

A STUDY OF DISTRIBUTION OF HAIR ON THE PHALANGES OF HAND IN NORTH INDIA

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ABSTRACT

The aim of the study was to observe the distribution of hair on the phalanges of the hand in the population of Uttar Pradesh and Uttarakhand. 1000 males and 800 females aged between 18-30 yrs were randomly selected for study. The dorsum of hand was inspected for phalangeal hair distribution. Observations were categorized on the basis of gender and phalangeal hair patterns. The results showed that proximal phalangeal hair was present in 98.8% males and 98% females. The most common combination was 1-2-3-4-5. The middle phalangeal hair was absent in 56.3% males and 64.8% females. 3-4 pattern was most common combination in middle phalangeal hair distribution. Hair on distal phalanx were absent in all subjects. All these parameters were compared with available literature and it was found that interethnic, sexual and racial variations exist in phalangeal hair distribution. So, we conclude that the study of hair distribution has anthropological and medico legal importance.

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INTRODUCTION

Distribution of hair on dorsum of phalanges of hand is of medico legal and anthropological importance because it shows wide variation in relation to race, nationality and ethnic groups. Hair distribution on phalanges is genetically determined and follows the Mendelian law of inheritance. The presence of hair on greater number of fingers is considered as a dominant character[1]. Complete absence of phalangeal hair is a recessive trait [2].

Bernstein & Burks described that the distribution of phalangeal hair is controlled by a set of five Alleles, which has an increasing dominance in phantasies A₀, A₁, A₂, A₃, and A₄. A person without Phalangeal hair will have A₀ phenotype and A₀A₀ genotype. Thus, we conclude that this is genetically determined factor and shows racial variation [3].

Besides this, the phalangeal hair distribution is also influenced by the environmental conditions and sex (4). Thus, this study is also important to establish the geographical and sexual differences.

The study on distribution of Phalangeal hair was first carried out by Danforth in 1921[5]. Since than many investigators tried to study the racial, geographical and sexual variations in hair pattern in different parts of world [6,7,8,9,10] Recently the study was conducted by some scientists in southern states in India[11], but the literature related to northern states is still lacking. So the aim of present study is to explore the different patterns of hair

distribution in people of northern states and to observe sexual dimorphism in it.

EXPERIMENT WORK

The study was conducted on randomized population sample of 1000 male & 800 female, medical and paramedical students of Teerthanker Mahaveer Medical College & Research Centre, T.M.U., Moradabad (U.P.) & Shri Guru Ram Rai Institute of Medical & Health Sciences, Dehradun (Uttarakhand), aged between 18 – 30 years. All subjects were natives of North India. Name, age and sex of each individual were recorded. Individuals with skin disease or any type of hand injury were excluded from the study. All observations were made in daylight by using hand lens. Presence or absence of hair over each phalanx was recorded and the data was analysed statistically.

RESULTS

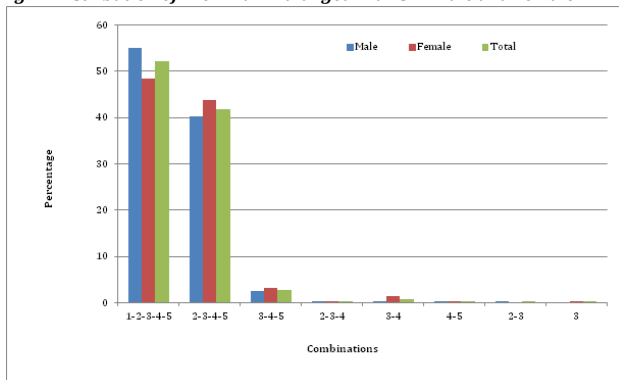
Distribution of hair on proximal phalanges of the hand is shown in table 1. Hair is present over the proximal phalanx in 98.8% male and 98% female. The most common combination of fingers with proximal Phalangeal hair is 1-2-3-4-5(52.1%), the next common combination is 2-3-4-5(41.8%). The least common combination is 3(0.05%). In both the sex most common combination is 1-2-3-4-5 but frequency is slightly less in female (48.5%) as compared to male (55.1%) where as 2-3-4-5 combination is more frequent in female (43.7%) as compared to male (40.2%).

The combination of 3 is not seen in males and 2-3 combination is absent in females.

Table I - Distribution of Proximal Phalangeal Hairs in Male and Female

COMBINATIONS	MALE(1000)	FEMALE(800)	TOTAL(1800)
1-2-3-4-5	551(55.1%)	388(48.5%)	939(52.1%)
2-3-4-5	402(40.2%)	350(43.7%)	752(41.8%)
3-4-5	26(2.6%)	26(3.2%)	52(2.8%)
2-3-4	4(0.4%)	1(0.12%)	5(0.27%)
3-4	1(0.1%)	11(1.36%)	12(0.66%)
4-5	2(0.2%)	2(0.25%)	4(0.22%)
2-3	2(0.2%)	-	2(0.11%)
3	-	1(0.12%)	1(0.05%)
Absent	12(1.2%)	21(2.6%)	33(1.75%)

Fig. I - Distribution of Proximal Phalangeal Hairs in Male and Female

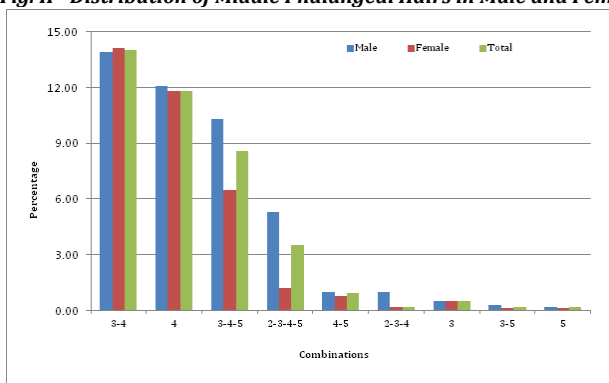


In the present study, middle Phalangeal hair pattern is also studied and its distribution is shown in table2. The middle Phalangeal hair is absent in 60.1% subjects [(56.3% males) & (64.8% females)].The most common combination is 3-4 (14%) followed by 4(11.8%). The least common are 3-5 (0.2%), 2-3-4 (0.17%) & 5 (0.17%). The combinations 3-4-5 & 2-3-4-5 were more frequent in male (10.3%) and (5.3%) than those in female (6.5%) and (1.2%) respectively. Hair on distal phalanx are absent in all subjects.

Table II - Distribution of Middle Phalangeal Hairs in Male and Female

COMBINATIONS	MALE (1000)	FEMALE(800)	TOTAL (1800)
3-4	139(13.9%)	113(14.1%)	252(14%)
4	121(12.1%)	91(11.8%)	212(11.8%)
3-4-5	103(10.3%)	52(6.5%)	155(8.6%)
2-3-4-5	53(5.3%)	10(1.2%)	63(3.5%)
4-5	10(1%)	7(0.8%)	17(0.94%)
2-3-4	1(0.1%)	2(0.2%)	3(0.17%)
3	5(0.5%)	4(0.5%)	9(0.5%)
3-5	3(0.3%)	1(0.12%)	4(0.2%)
5	2(0.2%)	1(0.12%)	3(0.17%)
Absent	563(56.3%)	519(64.8%)	1082(60.1%)

Fig. II - Distribution of Middle Phalangeal Hairs in Male and Female



DISCUSSION

The studies on phalangeal hair distribution in different parts of world have revealed the difference in the pattern of arrangement of hair in proximal and middle phalanges. In present study 98.1% (98.8% in male & 97.4% in female) shows the presence of hair on proximal phalanges. This observation is similar to Jung[12] and Muralidhar R.S[11]. Similar to previous investigations the order of frequency of presence of proximal phalangeal hair is 3>4>5>2>1. The

comparative distribution of proximal phalangeal hair in different populations is depicted in table 3.

Table III - Comparative Distribution of Proximal Phalangeal Hairs in Different Population

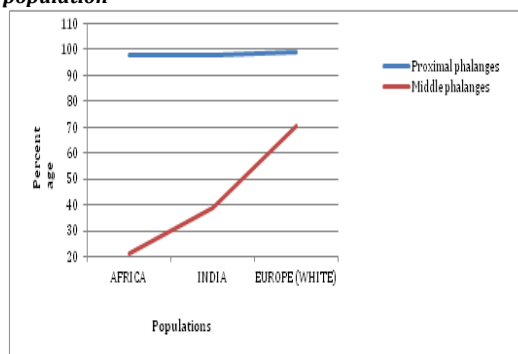
Population	Percentage of Hair			Reference
	Male	Female	Total	
Nigeria	96	95	-	J.D.Singh 1982
Turkey	99.8	98.3	-	Hati Boglu 1983
Pakistan	98	80	-	Nasir 1995
Nigeria	92	92.4	-	M Bajiorgu 1996
Malaysia	99.3	85.1	-	Dhurap 1996
Korea	-	-	98.2	Jung 2001
Nigeria	-	-	98	Olabiya 2008
Nigeria	98.4	100	98	Onyije 2011
India(South)	99.1	98	98.6	Muralidhar R.S. 2012
India (North)	98.8	97.4	98.1	Present Study 2012

The common combination of proximal phalangeal hair in present study was 1-2-3-4-5 (52.1%) followed by 2-3-4-5 (0.8%), this is similar to Hati Boglu[14] and Muralidhar R.S. but differ from Onyije, Nigeria. In present study the middle phalangeal hair was absent in 60.1% individual (56.3%male & 64.8% female) this observation was similar to that of Permer, Tiwari and Bhasin, Dutta, Hati Boglu (Table 4).

Table IV - Combinations of Fingers with Proximal Phalangeal Hairs in Different Population

COMBINATIONS	MALE	FEMALE	TOTAL	STUDY
1-2-3-4-5	74	68	71.6	Hati Boglu, Turkey
	-	-	10	Onyije, Nigeria
	56.4	50.7	53.5	Muralidhar R.S., South India
	55.1	48.5	52.1	Present Study, U.P.& Uttarakhand
2-3-4-5	24	26.4	25.2	Hati Boglu, Turkey
	-	-	65	Onyije, Nigeria
	39.1	42.7	40.9	Muralidhar R.S., South India
	40.2	43.7	41.8	Present Study, U.P.& Uttarakhand
3-4-5	1.6	1.2	1.4	Hati Boglu, Turkey
	-	-	9	Onyije, Nigeria
	2.8	3.1	3	Muralidhar R.S., South India
	2.6	3.2	2.8	Present Study, U.P.& Uttarakhand
2-3-4	-	-	-	Hati Boglu, Turkey
	-	-	7	Onyije, Nigeria
	0.4	0.1	0.2	Muralidhar R.S., South India
	0.4	0.12	0.27	Present Study, U.P.& Uttarakhand
3-4	-	2.7	1	Hati Boglu, Turkey
	-	-	6	Onyije, Nigeria
	-	0.8	0.4	Muralidhar R.S., South India
	0.1	1.36	0.66	Present Study, U.P.& Uttarakhand
Absent	0.2	1.7	0.9	Hati Boglu, Turkey
	-	-	1	Onyije, Nigeria
	0.8	2	1.4	Muralidhar R.S., South India
	1.2	2.6	1.7	Present Study, U.P.& Uttarakhand

Fig. III - Distribution of phalangeal hairs of hand in different population



Distribution of hair on middle phalanx in different populations is shown in table 5. The order of frequency of presence or absence of middle phalangeal hair is same (4>3>5>2) as in previous investigation. In present study observations are similar to those which were observe in population of Turkey, Tibet, Nepal, Bengal and South India which belongs to Asia. In African race frequency of presence of middle phalangeal hairs was lowest. It was highest in white race and intermediate in Asian. The common combination of fingers with mid phalangeal hair in present study was 3-4 (14%) followed by 4 (11.8%) and 3-4-5 (8.6%). This was similar to Hati Boglu, Muralidhar R.S. but different from Mbagiorgu, who observed that 3-4-5 pattern was more common in Nigerian population. In present study 3-4-5 and 2-3-4-5 combinations of finger with middle phalangeal hairs was more common in male [10.3% & 5.3%] as compared to those in females [6.5% & 1.2%] respectively. 3-4 pattern slightly more frequent in female. These findings were consistent with those of Hati Boglu and Tiwari & Bhasin. Distal phalangeal hair was not observed in any subject in present study also.

Table V - Comparative Distribution of Middle Phalangeal Hairs in Different Population

POPULATION	PERCENTAGE		PERCENTAGE OF MPH DISTRIBUTION				STUDY
	Without MPH	With MPH	2	3	4	5	
America	-	70.4	3.6	30.8	44.3	21.3	Danforth, 1921
America Whites	22	-	-	-	-	-	Berstein & Burk 1942
japan	-	36.8	2.1	33.8	49.4	14.7	Matsunaga 1956
Ethiopia	-	25.6	0	31.1	46.7	19.3	Batmirian 1962
Bangal, India	51	49	3.5	30.2	52.3	14	Dutta (1963)
Britain	29	70.2	3.4	32	42.6	23	Borthwell & Mollenson (1965)
Japan	56	-	-	-	-	-	Parmar (1968)
Nepal	66	-	-	-	-	-	Parmar (1968)
Tibet	55.7	44.3	6.5	33.6	43.9	15.9	Tiwari & Bhasin (1969)
Nigeria	79	21	0	15	18	7.5	Singh (1982)
Turkey	50.7	19	6	35	48	20	Hatiboglu (1983)
Nigeria	89.1	-	-	-	-	-	Onyije (2011)
South India	57.2	42.8	2.8	25.6	37.6	11.7	Muralidhar R.S. (2012)
North India	60.1	38.9	3.6	26.9	39.01	13.4	Present Study (2012)

CONCLUSION

The distribution of phalangeal hair was observed in U.P. & Uttarakhand, India among 1800 individual out of which 1000 were males and 800 were females choosen randomly. The proximal phalangeal hairs was present (98.8%) in males and (97.4%) in females with common combination of 1-2-3-4-5(52.1%), followed by 2-3-4-5(41.8%). The middle phalangeal hairs was present in males (43.7%) and females (35.2%) with common combination of 3-4 (14%) followed

by 4(11.8%). Distal phalangeal hairs were not observed. This study has medico-legal and anthropological significance in deciding the nationalism, race and the sex.

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