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A Study on the Finger and Palmar Dermatoglyphics among the Tiwas of Dhemaji District, Assam, India

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Abstract: This research paper intends to explore about finger and palmer dermatoglyphic pattern of *Tiwa* community, Dhemaji district, Assam, India. Two *Tiwa* (*Lalung)* dominated villages from *Dhemaji* District, Assam, under Sissiborgaon Development Block namely, *Kathalguri Lalung Gaon* and *Borkhel Lalung Gaon* were selected for the present study. The data for the present study consists of 50 male and 50 female unrelated individuals aged 18 – 40 years belonging to *Tiwa* community. The result shows that, among males, the frequency of whorl (44.8%) is less than the loops (52.4%). In case of females, the frequency of whorl (49.2%) is slightly more than the loops (48.6%). The frequency of the three principal main line formulae in the two sexes of *Tiwa* people shows that the formula 11.9.7 is more frequent in male and 9.7.5 is more frequent in female respectively. The percentage of formula 7.5.5 is very low in both the hands of both the sexes. It is also found that the distribution of principle main line formula of the *Tiwa* conform to the order of the preponderance 11.9.7>9.7.5>7.5.5. However, the chi-sequence list of significance indicates that there is a significant difference between the two sexes of the *Tiwas* in respect of the occurrence of the main line formulae at 5% level (X2= 5.90, df=2, 0.10>P>0.05 significant).

Keywords: dermatoglyphics, whorl, loops, Dhemaji district, *Tiwa* community

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Introduction

Dermatoglyphics is the study of dermal ridges on finger balls, palms and soles. The term dermatoglyphics was first coined by Cummins and Midlo in 1926. Where 'derma' means 'skin' and 'glyphic' means 'carve'. It was often claimed to be associated with several diseases such as cancer, heart disease, diabetes and some other genetic disorders. (Mukherjee 2006). Several works were done

on dermatoglyphics in different parts of India and abroad to know the ethnic and population differentiation. However, the present study was attempted to explore the distribution of some finger and palmer dermatoglyphics trait among Tiwa community of Dhemaji district, Assam.

Two *Tiwa* (*Lalung)* dominated villages from *Dhemaji* District, Assam, under Sissiborgohaon Development Block namely, *Kathalguri Lalung Gaon* and *Borkhel Lalung Gaon* were selected for the present study. The data for the present study consists of 50 male and 50 female unrelated individuals aged 18 – 40 years belonging to *Tiwa* community.

The *Tiwas* are the aboriginal inhabitants of Assam and Meghalaya in North-East India. They are recognized as a Scheduled tribe within the state of Assam .They are also known as *Lalung*s. According to the *Lalung* dialect "***Ti***" means water and "***wa***" means superior. They are the branch of Bodo group and belong ethnically to Mongoloid stock.

Materials and Methods

Two *Tiwa* (*Lalung)* dominated villages from *Dhemaji* District, Assam, under Sissiborgohaon Development Block namely, *Kathalguri Lalung Gaon* and *Borkhel Lalung Gaon* were selected for the present study. The data for the present study consists of 50 male and 50 female unrelated individuals aged 18 – 40 years belonging to *Tiwa* community. The prints were obtained by simple printers black ink method. The methods used in analyzing the data are those proposed by *Cummins and Midlo*. In the present study, an attempt has been made to find out the frequencies of finger patterns in the two sexes, three principal indices of finger pattern frequencies and the Wilder's three main line formulae.

Results and Discussion

Table- 1A represents the percentile frequencies of finger pattern of each digit among the *Tiwa* male. It shows that frequency of whorl is less (44.8%) than the loops (52.4%). Arches occur in 2.8% of the people. It is also observed that the highest percentage of whorl is seen in the digit IV (14.8%, 13.2%) of both the right and left hand, while the highest percentage of loop is observed in the V digit (4.8%, 4.0%) of both the right and left hand. The highest frequency of arch is observed in the III digit (2.0%) of the left hand and II digit (1.2%) of the left hand.

When the right and the left hands are compared to see if there is any bilateral variation among them it is seen that the left hands (53.6%) are distinctly different from the right hand (51.2%) in having more loops and lesser number

Table 1A: Percentile frequencies of finger pattern of each digits among the Tiwa male (N=50)

Digit	*Hand*	*Whorls*				*Loops*			*Arches*		
		TW	*LPL+TL*	*CPL*	*Total*	*LU*	*LR*	*Total*	*PA*	*TA*	*Total*
I	R	23(9.2)	0+5(2.0)	--	28(11.2)	19(7.6)	1(0.4)	20(8.0)	1(0.4)	1(0.4)	2(0.8)
	L	12(4.8)	0+6(2.4)	5(2.0)	23(9.2)	23(9.2)	3(1.2)	26(10.4)	1(0.4)	--	1(0.4)
	R+L	35(14.0)	11(4.4)	(2.0)	51(20.4)	42(16.8)	4((1.6)	46(18.4)	2(0.8)	1(0.4)	3(1.2)
II	R	20(8.0)	0+3(1.2)	1(0.4)	24(9.6)	21(8.4)	3(1.2)	24(9.6)	1(0.4)	1(0.4)	2(0.8)
	L	16(6.4)	0+4(1.6)	2(0.8)	22(8.8)	18(7.2)	7(2.8)	25(10.0)	2(0.8)	1(0.4)	3(1.2)
	R+L	36(14.4)	7(2.8)	3(1.2)	46(18.8)	39(15.6)	10(4.)	49(19.6)	3(1.2)	2(0.8)	5(2.0)
III	R	12(4.8)	0+3(1.2)	2(0.8)	17(6.8)	32(12.8)	1(0.4)	33(13.2)	--	--	--
	L	11(4.4)	0+7(2.8)	--	18(7.2)	25(10.0)	2(0.8)	27(10.8)	1(0.4)	4(1.6)	5(2.0)
	R+L	23(9.2)	10(4.0)	(0.8)	35(14.0)	57(22.8)	3(1.2)	60(24.0)	1(0.4)	4(1.6)	5(2.0)
IV	R	32(12.8)	0+3(1.2)	2(0.8)	37(14.8)	12(4.8)	1(0.4)	13(5.2)	--	--	--
	L	22(8.8)	0+9(3.6)	2(0.8)	33(13.2)	17(6.8)	--	17(6.8)	--	--	--
	R+L	54(21.6)	12(4.8)	4(1.6)	70(28.0)	29(11.6)	1(0.4)	30(12.0)	--	--	--
V	R	8(3.2)	---	4(1.6)	12(4.8)	38(15.2)	--	38(15.2)	--	--	--
	L	7(2.8)	0+1(0.4)	2(0.8)	10(4.0)	39(15.6)	--	39(15.6)	1(0.4)	--	1(0.4)
	R+L	15(6.0)	(0.4)	6(2.4)	22(8.8)	77(30.8)	--	77(30.8)	1(0.4)	--	1(0.4)

Table 1 B: Percentile frequencies of finger pattern of each digits among the Tiwa female (N=50).

Digit	*Hand*	*Whorls*				*Loops*			*Arches*		
		TW	*LPL+TL*	*CPL*	*Total*	*LU*	*LR*	*Total*	*PA*	*TA*	***Total***
I	R	28(11.2)	--	3(1.2)	31(12.4)	18(7.2)	1(0.4)	19(7.6)	--	--	--
	L	21(8.4)	1+6 0.4+2.8	1(0.4)	29(11.6)	19(7.6)	--	19(7.6)	2(0.8	--	2(0.8
	R+L	49(19.6)		4(1.6)	60(24.0)	37(14.8)	1(0.4)	38(15.2)	2(0.8	--	2(0.8
II	R	29(11.6)	-+ 1(0.4)	--	30(12.0)	15(6.0)	3(1.2)	18(7.2)	2(0.8	--	2(0.8
	L	28(11.2)	1(0.4)+--	5(2.0)	34(13.6)	14(5.6)	--	14(5.6)	2(0.8	--	2(0.8
	R+L	57(22.8)		(2.0)	64(25.6)	29(11.6)		32(12.8)	4(1.6	--	4(1.6
III	R	13(5.2)	--+1(0.4)	--	14(5.6)	35(14.0)	--	35(14.0)	1(0.1	--	1(0.4
	L	17(6.8)	--+2(0.8)	--	19(7.6)	28(11.2)	--	28(11.2)	--	3(1.2	3(1.2
	R+L	30(12.0)		--	33(13.2)	63(25.2)	--	63(25.2)	1(0.1	3(1.2	4(1.6
IV	R	34(13.6)	--+1(0.4)	2(0.8)	37(14.8)	13(5.2)	--	13(5.2)	--	--	--
	L	25(10.0)	--	--	25(10.0)	24(9.6)	--	24(9.6)	--	1(0.4	1(0.4
	R+L	59(23.6)		2(0.8)	62(24.8)	37(14.8)	--	37(14.8)	--	1(0.4	1(0.4
V	R	15(6.0)	--	3(1.2)	18(7.2)	32(12.8)	--	32(12.8)	--	--	--
	L	9(3.6)	--	--	9(3.6)	40(16.0)	1(0.4)	41(16.4)	--	--	--
	R+L	24(9.6)	--	3(1.2)	27(10.8)	72(28.8)	1(0.4)	73(29.2)	--	--	--

of whorls. It is also important that 1.6% and 4.0% arches are found in both right and left hands respectively. However, this bilateral differences are statistically not significant (X2 = 4.40, df = 2, .25>p>0.10).

The frequency distribution of finger pattern in each digit of the right and left hand of the *Tiwa* female is shown in the Table- 1B. From the table, it is clear that the frequency of whorl is slightly more (49.2%) than the loops (48.6%). The arches occur in 2.2%. The frequency of whorl is more in the right hand than in the left hand and the percentage being 52.00%, 46.4% respectively. The highest percentage are (14.8%) being shown by IV digit of the right hands. The loops are more frequent in the left hand (50.4%) than in the right hand (46.8%). It is also important to note that only 1.2% arches are found in III digit of the left hand and the total arches occur in 2.2% only. This bilateral differences are statistically not significant (X2 = 0.38, df = 2, 0.70>p>0.60).

When both the sexes are considered to observe the frequency distribution of finger pattern, it is seen that female exhibits more whorls (49.2%) than the males (44.8%), while in case of loops, male sex exhibits more loops (52.4%) than the females (48.6%). It is also found that the arches are more frequent in the males (2.8%) than in the females (2.2%).

Table- 2 A shows the comparative occurrence of whorls and loops in different digits of the *Tiwa* males. From the table it is clear that 47.2% and 42.4% whorls are found in both right and left hand respectively, while in case of loops 51.2% and 53.6% found in both right and left hands. It is important that only 1.6% arches are found in right hand and 4.0% are found in left hand respectively.

Table 2 B shows the comparative occurrence of whorls and loops in different digits of the *Tiwa* females. From the table it is clear that the 52.0% whorls are found in right hand and 46.4% whorls are found in left hand, while 46.8% loops are found in right hand and 50.4% loops are found in left hand respectively.

Table 2A: Percentile frequencies of finger patterns of Tiwa Male

Hand	*Whorl*		*Loop*		***Arch***	
	No	*%*	*No*	*%*	*No*	*%*
Right	118	47.2	128	51.2	04	1.6
Left	106	42.4	134	53.6	10	4.0
Both	224	44.8	262	52.4	14	2.8

This bilateral differences are statistically not significant:

X2 = 4.40, df = 2, .250>p>.10).

Table 2B: Percentile frequencies of finger patterns of Tiwa Female

Hand	*Whorl*		*Loop*		*Arch*	
	No	*%*	*No*	*%*	*No*	*%*
Right	130	52.0	117	46.8	03	1.2
Left	116	46.4	126	50.4	08	3.2
Both	246	49.2	243	48.6	11	2.2

This bilateral differences are statistically not significant (X2 = 0.38, df=2, 0.70>p>0.60).

Table 3A: Wilder's three principal main line formulae of Tiwa Male

Formula	*Left hand*		*Right hand*	
	No	*%*	*No*	*%*
11.9.7	16	32%	40	80%
9.7.5	08	16%	30	60%
7.5.5	07	14%	09	18%

Table 3B: Wilder's three principal main line formulae of Tiwa Female

Formula	*Left hand*		*Right hand*	
	No	*%*	*No*	*%*
11.9.7	15	30%	06	12%
9.7.5	21	42%	23	46%
7.5.5	02	4%	06	12%

(X2= 5.90, df=2, 0.10>P>0.05 significant).

Table 4 A: Percentile frequencies of finger pattern in some Mongoloid populations of Northeast India

Population	*No.*	*Whorl*	*Loop*	*Arch*	*Source*
Tiwa	100	47.0	50.5	2.57	Present study
Mishing	100	39.1	53.2	8.7	Dutta das & Konwar, 2009
Galong	152	46	52.2	2.0	Kumar, 1955
Abor	147	53.24	44.28	2.28	Bhattacharyee, 1955
Kachari	109	54.66	43.41	1.81	Das, 1959
Hajong	75	44.68	53.69	1.63	Das, 1959
Khasi	292	45.28	53.36	1.35	Das, 1962
Garo	170	49.34	48.22	2.36	Das,1959

The frequency of the three principal main line formulae in the two sexes of *Tiwa* people have been shown in Table- 3. From the table it is clear that the

formula 11.9.7 is more frequent in male and 9.7.5 is more frequent in female respectively. The percentage of formula 7.5.5 is very low in both the hands of both the sexes. It is also clear from the table that the distribution of principle main line formula of the *Tiwa* conform to the order of the preponderance 11.9.7>9.7.5>7.5.5. However, the chi-sequence list of significance indicates that there is a significant difference between the two sexes of the *Tiwas* in respect of the occurrence of the main line formulae at 5% level (X2= 5.90, df=2, 0.10>P>0.05 significant).

The present data is compared with some other Mongoloid populations of North East India, for finger pattern types.

From the Table- 4 A, it is clear that loop dominates over whorl in most of the populations of Northeast India. The highest frequency of loop is seen in the *Hajong* (53.69%) which is followed by *Kachari* (53.36%) and *Mishing* (53.2%). The frequency of whorl is more than loop among the *Abor* (53.24%), Kachari (54.66%) and *Garo* (49.34%). Regarding the arches the *Mishing* shows the highest frequency (8.7%) and the *Khasi* shows the lowest frequency (1.35%). The *Tiwas* (2.57%) comes in the third in this respect. However, the chi-sequence test of significance shows that there is a statistically significant difference among the populations of Northeast India in the distribution of finger pattern types.

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