

## Dermatoglyphics of The Lyngam of Meghalaya, India

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**ABSTRACT** The note describes the results of finger and palmar dermatoglyphics of the Lyngam tribe of Meghalaya, India.

### INTRODUCTION

In an earlier communication (Ahmed et al., 1997), the genetic features of the Lyngam using ABO blood groups, Rh factor, PTC taste sensitivity and colour blindness have already been examined. The Lyngam are a lesser known scheduled tribe of Meghalaya, enlisted as a sub-tribe of the Khasi tribe. The migrational history of the population is not well recorded as their origin and ethnicity is still shrouded in obscurity. Some scholars believe that they are originated due to admixture between two major tribes of Meghalaya, the Khasi and the Garo. The language they speak also has a smattering of Khasi and Garo words (see Ahmed et al., 1997 for detail).

In the present note an attempt has been made to report some selected qualitative finger and palmar dermatoglyphic features of the Lyngam and to assess any similarity or marked departure they show from the variations observed in the neighbouring, the Khasi and the Garo populations.

### MATERIAL AND METHOD

Material for the present study comprise the finger and palm prints of 103 Lyngam (male 60, female 43) individuals and these were collected from Nongdaju village in the West Khasi hill district of Meghalaya. All subjects of the present study are adult, unrelated and selected at random.

The analysis of finger dermatoglyphic characteristics were restricted to papillary pattern types, and determination of digital indices, while it is termination of palmar main lines, atd angle and formulation of axial triradii in palm. The method of analysis followed were those of Cummins and Midlo (1961) and Mavalwala (1963).

### RESULTS AND DISCUSSION

The frequency of pattern occurrence in different finger configurational areas are summarised in table 1. On the whole, the Lyngam are within the broad range of finger dermatoglyphic variations displayed by the Mongoloid populations of North East India. In both the sexes, dextral dominance of whorl and sinistral dominance of loop and arch pattern is quite apparent. The frequency of whorl is notably low especially in

**Table 1: Digital patterns in Lyngam**

Characters	Right						Left					
	I	II	III	IV	V	Total	I	II	III	IV	V	Total
<i>Male (n = 60)</i>												
Whorl	5.00	3.83	3.00	7.50	4.83	24.17	5.00	3.50	3.50	6.17	4.17	22.33
Ulnar loop	4.50	4.67	7.00	2.50	5.17	23.83	4.17	5.67	6.17	3.67	5.50	25.17
Radial loop	-	0.33	-	-	-	0.33	-	0.33	0.17	-	-	0.50
Total loop	4.50	5.00	7.00	2.50	5.17	24.17	4.17	6.00	6.33	3.67	5.50	25.67
Arch	0.50	1.17	-	-	-	1.67	0.83	0.50	0.17	0.17	0.33	2.00
<i>Female (n = 43)</i>												
Whorl	3.49	3.72	1.86	5.12	3.95	18.14	3.26	3.26	2.09	4.65	3.49	16.74
Ulnar loop	5.35	4.42	7.44	4.88	5.58	27.67	5.12	4.88	6.74	4.65	5.58	26.98
Radial loop	0.23	0.69	-	-	0.23	1.16	0.23	0.70	0.23	0.23	0.23	1.63
Total loop	5.58	5.12	7.44	4.88	5.81	28.84	5.35	5.58	6.98	4.88	5.81	28.60
Arch	0.93	1.16	0.70	-	0.23	3.02	1.40	1.16	0.93	0.46	0.70	4.65

females; balanced by higher incidence of loops and arches. The loops are overwhelmingly dominant in digit II, III and V, however, higher frequency of whorl is seen in digit IV. In digit I, the whorl occur more frequently in male while loop predominates in females. Radial loop and arch occur very scarcely, as in the case with other human groups, and tend to be concentrated more on the index finger. Bimanual differences with regard to the occurrence of whorl, loop and arch pattern in each sex ( $\chi^2$  for male = 0.89; female = 1.73, d.f. = 2) are statistically not significant. However, the significance test shows statistically significant sex difference ( $\chi^2 = 18.39$ , d.f. = 2) for the digital pattern distribution.

In both sexes, the right hand always shows a comparatively higher occurrence of whorl and lesser in the manifestation of loops. Incidence of whorl is also relatively higher in males. As a result, the whorl-loop and pattern intensity indices of the right hand is comparatively high in both sexes of Lyngam and the indices are comparatively higher in males than females (Table 2). The characteristic comparative frequent oc-

(Tiwari, 1952) Mongoloid palmar main line formula '9.7.5.-' occurs with relative greater frequency among the Lyngam males.

**Table 3: Percentage distribution of palmar main line formula**

Formulae	Male		Female	
	R	L	R	L
11.9.7.-	20.00	15.00	18.60	9.30
9.7.5.-	41.67	38.33	34.88	30.23
7.5.5.-	23.33	31.67	37.21	55.81

Axial triradius 't' occurs 74.42 per cent in females and 85.83 per cent in males. Triradius 't' appears to be greater in females (22.09%) than in males (10.00%). Frequency of 't' is very low in them (male = 4.17%, female = 3.49%). In both the sexes, the right hand (male = 42.04°, female = 44.44°) have a little higher 'atd' angle than the left hand (male = 41.94°, female = 44.10°) and the females (44.27°) tend to have greater 'atd' angle than the males (41.99°).

The results of the present study on Lyngam were compared with the neighbouring popula-

**Table 2: Digital patterns and indices in Lyngam**

Sex	Hand	Digital patterns				Digital indices			
		Whorls	Loops			Arches	Dankmeijer's index	Furuhata's index	Pattern intensity index
			Ulnar	Radial	Total				
Male	R	24.17	23.83	0.33	24.17	1.67	6.90	100.00	7.25
	L	22.33	25.17	0.50	25.67	2.00	8.96	87.01	7.03
	R + L	46.50	49.00	0.83	49.84	3.67	7.89	93.31	14.28
Female	R	18.14	27.67	1.16	28.84	3.02	16.67	62.90	6.51
	L	16.74	26.98	1.63	28.60	4.65	27.78	58.54	6.21
	R + L	34.88	54.65	2.79	57.44	7.67	22.00	60.73	12.72

currence of arches in left hand, especially in females, is also reflected in the increase of arch-whorl index in the left hand as well as in females than their counterparts. Cummins and Midlo (1961) stated that arch-whorl index is almost without exception higher in females. In Lyngam male, this index is somewhat below the minimal level (index below 10) suggested for the Mongoloids.

It is evident (Table 3) that, of the three principal palmar main lines, the type 11.9.7.- and 9.7.5.- are invariably higher on right hand, whereas type 7.5.5.- observed to be associated more with the left palm. The female Lyngam exhibit higher values as regards to type 7.5.5.-. The supposedly

reported earlier from Meghalaya which offers papillary pattern frequencies and indices and palmar main line formulae (Bhasin et al., 1994; Das, 1963, 1978; Miki et al., 1960; Chakravarti and Mukherjee, 1961). The Lyngam male display the pattern of dermatoglyphic features which is not similar with that of the females. The findings are in consonance with the observation made by Rudan (1978), Lin et al. (1984) and others, who observed different patterns of inter-population variation on dermatoglyphic features for males and females.

In Lyngams, whorls and loops occur in the ratio of 48:52 in males and 38:62 in the females.

Studies conducted earlier had shown that the whorl and loop occurs in the ratio of 50:50 among the peoples of North East India having Mongoloid ethnic strain-. In the Khasi and Garo population of Meghalaya however, tendency of lowering of whorl and raising of loop has been noted. The Lyngam male shows similar papillary patterns with the Khasi and its sub-samples (Das, 1978) and the Garo population (Das, 1963). They however, stand distinctly apart from the Khasi as well as the Garo sample reported by Miki et al. (1960) and Chakravarti and Mukherjee (1961), respectively. The female Lyngam differ from all the samples reported from among the Khasi as well as from the Garo.

Dankmeijer's index in the Lyngam shows relatively higher value and exhibit marked deviation from the Khasi (Das, 1978; Miki et al., 1960) and Garo (Das, 1963; Chakravarti and Mukherjee, 1961). The value of Furuhashi's index is also higher in Lyngam and shows great differences with the Khasi. The whorl-loop index in them is also markedly different from the Garo. The pattern intensity index in male Lyngam shows almost equal consistency with the Garo and Khasi (Das, 1978). The Khasi male sample as reported by Miki et al. (1960) shows this index as much lower. The Lyngam female on the other hand show pattern intensity index which is much lower than the values exhibited by the female Khasi as well as the Garo.

Type 7.5.5.- is the predominating type in the males of Garo (32.91%, Das, 1966), Khyriem Khasi (44.61%), Pnar Khasi (38.75%) and War Khasi (37.50%) - all Khasi sub-samples reported by Das (1978) as against type 9.7.5.- in Lyngam (40.00%) male. On the other hand, type 7.5.5.- occur comparatively in higher frequency in Lyngam female (46.51%), while it is 9.7.5.- in females of Khyriem Khasi (40.92%), Bhoi Khasi (44.41%) and War Khasi (53.05%).

At the present state of our knowledge, a satisfactory assessment of the ethnic position of the Lyngam in comparison with other neighbouring populations with regard to various dermatoglyphic traits is not possible due to inadequate in-

formation. As regards the origin of the Lyngam, the presumed admixture between the Khasi and the Garo, it is most likely that the effect of admixture would be less on the expression in the polygenic traits like the dermal ridge patterns than on monogenic traits like the blood groups (ABO and Rh), PTC taste sensitivity as we noted in the previous communication (Ahmed et al., 1997). In the present study also pronounced deviating tendency of the Lyngam from the neighbouring Khasi and the Garo populations to various dermatoglyphic features cannot be ruled out. However, more data are required to understand their ethnic variability in all details.

#### REFERENCES

- Ahmed, T.J., Sengupta, S. and Ghosh, A.K.: A genetic study on the Lyngam of Meghalaya. *J. Hum. Ecol.*, **8**: 473-475 (1997).
- Bhasin, M.K., Walter, H. and Danker-Hopfe, H.: *People of India: An Investigation of Biological Variability in Ecological, Ethno-economic and Linguistic Groups*. Kamla-Raj Enterprise, Delhi (1994).
- Chakravarti, M.R. and Mukherjee, D.P.: Dermatoglyphic study of tribes and castes of the States on Assam. *Science and Culture*, **27**: 584-585 (1961).
- Cummins, H. and Midlo, C.: *Finger Prints, Palms and Soles: An Introduction to Dermatoglyphics*. Dover Publication, New York (1961).
- Das, B.M.: Finger prints of the Bodo populations of Assam. *J. Gauhati Univ.*, **14**: 77-79 (1963).
- Das, B.M.: *Variation in Physical Characteristics in the Khasi Populations in North East India*. Dutta Barua and Co., Guwahati (1978).
- Lin, P.M., Bach-Enciso, V., Crawford, M.H., Hutchinson, J., Sank, D. and Firschein, B.S.: Quantitative analysis of the dermatoglyphic patterns of the Black Carib population of Central America. In Crawford, M.H. (Ed.): *Current Development in Anthropological Genetics*, Volume 3, pp 241-268. Plenum Press, New York (1984).
- Maivalwala, J.: The utility of the angle atd in dermatoglyphics. *Amer. J. Phys. Anthropol.*, **21**: 77-80 (1963).
- Miki, T., Tanaka, T. and Furuhashi, T.: Investigation on the finger prints of the Lepchas and the Khasis. *Proceedings of the Japan Academy*, **36**: 4 (1960).
- Rudan, P.: Biological structure of the Istrian populations: Study of distance by anthropometric traits, dermatoglyphic properties and blood group gene frequencies. *Coll. Anthropol.*, **2**: 53-58 (1978).
- Tiwari, S.C.: Report on the palmar prints of the Rajis of Askote. *Man in India*, **32**: 1-13 (1952).