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RESEARCH ARTICLE

PALMAR DERMATOGLYPHIC TRAITS IN KALINGAS, AN ENDOGAMOUS CASTE GROUP IN NORTH COASTAL ANDHRA PRADESH

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ABSTRACT

This paper attempts to present the dermatoglyphic traits in Kalinga, an endogamous caste population from the north coastal Andhra Pradesh. So far, several anthropogenetic studies have been carried out on several tribal and non-tribal communities in the state of Andhra Pradesh. However, the present study population 'Kalinga' has not been touched so far. Hence, the observations made in this paper will add to the existing information on caste population of Andhra Pradesh. Palmar patterns, palmar main line formula, C-line polymorphism, atd angle are the main traits studied among males and females belonging to kalinga community. The observations (dermatoglyphic traits) were compared with data available on other caste populations of the state.

INTRODUCTION

The objective of the present study is to examine the distribution of the different dermatoglyhphic characters in Kalinga population from Srikakulam district of Andhra Pradesh and there by to see the range of variation by way of comparing these data with the data available on non-tribal populations of Andhra Pradesh. The outcome of the present study is summarised to add to the existing knowledge of dermatoglyphics from this part of the country. For the sake of convenience, the present study is discussed as palmar dermatoglyphics and the traits are also considered under two categories – qualitative and quantitative depending on the type of character.

MATERIALS AND METHODS

Palmar prints were obtained from Kalinga males and females inhabiting Srikakulam district of Andhra Pradesh. At the time of analysis, care has been taken to exclude all the blurred and unclear prints. Finally 282 samples comprising of 139 males and 143 females were considered for the present analysis. Different techniques were proposed for obtaining clear dermal ridge prints. In the present study, standard techniques and procedures were employed following Cummins and Midlo (1961), Holt and Mukherjee (1974). While taking these prints, information such as name of the individual, sex, age and address of the subjects was also recorded on the glazed sheets specified for this purpose. For recording the palmar impressions, a small paste of ink was placed on a slab and is spread into a thin film using a roller. Before applying the ink, the subjects were asked to wash their hands with soap and then to dry. The palmar prints obtained were analysed for various qualitative characters such as palmar main line formulae, mainline terminations, position of axial triradius etc. and quantitative character namely the atd angle were studied. Plato's (1970) system is followed for C-line terminations are studied.

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Statistical Method

The present dermatoglyphic data have been analyzed and tabulated giving proper statistical treatment. Basic calculations like percentage of frequencies of quantitative characters and measure of central tendency such as arithmetic mean, measures of variation such as standard deviation, standard error and S.E. of mean, S.E. of S.D., Chi-square and t-value for tests of significance, co-efficient of variation etc. are done

RESULTS AND DISCUSSION

Results of the dermatoglyphic data of kalingas of Srikakulam district among men and women were discussed and presented along with available comparable data on other caste populations from Andhra Pradesh. Different qualitative as well as quantitative characters such as the distribution of main line formulae, termination position of the main lines - D, C, B, A, position of the axial triradius, distribution of the atd angles etc. for palmar dermatoglyphic study have been analyzed for the

data obtained among Kalinga community from Srikakulam district of Andhra Pradesh. The observations made were presented hand-wise and sex-wise for easy comparisions and the data are finally compared with available data on other caste populations from the Andhra Pradesh state. Distribution of symmetrical and asymmetrical hands with regard to the incidence of the principal mainline formulae among the Kalinga males and females is shown in Table 1.

Table 1. Incidence of Wilder's principle mainline formulae among Kalingas

Principal Mainline formula	Male				Female			
	Right		Left		Right		Left	
	No.	%	No.	%	No.	%	No.	%
(a)	38	27.3	30	21.6	29	20.3	34	23.8
11.9.7	1	0.7	2	1.4	1	0.7	0	-
11.x.7	6	4.3	5	3.6	4	2.8	5	3.5
11.0.7	45	32.4	37	26.6	34	23.8	39	27.3
Sub-Total								
(b)	29	20.9	16	11.5	34	23.8	27	18.9
9.7.5	0	-	0	-	0	-	0	-
9.x.5	3	2.1	0	-	1	0.7	0	-
9.0.5	32	23.0	16	11.5	35	24.5	27	18.9
Sub-Total								
(c)	18	12.9	29	20.9	26	18.2	27	18.9
7.5.5	0	-	0	-	0	-	0	-
7.x.5	0	-	0	-	0	-	0	-
7.0.5	18	12.9	29	20.9	26	18.2	27	18.9
Sub-Total								
Others	44	31.7	57	41.0	48	33.5	50	34.9
Total	139	100.0	139	100.0	143	100.0	143	100.0
Chi-square for bilateral difference					Chi-square for bisexual difference			
Males = 7.775*					Right = 3.121			
Females = 1.372					Left = 2.255			
Box Sexes = 6.354					Both hands = 2.335			

* Value significant at 5% level

It is observed that symmetry with regard to the mainline formula 11.9.7 occurs in highest frequency (14.5 percent) followed by 9.7.5 (9.2 percent) and 7.5.5 (7.4 percent). In all, symmetry with regard to these mainline formulae is observed in 36.2 percent of the Kalingas (both men and women). This percentage is more among the females (41.3) compared to the males (30.9). The occurrence of symmetry with regard to the formulae 11.9.7 and 9.7.5 are also more among the females than among males.

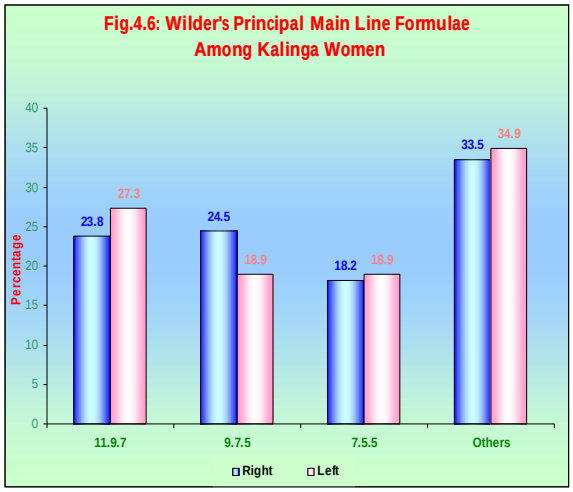


Figure 1.

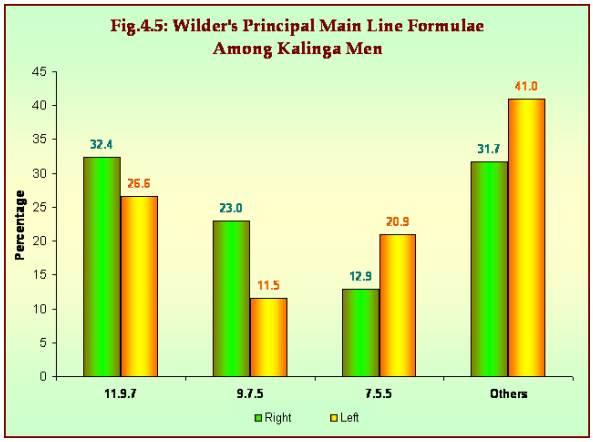


Figure 2.

Table 2. Incidence of bilateral symmetry of principal mainline formula *among Kalingas*

Sex	11.9.7	9.7.5	7.5.5	Others	Total	Asymmetry
Male						
No.	18	9	11	5	43	96
%	12.9	6.5	7.9	3.6	30.9	69.1
Female						
No.	23	17	10	9	59	84
%	16.1	11.9	7.0	6.3	41.3	58.7
Both sexes						
No.	41	26	21	14	102	180
%	14.5	9.2	7.4	5.0	36.2	63.8

C-line Polymorphism has been recognized by Piato (1970) and Piato *et al*. (1972) basing on their studies on different racial groups. The significance of the termination of C-line is because – it is the best polymorphic trait that exhibits qualitative and quantitative variation.

Table 3. Distribution of the model types of C-Line in Kalingas

Sex	Hand	Ulnar	Radial	Proximal (X)	Absent (0)	Total
Male	Right					
	No.	78	54	1	6	139
	%	56.1	38.8	0.7	4.3	100.0
	Left					
	No.	76	56	2	5	139
	%	54.7	40.3	1.4	3.6	100.0
	Right+Left					
	No.	154	110	3	11	278
	%	55.4	39.6	1.1	4.0	100.0
Female	Right					
	No.	84	53	1	5	143
	%	58.7	37.1	0.7	3.5	100.0
	Left					
	No.	78	60	0	5	143
	%	54.5	42.0	-	3.5	100.0
	Right+Left					
	No.	162	113	1	10	286
	%	56.6	39.5	0.3	3.5	100.0
Chi-square value for:				Bisexual differences		
Bilateral differences				Right = 0.439		
Males = 0.487				Left = 2.165		
Females = 1.656				Both hands = 1.408		
Both Sexes = 0.613						

The frequency distribution of the four types of C-line terminations on both hands combined and separately among the Kalinga males and females is presented in Table 2. Among the kalingas, the C-line is observed to terminate more frequently on the ulnar side than radial` side among both males and females. The frequency of ulnar termination of the C-line is more among females (56.6 percent) than among the males (55.4 percent) while the frequency of radial terminations is more or less equal among males (39.6 percent) and females (39.5 percent). These ulnar terminations are found to be more on right hands than left hands in both males and females while the radial terminations are more on left hands than right hands. Regarding other terminations, the frequency of proximal type is relatively low among males (1.1 percent) as well as females (0.3 percent) while the case of 4.0 percent of males and 3.5 percent of females, the absence of C-lines is noticed. However, the bilateral and bisexual differences with regard to the C-line polymorphism are not significant.

Table 4. Distribution of the position of Axial tri radial among Kalingas

Position of Axial Triradius		Men Right	Left	Right + Left	Women Right	Left	Right + Left
t	No.	106	119	225	110	114	224
	%	76.3	85.6	80.9	76.9	79.7	78.3
t'	No.	18	11	29	12	14	26
	%	12.9	7.9	10.4	8.4	9.8	9.1
t"	No.	5	3	8	5	10	15
	%	3.6	2.2	2.9	3.5	7.0	5.2
tt'	No.	4	2	6	8	3	11
	%	2.9	1.4	2.2	5.6	2.1	3.8
tt"	No.	6	4	10	8	2	10
	%	4.3	2.9	3.6	5.6	1.4	3.5

the females. Its occurrence is found to be more on left hands (85.6 percent) than on right hands (76.3 percent) among males and in females, the frequencies are 79.7 percent on left and 76.9 percent on right hands. The frequency of t'-type is slightly more among males (10.4 percent) than among females (9.1 percent). T" – type is noticed more among the females (5.2 percent) than among the males (2.9 percent). Among the multiple triradii, i.e. tt' and tt" are recorded with frequencies of 2.2 percent and 3.6 percent among males and with 3.8 percent and 3.5 percent among females respectively.

Table 5. Distribution of Angle atd among Kalingas

atd Angle	Male				Female			
	Right		Left		Right		Left	
	No.	%	No.	%	No.	%	No.	%
25^0 - 30^0	5	3.6	2	1.4	4	2.8	0	-
31^0 - 35^0	35	25.2	48	34.5	35	24.5	39	27.3
36^0 - 40^0	51	36.7	58	41.7	54	37.8	60	42.0
41^0 - 45^0	30	21.6	21	15.1	31	21.7	27	18.9
46^0 - 50^0	11	7.9	8	5.8	14	9.8	15	10.5
51^0 - 55^0	5	3.6	2	1.4	3	2.1	1	0.7
56^0 - 60^0	2	1.4	0	-	2	1.4	1	0.7
Minimum atd angle	28^0				28^0			
Maximum atd angle	57^0				60^0			

It can be noticed that a higher proportion of males and females show atd angles between 36^0 and 40^0 followed by 31^0 to 35^0. These atd angles are found to be more on left hands than on right ones in both the sexes. The value of the angle ranged from 28^0 to 57^0 among men while it ranged from 28^0 to 60^0 in case of women.The mean atd angles, S.D. and C.V. along with corresponding standard errors are shown in

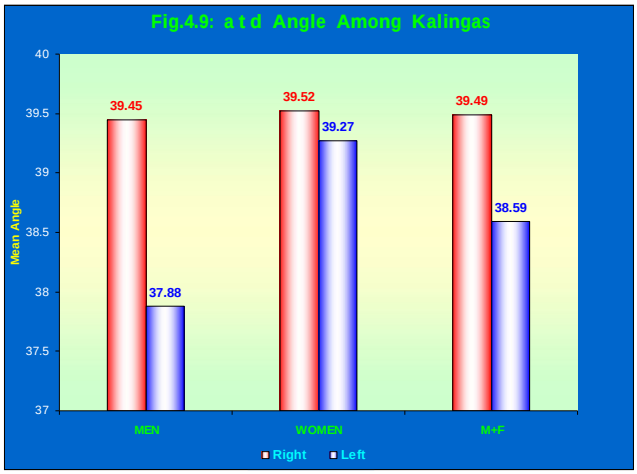


Figure 3.

The computed t-values revealed significant bilateral differences for men and both sexes combined while for females, these differences are not significant. Regarding the bisexual differences, between right and left hands, only females recorded significant differences. Data on the present palmar dermatoglyphic characters are compared with other available data on caste populations of Andhra Pradesh

Table 6. Mean, Standard Deviation, Coefficient Variation, Standard Errors and 't' values for atd angle among Kalingas

Sex/Hand	Number	X±S.E.	S.D.±S.E.	C.V.±S.E.
Male				
Right	139	39.45±0.49	5.79±0.35	14.68±0.88
Left	139	37.88±0.40	4.65±0.28	12.28±0.74
Female				
Right	143	39.52±0.46	5.44±0.32	13.77±0.81
Left	143	39.27±0.42	5.00±0.30	12.73±0.75
Both sexes				
Right	282	39.49±0.33	5.60±0.24	14.18±0.60
Left	282	38.59±0.29	4.88±0.21	12.65±0.53
		't' Value		
Bilateral Difference:		Male = 2.502*		
		Female = 0.407		
		Both sexes = 2.044*		
Bisexual Difference:		Right = 0.107		
		Left = 2.423*		
		Both hands = 1.655		

* Value significant at 5% level.

It can be noticed that, with regard to Dermatoglyphic traits, the distance value is highest between Kalinga and Pokkanti Kapu and is lowest between Kamma and Rajaka in case of males. In the case of females highest distance is noticed between Kalinga and Rajaka and it is lowest between Kamma and Pokkanti Kapu.

Table 7. Distribution of some palmar dermatoglyphic traits in some Andhra caste populations

Population	Sex	Number Tested	Main line formula (%)					Investigator
			11.9.7	9.7.5	7.5.5	'Rest'	't'	
Kalinga	M	139	24.46	16.19	16.91	42.09	80.90	Present study
	F	143	22.03	21.33	18.53	34.27	78.30	
Golla	M	134	28.36	16.42	20.52	34.70	-	Ramalakshmi, 1980.
	F	144	24.65	18.40	21.53	35.42	-	
Kashtriya	M	130	21.16	16.54	17.69	44.62	-	Anuradha, 1980
	F	130	25.78	16.92	18.46	38.84	-	
Madiga	M	200	31.75	15.75	22.50	30.00	76.00	Rajasekhar Reddy, 1984
	F	200	36.00	8.50	25.50	30.00	67.25	
Niyogi	M	123	34.15	9.35	16.67	39.83	65.45	Sreenath, 1981
Brahmin	F	77	35.71	9.74	7.79	46.76	57.14	
Padma	M	50	40.00	23.00	26.00	11.00	59.00	Santhidevi and Veerraju, 1992
Salis	F	53	50.00	19.00	32.00	5.00	67.00	
Pokanati	M	118	44.49	11.44	11.44	32.63	-	Ramachandraiah *et al*., 1980
Kapu	F	43	41.11	11.11	8.89	38.89	-	
Rajaka	M	202	31.19	14.85	11.88	42.08	86.14	Parvatheesam, 1995
	F	208	32.21	23.07	12.98	31.74	80.20	
Reddi:								
Pokanati	M - R	200	43.50	13.00	8.00	35.50	74.00	Chandrasekhara Reddy and Rami Reddy, 1990
	L		15.00	19.00	24.50	41.50	73.50	
Pedakanti	M - R	200	40.00	10.50	15.50	34.00	73.00	- do -
	L		14.50	7.00	21.00	57.50	71.50	- do -
Panta	M - R	200	47.50	8.00	16.50	28.00	76.50	-do-
	L		17.50	11.00	18.00	53.50	80.00	-do-
Palle	M - R	200	42.50	10.00	8.50	39.00	70.50	-do-
	L		17.50	10.50	15.00	57.50	66.50	-do-
Akuthota	M - R	200	47.00	9.50	12.50	31.00	76.50	
	L		19.50	10.00	14.50	55.00	80.00	
Segidi	M	132	26.13	15.90	21.97	35.99	-	Ramalakshmi, 1980
	F	140	22.50	18.93	22.14	36.43	-	
Tangala	M	130	35.39	16.15	14.62	33.84	80.87	Chengal Reddy, 1979
Mala	F	86	29.69	19.77	20.35	30.23	88.83	
Vydiki	M	115	20.57	17.83	12.61	48.99	69.57	Sreenath, 1981
Brahmin	F	85	37.65	11.76	7.65	42.94	59.41	
Vysya	M	100	43.50	9.50	14.00	33.00	-	Ramachandraiah *et al*., 1980
	F	100	44.00	11.50	13.50	31.00	-	

Table 8. Euclidean Distance Matrix for dermatoglyphic traits

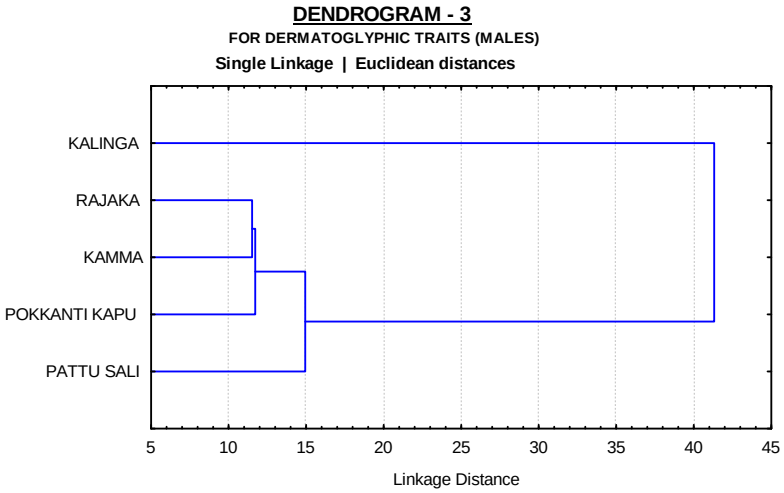
Males

	Kalinga	Rajaka	Kamma	Pattu Sali	Pokkanti Kapu
Kalinga					
Rajaka	52.592				
Kamma	41.322	11.516			
Pattu Sali	61.864	15.244	22.916		
Pokkanti Kapu	62.688	11.716	21.805	14.944	

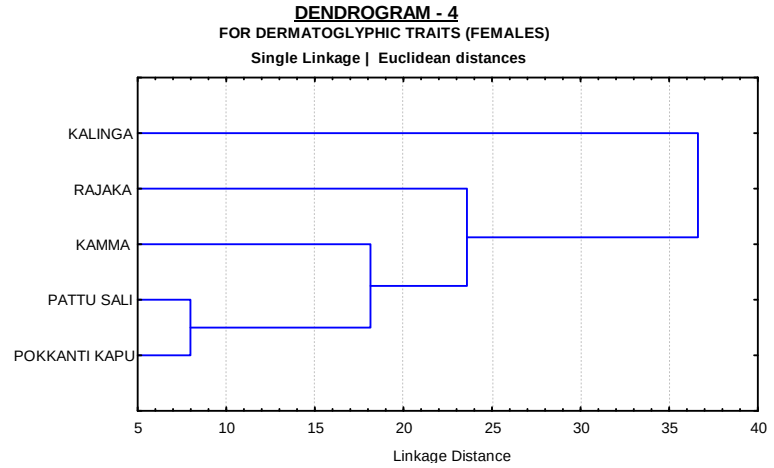
Females

	Kalinga	Rajaka	Kamma	Pattu Sali	Pokkanti Kapu
Kalinga					
Rajaka	79.215				
Kamma	36.623	43.972			
Pattu Sali	60.585	25.583	24.191		
Pokkanti Kapu	53.956	31.394	18.142	7.978	

Dendrogram 1:



Dendrogram 2.



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