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Correlation of Hand Index with Prakriti: A Cross -Sectional Study

Research Article

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Abstract

Introduction: Based on the measurements of the body, the constitution and physique of an individual can be classified as ectomorph, mesomorph, and endomorph body types (somaotypes). Similarly, the knowledge of anthropometry can be made applicable in the assessment of *Deha Prakriti*, described in *Ayurveda*. Somatometry, a division of anthropometry includes direct surface measurements of the human body by scientific methods. Analysis and comparison of the absolute measurements of body parts do not give a precise idea about the individual typology of the subject, so it is necessary to work out the relevant indices, so variation in hand index between the different groups of dominant *Prakriti* has been observed. Methodology: Two hundred apparently healthy male individuals of age 18-40 years were registered from the population residing in Delhi. *Prakriti* of the study participants was assessed through the questionnaire. The length and breadth of both the hands were measured by the digital sliding caliper. The hand index is calculated as the percentage of the breadth of hand to the length of hand. The difference in the values of the hand index in different groups of dominant *Prakriti* was statistically analyzed by appropriate statistical tests. Result: The receiver operating characteristic (ROC) analysis showed the value of right hand index in different dominant Prakriti as *Vata* dominant <= 41.344, 41.344 < *Pitta* dominant < 43.930, *Kapha* dominant>=43.930, whereas in left hand, the value of hand index in *Vata* dominant <= 41.895, 41.895 < *Pitta* dominant < 43.687, *Kapha* dominant>=43.687. Conclusion: There are significant differences in the hand index among different *Deha Prakriti.*

Key Words: Dactylion, Stylion, Metacarpale ulnare-radiale.

Introduction

Somatometry, a branch of anthropometry, is a systematized knowledge of the techniques for measuring and recording observations in the human body. It includes direct surface measurements on different parts of the human body by scientific methods. (1) Analysis and comparison of the absolute values of the somatic measurements do not give a precise idea about the individual typology of the subject, it does not indicate to which series or group he belongs. To appreciate the exact placement of an individual it is necessary to work out the relevant indices. (2)

In the past few decades, anthropometry has found its application in many areas of medicine and health. Based on measurements of the body, the constitution and physique of an individual can be worked out and classification of body types (somatotypes- ectomorph, mesomorph, and endomorph) can be made. (3) Similarly the knowledge of anthropometry can be made applicable in the assessment of *deha Prakriti*, described in *Ayurveda*.

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Prakriti is one of the chief concepts of *Ayurveda* which determines how one individual is different from the other. It has wide-ranging applications in the field of health, and assessment of the life span and strength of the person or patient. (4) *Prakriti* represents the body constitution of the individual and is formed at the time of the union of *Shukra* and *Shonit* inside the womb. The *Prakriti* of a person gets formed from the *dosha,* dominant (*Utkat*) at the time of fertilization. (5) (6) (7)

Kapha Prakriti person is *sthula anga* (well-built muscular body), *pralamba bahu* (long arm), *prithu peen vaksha* (big and prominent chest), *maha lalat* (big forehead) (8), but the objective physical characters are not well quantified in Ayurveda texts. In this study, the difference of an index called the hand index in different groups of dominant *Prakriti* was observed. Hand index is the ratio of hand breadth to the length of hand expressed in percentage. (9) Length of hand is defined as the linear distance from the midpoint of a line joining the stylion radiale and stylion ulnare to the dactylion (tip) of the longest finger (usually middle finger) without nail and breadth of hand is the linear distance from metacarpale ulnare to metacarpale radiale. (10) For precise measurement of a human body it is essential to determine the exact position of anthropometric points on the body. The anthropometric points used in this study are defined as follows. (11)

Metacarpale ulnare (MU)

It is the most projecting point on the free outer margin of the hand at the level of the metacarpophangeal articulation of the fifth metacarpal or little finger while the hand is stretched**.**

Metacarpale radiale (MR)

It is the most projecting point on the free outer margin of the hand at the level of the metacarpophangeal articulation of the second metacarpal or index finger while the hand is stretched.

Stylion radiale (SR)

It is described as the distal margin of styloid process of radius which can be traced to the lower end of anterior border of radius and is felt in the floor of anatomical snuff box.

Stylion ulnare (SU)

It is described as the distal margin of styloid process of ulna which can be traced on the posteromedial aspect of wrist.

Dactylion (da)

It is the most distal point of the longest finger of hand, usually middle finger.

Materials and Methods

- Research design - Cross Sectional Study.
- Research plan- In the present study, a total of two hundred (200) apparently healthy male study participants of age 18-40 years were registered from the population of Delhi. The participants were registered after the informed consent. All the study participants were assessed for *Prakriti* through a questionnaire developed by CSIR-IGIB (Institute of Genomics and integrative Biology- Council of scientific and industrial research, TRISUTRA unit) Govt. of India, New Delhi. The mid interstylion to dactylion length and metacarpale ulnare to metacarpale radilae breadth of both the hands was measured by digital sliding caliper following the standard operating procedures. Hand index of both the hands was calculated separately by the formula:

Hand index=breadth of hand X100/ length of hand

The difference of hand index in different groups of *Prakriti* was statistically analyzed by one-way analysis of variance **(**ANOVA), Bonferroni test and receiver operating characteristic (ROC).

Inclusion Criteria

The apparently healthy male individuals of age 18-40 years from the population of Delhi.

Exclusion Criteria

The individual with history of any deformity, injury, fracture or surgery of hand was excluded from the study.

Anthropometric points used for measurements of hand

a. Metacarpale ulnare and metacarpale radiale of both hands
b. Dactylion of hand (usually the middle finger)
c. Stylion radiale, stylion ulnare and mid interstylion of both hands

Results

Table 1: Comparison of Right Hand Index in dominant *Prakriti* groups

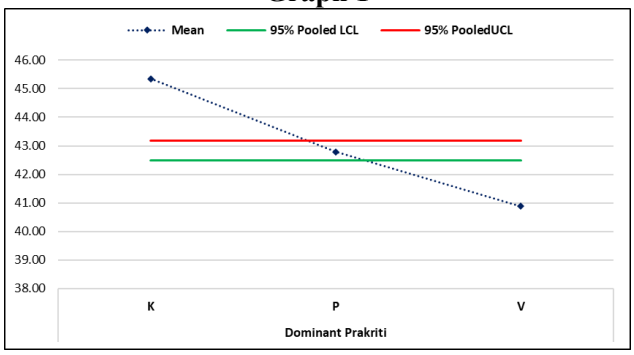
Dominant Prakriti	Right Hand Index				ANOVA	
	Mean	SD	LCL	UCL	F-value	*P*-value
Kapha	45.34	1.75	44.84	45.85	83.65	<0.001
Pitta	42.79	1.60	42.45	43.12		
Vata	40.88	2.09	40.34	41.41		

The ANOVA test showed significant difference in values of mean right hand index of various types of dominant *Prakriti* groups (*P*<0.001).

Bonferroni post hoc test showed significant difference among all the dominant *Prakriti* groups *Vata* dominant vs *Pitta* dominant: *P* <0.001**,** *Vata* dominant vs *Kapha* dominant: *P* <0.001**,** *Kapha* dominant vs *Pitta* dominant: *P* <0.001.

Further according to control chart analysis, the mean hand index of right hand showed significantly higher value for *Kapha* dominant *Prakriti* (This point is lying above the 95% pooled Upper Confidence Limit UCL) and significantly lower values for *Vata* dominant *Prakriti* (This point is lying below the 95% pooled Lower Confidence Limit LCL)

Graph 1



The optimum cut off points of right hand index for estimating dominant *Prakriti*, by the receiver operating characteristic (ROC) analysis are

- *Vata* dominant <= 41.344
- 41.344 <*Pitta* dominant < 43.930
- *Kapha* dominant>=43.930

Table 2: Comparison of Left Hand Index in dominant *Prakriti* groups

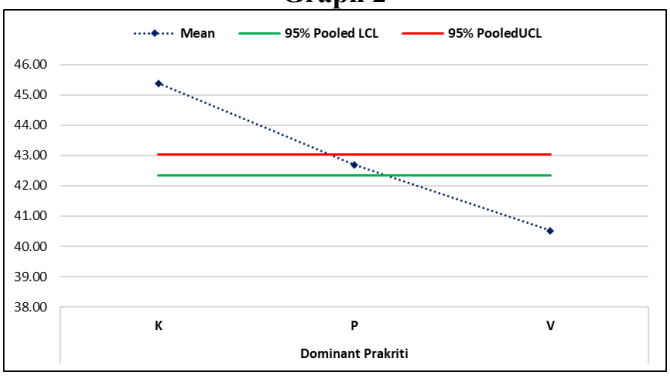
Dominant Prakriti	Left Hand Index				ANOVA	
	Mean	SD	LCL	UCL	F-value	*P*-value
Kapha	45.39	2.00	44.81	45.96	107.65	<0.001
Pitta	42.69	1.36	42.41	42.98		
Vata	40.52	1.97	40.01	41.02		

The ANOVA test showed significant difference in values of mean left hand Index of various types of dominant *Prakriti* groups (P<0.001).

Bonferroni post hoc test showed significant difference among all the dominant *Prakriti* groups *Vata* dominant vs *Pitta* dominant: P <0.001**,** *Vata* dominant vs *Kapha* dominant: P <0.001**,** *Kapha* dominant vs *Pitta* dominant: P <0.001.

Further according to control chart analysis, the mean left hand index showed significantly higher value for *Kapha* dominant *Prakriti* (This point is lying above the 95% pooled Upper Confidence Limit UCL) and significantly lower values for *Vata* dominant *Prakriti* (This point is lying below the 95% pooled Lower Confidence Limit LCL)

Graph 2



The optimum cut off points of left hand index for estimating dominant *Prakriti*, by the receiver operating characteristic (ROC) analysis are

- *Vata* dominant <= 41.895
- 41.895 < *Pitta* dominant < 43.687
- *Kapha* dominant>=43.687

Discussion

This study showed that the mean hand index of right hand and left hand has significantly higher value for *Kapha* dominant *Prakriti* and significantly lower value for *Vata* dominant *Prakriti*.

a. The right hand index is equal or less than 41.34 in *Vata* dominant individuals and more than 41.34 to less than 43.93 in *Pitta* dominant individuals whereas it is equal or more than 43.93 in *Kapha* dominant individuals
b. The left hand index is equal or less than 41.89 in *Vata* dominant individuals and more than 41.89 to less than 43.68 in *Pitta* dominant individuals whereas it is equal or more than 43.68 in *Kapha* dominant individuals.

The differences observed in the hand index among different *deha Prakriti* can serve as one of the quantified objective parameter for the assessment of *Prakriti*. Similarly, relation of anthropometric indices of other body parts with *Prakriti* can be evaluated.

Conclusion

There are significant differences in the hand index among different *deha Prakriti*. *Kapha* dominant individual has significantly higher value of the hand index and individual of *Vata* dominant has significantly lower value of the hand index where as hand index of *Pitta* dominant individual lies in between the two. Similar study may be conducted in future to estimate the relation of *Prakriti* with hand index in female study participants.

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