Study of different fingerprint patterns in relation to gender and ABO blood groups among South Indian population.

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Abstract

Background: Fingerprint patterns form the mainstay of criminal identification in forensics. Determining the association of fingerprints patterns with blood groups and gender will help to narrow down the suspects in criminal identification, mass disasters and personal identification.
Aim: To study the fingerprint patterns and determine its relation with gender and blood groups among South Indian Population.
Methods and Materials: The cross sectional study was conducted by collecting the fingerprints and data regarding the blood group and gender from 50 individuals. All the data collected were tabulated and statistically analysed by using SPSS software version 23.
Results: The predominant finger print pattern determined was loops among males (20 %) and loops & whorls(22%) among females. Chi square test was done and p value was obtained as 0.536, which was not statistically significant. When gender and blood group was compared O+ve blood group was common in males and females, Chi square test was done and the P value was obtained as 0.825, which was not statistically significant.
Conclusion: Loop pattern of finger print and O+ve blood groups were common in both males and female. Although we did not achieve any significant correlation between gender, blood group and fingerprints, further studies including larger sample sizes may lead us in a positive direction.

Keywords: Blood Groups, Fingerprint pattern, Gender, Criminal identification, Innovative technology, Novel method.

Introduction

Forensic dentistry or forensic odontology is the handling, examination and evaluation of dental evidence in criminal justice cases. Almost 100 articles were written in the last 30 years [1]. ABO blood type is a classification of blood, based on the presence or absence of antibodies and inherited antigenic substances on the surface of red blood cells. This +ve and -ve is decided based on presence of RH antigen. There are different types of blood groups like O+ve, O-ve, A+ve, A-ve etc. There are around 33 recognized blood groups in the world [2]. According to an article people with O group have decreased risk of thromboembolic events [3].

A fingerprint is an impression left by the friction ridges of a human finger. There are three most common types of fingerprints namely loops, whorls and arches. Finger prints help in finding criminals, biometric security etc. Fingerprints use in forensic is still up for a debate [4]. Fingerprints are unique. It is also interesting to note that people might not have the same fingerprint in their left thumb as in their right thumb. Fingerprints remain the same throughout a person's lifetime though other things might changes [5,6]. Fingerprints can also be used to open phones etc. In 1930 Landsteiner was awarded the Nobel Prize for discovering and describing the human ABO blood group system [7]. Studies correlating the finger print and the blood groups with gender are very minimal. This research was conducted to know whether there is any significant relation between blood group, finger print and gender and to analyses the predominant pattern of finger print and blood groups in males and females. This will help in identifying criminals in a more accurate way, for personal identification and also for other forensic purposes. Therefore the aim of this study is to determine the relation of finger print pattern with gender and blood group among south indian population.

Methods and Materials

This study was done in the Department of Oral Pathology, Saveetha Dental College and Hospitals. 50 randomly selected healthy volunteers of both genders (25 males and 25 females) were included in the study. The inclusion criteria of the study consisted of Healthy males and females with no systemic, metabolic, dermatological or endocrinal disease, individuals who were non-syndromic, and individuals born and brought up in South India. The exclusion criteria consisted of individuals with permanent scars on fingers caused by injuries,

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inflammation or surgery, Individuals with worn fingerprints, extra, webbed or bandaged fingers. And subjects with bacterial, viral or fungal infections affecting the fingers. The consent of all the participants was obtained after explaining them about the aim and the methodology of the study. The subjects were given unique enrollment number and their details such as gender and age were noted on a performa. The ABO blood group of these participants was obtained from their identity cards. Before taking fingerprints, the subjects were asked to clean their hands with a hand sanitizer to remove any dirt. An ink pad was used to obtain the finger prints and the prints of the left thumb were obtained on white bond paper with normal pressure. The fingerprints were then classified as loops, whorls and arches in males and females. Unclear fingerprints were eliminated. The pros of this study were that the samples were easily obtained whereas the cons were that there was very less sample size. Randomised sampling was done. Statistical analysis was done by using spss software version 23. Chi square tests were used to analyse the relation between gender and blood group and also between gender and fingerprints. The p value >0.05 was considered statistically significance. The results were thus obtained in the form of bar graphs.

Results

Most common blood group in males and females was found to be O=ve (22%) then followed by B+ve in both males (14%) and females (12%). The least common was AB+ve in males (2%) and females (2%). Chi Square test was done for statistical analysis and p value was obtained as 0.825 and was statistically not significant. Loop pattern of finger print are the predominant in males. Loops and whorl pattern of finger prints are predominant in females. Chi square test was done for statistical analysis and p value was obtained as 0.53 and is statistically not significant.

Discussion

O+ve is the most common blood group in males and females with a percentage of 22% followed by B+ve (14% in females and 12% in males). This result was in coordinate to the results obtained by Sana Qanber Abbasi et al, this author reported that the frequency comparison of different ABO blood groups between males and females showed the highest frequency percentage of B in males and females, 34.95% and 42.38% respectively [8]. According to Niroj maharjan et al, 2018, there is no significant relation between gender and ABO blood group [7].

Blood groups are of vital importance in various aspects especially blood transfusion, human evolution and forensic investigations, genetic research, inheritance patterns, paternity, finger printing and as predictor of national suicide rates. Correlation of blood groups and the gender can be helpful in forensic investigations, personal identifications mainly in mass disasters.

Fingerprints have had a lot of commercial and forensic and applications. Recent advances have resulted in an increased use of fingerprints in both civilian and government and applications such as border control, employment background checks, and secure facility access [9]. Fingerprints have been the gold standard for personal identification in the forensic sciences for more than one hundred years. These Fingerprints are commonly used as tools to understand the individuality of a person so as to reveal his or her identity. Usually, no crime can be committed without the aid and assistance of the hands, the prime body part of the person. Fingerprints are of permanent nature and they remain same throughout the life of an individual. From the results of our study, it was noted that, the predominant finger print in males is loop (20%) whereas in females it is loops (22%) and whorls(22%). Arches was the least predominant type of fingerprint pattern in males (12%) and in females(6%). Similar result was reported by Krishnan R P et al., the author reported that the loop fingerprint pattern was predominant in males and females [10]. A similar predominance was observed in a study conducted by Nagasupriya et al, who also reported a predominance of loop patterns in males and females [11]. On an average for both males and females loops is the highest found fingerprint followed by whorls and arches and this is also in accordance with the research done by niroj maharjan et al 2018 [7] where he has proved that the most common fingerprint in males is loop. However, we did not find any significant correlation between gender, blood group and the fingerprints. This may be attributed to the small sample size in our study. Still, we observed that the loop fingerprint pattern and O+ve blood group were predominant both the genders. This association could be further explored with studies consisting of large sample sizes and can thus serve as an important tool for sex determination in the forensic scenario. Our team has extensive knowledge and research experience that has translate into high quality publications [12-26].

Conclusion

Loop pattern of finger print and O+ve blood groups were common in both males and female. Although we did not achieve any significant correlation between gender, blood group and fingerprints, further studies including larger sample sizes may help in generalizing these results.

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