

The Relation Between Left Thumb Fingerprint Types with Blood Groups and Gender Among Students of Al-Kindy College of Medicine, 2019

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Abbreviations

FB	fingerprint
Rh	Rhesus factor

INTRODUCTION

The skin of the palms and soles is marked by a carved ridge. The pattern of these ridges on the fingers is called dermatoglyphics[1]. In dermatoglyphics, the minute ridge patterns made an impression which has exactly the same arrangement and the pattern of any individual remain unchanged throughout life[2].The friction ridges of all parts of a finger made an impression known as the fingerprint. A friction ridge is a raised section of the epidermis on

the digits or on the palmer and plantar skin, composed of one or more connected ridge units of friction ridge skin [3].

Dermatoglyphics is a polygenic trait with Mundelein or single gene inheritance model; however, an epigenetic contribution may play a role in its form [4, 5].

Regarding the embryogenesis of dermatoglyphics, the development initiates from the 12th-16th week and accomplished by the 20th

week of intrauterine life [6].

Given the unique appearance of the epidermal ridge, fingerprints are expected to perform some important functions; several functions have been proposed [7]. First, the ridge and furrow system serves to prevent slipping in a manner just as automobile tire treads, secondly as sweat pores open only on the primary ridges and not into furrows, so it is thought that small amount of sweat bathing the ridges might improve their level of friction[7]. Also since the ridges have extensive nerve endings, they may serve to enhance the sense of touch or to improve tactile stimulation[8]. The many functions probably indicate an evolutionary history within primates, all of which possess fingerprints that placed a premium on their ability to carry out secure grasping behavior, to perceive valuable information about the environment through the sense of touch, as well as to withstand extensive use of volar surfaces in moving apart. These peculiarities act as a means of survival to humans which reflect some ancestral adaptive response [8]. Although the individual dermatoglyphics are variable, the diversity falls within pattern limits that classify them into a loop, whorl and arch [9].

The pattern that starts from one side, move towards the center, curve backwards and terminate on the same side is known as loop pattern. While whorls are a circular or spiral arrangement of ridges in the center, regarding arches, the ridge lines start from one side and end at the opposite end [10,11].

There are four major classifications of blood group: A, B, O,AB types, depending on the presence or absence of two agglutinogens, A and B. If both of them were absent, then the person will have blood group O. If only A agglutinin is present, the person will have the blood group A. If only B agglutinin is present, the person will have the blood group B. Last but not least, when both agglutinogens present, then the person will have blood group AB [12].

There are six common types of Rh antigens, known as Rh factors. These types are designated C, D, E, c, d, and e. The type D antigen is widely prevalent in the population and considerably more antigenic than the other Rh antigens. An Rh positive person possesses D antigen, whereas a person who does not have type D antigen is said to be Rh negative[12].

Aim of study

1. To study the pattern of fingerprint on the thumb of left hand.
2. To study the association between fingerprint, blood group and gender.

Sample and methods:

¶This study is a cross-sectional study. It was conducted in the department of physiology at Al-kindy College of Medicine, Baghdad, Iraq from December 2018 to March 2019. Total of 315 subjects of 199 female and 116 male were selected randomly for this study. All Subjects were students in Al-kindy College of medicine.

¶After taking consent from the subjects, the fingerprints were taken from the left thumb on pre-designed form containing gender and blood groups of participants.

All participants were asked to press their left thumb fingertip on the ink pad and then to the paper to transfer the fingerprint impression. This method was applied to all the participants.

Materials used are powerful magnifying hand lens for fingerprint analysis, ink pad and white chart paper. Fingerprints were analyzed and identified with the assistance of fingerprint expert Captain Khalil Shakir.

Statistical analysis was performed with SPSS.17 for the window. Chi-square test was used to compare the qualitative data. Clustered

Table 1: Distribution of blood groups regarding gender.

		Blood Group							Total	
		O+	O-	A+	A-	B+	B-	AB+		AB-
Gender	Male (36.8%)	34	11	19	5	35	7	4	1	116
		29.3%	9.5%	16.4%	4.3%	30.2%	6.0%	3.4%	0.9%	100%
Gender	Female (63.2%)	72	6	52	3	46	7	10	3	199
		36.2%	3.0%	26.1%	1.5%	23.1%	3.5%	5.0%	1.5%	100%
Total		106	17	71	8	81	14	14	4	315
		33.7%	5.4%	22.5%	2.5%	25.7%	4.4%	4.4%	1.3%	100%

bar Table 1: shows the distribution of blood groups regarding gender. The most distributed blood groups in both male and female are B+35(30.2%) and O+72(36.2%) respectively. AB- blood group had the lowest percent 1(0.9%) of distribution in males, however, both AB- and A- blood groups had the lowest percent 3(1.5%) of distribution in females. Significant association between gender and blood group was found in this study(P value=0.034).

Table2: Distribution of fingerprint types regarding gender.

		Gender		Total
		Male	female	
Abstract	Loop	76	112	188
Abstract		65.5%	56.3%	59.7%
Abstract	Whorl	38	75	113
Abstract		32.8%	37.7%	35.9%
Abstract	Arch	2	12	14
Abstract		1.7%	6.0%	4.4%
Total		116	199	315
		100%	100%	100%

Table 2: Shows the distribution of fingerprint types regarding gender. Distribution of fingerprint types in both genders found that loop had the highest percent followed by whorl and then arch. Non significant association between fingerprint pattern and gender was found (P value=0.100).

Table 3: Distribution of fingerprint types regarding ABO blood groups.

Blood groups		FP			Total
		loop	whorl	arch	
ABO	O	70 59.9%	47 38.2%	6 4.9%	123 100.0%
	A	42 53.2%	32 40.5%	5 6.3%	79 100.0%
	B	64 67.4%	28 29.5%	3 3.2%	95 100.0%
	AB	12 66.7%	6 33.3%	0 0.0%	18 100.0%
Total		188 59.7%	113 35.9%	14 4.4%	315 100.0%

Table 3: Shows the distribution of fingerprint types regarding ABO blood groups. Regardless of blood groups, loop had the highest percentages compared to arch and whorl. There was no significant association between fingerprint patterns and ABO blood group (P value =0.599).

Figure 1: Distribution of fingerprint types regarding Rhesus blood groups.

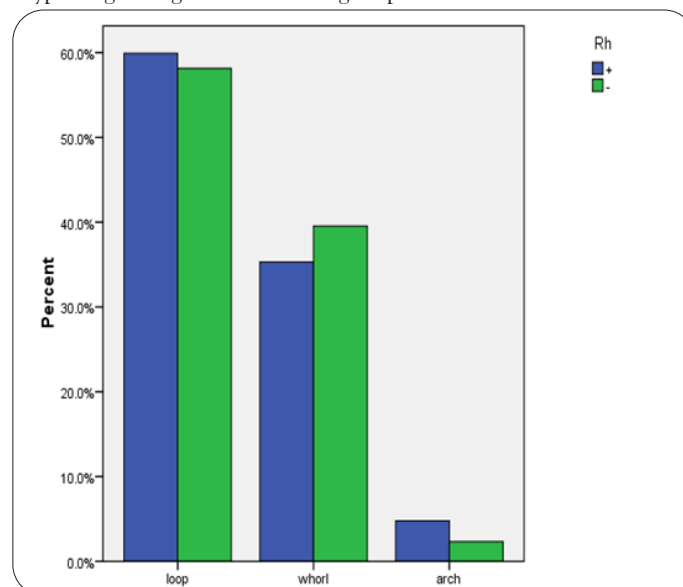


Figure 1: Shows distribution of fingerprint types regarding Rhesus blood groups. Rh positive was found to be higher in loop and arch, while Rh negative was higher in whorls. Loop was highest in both Rh groups followed by whorl and arch. In this study, no significant association between fingerprint pattern and Rhesus blood groups was found (p value=0.664).

Table4: Distribution of fingerprint types regarding ABO-Rh system

		Blood Group							Total	
		O+	O-	A+	A-	B+	B-	AB+		AB-
Fingerprint	Loop	61	9	37	5	55	9	10	2	188
		57.5%	52.9%	52.1%	62.5%	67.9%	64.3%	71.4%	50.0%	59.7%
	Whorl	40	7	29	3	23	5	4	2	113
		37.7%	41.2%	40.8%	37.5%	28.4%	35.7%	28.6%	50.0%	35.9%
	Arch	5	1	5	0	3	0	0	0	14
		4.7%	5.9%	7.0%	.0%	3.7%	.0%	.0%	.0%	4.4%
Total		106	17	71	8	81	14	14	4	315
		100%	100%	100%	100%	100%	100%	100%	100%	100%

Table4: Shows the distribution of fingerprint types among ABO-Rhesus blood groups. Loop has the highest percentages compared to whorl and arch in all blood groups, except in blood group AB- where whorl and loop have the same percentages (50%). There was no significant association between fingerprint patterns and ABO-Rhesus blood group (P value=0.903).

Discussion:

The purpose of this study was to determine fingerprint patterns in relation to gender and blood groups among students of Al-kindy College of Medicine, Baghdad, Iraq. Studies focusing on such topic have not been undertaken to this extent in this population. This will serve as an important aid in sex and blood group determination through fingerprint types and vice versa.

Regarding table1: The highest distribution of blood groups in male and female is B+ and O+ respectively .This results agree with a study was done in Navi Mumbai[13] .

There was significant association between gender and blood group (P <0.05) in contrast to study in the Delta State University, Abraka, Nigeria which did not find significant association between gender and blood group (P > 0.05)[14].

Regarding table2: Distribution of fingerprint types in both genders found that loop had the highest percent followed by whorl and arch, which agree with a study done in Malabar Medical College[15].

In this study, there was no significant association between gender and fingerprint pattern (P > 0.05). Similar observation was reported by Eboh, D. and Odokuma E.I.[14,17].

Regarding table3 and figure1: The distribution of the fingerprint pattern in different ABO blood groups [A, B, AB and O] and in Rhesus blood groups showed that loop had the highest percentage, followed by whorls and then arches. It means that regardless of the blood group, loop was the commonest fingerprint pattern followed by whorl and arch. Similar findings were observed by Eboh, D. and Prateek R.[14,16].

This study did not find statistical significant association between fingerprint pattern and ABO blood group (P > 0.05). This was in conformity with observation of Eboh, D. ,Odokuma E. I . and Kshirsagar S.V., who did not find any association between fingerprint patterns and ABO blood groups[14, 17, 18]. But this finding did not match with observations of similar earlier studies done by Bharadwaja A. and Mehta A.A. [19,13].

This study did not find statistical significant association between fingerprint pattern and Rh blood group (P > 0.05) in contrast to the study of the Delta State University, Abraka, Nigeria which found significant association [14].

Conclusion:

The study has revealed significant association between blood group types and gender .This study failed to find significant association neither between fingerprint patterns and gender nor between fingerprint patterns and blood group types.

In the above study, loops are the most frequent and arches are the least common fingerprint. The distribution of fingerprints in both gender and blood groups showed that Loops had the highest percent followed by whorls and then arch.

Recommendation:

1. For researchers who want to study this subject, they are advised to take large sample size to reach the best result.
2. New studies can be done using new variables for example: eye colors, left handedness or its association with diseases.

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