

The Khond: A Dermatoglyphic Study

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ABSTRACT An endeavour is made to report finger and palmar dermatoglyphic variation in a primitive tribal population viz., the Khond of Visakhapatnam District, Andhra Pradesh. It is evident that qualitative rather than quantitative characters depict greater variation along with statistically significant bimanual and sex differences. The Khonds show closest with neighbouring tribes like the Bagatha and Konda Dora in most of the dermatoglyphic characters studied.

INTRODUCTION

Finger and Palmar dermatoglyphic characters are profitably employed in the study of population variation. Dermatoglyphic characters once formed during 13th week of embryo sustain throughout the life of an individual. They exhibit wide range of variation in both qualitative and quantitative characters for the finger and palmar regions. The present paper reports, for the first time, finger and palmar dermatoglyphic variation in a primitive tribe of North Coastal Andhra Pradesh viz., the Khond.

There are 75 populations identified as Primitive Tribal Groups (PTGs) in India. Of these, 12 PTGs hail from the state of Andhra Pradesh, wherein 4 PTGs inhabit North-Coastal Districts. The Khond is one such population group. The other PTGs are – the Savara, the Gadaba and the Poroja. The term ‘Khond’ is most probably derived from the Dravidian word ‘Konda’, the hill. The Khonds are hill people who practice ‘Konda Podu’ or ‘Shifting Cultivation’ and ‘Terrace Cultivation’. Their land is known as ‘Guddi’. They are also involved in collecting minor forest produce to supplement the income. The size of the population is 39,400. The social structure of the population reveals that the Khond is a large endogamous tribe comprising of 5 groups viz., Donna Khond, Desya Khond, Kuttiya Khond, Penga Khond and Malwa Khond. Each group is further divided into several exogamous clans locally known as ‘intiperulu’ which regulate marriage alliances. In physical features, the people are medium to tall in stature, strong in body build, medium to dark brown in skin color and straight to wavy hair. They speak

their own dialect ‘Kuvvi’ or ‘Kui’ or ‘Khondu’, which is a conglomeration of Hindi and Oriya. They prefer and practice consanguineous marriages. Maternal uncle is considered as Pseudo-father by the Khond family. Hence, the incidence of Uncle-niece and Mother’s Brother’s Daughter (MBD) types are seldom observed. The frequency of Father’s Sister’s Daughter (FSD) type is notable. Marriage by negotiation is the rule though marriage by exchange, elopement and service are not uncommon.

MATERIALS AND METHODS

Both male and female Khonds were studied for finger (181M+80F) and palmar (193M+79F) dermatoglyphics from 12 villages of Munchingput mandal of Visakhapatnam district, Andhra Pradesh. The villages are – Bandalabadiput, Kappada, Karlapodur, Kodaput, Malagummi, Mettabadiput, Orakugummi, Sarbaput, Sindhiput, Tummidiput, Eguva Munchingiput and Pedabayalu. Only unrelated subjects were considered. The collection and analysis of data were done according to Cummins and Midlo (1961), Holt (1968). The χ^2 and t-tests were computed for bimanual, sex and inter-group variations.

RESULTS AND DISCUSSION

Finger and Palmar dermatoglyphic data were analyzed for various qualitative and quantitative characters. The results are shown in Tables 1 and 2.

1. Finger Dermatoglyphics

a. Qualitative Characters: From table 1, it is

Table 1: Finger dermatoglyphic characters among the Khonds

Character	Male (181)		Female (80)	
	No.	%	No.	%
I. Qualitative				
a) Finger Pattern Types				
Plain Arch	33	1.82	17	2.12
Tented Arch	14	0.78	7	0.87
Radial Loop	36	1.99	17	2.12
Ulnar Loop	875	48.34	479	59.88
True Whorl	694	38.34	213	26.63
Composites	158	8.73	67	8.38
		(χ^2_5 for sex diff. 20.00*)		
b) Pattern Symmetry				
Arch	13	1.43	3	0.75
Loop	356	39.34	204	51.00
Whorl	342	37.79	98	24.50
Total	711	78.56	305	76.25
		(χ^2_1 for sex diff. 1.28)		
c) Monomorphic Hands				
Right : Loop	25	13.81	19	23.75
Whorl	32	17.67	8	10.00
Left : Loop	24	31.25	14	17.50
Whorl	26	14.36	8	10.00
Both (Right+Left together)				
Loop	16	4.42	6	3.75
Whorl	19	5.42	5	3.12
II Quantitative				
a) Papillary Indices				
Finger Pattern Intensity Index (FPII)		14.48 ± 0.18		13.26 ± 0.26
($\bar{X} \pm S.E$)		(t value for sex diff = 3.86*)		
b) Ridge Count ($\bar{X} \pm S.E$)				
TFRC		122.60 ± 1.40		105.53 ± 1.86
AFRC		184.20 ± 3.21		147.40 ± 3.93
		(t values for sex diff = 3.60* & 3.73*)		

· Statistically significant at 5% probability level

evident that the Khond males are characterized to show an excess of whorls (47.07%) whereas the females display a preponderance of loops (60%) and arches (4%), a common situation observed in most of the tribes of Andhra Pradesh and Kerala (Narahari 1982). In Tamil nadu tribal populations, males show relatively higher values than females though they do not deviate much from the general trend observed from the South Indian populations by Bhasin et al. (1994) and Bhasin and Walter (2001) who reported high frequency of Whorls followed by loops and arches. A close perusal of the data available on 26 tribal populations (14 from Andhra Pradesh, 9 from Tamil nadu; and 3 from Kerala) The Bhagata (Rao 1970, Devi 1972) from Andhra Pradesh, Mullu Kurumba, Paniyan, Sholaga (Chakravarthy and Mukherjee 1964) of Tamil Nadu, Kadar (Chakravarthy, 1969) and Urali (Chakravarthy and Gupta, 1964) show an excess of Whorls (40-50%) in combined sex series. The other tribes

display relatively high frequency of loops (50-62%). The frequency of Arches ranges from 2% (Koya) to 6% (Lambada) in Andhra tribal groups while for other states it is 1-3%. Khonds of present study, by virtue of possessing an excess of Whorls in males in Loops in females, much closer to Andhra tribes viz., the Bhagata, the Valmaki and the Chenchu but they fall apart from the Mullu Kurumba and Sholaga of Tamil nadu. Kada and Urali of Kerala who show a higher range frequency (48-57%) a higher range frequency of Whorls. Chi-square tests concluded for finger pattern types between the present populations and other available tribal groups of South India also conform such finger dermatoglyphy closest among them.

In Henry's classification, the tented arches (<1%), radial loops (<3%) and composites (<9%) occur with low frequencies, which is in contrast to the observations made for neighbouring tribal groups- Bagatha, Jatapu, Konda Dora and Nooka

Table 2: Palmar dermatoglyphic characters among the Khonds

Character	Male (193)		Female (79)	
	No.	%	No.	%
I. Qualitative				
a) Palmar Mainline Formula				
11.9.7. -	114	29.53	39	24.68
9.7.5. -	71	18.40	36	22.79
7.5.5. -	75	19.43	49	31.01
“Rest”	126	32.64	34	21.52
		(χ^2_3 for sex diff. 13.32*)		
b) Mainline Symmetry				
11.9.7. -	21	10.88	10	12.66
9.7.5. -	9	4.66	7	8.86
7.5.5. -	19	9.85	13	16.46
“Rest”	144	74.61	49	62.02
		(χ^2_1 for sex diff. 4.29)		
c) C-line variation				
Radial	193	50.00	58	36.71
Ulnar	161	41.71	93	58.86
Proximal	8	2.07	3	1.90
Absent	24	6.22	4	2.53
		(χ^2_3 for sex diff. 14.29*)		
d) C-line Symmetry				
Radial	57	29.53	21	26.58
Ulnar	47	24.35	38	48.10
Proximal	-	-	-	-
Absent	5	2.60	-	-
Total	109	56.47	59	74.68
		(χ^2_1 for sex diff. 7.85*)		
e) Hypothener Triradii				
h ^F	20	5.18	4	2.53
h ^{Ext}	33	8.55	17	10.76
h ^A	333	86.27	137	86.70
		(χ^2_2 for sex diff. 2.11)		
II Quantitative				
		<i>t-value</i>		
a) PPII	12.77 ± 0.50	2.06	12.15 ± 0.25	
b) MLI	16.98 ± 0.17	2.38	16.22 ± 0.27	
c) Angle atd	45.29 ± 0.60	0.51	45.80 ± 0.80	
d) Palmar Ridge Counts				
a-b	32.24 ± 0.50	0.72	32.77 ± 0.54	
b-c	21.08 ± 0.41	1.52	22.08 ± 0.52	
c-d	28.53 ± 0.51	2.68*	31.18 ± 0.85	
a-d	61.13 ± 0.89	2.48*	65.27 ± 1.38	

* Statistically significant at 5% probability level

Dora (Narahari, et al. 1989, Heena and Narahari, 1990, Narahari et al., 1998 who show about 5% to 9% radial loops, 3% to 5% tented arches and 20% to 25% composites which include lateral pocket loops, twin loops, central pocket loops and accidentals, respectively. Thus, the micro-level of pattern type analysis paved for statistically significant difference in bilaterality which is not evident in the present population. However, there is significant sex dimorphism for finger pattern types among the Khonds which is well established for many Indian populations (Mukherjee, 1976, Narahari et al., 1995). The occurrence of similar patterns on homologous digits i.e., symmetry, endorse the same trend

perceived for pattern frequency – symmetry by loops in females and by whorls in males are predominant. However, the sex difference is statistically non-significant. The frequency of monomorphic hands (similar patterns on all fingers) for whorls is greater in both the sexes that too in right hand. The left hand is evinced with a high frequency of loop monomorphism.

b. Quantitative Characters: The mean value of Finger Pattern Intensity Index (FPII) is greater in males (14.48 ± 0.18) than females (13.26 ± 0.26). Falling in the same line, the Total Finger Ridge Count (TFRC) and Absolute Finger Ridge Count (AFRC) also display higher values for males than females (Table 1). This is in accordance with the

observations made earlier for pattern frequencies. The sex dimorphism is statistically significant in all the quantitative characters studied (Table 1). TFRC for Indian populations is reported as 141.26 (Bhasin and Walter 2001). However the tribal populations are reported to show low value of it. In South India scheduled tribes show relatively higher value of TFRC compared to other ethnic groups. The present population fall well with in the range, observed for tribal groups in South India (Bhasin and Walter, 2001).

2. Palmar Dermatoglyphics

a. Qualitative Characters: In Principal Mainline Formulae (PMLF), the modal type 11.9.7. – in males (30%) and 7.5.5. – in females (31%) predominates the distribution (Table 2). This is followed by 7.5.5. – and 9.7.5. – in males and 11.9.7. – and 9.7.5. – in females, respectively. A similar trend was observed for the Bagatha and Konda Dora tribal groups (Heena and Narahari 1989, Narahari et al., 1995). Bhasin et al. (1994) reported the trend $11.9.7 > 9.7.5 > 7.5.5$ for Indian populations 'In contrast, the schedule tribes of South India tend to show a preponderance of 11.9.7 followed by 7.5.5 and 9.7.5 modal types (Bhasin and Walter, 2001) in particular among South Indian populations. The present study fall with in this trend. The bilateral occurrence of modal types display greater variation by the right hand in males and left hand in females. The symmetrical occurrence of modal types of PMLF is observed more for the 7.5.5. – followed by 11.9.7. – in females which are almost equal in their counterparts. However, the sex dimorphism is non-significant.

The terminations at polymorphic C-line show a high frequency of 'Radial' (50%) followed by 'Ulnar' (40%) type in males, which is exactly reverse in case of females. The frequency of 'Abortive' (Proximal + Absent) type of termination is more in males than in females. The sex dimorphism is statistically significant. The symmetrical occurrence of C-line terminations follow a similar trend observed for individual variation. The presence of hypothenar triradials (h^a) for males is almost double the frequency than that observed for females. The h^{ext} display higher incidence in females (10.76%) than males (8.55%). But the sex dimorphism is non-significant.

b. Quantitative Characters: Table 2 records slightly greater mean values for Palmar Pattern

Intensity Index (PPII) and Mainline Index (MLI) in males. In contrast, the females show an increased mean values in angle atd and palmar ridge counts a-b, b-c, c-d, and a-d. However, the Khonds show statistically significant sex dimorphism in PPII, MLI, c-d and a-d ridge counts.

CONCLUSION

Thus it is evident from the present study that the Khonds display greater variation in qualitative rather than quantitative dermatoglyphic characters. The bilaterality is evinced for the right hand in males and left hand in females. So also the sex dimorphism is conspicuous in qualitative characters. On comparison, the Khond do not deviate much from the neighbouring tribal groups and tend to be closer to the Bagatha, and Konda Dora.

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