

**STUDY OF FINGERPRINT PATTERN IN RELATION TO BLOOD GROUPS AMONG  
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Article Received on 03/08/2017

Article Revised on 24/08/2017

Article Accepted on 14/09/2017

**ABSTRACT**

Fingerprints form the most reliable criteria for identification as they are absolutely individualistic and do not change with time. In this study, we have made an effort to study a relationship between ABO blood group and pattern of fingerprint. This cross-sectional study was carried out among 150 medical students from August 2014 to September 2014. Fingerprints of right hand were collected for both male and female undergraduate students using simple ink pad. Fingerprints were classified and studied in detail regarding their types, as to whether or not they form a particular pattern by the help of various ridge patterns. Also after recording blood group against fingerprints, each individual combination was screened to look for a pattern. We found that the 'blood group B' 65(43.3%) was the most prominent blood group followed by 'O blood group' 55(36.7%) and loop was the commonest pattern observed in all fingers followed by whorl in blood group A, B and O. We concluded that there is an association between distribution of fingerprint patterns and blood group.

**KEYWORDS:** Fingerprint, Ridge pattern, Blood group, Medical students.**INTRODUCTION**

Dactylography has been one of the earliest forms of identification, the others being handwriting, lip marks, DNA fingerprinting, tattoo marks, scar marks, superimposition, and many more. Fingerprints are the most reliable form of identification as they do not change once formed during 3<sup>rd</sup> and 4<sup>th</sup> month of intrauterine life and also no two individuals have the same fingerprints. It is also the easiest and cheapest method of recording identity proof, which can be done without any fuss.

Fingerprint is an impression of the curved lines of skin at the end of a finger that is left on a surface or made by pressing an inked finger onto paper. Fingerprints can be divided into four categories i.e. Loop, whorl, arch, and composites.<sup>[1-3]</sup>

Karl Landsteiner discovered the concept of blood groups. As of now 19 major blood group systems have been identified although 'ABO' and 'Rhesus systems' hold most importance. ABO system divides blood groups into A, B, AB, and O groups while the Rhesus system subdivides them into Rh +ve and Rh -ve groups.<sup>[4]</sup>

A reliable personal identification is vital in many

situations like civil, criminal, commercial and latest in financial transaction frauds, where the question of identification becomes a matter of supreme importance. Even though fingerprints have been used as a means of identification for a long time, in this study we have made an effort to take step further to study a relationship between ABO blood group and pattern of fingerprint so that one can get an idea about the expected blood group from the study of fingerprint pattern and vice versa.

**MATERIALS AND METHOD**

After the permission from Institutional Ethics Committee had been sought, a cross-sectional study was carried out among 150 medical students at NKP Salve Institute of Medical Sciences and Research Centre, Nagpur, Maharashtra from August 2014 to September 2014. Prior informed consent was taken from each subject. Confidentiality of the subjects was maintained all through.

**Inclusion criteria**

Both male and female undergraduate students of were included.

**Exclusion criteria**

Smudged and incomplete prints were not included.

Fingerprints of right hand were collected from both male and female undergraduate students. Simple ink pad was used to collect various fingerprint samples. Strict quality control measures were maintained to avoid smudging, overlapping, partial printing or omissions of any kind. Then blood was collected from the same subjects using sterilized techniques, tested for blood groups with standard antiserum and recorded accordingly. Fingerprints were classified and studied in detail regarding their types, as to whether or not they form a particular pattern by the help of various ridge patterns. Also after recording blood group against fingerprints, each individual combination was screened to look for a pattern. The data was tabulated and analyzed for number and percentage.

**RESULT**

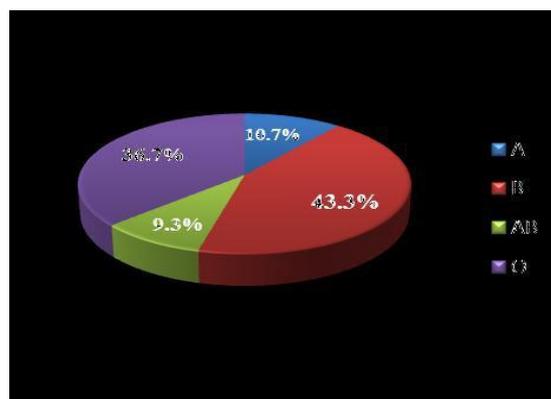
The present study was carried out among 150 undergraduate medical students. The 'blood group B' 65(43.3%) was the most prominent blood group followed by 'O blood group' 55(36.7%) while 'A' 16 (10.7%) and 'AB' 14(9.3%) were the least common as depicted in Fig. 1.

As seen in Table 1, loop was the commonest pattern observed in all fingers followed by whorl.

**Table 1: Fingerprint pattern in all fingers (n=150).**

Individual Finger	Loop	Whorl	Arch	Composite
Thumb	93(62%)	35(23.3)	09(6%)	13(8.7%)
Index finger	73(48.7%)	54(36%)	14(9.3%)	09(6%)
Middle finger	116(77.3%)	18(12%)	10(6.7%)	06(4%)
Ring finger	82(54.7%)	60(40%)	03(2%)	05(3.3%)
Little finger	117(78%)	27(18%)	04(2.7%)	02(1.3%)

In the present study, we observed that loop was the commonest fingerprint pattern in all fingers in blood group A, B and O; however whorl was the commonest fingerprint pattern in the thumb, index and ring finger in blood group AB as depicted in Table 2.

**Figure 1: Distribution of blood group in students.****Table 2: Distribution of fingerprint patterns in different blood groups (n=150).**

Finger	Blood Group															
	A (n=16)				B (n=65)				AB (n=14)				O (n=55)			
	L	W	A	C	L	W	A	C	L	W	A	C	L	W	A	C
Thumb	10 (62.5%)	06 (37.5%)	00	00	44 (67.7%)	14 (21.5%)	02 (3.1%)	05 (7.7%)	05 (35.7%)	06 (42.9%)	02 (14.3%)	01 (7.1%)	34 (61.8%)	09 (16.4%)	05 (9.1%)	07 (12.7%)
Index	11 (68.8%)	03 (18.8%)	02 (12.4%)	00	33 (50.8%)	22 (33.8%)	08 (12.3%)	02 (3.1%)	04 (28.6%)	05 (35.7%)	01 (7.1%)	04 (28.6%)	25 (45.4%)	24 (43.6%)	03 (5.5%)	03 (5.5%)
Middle	11 (68.8%)	03 (18.8%)	02 (12.4%)	00	54 (83.1%)	06 (9.2%)	02 (3.1%)	03 (4.6%)	09 (64.2%)	04 (28.6%)	01 (7.1%)	00	42 (76.3%)	05 (9.1%)	05 (9.1%)	03 (5.5%)
Ring	09 (56.2%)	06 (37.5%)	00	01 (6.3%)	41 (63.1%)	22 (33.8%)	02 (3.1%)	00	02 (14.3%)	09 (64.2%)	01 (7.1%)	02 (14.3%)	30 (54.5%)	23 (41.8%)	00	02 (3.7%)
Little	12 (75%)	04 (25%)	00	00	53 (81.5%)	08 (12.3%)	02 (3.1%)	02 (3.1%)	08 (57.1%)	01 (7.1%)	05 (35.7%)	00	44 (80%)	10 (18.2%)	01 (1.8%)	00

**DISCUSSION**

Identity is a set of physical characteristics, functional and pathological, that defines an individual. The various identification data that can be used are fingerprints, handwriting, lip marks, DNA fingerprinting, etc. The present study was carried out among 150 undergraduate medical students to screen fingerprint patterns of various individuals, to screen 'ABO' blood groups of the same individuals, and to study the relationship between them.

In the present study, we observed that blood group B was the commonest blood group followed by O blood group,

which is in agreement with the findings of earlier studies<sup>[5,6]</sup> However Bharadwaja A *et al.*<sup>[7]</sup> and Verma Usha *et al.*<sup>[8]</sup> observed blood group A while Soman MA *et al.*<sup>[9]</sup> observed blood group O positive the most common one. We found loop pattern of fingerprints to be the most prominent in all the fingers of the right hand, while composite was the least common. Earlier studies<sup>[5-11]</sup> are in concordance with our findings. However, in a study carried out in Gujarat by Raloti SK *et al.*<sup>[12]</sup> found that whorls occurred more frequently in males and loops in females.

The present study revealed an association between distribution of fingerprint pattern and blood groups. We observed that loop was the commonest fingerprint pattern in all fingers in blood group A, B and O; however whorl was the commonest fingerprint pattern in the thumb, index and ring finger in blood group AB. Similar findings were noted by previous authors.<sup>[5-12]</sup>

### CONCLUSION

In the present study blood group B +ve was the most common followed by O +ve and loop pattern of fingerprints was found to be the most prominent in all the fingers of the right hand followed by whorl pattern. The present study revealed an association between distribution of fingerprint pattern and blood groups. So we concluded that as there is an association between distribution of fingerprint patterns and blood group, one can get an idea about the expected blood group from the study of fingerprint pattern and vice versa.

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