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FINGER DERMATOGLYPHICS AMONG THE NAIKAS OF GUJARAT

ABSTRACT — *Naika is a schedule tribe of Gujarat, numbering 234,999 according to the 1971 census. They are mainly distributed in the Surat, Panchmahal and Valsad districts of Gujarat. Present samples of Naikas of 100 males and 100 females are from Banti and Atul villages of Valsad district.*

Present study reveals bilateral and sexual variations in three principal finger pattern types whereas non-significant differences for P. I., W/L, & A/W indices were also observed. The percentage distribution of whorls, loops and arches are as follows—45.35 %, 52.00 % & 2.65 % respectively. Besides other detail patterns like WTL (whorl with twin loop), CPL (Central pocket loop), LPL (Lateral pocket loop), A^T (Tended Arch) etc. were also studied for which significant sexual variations are observed.

The comparative study indicated that the Naikas are close to Gujarati Vaisyas and Bhils of Rajasthan, Charans of Gujarat, and that they maintain considerable differences with the other western region tribes.

KEY WORDS: *Finger Dermatoglyphics — Naikas tribe.*

INTRODUCTION

Dermatoglyphic traits are controlled by polygenic loci. They have been used by the anthropologists in studying the population variations and also in evaluating the degree of relationships in different populations because of their high variability. Finger patterns depend on different factors such as the number of ridges and their turning directions, number of centers of triradius and intensity of turning factors result the multitude of patterns.

The purpose of the present investigation is to study the extent of variability of dermal patterns, sexual variation among the Naikas and to focus their ethnic variation with special reference to western Indian populations.

The Naikas are one of the scheduled tribe of Gujarat, numbering 234 999 according to 1971 census. They are mainly distributed in Surat, Panch-

mahal and in Valsad districts of Gujarat and called by the name of Naiks or Naikdas. In Valsad district they are known as Naika or Naiks. The name Naikda or "little Naik" is probably due to the Broach Talabadas, who were formerly known as Naiks. According to Bombay Gazzetter Naikdas are degraded kolis and they also admit that Kolis, Bhils are into their groups. For this reason they accept the marriage alliances with them. At present they are divided into three main groups viz. Uncha (High), Nicha (Low) and Choliwala (inbetween the above two). Among these above three groups no marriage alliances are present. According to Shah, P.G. (1959) the Naikas are known for their turbulent nature. They are aggressive, short-tempered and also crude but at the same time very lazy. Their physical features show that they are tall-statured with black complexion, flat nose with large nostrils and thick lips. According to Grierson Naiki or Naikdi dialects are more or less identical with Bhili or Bhilodi

language and this linguistic opinion support the general conclusion on ethnological grounds that the two groups are probably from the same tribe only with local variations.

Naikdas also seems to be partly Bhil. Naikas follow the Hindu rule of inheritance and are animistic in religion. They are generally labourers and wood cutters in the different forest areas of Gujarat.

MATERIAL AND METHODS

2000finger prints were collected from the unrelated 100 males and 100 females of Naika tribe of Bamti and Atul villages of Valsad district during the year 1985.

Standard techniques of Cummins & Midlo (1961) were followed for obtaining finger prints and also for analysing the data. Chi-square (χ^2) figures are calculated by using Woolf's (1957) G- table and probabilities are determined from Fischer and Yates (1954).

RESULTS AND DISCUSSION

Distribution of three basic pattern types

The percentile distribution of papillary patterns in both sexes of Naikas are shown in Table 1. The most common pattern type among this community is ulnar loop (51.2 %) followed by whorls (45.35 %), while arches have very rare occurrence (2.65 %) (Table 1).

Frequency of whorl is higher in males (49.9 %) than females (40.8 %) and the L^u frequency distribution is just opposite among females where males show 46.8 % and females show 55.6 %. The distribution of radial loop (L^r) frequency distribution is very occasional among the Naika i.e. for males 0.9 % and for females 0.7 % in Table 1.

The bilateral differences are also shown between both sexes regarding three basic pattern types. The frequency of pattern type whorl is higher (52.6 %) in right hand than left hand and side by side ulnar loop is higher (50.0 %) in left hand than right hand (43.6 %). But regarding the arches it has been shown that there

TABLE 3. Fingerwise percentile occurrence of both hands among the Naikas

Fingers	No.	MALES							FEMALES						
		W	WTL	CPL	L^u	L	Ar^P	Ar^T	W	WTL	CPL	L^u	L	Ar^P	Ar^T
I	200	8.0	4.6	0.2	6.9	—	0.3	—	5.6	4.7	0.1	9.0	—	0.6	—
II	200	7.2	0.9	1.3	8.3	0.8	1.2	0.3	6.7	1.6	0.7	8.6	0.7	1.5	0.2
III	200	4.2	1.1	0.5	13.7	0.1	0.4	—	3.6	0.7	0.4	15.1	—	0.2	—
IV	200	12.2	0.5	1.6	5.5	—	0.2	—	9.8	0.1	1.1	8.9	—	—	0.1
V	200	5.8	0.7	1.1	12.4	—	—	—	4.0	0.7	1.0	14.0	—	0.2	0.1
TOTAL	1,000	37.4	7.8	4.7	46.8	0.9	2.1	0.3	29.7	7.8	3.5	55.6	0.7	0.4	0.4

is no marked bilateral difference (Table 1). This bilateral difference has been followed also among the females. Here the pattern type whorl shows higher frequency in left hand (41.6 %) than right hand (38.0 %) and L^u shows higher frequency in right hand (57.0 %) than left hand (54.2 %). Here also arches show more or less the same frequency distribution i.e. 2.8 % for right hand and 3.0 % for left hand.

There is no sexual difference regarding the $W-L-A$, these 3 pattern types ($\chi^2 = 1.6713$: d.f. 2, .50 > P > .30).

DIGITWISE DETAIL PATTERN TYPES DISTRIBUTION

The pattern types of all fingers on individual hands and both hands together in both sexes have been tabulated in Table 2 and in Table 3.

The pattern type frequency distribution on each digit shows that both males and females have high frequency of L^u on digit III, and V, and whorls (W) on digit IV. The frequency of pattern type whorl with twin loop (W^{TL}) shows remarkably higher frequency on digit I in both sexes and considering this particular 1st finger there are remarkable bilateral differences in both sexes but this difference is not statistically significant ($\chi^2 = 0.0825$, d.f. = 1; .80 > P > .70). Radial loop (L^r) frequency is very rare and among both sexes these pattern types have been observed on digit II only, but with very low frequency (Table 2). It is general trend that L^r is very rare in all populations and the Naika populations also show the same trend. Plain arch (Ar^P) and tented arch (Ar^T) also show very low frequency among both sexes. Lateral pocket loop (LPL) is completely absent among the Naika whereas central pocket loops (CPL) have been observed in almost all fingers of both sexes except in the right hand 1st finger males and left hand 1st finger of females. So here also no sex-difference is observed. Considering the whorl (W), it has been found that only the males show bilateral difference in the frequency distribution of this pattern type and the difference is 8.4 whereas among the females there is no bilateral difference (Table 2). Generally the male population shows higher incidence of whorls than loops. Here also the Naika population shows the same trend i.e. the frequency of whorls is higher in males (37.4 %) than females (29.7 %) but L^u is higher

in females (55.6 %) than in males (46.8 %) in Table 3. There is no marked sexual difference in the frequency distribution of other pattern types like W^{TL} , CPL , L , Ar^P , Ar^T . It also shows general trends like in other populations. The different types of whorls (W) show higher frequency among both sexes on the digit IV, II, I and ulnar loop (L^u) shows higher incidence on the rest of the two digits III and V. The frequency distribution of arches (Ar^P and Ar^T) is relatively lower among the Naikas but there is some apparent sexual difference regarding this particular pattern type.

The indices of different pattern types viz. Pattern Intensity index ($P.I.I.$), Furuata index (W/L index), and Dankmeijer index (A/W index) are shown in Table 4.

Considering the $P.I.$ index there is no sexual difference, but W/L index is noticeably higher in males (104.61) than females (72.46). This is due to relatively higher incidence of loops on whorls among the Naikas. But opposite situation has been observed in the A/W index, where females show higher index value (7.10) than males (4.80). The differences of W/L index and A/W index between both sexes are 32.15 and 2.30 respectively. The sexual variation between the three indices are not statistically significant ($\chi^2 = 1.6033$, d.f. = 2; .50 > P > .30) Table 4.

TABLE 4. Sexwise different indices among the Naikas

Name of the indices	Total Population	Males	Females
Pattern Intensity index	14.27	14.75	13.79
Furuhata index (W/L index)	87.21	104.61	72.46
Dankmeijer index (A/W index)	5.84	4.80	7.10

For Sexual difference;
 $\chi^2 = 1.6033$ d.f. = 2; .50 > P > .30

The bilateral differences regarding the three indices have been shown in Table 5. There is no bilateral difference in $P.I.$ index among the two sexes. F. indices are higher in both hands of the males than the females, and the bilateral difference between both

TABLE 1. Percentile occurrence of basic three patterns of both hands of Naikas

Principal Pattern Types	MALES						FEMALES						BOTH SEXES	
	R.H.		L.H.		Total R + L		R.H.		L.H.		Total R + L		R + L Combined	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Whorl	263	52.6	236	47.2	499	49.9	200	38.0	208	41.6	408	40.8	907	45.35
Loop Ulnar	218	43.6	250	50.0	468	46.8	285	57.0	271	54.2	556	55.6	1027	51.2
Loop Radial	6	1.2	3	0.6	9	0.9	1	0.2	6	1.2	7	0.7	16	0.8
Arch	13	2.6	11	2.2	24	2.4	14	2.8	15	3.0	29	2.9	53	2.65

TABLE 2. Fingerwise distribution of patterns in percentage of both hands of Naikas

Fingers	Number of Fingers	MALE													
		RIGHT HAND							LEFT HAND						
		W	WTL	CPL	L^u	L	Ar^P	Ar^T	W	WTL	CPL	L^u	L	Ar^P	Ar^T
I	100	10.0	3.4	—	6.0	—	0.6	—	6.0	5.8	0.4	7.8	—	—	—
II	100	7.6	1.2	1.8	6.6	1.2	1.2	0.4	6.8	0.6	0.8	10.0	0.4	1.2	0.2
III	100	4.0	1.0	0.4	14.4	—	0.2	—	4.4	1.2	0.6	13.0	0.2	0.6	—
IV	100	13.4	0.2	1.4	4.8	—	0.2	—	11.0	1.8	1.8	6.2	—	0.2	—
V	100	6.6	1.0	0.6	11.8	—	—	—	5.0	1.6	1.6	13.0	—	—	—
TOTAL	500	41.6	6.8	4.2	43.6	1.2	2.2	0.4	33.2	5.2	5.2	50.0	0.6	2.0	0.2
		FEMALE													
		RIGHT HAND							LEFT HAND						
		W	WTL	CPL	L^u	L	Ar^P	Ar^T	W	WTL	CPL	L^u	L	Ar^P	Ar^T
I	100	5.6	3.6	0.2	9.6	—	1.0	—	5.6	5.8	—	8.4	—	0.2	—
II	100	6.6	1.8	0.6	9.4	0.2	1.4	—	6.8	1.4	0.8	7.8	1.2	1.6	0.4
III	100	2.6	1.0	0.4	15.8	—	0.2	—	4.6	0.4	0.4	14.4	—	0.2	—
IV	100	10.6	—	0.6	8.8	—	—	—	9.0	0.2	1.6	9.0	—	—	0.2
V	100	4.4	1.2	0.8	13.4	—	0.2	—	3.6	0.2	1.2	14.6	—	0.2	0.2
TOTAL	500	29.8	7.6	2.6	57.0	0.2	2.8	—	29.6	8.0	4.0	54.2	1.2	2.2	0.8

sexes are 47.48 and 18.19 respectively but this difference is not statistically significant ($\chi^2 = 1.939$ 9, d.f. = 1; $.20 > P > .10$).

Regarding A/W index it has been observed that females show higher index values in both hands and there is no bilateral difference among the males. The sexual difference between both hands among the Naika is not statistically significant ($\chi^2 = 0.010$ 8, d.f. = 1; $.90 > P > .80$) in Table 5.

TABLE 5. Handwise comparative indices among the Naikas

Hands	MALES			FEMALES		
	P.I.I.	F.I.	D.I.	P.I.I.	F.I.	D.I.
Right Hand	7.5	117.41	4.94	6.86	69.93	7.0
Left Hand	7.25	93.28	4.66	6.93	75.09	7.21
Both (R + L) Combined	14.75	104.61	4.80	13.79	72.46	7.10

TABLE 6. Comparative finger dermatoglyphics among the Western Region castes and tribes

Caste populations	Pattern frequency (%)					Indices			References
	Sex	No.	Whorls	Loops	Arches	P. I. I.	W/L	A/W	
Brahmans of Rajastham	M	70	44.1	49.6	6.3	13.78	88.91	14.28	Kumbnani, 1966
Gujarati Vaisyas	M	45	42.7	55.8	1.6	14.3	76.5	3.7	Ahluwalia, 1969 (Unpub.)
Telis of Udaipur	M	50	56.94	39.23	3.82	15.22	112.72	8.51	Mukherjee, 1985 (Unpub.)
	F	50	44.49	50.70	4.0	13.94	145.12	6.71	
Gujaratis	F	40	35.0	60.3	3.8	13.6	55.6	10.4	—
Rajgars of Jaipur	M	80	46.3	50.3	3.5	14.3	92.0	7.6	Sharma, 1970—71 (Unpub.)
Gujaras of Jaipur	M	80	37.8	55.2	7.0	13.1	68.5	18.5	Gupta, 1970—71 (Unpub.)
Parsis	M	86	37.4	59.0	2.8	13.4	63.6	9.9	Banerjee, 1976
	F	56	31.2	61.8	1.6	12.4	50.6	22.3	
Tribal populations									
Naikas	M	100	49.9	47.7	2.4	14.75	104.61	4.8	Present study
	F	100	40.8	56.3	2.9	13.79	72.46	7.10	
Bhils of Rajasthan	M	90	43.5	53.2	3.2	14.0	81.20	7.4	Biswas, 1957
Bhils of Rajasthan	M	29	36.21	57.93	5.86	13.00	62.50	16.19	Srivastava, 1963
	F	45	36.67	56.67	6.66	13.18	64.71	18.18	
Banjaras of Rajasthan	M	33	47.88	51.21	0.91	14.70	93.49	1.89	Srivastava, 1963
	F	13	33.08	65.38	1.53	13.23	50.59	4.65	
Bhils of Rajasthan	M	100	39.4	58.4	2.2	13.90	73.40	5.42	Krishan G. 1984
	F	100	37.7	59.0	3.3	13.44	65.61	8.75	
Meena of Rajasthan	M	100	41.2	54.9	3.9	13.71	76.60	9.49	Krishan G., 1984
	F	100	38.4	51.7	9.9	12.85	72.34	25.52	
Walis of Gujarat	M	100	37.5	56.9	5.6	13.19	65.90	14.93	Mukherjee & Malhotra, 1985 (Unpub.)
	F	90	49.33	47.55	3.11	14.62	103.73	6.30	
Padhar of Gujarat	M	100	39.4	51.3	5.8	13.36	71.89	14.72	Krishan, 1986
	F	100	36.0	58.8	5.2	13.18	60.00	11.66	
Rabari of Gujarat	M	100	42.4	52.1	5.5	13.59	82.97	12.97	Krishan, 1986
Charan of Gujarat	M	50	52.6	45.6	1.8	21.08	110.96	3.42	Krishan, 1986
	F	50	38.8	52.8	8.4	13.04	73.48	21.65	

COMPARATIVE STUDY

It is important to note that very few dermatoglyphic studies are available from the Western India especially from the different tribal populations. On an average the frequency of whorl is less than 40 % and A/W index in males ranges between 3.2 and 18.5, for an average of about 10, (Sing and Bhasin 1979).

The comparison of finger dermatoglyphics of the

Naikas with other caste and tribal populations of Western India is listed in Table 6. The whorl loop ratio among the western region caste populations like Brahmans of Rajasthan (Kumbnani, 1966); Gujarati Vaisyas (Ahluwalia, 1969); Telis of Udaipur (Mukherjee, 1985); Parsis (Banerjee, 1976) etc. shows 37—57 W: 39—59 L among the males and 31—44 W: 50—61 L among the females. But among the tribal population of Western India the W: L ratio shows different picture, 36—48 W: 50—58 L among the males and 33—49 W: 47—65 L among the females. Naikas (present study) show the close similarity with that of Chran (Krishan, 1986) population of Gujarat. Comparatively higher frequency of whorls is found among the Charan males (Krishan, 1986) and loops are higher among the Banjara females (Srivastava, 1963), Frequency of arches is higher in three tribal female populations viz. Bhils (Srivastava, 1963), Meenas (Krishan, 1984) and the Charans (Krishan, 1986). In this respect, Naikas of Gujarat have no similarity. But the Naikas (present study) have close similarity with the Bhils (Krishan, 1984) regarding the precentile occurrence of arches.

The pattern intensity index showing close similarity between all Western India tribe and caste populations (Table 6) and Naikas also follow the same trend. Similarly the male population of Rabari and Charan (Krishan, 1986), Bhils (Biswas, 1957) and the Naikas show close values for F.I. than all populations compared. D. index, in Naikas shows a lower value for males than other populations compared, with the exception of Charans of Gujarat (Krishan, 1986).

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