



Digital and Palmar Dermatoglyphics of the Bhoi Khasis of Umden Village, Ri-Bhoi District, Meghalaya

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ABSTRACT The paper describes digital and palmar dermatoglyphic features of 232 Bhoi Khasi individuals (112 males and 120 females) of Umden, Ri-Bhoi district, Meghalaya. A comparison is made with other neighbouring populations of the region. Significant bimanual and bisexual differences are observed in many digital and palmar characters. The Bhoi Khasi males show similarities with the Garo in respect of finger patterns and females with the Pnars. Present population also show differences with the other populations compared.

INTRODUCTION

Bhattacharjee (1955) first time reported dermatoglyphic study among Abor of Assam in North-East India. Later on many dermatoglyphic studies had been reported from this region. Chakravarti and Mukherjee (1961, 1963), Das et al. (1980, 1985), Deka and Bora (1973), Deb (1979), Sengupta 2003) among others. Being a region with varied tribal and caste populations showing a lot of ethnic diversity, the scope of research in dermatoglyphics in North-East India is enormous. Such studies are mostly concentrated on collecting data on the distribution of finger and palmar dermatoglyphic characters in all parts of the region. More data are however, required to understand their ethnic variation. The present study aims to provide data on the digital and palmar dermatoglyphic features of the Bhois of Meghalaya and compare them with some other populations with Mongoloid affinities of the region.

The Bhoi Khasi is one of the sub-groups of the Khasi tribe of Meghalaya. They enjoy the same scheduled tribe status with the other Khasi sub-groups, namely, Pnars, Wars and Khyntams. Like all the other Khasi sub-groups, they follow the matrilineal system of society. The main language spoken by the people is Khasi which fall under the Mon-Khmer linguistic group.

MATERIAL AND METHODS

The data for the present study was collected from the Bhoi Khasi of Umden village, Ri-Bhoi district, Meghalaya. Digital and Palmar prints of 232 Bhoi Khasi individuals (112 males and 120

females) were collected and analysed following the method suggested by Cummins and Midlo (1961).

RESULTS AND DISCUSSION

Finger Patterns

The percentage frequencies of pattern types are presented in Table 1. In both the sexes, the most common pattern is the ulnar loop. The percentage frequency of occurrence of ulnar loops was found higher in females than in males. The ulnar loop is followed by the whorls. The total percentage occurrence of whorls is higher in the right hand in males, however, in females, the same is observed in the left hand. The arch pattern occurs in similar frequencies in both the sexes; however, its frequency is higher in the left hand than the right hand in both males and females. The percentage frequency of loops, whorls and arches are found in the decreasing order. Significant sex difference is observed in the pattern frequency ($\chi^2=16.42$ $p<0.005$). The bimanual difference in males is insignificant, while, in females, it is found significant to be ($\chi^2=9.44$ $p<0.01$).

The Furuhashi's index is 70.25 in males and 49.87 in females. According to Cummins and Midlo (1961), Dankmeijer's index is almost without exception higher in females than in males. Similar result was observed in the present sample population also, where, the Dankmeijer's index is found to be 5.99 and 13.30 in males and females respectively. The Pattern Intensity Index in males and females is 13.79 and 13.05 respectively. Except the Dankmeijer's index, other two indices are found higher in males than in females.

Table 1: Percentage frequency distribution of finger patterns among the Bhoi Khasi males and females.

Sex	Side	Whorls		Loop						Arches	
				Ulnar		Radial		Total			
		No.	%	No.	%	No.	%	No.	%	No.	%
Male	R	244	43.57	292	52.14	13	2.32	305	54.46	11	1.96
	L	207	36.96	325	58.04	12	2.14	337	60.18	16	2.86
	R+L	451	40.27	617	55.09	25	2.23	642	57.32	27	2.41
Female	R	177	29.5	410	68.33	5	0.83	412	69.16	8	1.33
	L	214	35.67	351	58.5	18	3	369	61.5	17	2.83
	R+L	391	32.58	761	63.42	23	1.92	784	65.34	25	2.09

The total ridge counts for both hands in the two sexes are presented in Table 2. The mean total ridge count has higher values in Bhoi Khasi males than their female counterparts.

Table 2: Total ridge count in both the sexes

Sex	Male		Female	
	Mean $\pm$ S.D		Mean $\pm$ S.D	
Total ridge count (TRC)	8.26195	3.00312	8.14688	3.34479

Palmar Dermatoglyphics

The different locations of the axial triradii are given in Table 3. In both the hands of both the sexes, the axial triradii occurs with highest frequency in position t, followed by t' and t'' respectively. Dual formations of axial triradii, though rare, have also been observed in all the given positions with position tt'' showing a higher frequency followed by t t' and t' t''. Lowest incidence of occurrence of axial triradii is observed in position t' t''. No subject has been found with t-missing condition on the palms. Significant bisexual variation is found in respect to this dermatoglyphic trait. The bimanual difference is significant only in males.

Table 3: Different locations of the male and female axial triradii

Triradius	Male	Female
T	123	138
t'	75	83
t''	18	9
t't'	5	1
tt''	1	7
t't''	2	2
Total	224	240

Bisexual variation: $\chi^2=15.8$, $df=5$, $p < 0.01$, significant

Apart from Wilder's three main line formulae that is, 11.9.7, 9.7.5 and 7.5.5, (Wilder 1922) other types of mainline formula found in reasonable proportions in the populations that is, 5.5.5, 5.7.5 and 8.6.5 have also been reported (Table 4). The most common mainline formula in males is 9.7.5, whereas in females, it is 7.5.5. The frequency of mainline formula, 11.9.7 is considerably higher in males than in females but in respect of the mainline formulae, 9.7.5 and 7.5.5, females show a higher frequency. Interestingly, the frequencies of the other mainline formulae were found to be comparatively more in males than found in females. The chi-square values indicate that the bimanual variation in males, females, both the sexes combined as well as the bisexual variation are each statistically significant.

Table 4: Mainline formula in both the sexes

Mainline formula	Male	Female
11.9.5	33	24
9.7.5	43	61
7.5.5	21	66
Others	58	23

Bisexual variation: $\chi^2=42.77$, $df=5$, $p < 0.005$, significant
 Bimanual variation in males: $\chi^2=40.81$, $df=5$, $p < 0.005$, significant
 Bimanual variation in females: $\chi^2=36.2$, $df=5$, $p < 0.005$, significant

Of the modal types of the C-line termination (Table 5), ulnar type is most frequent, the frequency of which is higher on the left hand in both the sexes. The C-line ulnar termination is more frequent in females than in males. With respect to the C-line radial termination, males have a higher frequency than the females. The C-line radial termination occurs at higher frequency on the right hand in both males and females. Significant bimanual differences are found in both males and females, sex differences are also significant.

Table 5: C-line termination in both the sexes

Sex	Termination type – C		
	Ulnar	Radial	Absent
Male	146	55	23
Female	170	46	24

Bisexual variation: $\chi^2=10.27$, $df=2$, $p < 0.01$, significant
 Bimanual variation in males: $\chi^2=12.92$, $df=2$, $p < 0.005$, significant
 Bimanual variation in females: $\chi^2=13.08$, $df=2$, $p < 0.005$, significant

The mean $\pm$ s.e is found to be 40.66 ± 0.37 males and 41.16 ± 0.36 in females. In both the sexes, the 'atd' angles have more or less equal frequencies in both the hands. The bisexual and bimanual variations with respect to this dermatoglyphic trait is found to be insignificant (Table 6).

Table 6: Mean 'atd' angle

Sex	Mean $\pm$ S.E
Male	40.66 ± 0.37
Female	41.16 ± 0.36

Bisexual variation: $t=0.96$, $df=230$, $p > 0.05$, insignificant

A comparison with a few neighbouring Mongoloid populations of Northeast India such as the Mishing, Chutia, Mikir, Lalung, Rabha, Ahom, Garo, Khynriam, Pnar, and War (Chakravartii and Mukherjee 1961; Deka and Bora 1973; Das 1978; and Das et al. 1980) suggest that the Bhois males of the present study exhibit similarity with the Garo population with respect to the finger patterns. However, the finger patterns of females show similarity with the Pnars.

CONCLUSION

The present data reveals that among the Bhoi Khasis, the most common pattern is the ulnar loop followed by whorls. In all the Khasi sub-groups, whorls and arches occur in lesser frequency in the females than in the males, while the reverse is true in respect of loops. This result is in conformity with that observed by other scholars. Significant bisexual variation is ob-

served in the pattern frequency, location of the triradii, mainline formula and C-line termination.

On comparison with other Mongoloid populations of Northeast India, it is seen that the Bhois males of the present study exhibit similarity with the Garo population with respect to the finger patterns while the finger patterns of females show similarity with the Pnars. Micro differences, also referred to as regional variation, are observed within the Khasi sub-groups that is, Khynriam, Pnar, War and Bhoi with respect to the finger patterns.

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