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DORSAL DISTRIBUTION OF HAIR ON THE PHALANGES OF HAND IN SUB- URBAN AREA OF HYDERABAD

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ABSTRACT

In humans, hairs are common, in man it is a special and cherished feature especially in females. Hair is a filamentous keratinized structure present over almost the entire body surface (Jungueira and Carneiro, 2005). One hundred and twenty four subjects comprising of 61 females and 63 males, aged 21-41 years were randomly selected from medchal town. Phalangeal hair distribution was inspected physically on the dorsum of the hands of the subjects. Gender and phalangeal hair patterns were observed and categorized. Fisher`s exact test was used to assess the relationship between gender and patterns. Result shows hair distribution patterns 1-2-3-4-5 (10%), 2-3-4-5 (54%), 2-3-4 (3%), 3-4-5 (16%), 3-4 (9%). One percent were without hair in there proximal phalanges. Result also shows that 0% occurrence of hair in the distal phalanges. The pattern 3-4 shows a significance female preponderance. This study also established that interethnic and racial variations exist in phalangeal hair distribution. Hence, confirming that biological anthropologic trait varies amongst various human populations.

KEY WORDS : Hair , dorsal distribution ,phalanges.

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INTRODUCTION

In humans, hairs are common, in man it is a special and cherished feature especially in females. Hair is a filamentous keratinized structure present over almost the entire body surface [1].It is a derivative of the epidermis which assists in thermoregulation and provides some protection against injury[2] . It has sensory functions and subserves various roles in social communication. It is used for diagnostic purposes[3] . Hairs are absent from few areas of the body, for example sole of foot, palm of hand, buccal surface of the lip etc.Hairs are commonly present on the dorsal surfaces of basal segments of all the fingers. Invariably absent on the dorsal surfaces of distal segments of fingers. Hair show wide variations with apparent familial and racial tendencies in their distribution on the dorsal surfaces of middle segments of fingers[4] .Distribution of hair has always been an important field of anthropological interest. The first study on the distribution of the phalangeal hair of the hands was carried out in 1921 and after [5,6] . Since, then many investigators have shown their interest to investigate the racial differences seen in distribution of hair on the dorsum of fingers [7,8,9,10,11.] Presence of hair on greater number of fingers is dominant over presence of hair over lesser number of fingers and this trait follows the Mendelian Law in its mode of inheritance. It is suggested that the distribution of middle segmental hair is governed by a set of five alleles, having increasing dominance in phantasies A°, A1, A2, A3 and A4 [12,13]. The subscripts correspond to the number of fingers the alleles cause to be affected. Thus, a person without middle segmental hair would be known as having A° phenotype, having A° A° genotype.The distribution of phalangeal hair has been studied in various tribes in the world, but yet to be studied in most places in india. The purpose of this study therefore is to evaluate the different patterns and frequency of hair distribution on the phalanges of population of medchal town.

MATERIALS AND METHODS

One hundred and twenty four subjects aged between 21-41 years were used for the study, among which 63 were males and 61 females from medchal town. All cases considered were subjects in which both parents are from the same place. Sex status of the subjects was also considered. Those with skin diseases were excluded from the study. Informed consent was granted by individual subjects. With hand-lens, hairs were viewed and being magnified, counting of hairs was made easy. The hairs were counted for the proximal, middle and distal phalanges for all fingers and recorded. Data were analyzed using Fisher's Exact Test. The p values <0.05 were considered significant

FIGURE -1
Patterns of hair distribution

Divided into 8 groups as shown below for easy analysis.

- *Proximal phalangeal hairs*
- *Those with hairs on 1st, 2nd, 3rd, 4th, 5th, fingers*
- *Those with hairs on 2nd, 3rd, 4th, 5th fingers*
- *Those with hairs on 2nd, 3rd, 4th fingers*
- *Those with hairs on 3rd, 4th, 5th fingers*
- *Those with hairs on 3rd and 4th fingers*
- *Those without hairs*
- *Middle phalanx*
- *3rd, 4th and 5th fingers*
- *4th finger only*
- *Distal phalangeal hair*

RESULTS

There were observable variations in the distribution of hair on the phalanges of males and females of medchal town. The tables below show the results. The groups with hairs on digits 2-3-4 (3%), while digits 2-3-4-5 had the highest (54%). 1% of the population has no hair on the proximal phalanges. Hair was absent on the distal phalanges of all subjects. Statistically pattern 3-4 showed significant difference in relation to sex. There was no significant difference in all the other patterns (Table 1).

Table 1
Hair Distribution Pattern According to Job Type and Sex

S/No	Group	Total No	Male	Female	Office	Field
1	2-3-4-5	63	33	30	36	27
2	3-4-5	20	9	11	8	12
3	2-3-4	4	2	2	1	3
4	3-4	12	3	9	3	9
5	4	1	1	-	1	-
6	1-2-3-4-5	14	11	3	3	11
7	4-5	2	-	2	2	-
8	3	4	2	2	-	4
9	3-5	1	1	-	-	1
10	1-2-3-5	1	1	-	-	1
11	Without hair	2	0	2	-	2

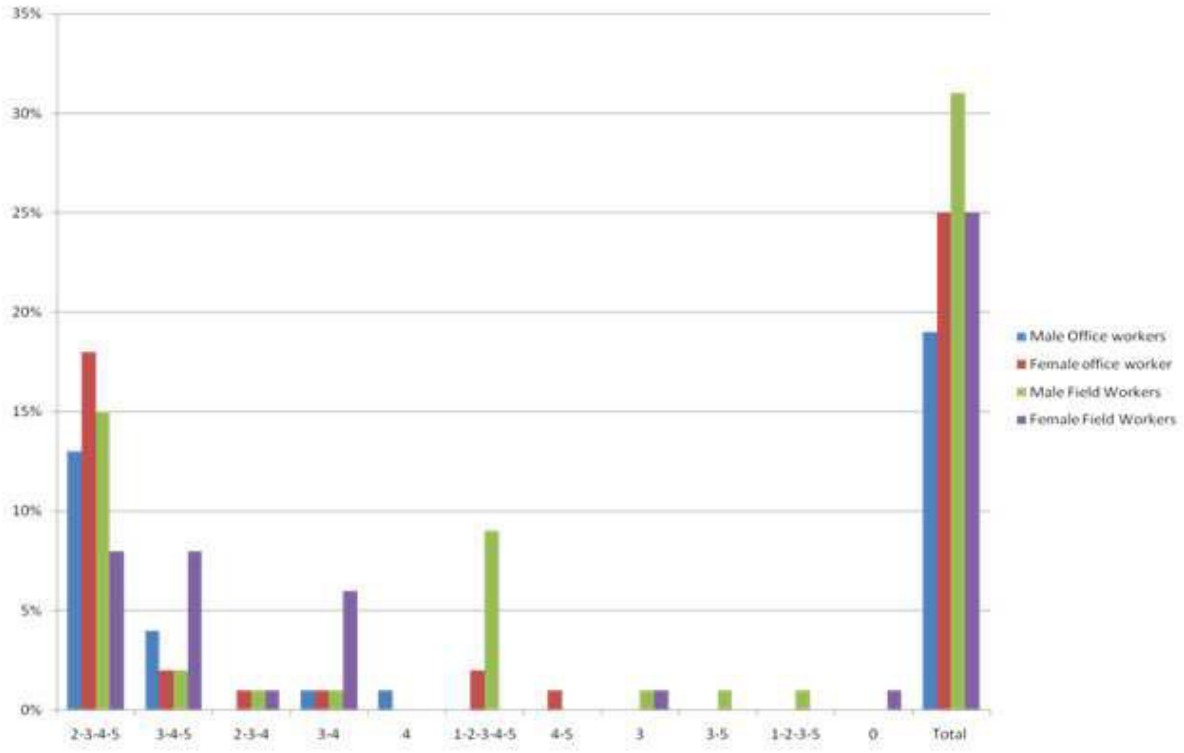
The phalangeal hair pattern was grouped according to presence of hair on the phalanges on each phalanx. 10 different phalangeal hair patterns were recorded which have been grouped into 1 to 10 with the group of people without phalangeal hair in group 11. It was noticed that the most common phalangeal hair pattern is the 2-3-4-5 group 1 in which hair was simply present on the 2^{nd}, 3^{rd}, 4^{th} hand 5^{th} phalanges. This is because 54% of the sample size had this type of phalangeal hair pattern. It was followed by group 2 (3-4-5) pattern with 16%

of the sample size while the least common phalangeal hair pattern are the group 5 (4), group 4(3-4), and group 10 (1-2-3-5) phalangeal hair patterns according to table-2.

Table- 2
Job Type, Sex, and Hair Distribution

	PHALANGEAL HAIR DISTRIBUTION PATTERNS											
Group	2-3-4-5	3-4-5	2-3-4	3-4	4	1-2-3-4-5	4-5	3	3-5	1-2-3-5	0	Total
Male Office Workers	15 13%	5 4%	- -	2 1%	1 1%	- -	- -	- -	- -	- -	- -	23 19%
FemaleOfficeWorkers	21 18%	3 2%	1 1%	1 1%	-	3 2%	2 1%	-	-	-	-	31 25%
Male feild Workers	18 15%	3 2%	1 1%	2 1%	-	11 9%	-	2 1%	1 1%	1 1%		39 31%
Female feild Workers	09 8%	9 8%	2 1%	7 6%	-	-	-	2 1%	-	-	2 1%	31 25%

Figure- 2
Job Type, Sex, and Hair Distribution



Results in table-2 and figure-2 shows that 2-3-4-5 group has the highest frequency of occurrence which is 54% of the total sample size. It also shows that the difference between both sexes is not significant i.e.2%. The following distribution combinations are the least common 4,3-5,1-2-3-5. 1% of the population has no hair on the phalanges. The most common pattern for both sexes is 2-3-4-5 while the least common for male are 4,3, 3-5, 1-2-3-5 and for female is pattern3, 3-5, 1-2-3-5.

Table 3
Type and Density of Field Workers.

Density per cm	0	1	2	3	4	5	6	7	8	9	Total
No of people with X density on the right phalanges	6	8	22	18	7	4	-	-	-	-	65
No of people with X density on the left phalanges	10	11	13	12	10	1	2	-	-	-	59

Table 4
Job and Density of Office Workers.

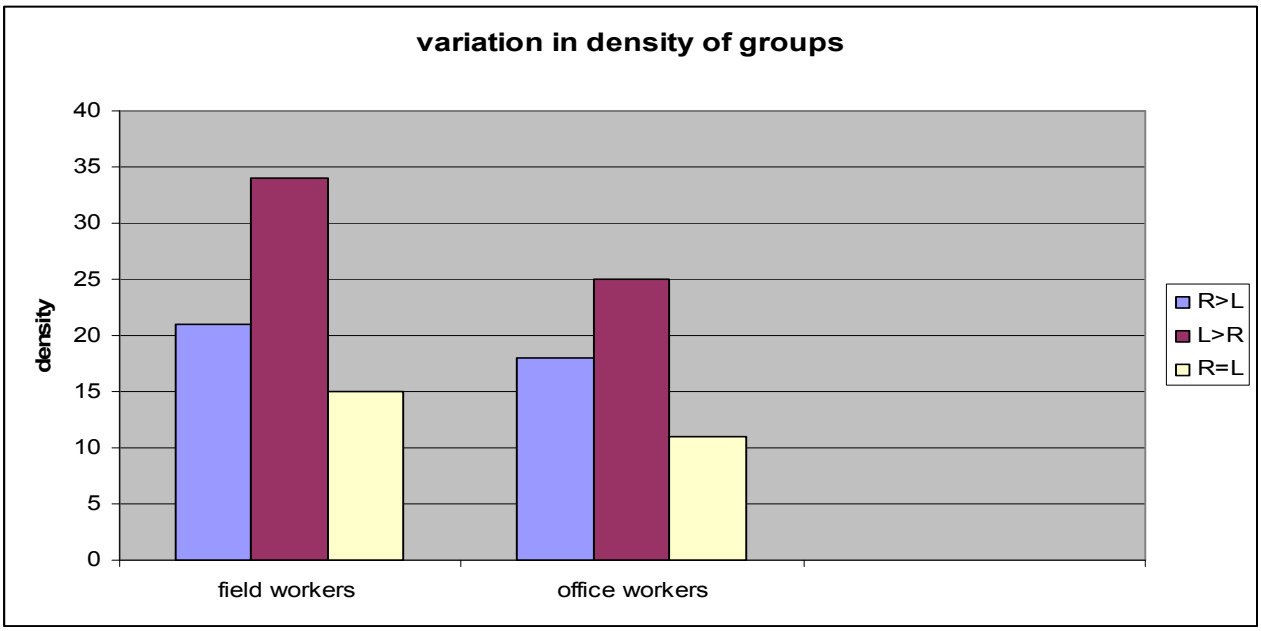
Density per cm	0	1	2	3	4	5	6	7	8	9	Total
No of people with X density on the right phalanges	0	5	-	16	18	11	-	1	-	-	51
No of people with X density on the left phalanges	2	6	7	29	17	6	6	-	-	-	73

Results in table 3 show no significant difference between the density of the phalangeal hair on the right and left hands of field workers given that left: right = 59:65. Table-4 shows a significant variation in the density of phalangeal hair on the right and left hands of office workers. It shows that the density of the left phalangeal hair is greater than that of the right hand, given that, left right: 73:51. These are expected because differentials have been found among types of phalanges used for particular forms of job and depending on regularity of use.

Table 5
Variation in Density of Right and Left Hands in Field and Office Workers.

	Group	Field worker	Office worker
Density	Right>Left	21	18
Density	Left>Right	34	25
Density	Left=Right	15	11

Figure-3
Variation in Density of Right and Left Hands in groups



Shows that the larger percentage of the population's (47.5%) left phalangeal hair density is higher than that of the right hand. The least common of both job types is equal phalangeal hair on both right and left hands.

DISCUSSION

In majority of the people, hair have always been present on proximal and absent on distal segments of fingers. Previous researches shows that individuals tend to have more hair on the proximal phalanges in both sexes than the middle and none in the distal phalanges. In

the present findings the highest percentage of hair distribution was observed in the proximal phalanges, males 100% and females 99%. This finding is correlation with observation in previous studies like calabar Nigeria (Singh 1982)[11]and punjabis in pakistan (Nasir. etal 1995)[4] . Statistically pattern 3-4 showed significant (<0.005) difference in relation to sex. There was no significant difference in all the other patterns. 2nd, 3rd, 4th, 5th, finger pattern is commenest type of hair, while the least was 3rd, 4th,3-5 and 1-2-3-5 finger patterns for this ethnic group which is consistent previous studies [4,14].Hair variants are genetically determined and the complete absence of mid-phalangeal hair is a recessive trait [9] and varies from different ethnic groups, race and nationality. Prolonged wet work such as bricklaying, block making, laundry, hairdressing, machines and all types of fieldwork predisposes subjects to sparse phalangeal hair. It was recommended among others that people engaged in these kind of jobs should cultivate the habit of wearing hand gloves to protect their phalangeal hair, a very important cold receptor and which can also be used for hair analysis for diagnosis before and after death.

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