

Investigation of Fingerprints Patterns and Blood Group in Relation to Male and Female

Dr. Rakesh Kumar Ray*

Assistant Professor, Department of Forensic Science, Swami Vivekananda University, Sagar, MP

Abstract – Fingerprint proof is undoubtedly the most solid and adequate proof until date in the official courtroom. Because of the immense capability of fingerprints as a viable strategy for recognizable proof, an endeavor has been made in the present work to examine their relationship with gender and blood group of a person. This planned investigation was completed over a time of 2 months among 200 therapeutic understudies (100 male and 100 female) having a place with the age group 18-25 of Kasturba Medical College, Mangalore, India. Results demonstrate that each finger impression is remarkable; loops are the most normally happening fingerprint design while curves are the least normal. Males have a higher rate of whorls and females have a higher occurrence of loops. Loops are predominant in blood group A, B, AB and O in both Rh positive and Rh negative people aside from in O contrary where whorls are increasingly normal. We can infer that there is an association between distribution of fingerprint patterns, blood group and gender and in this manner expectation of gender and blood group of a person is conceivable dependent on his fingerprint design. Fingerprints are ordered and documented dependent on edge patterns. The impressions made by the example of any individual stay unaltered all through life. The investigation was done on 400 people among which 200 were males and 200 were female's subjects having diverse ABO blood groups, all the 10 fingerprints were isolated into loops, whorl and curves. The outcomes demonstrated that larger part of the subjects had a place with blood group O. The unique mark example of loops had the most astounding frequency while curves were the least. Blood group O were generally connected with the loop design while AB had minimal frequency in all the fingerprint patterns. Males had the most elevated number with the loops and whorls while females had the most astounding number of curves. It was reasoned that there was an association between distribution of fingerprint patterns, blood group and gender and in this way expectation of gender and blood group of a person was conceivable dependent on the fingerprint patterns.

Key Words: Fingerprints, Gender, Blood Groups, Investigation

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1. INTRODUCTION

Human recognizable proof from physical and mental attributes is a pivotal target of legal investigation. It includes investigation of physical or neurotic, useful or mental trademark highlights, which are interesting to a person. Human ID is fundamental for personal, socio-legitimate reasons. Data utilized for personal recognizable proof incorporate tattoo marks, anthropometry, dactylography, lip prints, blood grouping, DNA fingerprinting, stature determination, determination of age and sex, nibble marks, penmanship, iris and retinal prints, mannerisms and so forth. As fingerprint has an extraordinary trademark design, it very well may be utilized to recognize somebody. Fingerprint is an oily and oily impression of the friction ridges of the finger. These friction ridges are raised portions of the epidermal piece of the skin of the finger digits and palmar or plantar surface. The most punctual work on fingerprints and its utilization for personal

recognizable proof were done numerous years back in India. Dermatoglyphics is the investigation of fingerprints. Cummins and Kennedy that the remarkable attributes example of epidermal skin ridges is interestingly separated in authoritative structures during the 3rd and fourth intrauterine life have accounted for it. It is said that the fingerprint patterns are genetically decided and are constant for the duration of the life of a person from birth until death.

Personality is a lot of physical attributes, practical or psychic, typical or pathological that characterizes a person. As of late, there has been an expanded enthusiasm for biometric advancements that is human identification dependent on one's individual highlights. The different identification information utilized are fingerprints, handwriting, nibble marks, DNA fingerprinting and so on. Fingerprints are constant

and individualistic and structure the most solid criteria for identification.

A fingerprint is an impression of the friction ridges of all piece of the finger. A friction ridge is a raised bit of the epidermis on the digits or on the palmar and plantar skin, comprising of at least one associated ridge units of friction ridge skin. Fingerprints might be kept in characteristic emissions from the eccrine glands present in friction ridge skin, they might be made by ink, or different contaminants moved from the peaks of friction skin ridges to a moderately smooth surface.



Figure 1 – Finger Print

Because of the immense capability of fingerprints as a viable technique for identification, an endeavor has been made in the present work to break down their correlation with gender and blood group of a person. This correlation between fingerprint design and these parameters may help in utilizing fingerprints as a significant guide in sex and blood group determination and the other way around, in this way, enhancing the authenticity of fingerprints in identification of crime and criminals.

Because of the immense capability of fingerprints as a powerful strategy for identification, an endeavor has been made in the present work to investigate their correlation with gender and blood group of a person. This correlation between fingerprint design and these parameters may help in utilizing fingerprints as a significant guide in sex and blood group determination and the other way around, accordingly, enhancing the authenticity of fingerprints in identification of crime and criminals.

The present examination demonstrates that there is an association between distribution of fingerprint patterns, blood group and gender. Majority of the subjects in the examination had a place with blood group O; trailed by blood group B, A and AB. Majority of subjects (96%) were Rh positive while just 4 % were Rh negative. The general distribution pattern of the essential fingerprint was of a similar request in people with A, B, AB and O blood groups for example high frequency of loops, moderate of whorls and low of arches. This is as per the investigation led by Bharadwaja et al. Comparable discoveries were found in Rh-positive and Rh-negative people except

in blood group O adverse where whorls predominated.

Bharadwaja et al led an examination during 2000-2001 on 300 medical students with various ABO blood groups in Rajasthan which uncovered that people with blood group A have a greater amount of loops, while that of blood group AB had a greater amount of whorls. In the present examination, it was discovered that blood group A had a higher frequency of loops yet Blood group AB was not related with a predominance of whorls as was found in the previously mentioned investigation. Present investigation likewise uncovered that whorls were progressively common in blood group O (consistent with the examination led by Sharma et al), and arches in blood group A.

The present investigation has distinguished loop as the most common sort of fingerprint pattern. The investigation has additionally revealed significant association between fingerprint pattern and ABO blood group. Unfortunately, this investigation neglected to recognize significant association among gender and fingerprint pattern. The consequence of this examination is significant as it can assist the specialists with determining the blood group from the fingerprint pattern and the other way around exploring the crime. It is recommended to convey comparable examinations in future to look through association between the fingerprint pattern and gender and blood group. While blood groups An and B were observed to be the most common (similarly predominant) among males, blood group O was the most commonly observed blood group in females. The present examination likewise uncovers that frequency of loops is more noteworthy in females as compared to a higher frequency of whorls in males. Arches were observed to be progressively frequent in females. An exhaustive pursuit of writing has not revealed any past investigations emphasizing on the connection among fingerprints and gender.

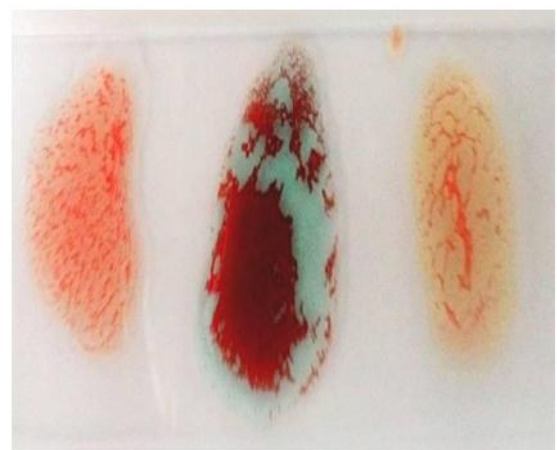


Figure 2 - Identification of blood group

2. REVIEW AND LITTRETURE

Sudikshya K. C. (2018) - Dermatoglyphics, the investigation of epidermal ridges on palm, sole, and digits, is considered as best and dependable proof of identification. The fingerprints were considered in 300 Nepalese of realized blood groups of various ages and characterized into essential patterns and afterward investigated statistically. In both genders, rate of loops was most astounding in ABO blood group and Rh +ve blood types, trailed by whorls and curves, while the frequency of whorls was most elevated pursued by loops and curves in Rh -ve blood types. Loops were higher in all blood groups except "A - ve" and "B - ve" where whorls were predominant. The fingerprint design in Rh blood sorts of blood group "A" was statistically huge while in others it was unimportant. In center and little finger, loops were higher though in ring finger whorls were higher in all blood groups. Whorls were higher in thumb and forefinger except in blood group "O" where loops were predominant. This investigation presumes that distribution of essential example of fingerprint isn't identified with gender and blood group yet is identified with individual digits.

Gnanasivam and Muttan (2011) - proposed another method to distinguish gender by examining fingerprints with the assistance of quick Fourier change (FFT), discrete cosine change (DCT) and power otherworldly thickness (PSD). The interior database was made by gathering the fingerprints of 400 persons of different age and gender. At the beginning time all the 10 fingers of the person were examined and after that it was recognized that the left center finger pursues the predefined threshold. The outcomes acquired by frequency space are assessed against foreordained threshold. From that the gender was settled.

Ramaswamy (2010) - proposed another strategy for human identification. By utilizing scientific investigation of the arbitrary patterns, which are detectable inside the fingerprints from some separation, the person was recognized. That was especially implied for constant and exceptionally sure acknowledgment. The pictures of various deterioration of matching were done to accomplish an improved precision in matching. At the point when thought about the resultant fingerprints, it is reasoned that these parameters accomplished better. This strategy works even more rapidly and increasingly exact to assess the fingerprints matching procedure.

Sudesh Gungadin (2007) - The art of fingerprint has been utilized for the purpose of identification from 700 AD. In 3000BC, Chinese utilized fingerprints as official documents. In 1858, this framework was first presented in India by Sir William Herschel to stay away from impersonation; however, the praise is given to Sir Francis Galton for having it systematized for the identification of criminals. In 1894, in England,

this framework was definitively acknowledged, and was modified by Sir Edward Henry. At that point the examination have been directed on fingerprint ridges particularly on its sorts, orders, strategies for raising fingerprints, recording of fingerprints and materials used to develop fingerprint

3. MATERIALS AND METHODS

In the wake of getting clearance from institutional ethics committee, this planned investigation was done over a time of two months among restorative understudies of Kasturba Medical College, Mangalore. Complete 200 understudies (100 male and 100 female) having a place with the age group 18-25 voluntarily took an interest in the investigation.

Students with permanent scars on their fingers or thumbs, with any hand deformations because of damage, birth imperfection or infection, those having worn fingerprints, additional, webbed or bandaged fingers, were avoided from the examination.

Each subject was approached to wash his hands completely with cleanser, water, and dry them utilizing a towel. He was then approached to squeeze his fingertip on the stamp pad and afterward to the paper to move the fingerprint impression. A similar technique was rehashed for every one of the fingers of two hands. Along these lines, the plain fingerprints of all the ten digits were taken independently on the particular squares on a similar sheet of paper. Care was taken to abstain from sliding of fingers to forestall smearing of the print. After the fingerprints were obtained, subtleties, for example, name, sex and age were noted. The subtleties of their blood group were noted from their school character cards. Each subject was appointed a sequential number. The fingerprint patterns were considered with the assistance of an amplifying focal point and were recognized as: Loops, Whorls and Arches dependent on the appearance of ridgelines

As per Henry's arrangement of characterization. This framework assigns each finger a number as indicated by the request where is it situated in the hand, starting with the correct thumb as number one and completion with the left little finger as number 10. The distribution of dermatoglyphic fingertip patterns in two hands of people and its association with gender and distinctive ABO and Rh blood groups was assessed and broke down statistically.

4. RESULTS AND DISCUSSION

200 subjects participated in the examination out of which 100 were males and 100 were females. Majority of the subjects, 71(35.5%), in the

examination had a place with blood group O; trailed by blood group B, An and AB which were 64 (32%), 56 (28%) and 9(4.5%) individually. While blood groups A and B were observed to be the most widely recognized (similarly predominant) among males, blood group O was the most regularly observed blood group in females. (Table 1)

Table 1 - Distribution of Subjects According to Sex and Blood Groups

Sex	A	B	AB	O	Total
Male	33 (16.5%)	33 (16.5%)	4 (2%)	30 (15%)	100
Female	23 (11.5%)	31 (15.5%)	5 (2.5%)	41 (20.5%)	100
Total	56 (28%)	64 (32%)	9 (4.5%)	71 (35.5%)	200

Frequency of loops was highest in both the Rh-positive and Rh-negative subjects of ABO blood groups except O negative blood group where whorls predominate. Incidence of loops differed between 45% (in „O“ negatives) to 80% (in „A“ negatives). Among the subject of various blood groups, blood group A demonstrated highest loops (Rh +ve 63.2% and Rh - ve 80.%). Whorls indicated moderate frequency going between 10% (in, A“ negatives) to 55% (in, O“negatives). Arches were least basic extending from 1.11% (in, AB“ positives) to 10% (in, A“ negatives).

Frequency of loops was observed to be higher in females (52.42%) than in males (47.58%) while whorls were increasingly frequent in males (55.78%) as compared to females (44.22%). 44.61% of arches were available in males and 55.38% in females. (Table No. 5)

Our Sincere gratitude to Kasturba Medical College, Mangalore, India for financing this task and to students of Kasturba Medical College, Manga-legend for voluntarily taking an interest in the examination.

Table 2 – Distribution of Pattern of Finger-Prints among Males and Females

Type	Male	Female
Loops	581(47.58%)	640(52.42%)
Whorls	362(55.78%)	287(44.22%)
Arches	58(44.61%)	72(55.38%)

Maximum 192 (96%) subjects in the examination were Rh positive, of which 69(34.5%) had a place with blood group O, 61(30.5%) had a place with blood group B, 53 (26.5%) subjects had blood group some time just 9(4.5%) had blood group AB. Among Rh-negative people, 3(1.5%) had a place with blood group A, 3(1.5%) to blood group B and 2 (1.5%) had a place with blood group O. None of the subjects showed blood group AB negative. (Table 2)

Table. 3 - Distribution of Subjects According to RH Factor

Blood Group	Rh positive	Rh negative
A	53(26.5%)	3(1.5%)
B	61(30.5%)	3(1.5%)
AB	9(4.5%)	0
O	69(34.5%)	2(1%)
Total	192(96%)	8(4%)

Fingerprint pattern analyses showed that, loops were the most widely recognized pattern in the investigation 1221(60.95%), trailed by whorls 649(32.55%) while arches were available in a littler rate (6.5%) of the examination group. (Table 3).

Table 4 - General Distributions of Primary Finger Print Patterns in All Fingers of Both Hands

Pattern of finger- print	Number	Percentage
Loops	1221	60.95%
Whorls	649	32.55%
Arches	130	6.5%
Total	2000	100%

Table 5 -Distribution of Pattern of Fingerprints among A, B, O and Rh Blood Groups

Type of finger print	Blood Group A		Blood Group B		Blood Group AB		Blood Group O	
	Rh+ve	Rh-ve	Rh+ve	Rh-ve	Rh+ve	Rh-ve	Rh+ve	Rh-ve
Loops	335 (63.2%)	24 (80%)	383 (62.79%)	23 (76.67%)	62 (68.87%)	0	385 (55.79%)	9 (45%)
Whorls	168 (31.7%)	3 (10%)	188 (30.82%)	6 (20%)	27 (30%)	0	246 (35.65%)	11 (55%)
Arches	27 (5.09%)	3 (10%)	39 (6.39%)	1 (3.33%)	1 (1.11%)	0	59 (8.6%)	0
Total	530	30	610	30	90	0	690	20

5. CONCLUSION

The motivation behind classifying fingerprints is that they can be documented and recovered when required. The different classification frameworks utilized all through the world depend on the pattern of friction ridges seen on mash of terminal piece of all the ten fingers. Single-finger records are kept uniquely for a predetermined number of known criminals. Thusly, generally, it is difficult to make identification from fingerprint documents dependent on a solitary print found at the scene of a crime. These patterns fall into three general classes called arches, loops, and whorls.

Arches are the least difficult patterns and the rarest. There are two sorts: plain arches and rose arches. In the two kinds, the ridgelines flow into the print from one side, ascent amidst the pattern, and flow out to the opposite side of the print. Loops are shaped by ridgelines that flow in from one side of the print, clear up in the inside like a rose curve, and after that bend back around and flow out or will in general flow out as an afterthought from where they entered. Loops are assigned as being either spiral or ulnar, contingent upon which side of the finger the lines enter. The loop is the most common

of the considerable number of patterns. There are four distinctive whorl patterns: the plain whorl, the focal pocket loop, the twofold loop, and the inadvertent whorl. Their common highlights are that they have at any rate two deltas and at least one of the ridgelines curves around the center to frame a circle or winding or other adjusted, constantly bending structure. The incidental whorl can be any pattern or mix of patterns that does not fit into any of the above classifications. The expression "Composite" is utilized to depict such patterns. Positive identification utilizing fingerprints can be set up just if 16 to 20 points of similarity exist in the minutiae.

Each fingerprint is one of a kind thus, it tends to be in all respects viably utilized as a proof for identification in the official courtroom. Loops are the most commonly happening unique finger impression pattern and Arches are the least common. Blood group O positive is the most common and a negative is the rarest. Loops are predominant in blood group A, B, AB and O in both Rh positive and Rh negative people except in O contrary where whorls are increasingly common. Whorls are progressively common in blood group O negative. Loops and arches are maximum found in blood group some time whorls are increasingly common in blood group O. Blood groups An and B were observed to be the most common (similarly predominant) among males, blood group O was the most commonly observed blood group in females. Males have a higher incidence of whorls and females have a higher incidence of loops.

Hence, prediction of gender and blood group of a person is possible dependent on his fingerprint pattern. Comparative investigations ought to be led on a bigger example to build the exactness of prediction.

6. REFERENCES

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Corresponding Author

Dr. Rakesh Kumar Ray*

Assistant Professor, Department of Forensic Science, Swami Vivekananda University, Sagar, MP