ORIGINAL ARTICLE

# Comparative Study of Dactylography among the Students of Avicenna Medical College Lahore

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## ABSTRACT

**Objective**: To determine the distribution pattern among the students of Avicenna Medical College in relation to ABO blood groups.
**Study design**: Cross sectional study
**Place and duration of study**: Avicenna Medical College Lahore from 1-12-2011 to 29-02-2012.
**Materials and methods:** Finger prints were collected from the subjects after obtaining their informed consent in the month of 1 December, 2011 to 29 February, 2012. A total of 100 MBBS, $3^{rd}$ year students of the Avicenna Medical College Lahore participated in the study. Finger prints were recorded on a plain white paper with a stamp pad by plain and rolled method and each finger print was assigned by their serial numbers and roll no. of student. The Name and general information of the students like Age, Sex and Blood groups were recorded on the Proforma. All the subjects were in the age range of 19-25 years consisting of 30 male and 70 female students. Ethical clearance was obtained from the institutional Ethical Committee.
**Results:** Out of hundred participants majority were showed the trend and most common pattern belonging to Loop pattern 50%, followed by whorl pattern which was 42%, a very small proportion belonging to Arch pattern which was only 8%. The most common blood group pattern was B +ve 48% which showed commonality and community trend followed by O+ve which were 28%. Participants belonging to A+ve were 15%. Blood groups AB +ve were 6% and B-ve was 2% whereas A-ve was very uncommon 1% only. Maximum no were B+ve whereas least common was A –ve. relationship of different finger printing pattern with different blood groups but when we applied Chi-squared test at P-value ≤ 0.05 with 8 degree of freedom. It came out to be 7.89 which is much less than the cut off value at 0.05 which was 15.51 which revealed that the association was not found to be significant statistically at this level but this finger print pattern might be associated with blood groups , biologically which is still to be proved.
**Conclusion**: Loops are the most commonly occurring finger-print pattern and Arches are the least common. Blood group B positive is the most common and A negative is the rarest. Loops are predominant in blood group A +ve, B +ve and O+ve in individuals. Whorls are more common in blood group B+ve and O+ve and A+ve and least common in A-ve, and B-ve. Loops and Whorls are maximum seen in blood group B+ve  while whorls are more common in blood group B+ve and O+ve
**Key words**: Dactylography, dermatoglyphics, ABO blood groups

## INTRODUCTION

The increasing awareness regarding the biometric system of dermatoglyphics pattern is one of the surest methods of identification[1]. The study of the epidermal ridges and the patterns formed by them is known as dermatoglyphics, a word coined by the anatomist Harold Cummins of Tulane University. The word dermatoglyph means "a skin carving"[2]. A finger pint is the pattern on the inside of the finger in the area between the tip and the first joint, and stays the same from the day of a person's birth to the day he

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dies. These two facts make fingerprints very useful in identifying somebody beyond any doubt, and this is why police forces find them invaluable in tracking down a criminal[3]. This science is very old and has been used by Chinese as a signature few thousand years ago[4]. Epidermal ridges are formed between $11^{th}$ and $24^{th}$ week of gestation; after this period epidermal ridges do not change[5]. The critical growth of the brain is also occurring during this period. Since the skin and brain develop from the same ectoderm, dermatoglyphic variations are informative for early developmental brain disturbances[6]. There are three basic patterns of finger prints Named Arch, Loop, and Whorl[7]. Arch can further be classified into tented and loop arches with further sub divisions into Radial and

Ulnar variety. The whorls type is divided into five sub groups- Simple, central packed loop, twinned loop, lateral packed loop and accidental.[8].The pattern area is the part of a loop or whorl which contains the core delta and ridges. Total finger ridges count is the most inheritable feature in dermatoglyphics. The most common pattern, a simple Loop (60-70%) is characterized by single triradius, is not advantageous for tactile perception and precession group. Whorl has two triradi yielding two central, while simple arches have no true triradi, resulting in zero count[9,10,11]. Finger prints are also useful in medical diagnosis of genetically inherited diseases and in detection of crimes. Finger prints collected at a crime scene can be used to identify perpetrator of crime, victims and other persons who touched the surface. Finger prints scan can be used to validate electronic registration, cash less catering, library access especially in school and colleges and office attendance. The secretions in the fingerprints contain residues of various chemicals and metabolites which can be detected and used for the forensic purposes[12]. A considerable improvement has been achieved in the concept of relation between the type of patterns of lines on the fingers and some individual disorders[10,11,12,13]. This study was aimed at determining and establishing Dermatoglyphic pattern among the students of Avicenna Medical College to determine the association in pattern of finger prints with type of blood group.

## MATERIALS AND METHODS

Finger prints were collected from the subjects after obtaining their informed consent in the month of 1 December, 2011 to 29 February, 2012. A total of 100 MBBS, 3rd year students of the Avicenna Medical College Lahore participated in the study. Finger prints were recorded on a plain white paper with a stamp pad by plain and rolled method and each finger print was assigned by their serial numbers and roll no. of student. The Name and general information of the students like Age, Sex and Blood groups were recorded on the Proforma. All the subjects were in the age range of 19-25 years consisting of 30 male and 70 female students. Ethical clearance was obtained from the institutional Ethical Committee. The study design was cross sectional study. The students of either sex from 3rd year MBBS enrolled in Avicenna Medical College, Lahore belonging to any ABO blood group and any ridge pattern of finger prints were included. The students suffering from any chronic skin disease e.g. eczema, leprosy and chronic dermatitis having scars, congenital or acquired anomalies due to trauma on fingers were excluded from this study. A proforma was designed in which data including name, age, gender, ethnicity, and ABO blood groups were entered. Impression of all fingers and thumbs of both hands were taken. The impressions were taken by simple plain and rolled method. Screening of finger prints were done by using magnifying lens and scanner.

## RESULTS

Out of hundred participants majority were showed the trend and most common pattern belonging to Loop pattern 50%, followed by whorl pattern which was 42%, a very small proportion belonging to Arch pattern which was only 8%.

Table 1: Finger print pattern

| Pattern of finger prints | No. of students in each pattern | %age |
|---|---|---|
| Arch | 8 | 8 |
| Loop | 50 | 50 |
| Whorl | 42 | 42 |
| Composite | No any | - |
| Total | 100 | 100 |

Table 2 showed the most common blood group pattern was B+ve 48% which showed commonality and community trend followed by O+ve which were 28%.Participants belonging to A+ve were 15%.Blood groups AB+ve were 6% and B-ve was 2% whereas A-ve was very uncommon 1% only. Maximum no were B+ve where as least common was A–ve.

Table 2: Blood groups pattern

| Blood groups | No. of students in each Group | %age |
|---|---|---|
| A +ve | 15 | 15 |
| A –ve | 1 | 1 |
| B +ve | 48 | 48 |
| B-ve | 2 | 2 |
| AB +ve | 6 | 6 |
| O+ve | 28 | 28 |
| Total | 100 | 100 |

Table 3 shows relationship of different finger printing pattern with different blood groups but when we applied Chi-square test at P-value ≤ 0.05 with 8 degree of freedom. It came out to be 7.89 which is much less than the cut off value at 0.05 which was 15.51 which revealed that the association was not found to be significant statistically at this level but this finger print pattern might be associated with blood groups , biologically which is still to be proved.

Table 3: Blood Group pattern in relation with Pattern of finger print

| Pattern of finger print | Total | A +ve | A –ve | B +ve | B –ve | AB +ve | O +ve |
|---|---|---|---|---|---|---|---|
| Arch | 8 | 1 | | 2 | | 2 | 3 |
| Loop | 50 | 9 | | 26 | 1 | 2 | 12 |
| Whorl | 42 | 5 | 1 | 20 | 1 | 2 | 13 |
| Total | 100 | 15 | 1 | 48 | 2 | 6 | 28 |

Our study was having some limitations and a more detailed study is proposed to explore the correlation of finger print pattern with different blood groups or other wise.

## DISCUSSION

Identification is a set of individual physical characteristics, functional or psychic, normal or pathological that defines an individual[12]. Dermatoglyphic is a scientific method for anthropological, medico legal and genetic studies[15]. The role of finger printing cannot be neglected and the patterns of finger prints are unique to each and every individual due to their uniqueness they can be used to identify the culprits at crime scene and blast injuries and in mass disaster injuries and as well as for national identification[15]. In our study the most common prevalent pattern of finger prints is Loop 50% followed by whorl 42% and arch 8% respectively. These studies are largely in conformity with studies done previously, One National and some International studies on this subject[10,11], Where as in another study done in Karachi, whorl pattern is predominant 48% followed by loops 42.5% and then arches 4.8%[16] which is similar to the study done in India[12]. An other study was done in Ziauddin University Karachi, showing loop pattern 48.8% followed by whorl 32% and then Arch 19.2% and in the types of blood groups antigen B was the most frequent type 47% followed by O antigen 27%, A antigen 18.8% and AB 6.8%. The blood group B was most common 28.4% in people who have Loop type of finger print pattern followed by O group and A group respectively. Similarly in whorl type of finger print pattern B group antigen was most common but people who have arched type of finger print blood group B and O antigen are equally common[15]. In present study the most common blood group pattern was B+ve 48% which showed commonality and community trend followed by O+ve which were 28%.Participants belonging to A+ve was 15%. Blood groups AB+ve were 6% and B-ve was 2% where as A-ve was very uncommon 1% only. Maximum number were B+ve where as least common was A–ve. Loops are predominant in blood group A +ve, B

+ve and O+ve in individuals. Whorls are more common in blood group B+ve and O +ve and A+ve and least common in A-ve, and B-ve. Loops and Whorls are maximum seen in blood group B+ve while whorls are more common in blood group B+ve and O+ve. When the correlation between the two variables i.e. finger print types and types of blood group were tabulated using Chi-square test at P-value ≤ 0.05 with 8 degree of freedom. It came out to be 7.89 which is much less than the cut off value at 0.05 which was 15.51 which revealed that the association was not found to be significant statistically at this level. In India Dr. Prateek Rastogi, Ms. Keerthi R Pillai et al reported in their study that there is an association between distribution of finger prints, blood group and gender.[12].Studies from other parts of the world show no such linkage[17] The reason for such type of result might be due to sampling fluctuation, or the sample size is not adequate, sampling error or these two variables are independent and do not effect each other. Similar studies should be conducted on a larger sample at the National level so as to increase the accuracy of prediction. Finger print patterns are related to genetic predisposition to various disorders. Several studies also reported the importance of dermatoglyphics as markers of a prenatal disturbance in patients with Schizophrenia due to the fact that finger prints are formed by the end of 2nd trimester and they may provide clues to identify disturbances in early development[18]. It was proven that finger prints are closely related in predicting familial disorders. There is a need to evaluate the finger printing in genetical diseases along with familial diseases.

## CONCLUSION

- Each fingerprint is unique hence it can be very effectively used as an evidence for identification in the court of law.
- Loops are the most commonly occurring finger-print pattern and Arches are the least common.
- Blood group B positive is the most common and A negative is the rarest.
- Loops are predominant in blood group A +ve, B +ve, and O+ve in individuals.
- Whorls are more common in blood group B +ve and O +ve and A +ve and least common in A-ve, and B-ve.
- Loops and Whorls are maximum seen in blood group B+ve while whorls are more common in blood group B+ve and O+ve.
- Statistically no any significant variation and association of finger prints and blood groups have been found.

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