



Study of Dermatoglyphic Patterns and its relation to the Intelligence Quotient in *Homo sapiens*

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ABSTRACT- Fingerprints of an individual are considered as their own recognition; study of these patterns is called Dermatoglyphics. Although there is a heritable factor behind the various patterns, ridge count vary significantly based on a lot of factors and there is insignificant evidence towards the association of such patterns to cognitive ability. Association between fingerprint patterns and intelligence quotient was previously documented by Nanakorn *et al.*, (2011). This study involves the association of various dermatoglyphic patterns linked to clasping of hands (a known heritable trait) and IQ (Intelligence Quotient). The samples considered in the study were the undergraduate and postgraduate students, aged between 12-28 years. The Fingerprint patterns of samples that were studied were ulnar loop, Radial loop, Plain whorl, Central pocket, double loop, Accidental whorl, Plain arches and tented arches. Fingerprints were collected by ink printing method. The collected fingerprints were analyzed and various patterns associated with intelligence were studied and the pattern of inheritance was compared to Hand clasping. Various dermatoglyphic patterns were found in equal proportions across all the test subjects as: Loops - 50%, Whorls - 45% and Arches - 5%. There was no statistically, significant correlation between the various dermatoglyphic patterns and intelligence. Variances in intelligence of people can be associated with characteristics like Quantitative Reasoning, Logical thinking etc.

Keywords: Dermatoglyphic patterns, IQ, Mendelian trait, Education, Loops, Arches, Whorls

I. INTRODUCTION

Dermatoglyphics- derma, means "skin", and glyph, is "carving". This is the scientific study of fingerprints, lines, mounts and shapes of hands, as distinct from the superficially similar pseudoscience of palmistry. Skin patterns start appearing in the 12th-16th week of embryo development and formation completes in 24th week (six foetal months). Once formed do not change whole life time. Patterns develop in the form of mounds on the tips of digits, interdigital, thenar and hypothenar areas of hands. Also, as regressed areas on regions of soles. Study of fingerprints started early days like 1000BC in Chinese and Babylonian civilization for signing the legal documents. Dermatoglyphics also refers to the making of naturally occurring ridges on certain body parts, namely palms, fingers, soles, and toes. In a 2009 report, the scientific basis underlying dermatoglyphics was questioned by the National

Academy of Sciences, for the discipline's reliance on subjective comparisons instead of conclusions drawn from the scientific method. Dermatoglyphics can be correlated with genetic abnormalities, aids in the diagnosis of congenital malformations at birth or soon after. Where, we generally correlate Mendelian trait with dermatoglyphics. Systematic and scientific study was done at the end of 19th century using automated fingerprinting systems [1] [2] [3].

II. OBJECTIVES

- To survey the people for the particular Mendelian trait chosen for the study.
- To study the dermatoglyphic patterns relevant to the particular Mendelian trait.
- To study & analyse the correlation of dermatoglyphic patterns with the Intelligence Quotient

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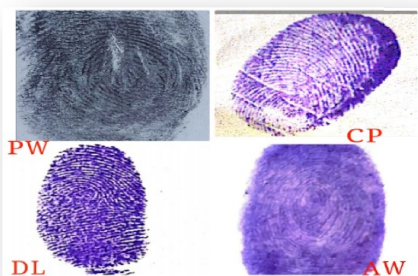


III. MATERIALS AND METHODS

The present study was conducted in the geographical area of Achhapana Koppallu, Mandya district and in Padmashree group of institutions, Bangalore district. Both undergraduate and postgraduate students aged between 12-28 years participated in the study. The Dermatoglyphic patterns of the samples, like Loops (ulnar loop and Radial loops), Whorls (plain whorls, central pocket, double loop, accidental) and Arches (plain arches and tented arches), in relation to one of the Mendelian trait, Clasping of hands was studied.



Photographic Plate 1-Radial loop and Ulnar loop



Photographic Plate 2- Whorls and its types



Photographic Plate 3-Tented arches and plain arches

Prints were taken with simple items for fingerprints. Photographs for clasping of hands were scanned and

observed. A basic set of printing materials includes a means for taking impressions and for reading prints. Common methods utilized were printer's ink or ink like substances with A4 size paper. This method offers advantages of direct printing, any size enlargement, and excellent detail of ridges showing individual sweat pores.

IV. RESULTS AND DISCUSSION

A. Clasping of Hand

Statistics

According to the study, it was analyzed that, 40% people had Left hand thumb on the top which is dominant and 60% people had right hand thumb on the top which is recessive trait.

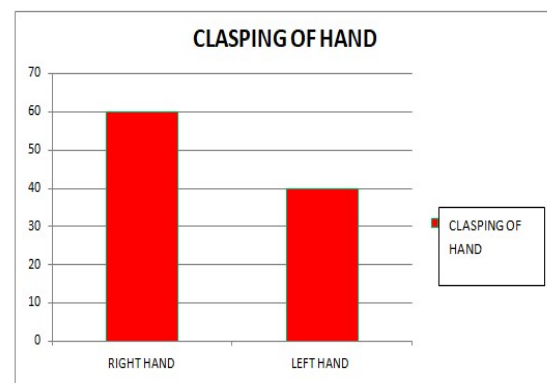


Fig. 1 - Depicting the number of students with Mendelian trait, Clasping of hands (In percentage)



Photographic Plate 4- Clasping of Hands. i) Left on Right ii) Right on Left.



B. Dermatoglyphic patterns

Statistics

In the study, the samples exhibited, 42.5%- Ulnar loop, 7.25% - Radial loop, 23%- plain whorl, 5%- central pocket, 1%- Double loop, 11% - Accidental whorl, 5.25%- tented arches and 5%- plain arches.

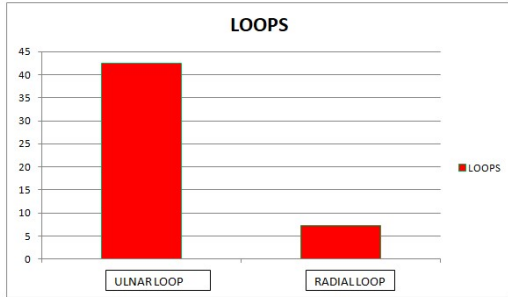


Fig. 2- Depicting the number of students with Dermatoglyphic patterns of loops (In percentage)

In the study it was found that, samples showed, 23%- Plain whorls, 5%- Central pocket, 1%- Double loop and 11%- Accidental whorl

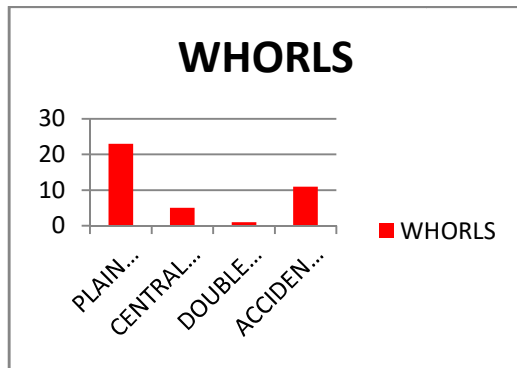


Fig. 3- Depicting the number of students with Dermatoglyphic patterns of Whorls (types of whorls) [In percentage]

From the study it was evident that, samples had, 5.25%- Tented arches and 5%- Plain arches.

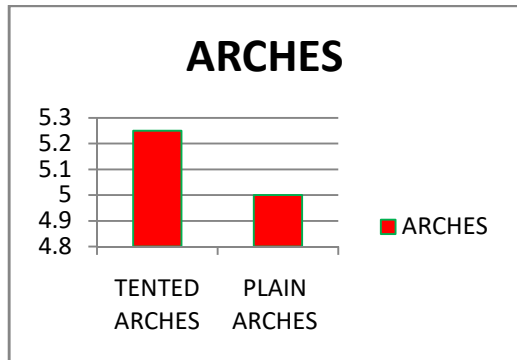


Fig. 4- Depicting the number of students with Dermatoglyphic patterns of Arches (In percentage)

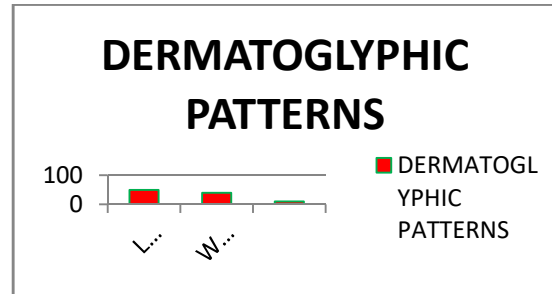


Fig. 5- Depicting the number of students with Dermatoglyphic patterns of LOOPS, WHORLS, and ARCHES (In percentage)



Photographic plate 5 – Dermatoglyphic patterns on Right hand



Photographic plate 6- Dermatoglyphic patterns on Left hand

C- Intelligence analysis based on their academic marks

Statistics

The study was done in the area of village and city, among the samples collected, 0.75% members have been dropped their education below 10th class, 2.5% members have incomplete studies at 10th standard, 1% members have incomplete studies at 12th standard, and 1% members have incomplete studies at undergraduate level and 45% members were still studying in Under graduation and 5% members were studying in Post graduation.

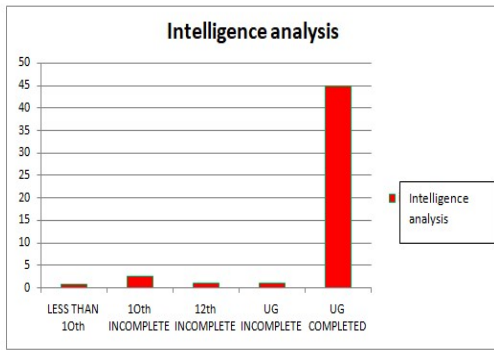


Fig. 6- Depicting the number of students with their academic marks analysis (In percentage)

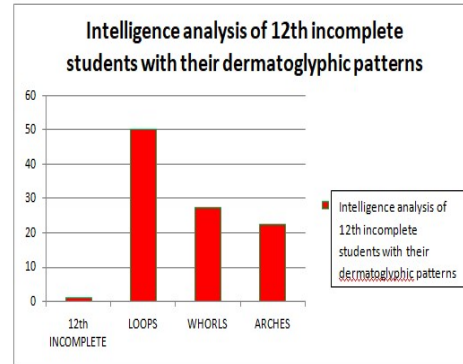


Fig. 9- Depicting the intelligence of 12th incomplete students with their Dermatoglyphic patterns (In percentage)

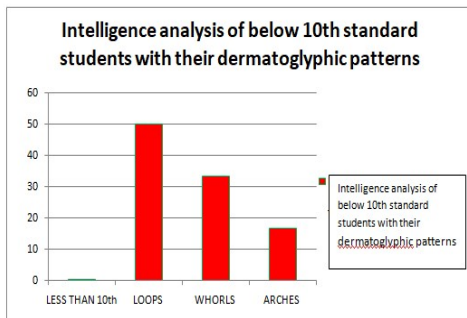


Fig. 7- Depicting the intelligence of students who dropped the studies below grade 10 with their Dermatoglyphic patterns (In percentage)

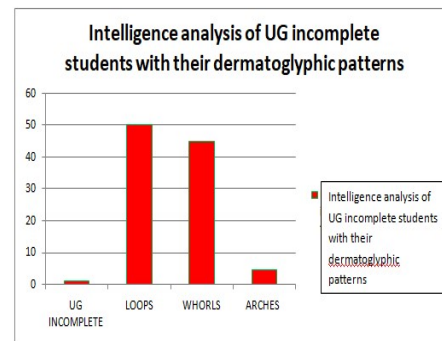


Fig. 10- Depicting the intelligence of UG incomplete students with their Dermatoglyphic patterns (In percentage)

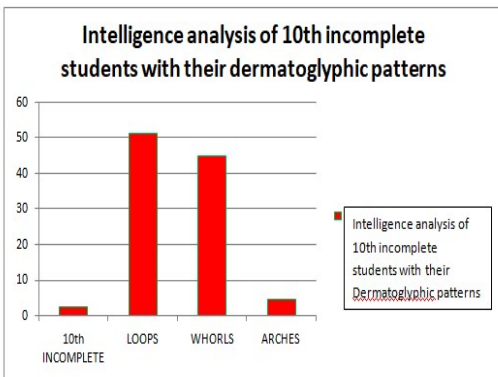


Fig. 8- Depicting the intelligence of 10th incomplete students with their Dermatoglyphic patterns (In percentage)

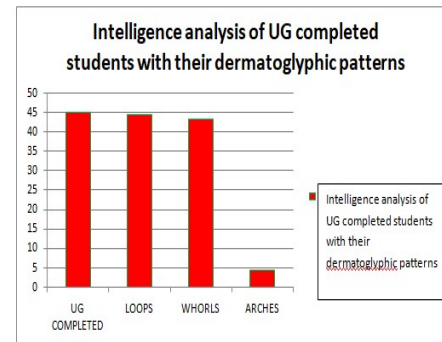


Fig. 11- Depicting the intelligence of UG completed students with their Dermatoglyphic patterns (In percentage)

Discussion

In the present study the samples were considered for the dermatoglyphic patterns like Ulnar



loop, Radial loop, Plain whorl, Central pocket, Double loop, Accidental whorl, Plain arches and Tented arches and Mendelian trait Claspings of hands. Each person's dermatoglyphic pattern impression was taken for the analysis of correlation of the pattern with traits chosen. From the study it was evident that, ulnar loop (42.5%), radial loop (7.25%), plain whorl (23%), central pocket (5%), double loop (1%), accidental whorl (11%), tented arches (5.25%) and plain arches (5%) were present in the samples. In this village, among the samples studied, Ratios for Below SSLC: Incomplete 10th: Incomplete 12th: Incomplete UG: Studying UG: Studying PG. were 42.4:7.25:23:5:1:11:5.25:5

0.75% people who studied grade 9th, their dermatoglyphic patterns exhibited the ratios as- 50:33.3:16:6 (loops: whorls: arches) 2.5% people who had incomplete their education at grade 10th, their Dermatoglyphic patterns had ratios as - 51.2:45:3.8 (loops:whorls:arches).

1% people who had incomplete education at the stage of 12th standard, their Dermatoglyphic patterns had ratios as 50:27.5:22.5 (loops: whorls: arches) 1% of students who had incomplete education at the stage of undergraduate, their Dermatoglyphic patterns had ratios as 50:45:5 (loops,whorls and arches).

Highest number of students (45%) who had completed under graduation, their Dermatoglyphic patterns had ratios of 44.4:43.33:12.77 (loops, whorls and arches).

The trait claspings of hand was analyzed for dermatoglyphic pattern. It was analyzed that 40% people had Left hand thumb on the top which is dominant trait and 60% people had right hand thumb on the top which is recessive trait.

Among all the Mendelian traits considered in the study, It was analyzed that the dermatoglyphic pattern, the loops were exhibited in greater number than the other patterns, the whorls and the arches.

V. CONCLUSION

The samples studied in the present study were undergraduate and postgraduate students aged between 12-28 years. Both males and females were included in the study. Students belonged to two different regions- City and Village. The

Dermatoglyphic patterns of the samples studied were, Loops (ulnar loop and Redial loops), Whorls (plain whorls, central pocket, double loop, accidental) and Arches (plain arches and tented arches), in relation to one of the Mendelian traits, Claspings of hands.

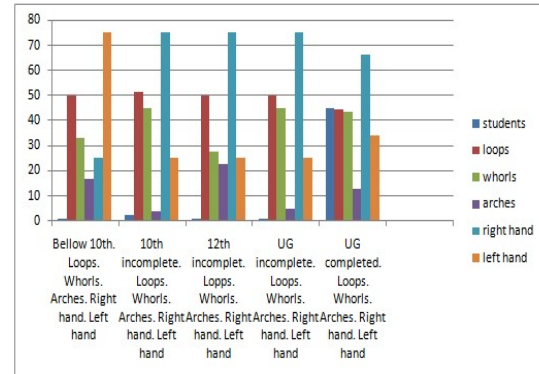


Fig. 12: - Depicting the number of students with dermatoglyphic patterns and claspings of hand in the present study.

In the study, it was found, that samples exhibited, 42.5%- Ulnar loop, 7.25% - Radial loop, 23%- plain whorl, 5%- central pocket, 1%- Double loop, 11% - Accidental whorl, 5.25%- tented arches and 5%- plain arches, 23%- Plain whorls, 5%- Central pocket, 1%- Double loop and 11%- Accidental whorl, 5.25%- Tented arches and 5%- Plain arches.

Impression: According to the study it was found that, the human intelligence is not related to the Dermatoglyphic patterns, because approximately equal percentage of all types of dermatoglyphic patterns, loops (50%), Whorls (45%), Arches (5%) were observed in the samples. And also it was evident from the study, that one of the Mendelian traits, claspings of hand is also not related to any intelligence in "*HOMO SEPIENS*"

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