Original Article

Evaluation of Finger Prints in Relation to Academic Performance of Students in Anatomy at Islam Medical and Dental College, Sialkot

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ABSTRACT

Objective: To assess the relationship between the fingerprint patterns and academic performance of students in Anatomy.

Methodology: This Cross-sectional study was conducted in the Anatomy department of Islam Medical and Dental College Sialkot. The duration of the study was from mid-November 2022 to mid-December 2022. A total of 300 healthy medical (1st and 2nd year MBBS) and dental (1st year BDS) students with no injury and deformity, voluntarily participated in this study. The student's age were 20-22 years. Simple convenient sampling was used. Ethical clearance was obtained before study. Thumb prints were collected along with questionnaire. The study was done by categorizing the pattern into arches, loops and whorls. The academic performance was taken in percentage and classified as above 70 %, between 50 % and 70 % and below 50%. The statistical analysis of categorical data was done by using non-parametric test i.e. chi square test. A P value of < 0.05 was considered statistically significant.

Results: The most common pattern observed among students was loops. The students with loop pattern were in high scoring group while students with whorl and arch pattern scored less marks in Anatomy.

Conclusion: The percentage of academic performance was higher in students with loops as compared to whorl and arch pattern with low percentage of academic performance in Anatomy.

KEYWORDS: Finger print pattern, academic performance, Anatomy

INTRODUCTION

Each individual has certain unique features, which differentiate him/her from other individuals. These features could be psychological, functional, or pathological, that express him/her as an individual and they are important for social, personal or most importantly for lawful purpose in the forensic anatomy.[1] In this perspective, the methods commonly used are anthropometry, finger prints, sex determination, estimation of age and difference by blood groups.[2]

Finger printing is the scientific study of the skin ridge patterns present on the fingers, toes, palms of hands, and soles of the feet.[3,4] They are epidermal elevations which are formed during the 12th to 16th week of development and remain unchanged throughout the life. Each finger specify to a lobe of brain and each fingerprint relays to a specific learning type e.g. Ulnar Loop pattern tells about Affective Learning, Radial loop pattern relates to Critical Thinking, Whorls are linked with cognitive learning and Arch pattern is associated with reflective learning.[5,6] Environmental and genetic factors play an important role in the progress of an individual's fingerprints. Studies have shown a correlation between the finger prints, gender and blood groups.[7,8]

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Academic performance of a student is a result of the student's learning ability. It also indicates the level of students reasoning and understanding capabilities. The cerebral cortex (memory area), fingerprints, and palm prints develop at the same period from embryonic ectoderm. If there is any anomaly present in the hereditary trait, the offspring inherits it and it is reproduced in the dermatoglyphic pattern of the person. Thus, it serves as a tool in identifying diseases having inherited origin. Genetic studies suggest that the differences in academic accomplishment of an individual are significantly transmissible.[9]The genetic nature of academic achievement is as significant as the heritability of intellect. The academia is pre-mediated to improve the learning ability and critical thinking by offering learners with challenges.[4] In the instructive settings, intelligence has a main role in educational ability of an individual. Studies have established that less Intellect Quotient result in lesser accomplishment levels.[9] Dermatoglyphic educations also help in making a person conscious of his strengths, potential and character traits and also assists in investigating multiple intelligences. Thus, finger print study can be used as a way to identify and develop capacities and for providing proper instructive teaching.[9]

Studies have been done on finger printing and academic performance of student separately but no research has been done in our set up in order to correlate the finger printing with academic performance of students. The main aim of the study was to investigate the finger print patterns and their distribution to assess the relationship with academic performance of the students in Anatomy at Islam Medical and Dental College, Sialkot. Therefore, this study was conducted to get base line information as it will serve as an important aid in determination of weak students which will help us in improving the learning methodologies (revision, use of reference book, discussion with batch fellows and teacher) to strengthen the academic of weak student in Anatomy.

METHODOLOGY

This cross-sectional study was conducted in the Anatomy department of Islam Medical and Dental College Sialkot. The duration of the study was from mid-November 2022 to mid-December 2022 after the approval of synopsis from Board of Ethical and Scientific committee (reference letter no 234: Ana/ Int.). Sample size calculated by open epi sample size calculator. Population proportion=50%, error of margin=5% at 95% confidence level total population of student were 1000.[10] Calculated sample size was were 278. To strengthen our study, 300 healthy students, aged between 20 and 22 years were involved in the study. Among them, 108 (36%) were male and 192 (64%) female medical (1st and 2nd year MBBS) and dental (1st year BDS) students. All those healthy students who were present on the day of taking finger printing and willing to participate in the study were included in the study population. Students having hand injury or had bandage on the hand or had any deformity of hands were excluded. Simple convenient sampling technique was used. Informed written consent was acquired proceeding to taking the prints. Hands of the participants were clean with soap and water and were air dried. Then thumb of right and left hand of the participants was placed on ink pad. The prints were obtain on questionnaire page, along with their age and gender. Each student was given code number. The fingerprints were then studied and identified as being loop, whorl or arch with the aid of a magnifying lens and recorded on data sheet. The academic data was calculated in percentage by average of nine formative assessments. It was categorized in three groups. One above 70 %. Second group between 50 % and 70% and third group was below 50%. The statistical analysis was done using SPSS software, version 22. Continuous variables are presented as mean ± SD and categorical variables were presented as frequency and percentages. Non-parametric test i.e. chi square test was used to check association. A P value of ≤0.05 was considered statistically significant

RESULTS

A total of 300 healthy students, aged 21±0.85 participated in this study. Out of which 192 (64%) were female and 108 (36%) were male. (Table 1) Most of right thumb patterns observed in students were loop (50.6%), followed by whorl (40.6) and

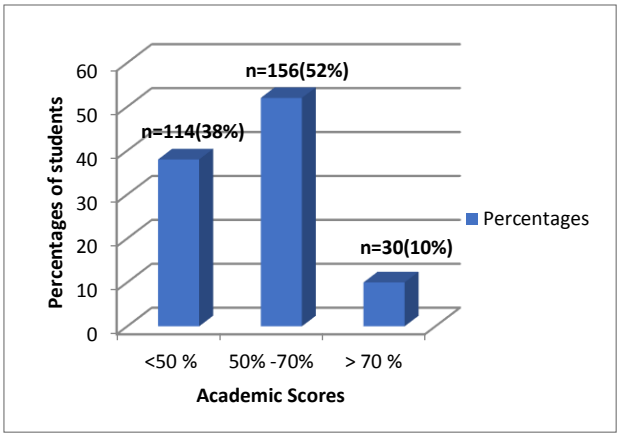
then arch (8.6%). (Table 1,)

Table 1. Frequency and percentage of gender, right and left thumb patterns (n= 300)

Frequency of gender		Frequency of right thumb			Frequency of left thumb		
Male	Female	Arch	Loop	Whorl	Arch	Loop	Whorl
108 (36%)	192 (64)	26 (8.6%)	152 (50.6%)	122 (40.6)	20 (6.6%)	157 (52.3%)	123 (41%)

Most of left thumb patterns observed in students were also loop (52.3%), followed by whorl (41%) and then arch (6.6%). (Table 1) Most of students (52%) were in group of 50-70%. Thirty-eight percentage of students were observed in group of less than 50% while 10 % students were in group of above 70 %. (Figure2)

Figure No. 2: Frequency and percentage of academic performance



Comparing the right thumb pattern with academic performance of students, we found that in category of above 70 % and 50 -70 % marks, most of the students were with loop patterns (66.6%) and 55.1% respectively. In category of less than 50 % marks, students with whorl pattern were with high percentage. Students with arch pattern, obtained low marks and low percentage in each category. There was significant relationship (P= 0.03) of thumb pattern with academic performance (Table 2).

Table 2: Association of right thumb pattern with academic performance (n= 300)

Right thumb pattern	Academic performance (%)			
	Less than 50 %	50-70 %	Above 70%	P value (Chi square)
Arch (n=26)	14 (12.2%)	11 (7.1%)	01(3.3%)	0.03
Loop (n = 152)	46 (40.3%)	86 (55.1%)	20 (66.6%)	
Whorl (=122)	54 (47.3%)	59 (37.8%)	09 (30 %)	
Total (n=300)	114	156	30	

Pearson Chi- Square test with p value <0.05 as significant

Comparing the left thumb pattern with academic performance of students, we found that students with loop and whorl patterns scored high and passing marks while students with arch pattern, obtained low marks. There was no significant relationship (P= 0.08) of left thumb pattern with academic performance (Table3)

Table 3: Association of left thumb pattern with academic performance (n=300)

Left thumb pattern	Academic performance (%)			
	Less than 50%	50-70%	Above 70%	P Value (Chi square)
Arch (n=20)	08	07	5	0.08
Loop (n=157)	54	89	14	
Whorl (n=123)	52	60	11	
Total (n=300)	114	156	30	

Pearson Chi- Square test with p value <0.05 as significant

DISCUSSION

In this study our main objective was to establish a relationship of finger print pattern with academic performance of students.

Analysis of thumb pattern from this study showed that loop were most common pattern followed by whorls and arch. This is same result showed by Varma et al. Varma et al in their study on medical student found that loop were the most frequently pattern followed by whorl and arch in both hands among male and females.[11] Vishwakarma AK et all in their study on medical student found that loop (56.6%) were the most abundant pattern followed by whorls (35.2%) and arch (8.3).[12] Sintakala C et all in their study on 2000 medical student concluded that loop (60.9%) were more than whorls (29.5%), arch (6.7%) and composite (3.3%) finger print patterns.[13] Sharma et al investigated 3000 finger prints of Jammu student. Out of which loop were 64.8%, followed by whorl pattern 30.8% and the least frequent pattern were arch (4.3%).[14] In another study by Baral et al also find out that loop pattern

were frequent than whorl and arch pattern.[15] In a study conducted at Khyber Medical and Dental College, Peshawar, the fingerprint pattern frequency revealed that the predominant pattern was loops (58.55%) followed by whorl (32.65%) and arch (8.8%).[16] Sudikshya K reported higher trends of loop pattern in middle and little finger.[17]

However, some studies suggest that whorls are the most commonly pattern followed by loop and arch. These opposing opinions suggest that finger print pattern varies depending on the topographical distribution of the population. [14,18]

Academic performance of a student is a result of the student's knowledge ability. It also indicates the level of students understanding capabilities and reasoning.[19]The cerebral cortex (related with academic performance) and fingerprints develop at the same period from embryonic ectoderm. Hence academic performance and finger prints are related to each other.[9]The genetic nature of academic achievement is as significant as the heritability of intellect. The academia is premediated to improve the learning ability and critical thinking by offering learners with challenges. In the instructive settings, intelligence has a main role in educational ability of an individual. [20-23]

Studies have established that less Intellect Quotient result in lesser accomplishment levels. Dermatoglyphic educations also help in making a person conscious of his strengths, potential and character traits and also assists in investigating multiple intelligences.[14] Thus finger print study can be used as a way to identify and develop capacities and for providing proper instructive teaching.[23]

We found in our study that most of the students with loop pattern scored higher while students with whorl, were average scoring group and arch pattern were in low scoring group. This fact was also found in previous studies which reported that loop pattern on any finger relates significantly with better academic performances of students. Nayak et al in their studied about the correlation between finger prints of right thumb, academic performance and learning methodologies of medical students and found that loop pattern was associated with better performance of students.[24] Sachan K et al in their study on dermatoglyphic patterns and academic performance of college students found that student with average and higher performance had loop pattern while student with below average had whorl and arch finger print pattern.[25] Nayak et al in their study of medical students on fingerprint patterns, have found that distribution of loop pattern was the highest among the group of good students.[24] Sachan et al study found that Students with above average academic performance had prevalence of loop pattern (Whorls 37 %, loops 58 %, arches 4 %) while students with below average academic performance had prevalence of whorl pattern (Whorls 58 %, loops 39 %, arches 2 %).[25] However some studies concluded that students with higher academic marks had whorls pattern while students with arch and loop pattern were in less mark group. These opposing opinions suggest that finger print pattern varies depending on the topographical distribution of the population.[18,24]

Limitations: Since this study was single departmental study, cannot be generalized to all departments of medical and dental college.

CONCLUSION

This study revealed that most of the students with right thumb loop pattern scored average and higher academic marks in Anatomy compared to students with other fingerprint patterns. This shows that finger print pattern of right thumb is related to the academic performance of an individual. Thus, finger print study can be used as a way to identify and develop capacities and for providing proper instructive teaching in Anatomy.

Recommendations: More research work need to be done in different departments of medical and dental college in order to find out the association of finger print with academics of students. Further research should be done on larger sample size.

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