

Finger Dermatoglyphics in Schizophrenia

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Abstract : Finger prints of 81 male and 50 female certified schizophrenic patients, aged 20-50 years, from Calcutta have been studied for digital patterns, ridge-counts and ridge-dissociation. Both male and female schizophrenics show no marked differences with normals in digital patterns. Similarly, no significant difference between schizophrenics and controls in the total finger ridge-counts has been found. Contrary to earlier observations, not even a single schizophrenic patient was found having ridge-dissociation.

INTRODUCTION

Variations from normal finger, palmar and sole dermatoglyphic patterns have been reported in a number of human chromosomal disorders, single-gene defects as well as defects with unknown mode of inheritance; for a detailed review see Holt (1968); Schaumann & Alter (1976). Last two decades have witnessed increasing attention being paid to discern association between dermatoglyphics and schizophrenia. The results of these studies, however, have been markedly inconsistent. The literature on finger dermatoglyphic patterns in schizophrenia has been reviewed here briefly. Poll (1935) and Moller (1935) reported slight decrease of whorls and increase of arches among Dane schizophrenics; Duis (1937) and Wendt & Zell (1951) found no marked differences among East Prussians; Raphael & Raphael (1962) reported an elevated frequency of both whorls and arches, particularly tented ones, among male schizophrenics sampled in Michigan, USA; Beckman & Norring (1963) reported a significant increase in whorls among Swedish schizophrenics; and Singh (1967) 'taking each subjects pattern as a sum of his finger patterns, only arches and accidentals amongst males and whorls and ulnar loops in the females show a significant difference between normal and schizophrenics' (the data pertained to the white Australians).

Mellor (1967) found highly significant differences between the mean total finger ridge-count of normal and schizophrenic males.

Raphael & Raphael (1962) observed pattern disturbances or ridge-dissociations on one or more fingers in 18% of the schizophrenics; subsequent studies by Beckman & Norring (1963) and Singh (1967) supported these findings.

Studies on finger dermatoglyphics in Indian schizophrenics are conspicuous by their absence. An international pilot study on schizophrenia, initiated by WHO in 1965, report that investigations on this behavioural disorder have largely been confined in Europe, America and Australia.

In view of the highly inconsistent results obtained in the previous studies, as evidenced from the above review, and lack of such studies in India, the finger dermatoglyphics, both qualitative and quantitative, of a further series of schizophrenics from Calcutta, have been reported in this paper.

MATERIALS & METHODS

Finger and palm prints were obtained from 61 male and 50 female certified indoor patients at the Gobra Mental Hospital in Calcutta. All patients had been in the long-stay wards for upwards of six months and their ages varied from 20 to 50 years. The diagnostic sub-categories of schizophrenia of the patients were catatonic, chronic, and paranoid.

The exact caste affiliation of several patients could not be ascertained; an inspection of the surnames, however, indicated that a majority of them were Brahmin and Kayastha. The circumstances unfortunately, did not permit taking prints of normal sibs of the affected persons. Therefore, published data on normal Brahmin and Kayastha populations have been used as a control group (Sarkar, 1969; Banerjee 1970). In both these studies the Brahmins and Kayasthas showed no marked differences and therefore the data were pooled to form a single normal sample.

Rolled print method prescribed by Cummins and Midlo (1961) has been followed in taking prints and evaluated for the most part by their methodology. Ridge-counts were obtained following Holt (1961). The traits analysed in this paper are: digital patterns, finger ridge-counts and total finger ridge-count (TFRC), absolute finger ridge-counts and total absolute finger ridge-counts (ATFRC), and radial and ulnar ridge-counts.

RESULTS

Digital patterns : There is a slight decrease of whorls in females (35.9%) as opposed to males (45.1%); the females have a higher frequency of loops (60%) than males (50.3%); the incidence of arches is similar in both sexes (Table 1). Sex difference in schizophrenics is, however, statistically non-significant ($\chi^2=0.516$, d.f. 2). A comparison between schizophrenic males and females, and the control males and females do not reveal marked variation (Table 2).

Ridge-counts : The mean ridge-counts for separate fingers and for ten fingers together (TFRC) in male and female schizophrenics are shown in Table 3. The mean ridge-counts, in decreasing order of magnitude, are

those for digits I, V, IV, III and II in both the sexes. The two sexes showed significant differences in ridge-counts on digits I and V, as well as in TFRC ($t=2.04$). The differences in TFRC between both sexes of schizophrenics and normals are not significant (Table 4).

TABLE 1 *Frequencies of finger patterns in Schizophrenics*

Sex	Finger side	No. of fingers	Pattern types		
			Whorl	Loop	Arch
MALE	R	305	144 (47.2)	147 (48.2)	14 (4.6)
	L	305	131 (42.9)	160 (52.5)	14 (4.6)
	R+L	610	275 (45.1)	307 (50.3)	28 (4.6)
FEMALE	R	245	82 (33.4)	154 (62.9)	9 (3.7)
	L	245	94 (34.4)	140 (57.1)	11 (4.5)
	R+L	490	176 (35.9)	294 (60.0)	20 (4.1)

Figures in parentheses indicate percentages.

TABLE 2 *Frequencies of finger patterns in Schizophrenic and Control*

Population	Sex	No. of fingers	Pattern types		
			Whorl	Loop	Arch
Schizophrenic	M	610	275 (45.1)	307 (50.3)	28 (4.6)
	F	490	176 (35.9)	294 (60.0)	20 (4.1)
Control (Source: Banerjee, 1970)	M	2080	907 (43.6)	1101 (52.9)	72 (3.5)
	F	2110	791 (37.5)	1198 (56.8)	121 (5.7)
	M	2310	970 (42.0)	1280 (55.4)	60 (2.6)

Figures in parentheses indicate percentages.

TABLE 3 *Distribution of mean total finger ridge-counts for each finger and for all fingers in Schizophrenics, male and female (right and left hand combined)*

Finger	MALE			FEMALE			Sex-difference (value of t)
	No. of individuals	Mean \pm S.E.	S.D.	No. of individuals	Mean \pm S.E.	S.D.	
I	57	34.96 \pm 1.16	8.74	42	30.33 \pm 1.16	7.53	2.82*
II	46	26.07 \pm 0.07	8.48	44	24.70 \pm 1.29	8.57	0.77
III	56	27.11 \pm 1.08	8.09	43	25.42 \pm 1.15	7.57	1.07
IV	59	31.12 \pm 1.04	7.99	40	28.98 \pm 1.30	8.20	1.29
V	55	26.40 \pm 0.98	7.29	43	23.40 \pm 1.16	7.58	1.97*
All fingers	41	152.49 \pm 6.04	38.63	29	135.93 \pm 5.43	29.29	2.04*

*Difference significant at 5% level.

TABLE 4 *Mean total finger ridge-counts (TFRC) of Schizophrenics and Normal subjects*

Population	Sex	No. of fingers	Mean \pm S.E.	S.D.
Schizophrenics	M	410	152.49 \pm 6.04	38.63
	F	290	135.93 \pm 5.43	29.29
Control				
Source : (Sarkar, 1969)	M	2310	146.09 \pm 2.63	40.09
Source : (Banerjee, 1970)	M	2150	144.15 \pm 2.97	43.67
.. ..	F	2110	128.96 \pm 3.15	45.78

Absolute total finger ridge-counts : The mean absolute ridge-counts for separate fingers and for ten fingers together (ATFRC) in male and female schizophrenics are shown in Table 5. The mean absolute ridge-counts, in decreasing order of magnitude, are those for digits I, IV, II, III and V in both the sexes. The two sexes showed significant differences in absolute ridge-counts on digit I ($t=2.42$). Since data on ATFRC on control samples are not available, no comparison with the normal could be made.

TABLE 5 *Mean absolute total finger ridge-count (ATFRC) in Schizophrenics for each finger and for all fingers (right and left hand combined)*

Finger	MALE			FEMALE			Sex-difference (value of t)
	No. of individuals	Mean \pm S.E.	S.D.	No. of individuals	Mean \pm S.E.	S.D.	
I	57	51.40 \pm 2.84	21.43	42	42.12 \pm 2.58	16.74	2.42*
II	46	37.74 \pm 2.66	18.06	44	32.91 \pm 2.48	16.42	1.33
III	56	33.89 \pm 2.38	17.83	43	29.84 \pm 2.07	13.55	1.29
IV	59	45.41 \pm 2.38	18.29	40	40.13 \pm 2.59	16.35	1.50
V	55	30.69 \pm 1.79	13.27	43	26.35 \pm 1.72	11.28	1.75
All fingers	40	210.20 \pm 1.50	59.82	29	177.03 \pm 10.45	56.33	0.40

* Difference significant at 5% level.

Radial and Ulnar ridge-counts : The mean radial and ulnar finger ridge-counts for separate fingers and for ten digits together in male and female schizophrenics are set out in Table 6. The two sexes revealed significant differences in mean radial ridge-counts on digits I, and V, while in the case of ulnar mean ridge-counts on digit I only. Significant sex differences were observed in both mean radial and ulnar ridge-counts, ten digits considered together. Comparable data on these aspects on normal subjects are not available.

TABLE 6 *Mean radial and ulnar finger ridge-counts for each finger and for all fingers in Schizophrenics (right and left hand combined)*

Fingers	No. of individuals	MALE		FEMALE		Sex-difference (value of t)	
		Mean±S.E.	S.D.	Mean±S.E.	S.D.		
RADIAL COUNT							
I	59	31.95±1.45	11.17	45	26.91±1.58	10.57	2.35*
II	58	18.71±1.53	11.64	48	19.75±1.41	9.76	0.5
III	59	25.25±1.23	9.43	43	24.81±1.56	10.25	0.22
IV	59	30.78±1.04	7.95	40	27.30±1.56	9.84	1.86
V	59	25.82±1.03	7.67	44	15.73±1.19	7.88	6.43
All fingers	49	132.96±5.40	37.79	34	116.41±6.63	38.64	1.98
ULNAR COUNT							
I	58	18.10±2.06	15.72	45	12.38±1.87	12.57	2.06*
II	58	11.86±1.67	12.75	48	10.65±1.82	12.59	0.49
III	58	7.17±1.60	12.16	49	4.53±1.25	8.77	1.30
IV	59	14.69±1.64	12.59	45	11.27±1.72	11.52	1.44
V	55	4.87±1.11	8.21	45	3.09±1.0	6.69	1.19
All fingers	48	57.08±6.95	48.17	40	39.48±5.57	35.22	1.98*

* Difference significant at 5% level.

DISCUSSION

The present results that both the male and female schizophrenics and normals show no marked differences in the digital patterns confirm findings of Poll (1935), Moller (1935), Duis (1937), Wendt & Zell (1951), and Hirsch (1960). The present results, however, are at variance with the observations of Raphael & Raphael (1962), and Singh (1967).

In the present study there is no significant difference between schizophrenics and controls in the TFRC; this result is in agreement with Singh (1967). Mellor on the other hand found highly significant difference between normal and schizophrenic males ($t=3.695$, $p<0.001$) and concluded "that there is an association between the total finger ridge-count and genes modifying the expression of the schizophrenic phenotype" (p.940).

Unfortunately comparable data on ATFRC, ulnar and radial counts are not available on normal controls. We have, however, presented these data for their possible use in future.

It is highly noteworthy that Raphael & Raphael (1962), Beckman & Norring (1963), Singh (1967), among others, found a high frequency of schizophrenics with ridge-dissociation but in the present series none of the schizophrenics showed such features on the fingers. Instead of skin injuries in 32.8% males and 18% females were noticed.

It is thus evident that the results of this investigations are not in complete agreement with other studies. We agree with Sank (1968) that this

disparity may stem from inter-study variations in diagnostic criteria, geographical variations, and / or differences in sample sizes.

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