies suggest a relatively low interpersonal variation. Notably, the composition of skin micro biota also varies between different anatomical sites, which provide different environmental conditions (e.g. moisture, temperature, pH, presence of Hair, follicles and other microbes, sweat, nutrients, exposure to light and oxygen) for microbes to proliferate.

Based on cultivation studies, the healthy human microbiota has been proposed to constitute mainly of *Propionibacterium* (e.g. P. acnes), *Staphylococcus* (e.g. S. epidermis and S. hominis), *Corynebacterium, Streptococcus, Pseudomonas, Micrococcus, and Acinetobacter, Brevibacterium* and *Dermabacter hominis* and the yeast *Malassezia*. The Skin microbiota plays a role in both maintenance of skin health and development of skin diseases. Examples associated with alterations in the composition of skin microbiota include acne and psoriasis.[11]

The constant exposure to the environment the skin has transient microorganism. Nevertheless, there is constant and well-defined resident flora modified in different anatomical areas by secretions, habitual wearing of clothing or proximally to mucus membranes (mouth, nose and perennial areas). Among the factors that may be important in eliminating non-resident micro-organisms from the skin are the low pH, the fatty acid in sebaceous secretion and the presence of lysozymes. The profuse sweating, washing or bathing cannot eliminate or significantly modify the normal resident flora. The number of superficial microorganisms may be diminished by vigorous daily scrubbing with soap containing hexachlorophene or the other disinfectants. The predominant member of the normal flora of the skin is *Staphylococcus epidermis*. It is non-pathogenic on skin but can cause disease when it returns to certain sites. *Staphylococcus aureus* is also present on the skin, but its main site is in the nose.

**MATERIAL AND METHODS**

It was cross sectional study in which volunteers were studied single time. Total 1187 volunteers were initially screened with the help of screening proforma (consisting of inclusion and exclusion criteria). Screening proforma consist of healthy status form which include questionnaires according to Kashyapa and Charaka Samhita. Those volunteers fulfilling 80% of its lakshana were considered as healthy, 904 volunteers fulfilled screening criteria were further studied for Prakriti Parikshana until getting dominant Prakriti (> 65% single Prakriti Lakshana). 150 volunteers having single dominant Prakriti (50 volunteers from each dominant Prakriti Group) were randomly selected for further study. Prakriti Parikshana was done with the help of questionnaires based on score system of Ayusoft. Each lakshana carried score and maximum score was used to decide Prakriti. If more than 65% lakshana were present, then it considers as dominant Prakriti.

**Inclusion criteria**

- Healthy volunteers.
- Unmarried female volunteers.
- Age: - 21 – 30 yrs.
- Volunteer residing in particular area since last six months.
- Volunteer residing 50 kms periphery from study site.
- Occupation- student.
- Volunteer with middle socio-economic class.
- Willing for consent.

**Exclusion criteria**

- Pregnant and Lactating women.
- Volunteers participated in any other clinical trial 4 weeks prior to enrolment into this study.
- Volunteer with history of Anaemia.
- Volunteer with history of any allergic disorder.
- Volunteer with family H/O Congenital or hereditary disorders.
- Volunteer with history of travelling in another environment in last 4 weeks.
- Volunteers with premature sign of skin aging.
- Volunteers with addiction of smoking and chronic Alcohol intake.

The selected volunteers were enrolled for further study after signing consent form. Skin swab was obtained for microbial

culture. All 150 volunteers were instructed not to apply any cosmetic before skin examination. In this research work microbiological study is limited to some normal skin flora of bacterial origin. Skin swab was collected from anterior cubital fossa by using sterile swab stick. The swabs were cultured on Blood agar and MacConkey's agar by following standard culture technique.[12] The Microbial growth of *Bacillus subtilis, Corynebacterium*, *Escherichia coli, Klebsiella pneumoniae, Micrococcus species, Nonhemolytic-streptococci, Pseudomonas aeruginosa, Staphylococci aureus, Staphylococci epidermidis* were observed.

**Table 1: Distribution of Skin Bacteria isolated (N = 150)**

| Skin Aerobic Bacteria | Number of Volunteers | | | Total | p-value |
|---|---|---|---|---|---|
| **Micro organisms** | **Vata Prakriti (N = 50)** | **Pitta Prakriti (N = 50)** | **Kapha Prakriti (N = 50)** | | |
| *Bacillus subtilis* | 02 (04%) | 05 (10%) | 04 (8%) | 11 (7.34%) | 0.626, NS |
| *Diptheroids* | 05 (10%) | 04 (8%) | 09 (18%) | 18 (12%) | 0.374, NS |
| *Micrococcus species* | 02 (4%) | 00 (0%) | 03 (6%) | 5 (3.33%) | 0.371, NS |
| *NHL streptococci* | 00 (0%) | 01 (2%) | 01 (2%) | 2 (1.34%) | 1.000, NS |
| *Enterobacteriace* | 15 (30%) | 16 (32%) | 16 (32%) | 47 (31.37%) | 1.000, NS |
| *Staphylococci aureus* | 03 (6%) | 01 (2%) | 01 (2%) | 5 (3.33%) | 0.620, NS |
| *Staphylococci epidermidis* | 23(46%) | 23(46%) | 16 (32%) | 62 (41.34%) | 0.260, NS |
| | 50 | 50 | 50 | 150 (100%) | |

P > 0.05 – No significant, P < 0.05 and < 0.01 – Significant and P < 0.001 – highly significant, NS – no significant

## RESULT

In present study out of total 150 female volunteers, it was observed that *Staphylococci epidermidis* was found in 62 (41.34%) volunteers, *Enterobacteriace* was present in 47 (31.37%) volunteers and *Diptheroids* was present in 18 (12%) volunteers. The Other bacteria like *Bacillus subtilis* 11(7.34%), *Micrococcus species* 5 (3.33%), NHL *streptococci* 2(1.34%) while *Staphylococci aureus* 5 (3.33%) were present.

*Staphylococci epidermidis* was found in 23 (12%) volunteers of Vata and Pitta Prakriti while in Kapha Prakriti volunteers *Staphylococci epidermidis* was present in 16 (32%) volunteers. Out of 50 Vata Prakriti volunteers *Enterobacteriace* was found in 15(30%) volunteers. In Pitta Prakriti volunteers *Enterobacteriace* was present in 16(32%) volunteers while in Kapha Prakriti volunteers *Enterobacteriace* was present in 16 (32%) volunteers. Out of 50 Vata Prakriti volunteers. *Diptheroids* was found in 5 (10%) volunteers. In Pitta Prakriti volunteers *Diptheroids* was present in 4 (8%) volunteer and in Kapha Prakriti volunteers *Diptheroids* was present in 9 (18%) volunteers.

## DISCUSSION

Skin is the largest organ of the body. It helps in maintaining homeostasis by regulating heat and moisture transfer. The Skin provides first line of defence against environment such as temperature and pathogens. The skin and mucous membrane always harbor by a variety of micro-organisms' that can be arranged as resident or transient flora. The Resident flora consists of relatively fixed type of microorganisms regularly found in a particular area, if this disturbed it promptly re-establish itself. The Transients flora consists of nonpathogenic or potentially pathogenic microorganisms that inhabit the skin or the mucous membrane for hours, days or weeks. It is derived from the environment and does not establish itself permanently on the skin.

The Site-specific differences in community composition (volar forearms, inner elbow etc.) may be influenced by difference in sebum production, moisture and exposure to light and environmental condition.

In present study out of total 150 volunteers *Staphylococci epidermidis* was found in 62 (41.34%) volunteers, *Enterobacteriace* was present in 47 (31.37%) volunteers, *Diptheroids* was present in 18 (12%) volunteers and *Staphylococci aureus* was found in 5 (3.33%). These are most common commensal organism found on skin. Similar type of skin flora was observed by Mollie *et al*[13] in 10 healthy volunteers. He found the prevalence of *Micrococcus* and *Staphylococci* in 100%, *Bacillus species* 60% and *Enterobacteriaceae* in 10% of enrolled healthy volunteers. In few studies it has been observed that aerobic bacteria are more in number on black skin than white skin volunteers.[14]

According to Cogen A.L. *et al*[15] *Staphylococci aureus* is infrequent and usually pathogenic bacteria. In our study it was found that *Staphylococci aureus* was found in 6% of Vata Prakriti while it was found in 2% of Pitta and Kapha Prakriti volunteers respectively. Above distribution showed that though all volunteers were healthy and free from skin diseases, but *Staphylococci aureus* was seen more in Vata Prakriti. But it is statistically insignificant.

## CONCLUSION

Microbial study showed distribution of microorganisms as per normal distribution of microbial flora in all three group of Prakriti. The variation of microorganisms among different Deha Prakriti female students did not show any association. This may be due to less sample size for such type of microbial study.

## REFERENCES

1. Umarkar SV. The study of skin according to different Deha Prakriti with certain Ayurvedic, Biophysical, Biochemical and Microbial parameters. MUHS Nasik; 2017.
2. Sathe KD. Twacha Parikshana. In Pukshalavidhanam- Sharir Kriya Pratyakshik Margaadarshika. Pune: Pragati Books PV Ltd; 2005. p. 8.1-8.4.
3. Ranade S, Chaubhe S. Twacha Parikshana. In Sharir Kriya Vigyan (Pratakshik). Pune: Anmol Prakashan; 2004. p. 68.
4. Tikramji Y, editor. In Charaka Samhita Ayurved Dipika. Varanasi: Chaukhambha Surbharti Publication; 2005. p. 277.
5. Tripathy R, Shukla V, editors. In Charaka Samhita Vaidyamanorama Hiindi commentary. Varanasi: Chaukhambha Surbharti; 2000. p. 645.
6. Tripathy R, Shukla V, editors. In Charaka Samhita Vaidyamanorama Hindi commentary. Varanasi: Chaukhambha Surbharti; 2000. p. 644.
7. Umarkar SV, Vyas DM, Sathe KD, Kulkarni SB. Case series study of different predominant Deha Prakriti with special

reference to Fitzpatrick skin type classification. Int. J. Res. Ayurveda Pharma 2013 February; 4(6): 797-799.
8. Umarkar SV, Vyas DM, Kulkarni SB, Sathe KD. Variation in Skin Hydration on the basis of Deha Prakriti (Body Constitution) - A Cross Sectional Study. AYU 2018; 39: 127-131.
9. Annanthanarayana, Panikar. Textbook of Microbiology. 8th ed. Hyderabad: University Press India Private Ltd.; 2009.
10. Ravneet CK, Saroj V, Johar S. Concept of Microbiology in Ayurveda. Journal of Mechanical and Civil Engineering 2015 February; II (2).
11. Charbonneau DL, Song YL, Liu CX. Aging Skin Microbiology. In Farage MA, Miller KW, Maibach HI, editors. Textbook of Aging Skin: Springer Publication p. 873.
12. Collee J, Mrr W. Culture of Bacteria. In Mackie, Mecartney. Practical Medical Microbiology. 14th ed. p. 113-129.
13. Mollie E, Mcbride W, Christopher D, Knox JN. The Environment and the Microbial Ecology of Human skin. Applied and Environmental Microbiology 1977 March; 33(3): 603-608.
14. Ihuma JO, Asenge GH, Abioye JOK, Koggie AZ, Nmadu P, Nwakwo M. The Effects of some Medicated Soaps on some normal Micro-flora of the human skin. International Journal of Advanced Biological Research 2013; III (3): 341-347.
15. Cogen AL, Nizet V, Gallo RL. Skin Microbiota: a source of disease or defense? British Journal of Dermatology 2008; 158: 442-455.

**Cite this article as:**

Vyas Suwarna D. and Vyas Deepak M. Skin Bacterial Microflora among different Deha Prakriti healthy female students: A Cross Sectional Study. Int. J. Res. Ayurveda Pharm. 2020;11(6):27-30
http://dx.doi.org/10.7897/2277-4343.1106180

Source of support: Nil, Conflict of interest: None Declared