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Original Research Article

To assess the relation between finger print pattern and blood groups

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ABSTRACT

Introduction: Fingerprint patterns are special and one of the best tool for identification of each person. During the foetal period, the fingerprint ridges formed which won't change their course or alignment during an individual's life. Among the various blood grouping patterns, the ABO and Rh types are considered for the current investigation. A theoretical attempt was made in this analysis and to correlate the fingerprint patterns with sex and blood grouping.
Objectives: To study the fingerprint pattern among the persons having specific ABO & Rh blood groups. To find any association between finger-print patterns with ABO & Rh blood groups.
Materials and Methods: Around 200 MBBS & BDS students having different blood groups were involved for this study, which was done at department of Anatomy MES medical college, Perinthalmanna. Fingerprints were taken from all the fingers and categorised into 3 groups like loops, whorls and arches.
Results: The 'loop' pattern was the maximum followed by the 'whorling' and 'arches' in various ABO and Rh blood groups. The maximum numeral of 'loop' variety was detected in people with 'O positive' blood group.
Conclusion: The existing study observed that there is correlation between the morphology of fingerprint pattern and the type of blood group. The human fingerprint distributions of various types also revealed few peculiarities in relation to the different blood groups.

1. Introduction

The skin over the palm and plantar aspects are wrinkled along with the small crimsons called as friction ridges. A fingerprint is an imprint on all areas of the friction ridges. Fingerprint is based on the principle of individuality, it has a permanent feature that cannot be duplicated during an individual's entire life span. Fingerprint is one of human body's most significant, accurate and special characteristics.[1] There are no precisely the same two fingerprints. Two people with the same fingerprints are around one in 64,000 million.[2]

The person's identity can be done by Fingerprints, lip prints, footprints, DNA profiling, and iris scanning. The primary ridge growth happens over the basement membrane and becomes obvious approximately about 12th to 16th weeks of embryonic development in histological foetal preparations and their creation is completed by the twenty fourth week.[3]

Throughout fetal development, the united consequence of genetics and ecological factors produce stress and tension over the morphological designs of finger-prints.[4] Locard's principle of exchange theory dictate the finger print pattern. The fingerprint secretions comprise traces of specific chemical compounds and their metabolites that can be noticed and used forensically.[5]

Identification of fingerprints, also referred to as dactyloscopy is the method of examining the impressions of the established friction skin ridges. The examination can be from the palmar surface and digits, and to check if the impressions are from the same finger. The importance of dactylography involve finding the criminal as means of

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identity in bank cheques, currency notes, passports and calamity. The medicolegal importance is for unintended trade of new born babies and to perceive anonymous bodies.

Karl Landsteiner identified the blood group system in 1901. A blood type is a blood grouping based on the existence or absenteeism of inherited antigens over the red blood cell. ABO and the Rh method are the two most significant ones. The ABO blood grouping is also classified into A, B, AB and O varieties, based on the existence of the plasma antigen. The Rhesus system is based on positive (Rh+ ve) and negative (Rh-ve) varieties which are classified because of D antigen.[6]

Blood group genetics are complicated by gene linkage to other characters. It has some clinical importance, such as high incidence of ulcers in duodenum in people with 'O' blood group and cancer stomach if the blood group is of 'A' variety. This prevalence is higher in comparison to general population of other blood groups.[7,8] Dermatoglyphics studies conducted earlier found a strong link between fingerprint patterns and blood groups.[9,10]

Due to all these implications of finger- prints as an effective way of identity, this study was attempted to evaluate finger -print patterns, their relation with an individual's sex and blood group, and additionally to decide the distribution of various types of fingerprints amidst people of Kerala.

2. Materials and Methods

Institutional Ethical Committee clearance obtained from the Member Secretary, MES Medical College, Perinthalmanna. This study was conducted in the Department of Anatomy, selecting over 200 medical and dental students (54 males and 146 females) of both gender and different age groups. Written informed consent was obtained from the contestants.

The ink method as suggested by Cummins was used to take dermatoglyphics. With the aid of a strong hand lens, key patterns (loops, whorls and arches) were observed. All the people's blood types have also been noted for further research. If the blood group was not known, then antiserum A, B and D were used to classify the blood group. A number was assigned to each finger in the finger print slip, ex: the numeral 1 was given to the right thumb and the numeral 10 to the left little finger. To remove dirt and grease, the subjects are told to wash and dry their hand. In the proforma along with the fingerprints, the specifics of the participants such as age, gender and demographic data were collected. The types of fingerprints were examined under a magnifying lens.

2.1. Criteria for inclusion

Transparent, clear prints and those given the informed consent will be included.

2.2. Criteria for exclusion

Any proof of finger- tip sickness and injury that was seemingly to cause an amendment within the fingerprint pattern like Hansen's disease, lacerations over fingers and incomplete / smudged prints. The data were tabulated and analysed using descriptive statistics.

3. Results

Among the 200 students taken for the present study, 54 were males and 146 were females. Table 1 shows the gender disposal of blood groups. In this study, the majority of subjects (46.5%) were O blood group trailed by blood group B, A & AB, 91.5% of which were Rh Positive.

Table 2 demonstrates the dispersal of participants by their blood group's Rh factor. 183 Of the 200 subjects were Rh+, 17 of the 200 subjects were Rh+. Most of the subjects of Rh+ were belonged to blood group O, trailed by blood group B, A & AB. Likewise, most of the 17 Rh-subjects were belonged to blood group O, followed by blood group A, B, & AB.

Table 3 displays the finger print pattern distribution of all fingers according to gender. The total number of loops contained in all the digits was 1089 (54.5%). Similarly, in all the digits of both hands, the number of whorls was 577 (28.8%) and the number of arches was 334 (16.7%). This table clearly shows that the loops dominates and pursued by whorls and arches.

Table 4 displays the fingerprint pattern distribution among ABO blood groups. Further more numbers of loops are found among the Rh+ individuals in blood group O followed by B. But in the blood group O of Rh individuals, the incidence of loops is found to be predominant.

4. Discussion

Finger- prints are the impressions produced by the epidermis at the flexor compartment of the digit. Chinese people were initially practiced using fingerprints to sign the documents legally. The dermatographics was first ever carried out 3000 years ago. Herschel used fingerprinting in India for personal identification.[10] Loops, whorls and arches are the common fingerprint patterns used in this analysis. Table 5 shows a comparative study of fingerprint pattern distribution.

The present study reveals a correlation between the fingerprint pattern distribution and blood groups. In persons with ABO, Rh blood types, i.e. more loop size, medium whorls, and small arches. The primary finger print's general distribution pattern was of the same order. Kshirsagar et al[13] and Bharadwaja et al[5] have found similar findings.

The present study showed that in all blood groups the loop pattern was more common. Different research carried out by Bhardwaj et al,[5] Prateek et al[14] and Gowda & Rao[15] showing high loop frequency, medium whorls and low arches in blood groups of ABO & Rh.

Table 1: Distribution of blood groups according to gender

Blood group	Male (54)	Female (146)	Total (200)
A	13 (6.5%)	30 (15%)	43 (21.5%)
B	15 (7.5%)	36 (18%)	51 (25.5%)
AB	4 (12%)	9 (4.5%)	13 (6.5%)
O	22 (11%)	71 (35.5%)	93 (46.5%)
Total	54 (27%)	146 (73%)	200

Table 2: Distribution according to Rh factor of blood group

Blood group	Rh positive	Rh negative	Total
A	39	4	43
B	47	4	51
AB	12	1	13
O	85	8	93
Total	183 (91.5%)	17 (8.5%)	200

Table 3: Distribution of fingerprint patterns according to gender

Finger Print pattern	Male (%)	Female (%)	Total
Loop	255 (12.75%)	834 (41.7%)	1089 (54.5%)
Whorl	183 (9.15%)	394 (19.7%)	577 (28.8%)
Arch	102 (5.1%)	232 (11.6%)	334 (16.7%)
Total	540	1460	2000

Table 4: Distribution of fingerprint patterns amongst A, B, AB, O blood groups with Rh factors

FP Pattern	A+	A-	B+	B-	AB+	AB-	O+	O-
LOOP	207	26	240	21	85	5	460	45
WHORL	126	6	150	11	19	3	243	19
ARCH	57	8	80	8	16	2	147	16

Table 5: Comparison of distribution of primary finger print pattern

Finger print pattern	Bhavana et al.[11]	Rastogi et. al.[12]	Narayana et al[3]	Present study
LOOP	58.9%	60.95%	56.6%	54.45%
WHORL	29/6%	32.55%	33.7%	28.85%
ARCH	11.5%	6.5%	9.7%	16.7%

5. Conclusion

We tried to examine and compare fingerprint patterns with an individual's gender and blood group in the current study. Although we recognize that fingerprints are never the same and in no way alter from beginning to death, an strive used to be made in this study to link fingerprints with gender and blood type, which in impact can also augment the accuracy of finger-prints in recognition and revelation of culprit.

Loops were maximum frequently found pattern in the present study, & arches were the last. Blood group O positive was the most frequent and it was found that AB negative was the rarest. By contrast to Rh negative blood groups, Rh positive blood groups are more likely. In both genders loops were the more frequent pursued by whorls and arches. According to this analysis, we can conclude that gender prediction and blood groups of a person may be possible with the study of fingerprints methods. This may help in forensic medicine to identify the victim.

6. Conflict of interest

None

7. Sources of funding

None

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