

A COMPARISON STUDY OF MORPHOMETRIC FEATURES OF SCALP HAIR AMONG DIFFERENT REGIONS OF INDIA

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INTRODUCTION

From the follicles found in our dermis, hair is a protein filament that grows out of it. Hair is one of the most defining features of all mammals. Hair is made of a tough protein called keratin. It mainly consists of two different parts that are the follicle and the shaft. Hair is also one of the most common biological evidence found at a crime scene, it is accounted as a class evidence. We can easily use hair to solve the question of who committed the crime as hair helps in individualising a person. From the root of the hair, we can get nuclear DNA (Deoxyribonucleic acid) and from the shaft of the hair, we can get mitochondrial DNA. We can use hair to find out the race of an individual; forensic officers differentiate between hair of caucasoids, mongoloids, and negroids, as all of these hairs exhibit particular microscopic characteristics that distinguish them from one another.

METHODOLOGY

In this study, the aim was to distinguish between the morphometric features of hair from the different regions of India. To do this, India was divided into six regions that included the North, South, West, East, Central, and Northeast. 300 hair samples were collected in total

and their hair length was measured first, then the hair was examined under the microscope for the medullary width, medullary index, hair diameter, and root diameter. The medullary width and hair diameter were examined from the proximal, distal, and intermediate region. This study was conducted as there is a lack of a database to identify people from different regions of India through hair.

FINDINGS

The data collected from analysing all the samples was compiled into a Google sheet, and the mean value of each of the parameters was calculated for each region, and the resulting values were compared with each other.

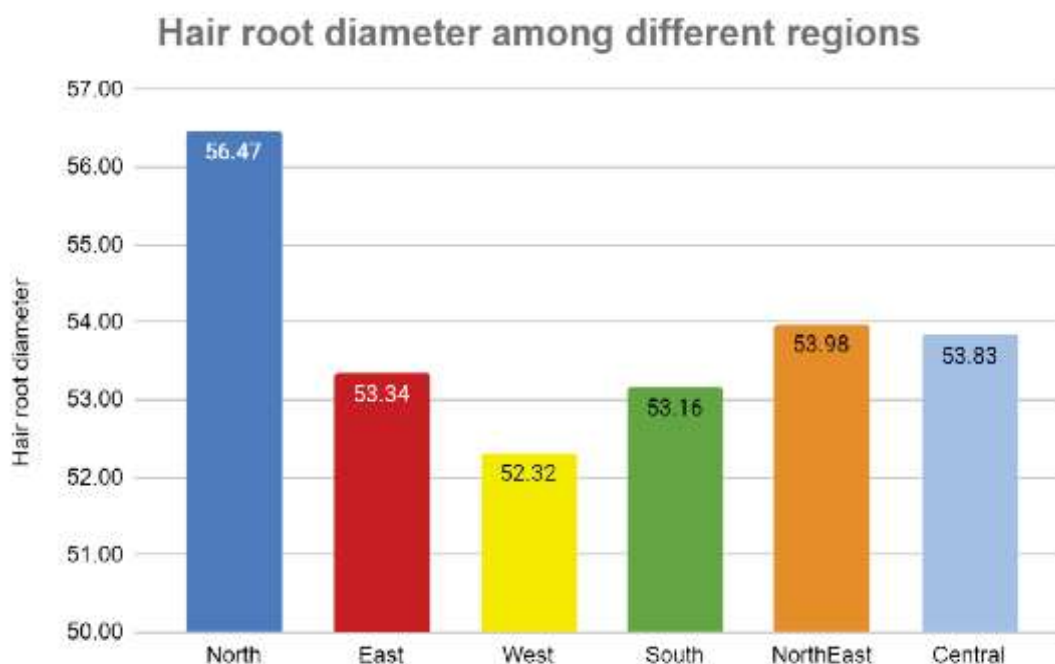


Fig 1.1: Graph showing the mean value of hair root diameter among different regions

It can be seen that the people in the North region have the largest root diameter and the people in the West region have the smallest root diameter.

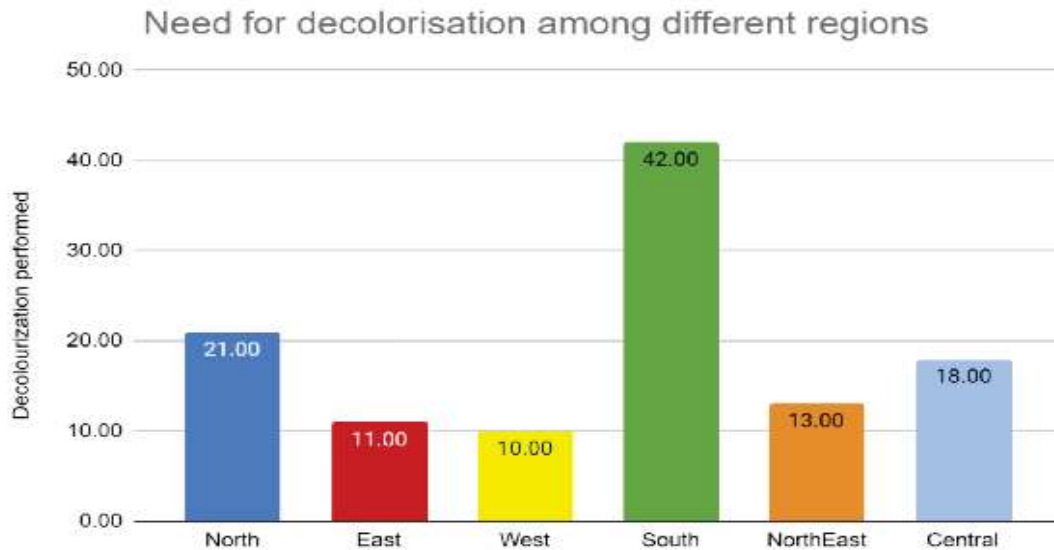


Fig 1.2: Graph showing the value of need for decolourisation among different regions

It can be inferred that due to a large number of samples requiring decolourisation in the South region, the hair of people in the South region contain more pigment compared to all the other regions. And in the West region, only 10 hair samples required decolourisation, so it can be inferred that the hair of the people belonging to that region have lesser pigmentation compared to the other regions.

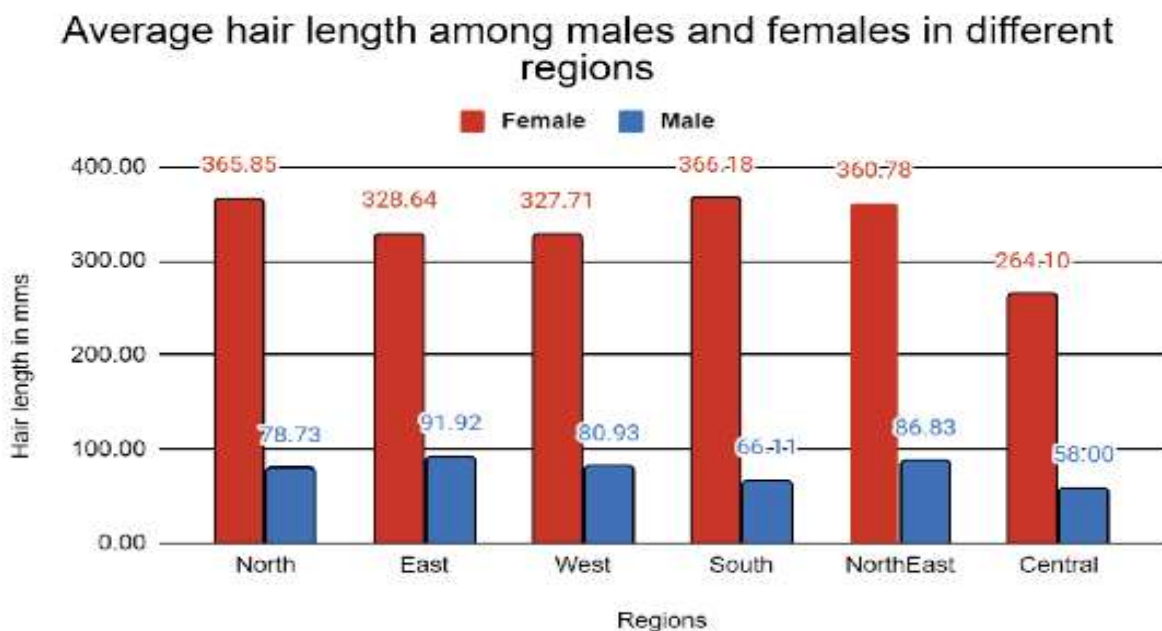


Fig 1.3: Graph showing average hair length among males and females in different regions

It can be observed that females in the South and North region have the highest hair length, and the males of the East and Northeast region have the highest hair length. The females of Central and West have the shortest hair length, and the males of Central and South have the shortest hair length.

Average hair diameter in proximal, intermediate and distal regions of hair among different regions

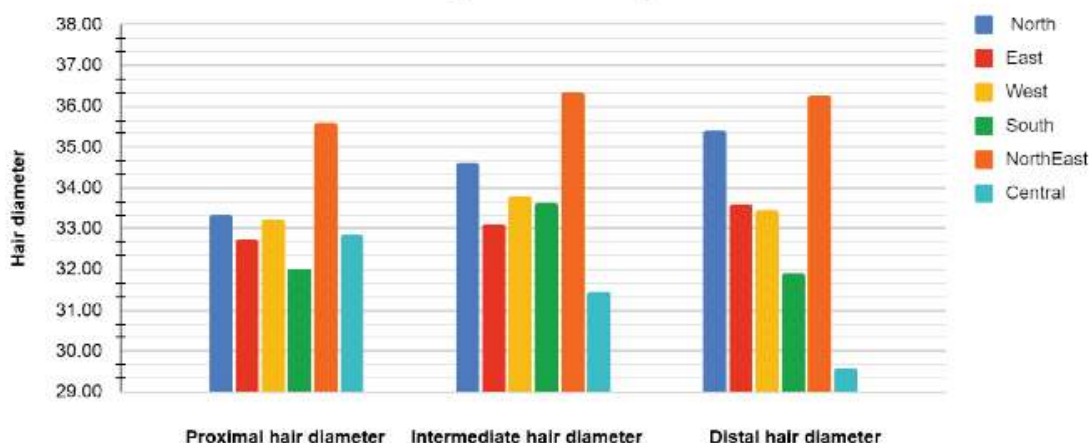


Fig 1.4: Graph showing average hair diameter in proximal, intermediate, and distal regions of hair among different regions

It can also be observed that the mean hair diameter value of North-east region is highest in proximal, intermediate, and distal regions compared to the other regions. And there is a significant difference in the value of the central region in the distal part compared to the other regions.

Average hair root diameter in males and females of different regions

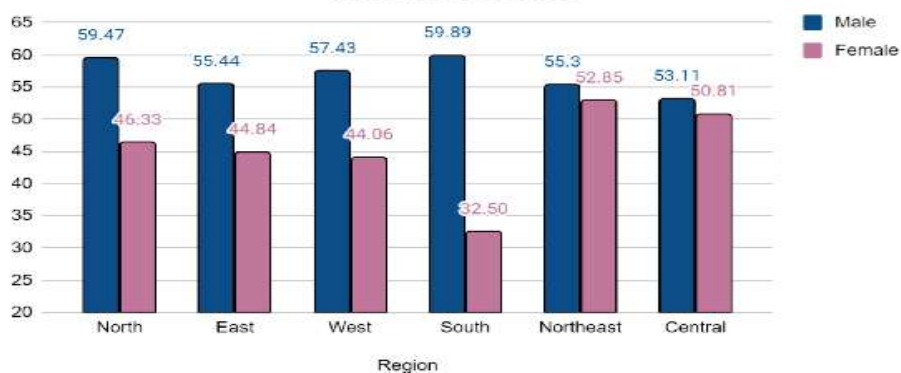


Fig 1.5: Graph showing the average hair root diameter in males and females of different regions.

It was seen that the Northwest region showed the lowest value of hair root diameter for male population and the south region showed the lowest value of hair root diameter for the female population. It was observed that the average hair root diameter was higher in male population compared to that of the female population.

CONCLUSION

The major findings of the present study are:

- 1) People in the north region have the largest root diameter and people in the west region have the smallest root diameter.
- 2) A large number of samples required decolourisation in the south region, the hair of people in the south region contain more pigment compared to all other regions.

It was also observed that there was a similar range between the hair root diameter of females of all the regions and males of all regions respectively. But since this is a study conducted with a small sample size, this particular observation cannot be declared. This study is only a preliminary study and therefore can be expanded further with a larger sample size.

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