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Familial Correlations for Finger and Palmar Quantitative Dermatoglyphic Features Among the Khurkhul of Manipur

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ABSTRACT The present study examines the heretability of finger and palmar quantitative dermatoglyphic traits by calculating Karl Pearson's coefficient of correlationship 'r' and regression equation between the actual parents and children and unrelated pairings. The sample is made up of 50 couples and their 135 children (66 sons and 69 daughters) belonging to the Khurkhul community of Manipur. The traits included in the study are: total finger ridge count, absolute finger ridge count, pattern intensity index, palmar main line index, atd-angle and palmar a-b, b-c, c-d ridge counts. Highly significant correlation values higher than the theoretical value of 0.5 of parent-child were observed in the studied quantitative feature, except palmar b-c and c-d ridge counts. The estimated values of correlation coefficient 'r' found in parent (x)-child (y) correlationship for total finger ridge count (TFRC), absolute finger ridge count (AFRC) and finger pattern intensity index (PII) agree with the theoretical value of coefficient of correlation between mid-parent and the child i.e. $1/\sqrt{2}$ or 0.71. In all the studied quantitative dermatoglyphic features, randomly paired unrelated ones show very low correlation values when compared with those of the related parents and children's correlation values, except father-child correlation value of palmar b-c ridge count. Higher correlation coefficient values of 'r' were observed in finger than in palmar. This indicates that environmental factors exert greater effect on the palmar region in early prenatal life than do on the finger.

INTRODUCTION

Galton and Pearson have developed the classical theory and method of correlation to measure the degree of hereditary likeness between relatives of different degrees. They suggested theoretical values of the correlation to be a half (0.50) between first-degree relatives such as parent: offspring pair or sib-pairs, a quarter (0.25) between second-degree relatives such as grandparent: grandchild or uncle/aunt: nephew/niece and so on. Galton, however suggested the theoretical coefficient of correlation between the measurement of the child and the mid-parent measurement, i.e. the average value for the two parents is $1/\sqrt{2}$,or 0.71. Sir Francis Galton (1892) provided the first evidence on hereditary influence of finger ridge patterns. He compared the frequencies with which similar patterns occurred on the right index fingers of pairs of sibs with those occurred on the corresponding fingers of randomly paired unrelated persons. The agreement among the sibs was greater than was to be expected by chance while in the unrelated sample, the observed and expected numbers agreed well. The increase concordance, Galton explains, is due to inheritance of pattern type. Galton also studied ridge configurations in twins, but the real pioneer in this branch of dermatoglyphics was Wilder (1902,1 904). His early studies on twins extend the evidence of inheritance and he adds to the literature two family trees demonstrating the transmission of patterns, one is palmar thenar pattern and the other is rare calcar pattern, as opposed to patternless configurations in the areas concerned. Bonnevie (1924) extended the method of counting ridges to get quantitative measures of finger ridge patterns. Now abundant evidences are at hand to prove that some characteristics of fingerprints and of other dermatoglyphic areas are inherited. The inheritance of quantitative dermatoglyphic features of the palms has been investigated by a number of researchers. Cummin's main line index was employed by Pons (1954, 1959) as a measure of transverseness in a genetical study of palmar main lines. Penrose (1954) investigated inheritance of the maximal atd-angle while inheritance of the a-b ridge count was analysed by Fang (1950) and Pons (1964). Holt (1952, 1956, 1957) established the mode of inheritance for total finger

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ridge count by means of twin-twin correlations, parent-child correlations and sib-pair correlations. Similarly, heritability estimates have also been obtained for a few other dermatoglyphic variations on fingers, palms and soles (Smith, 1964, Mukherjee, 1966). Total finger ridge counts, Cummin's palmar main line index, maximal atd-angle and palmar a-b ridge count have already been shown to be inherited characteristics and various correlation coefficients have been reported by different investigators (Fang, 1950; Penrose, 1954; Holt, 1956; Pons, 1954, 1959, 1964). In her studies on heritability in total finger ridge count, Holt has obtained the estimate values of r = 0.50 for parent-child, r = 0.49 ± 0.04 for mother-child, r = 0.50 ± 0.04 for father-child, r = 0.41 ± 0.06 for mother-son, r = 0.60 ± 0.05 for mother-daughter, r = 0.55 ± 0.06 for father-son and r = 0.45 ± 0.07 for father-daughter relationship. Moreover she obtained the value of midparent-child correlation as 0.67 ± 0.03, while the regression of offspring on midparent value was linear. Pons has reported similar results for the transverseness of palmar main lines. Using Cummin's index he obtained r = 0.52 for parent-child, r = 0.59 ± 0.07 for mother-child, r = 0.43 ± 0.08 for father-child and r = 0.72 ± 0.05 for midparent-child relationship. Penrose has obtained the parent-child correlation coefficient for maximal atd-angle as 0.29 ± 0.04. Fang has reported the estimate values of 'r' for a-b ridge count as 0.23 ± 0.07 for mother-child, r = 0.24 ± 0.07 for father-child and r = 0.43 ± 0.07 for midparent-child relationship. However, Pon's (1964) report of Spanish families differ markedly from Fang's. His estimated value of parent-child correlation is 0.50 ± 0.06. The father-child and mother-child correlation values are, 0.68 ± 0.06 and 0.31 ± 0.10, respectively.

The present study attempts to find out the correlation coefficient 'r' and regression equations between parent-child, father-child, mother-child, father-son, father-daughter, mother-son and mother-daughter for quantitative dermatoglyphic features viz., total finger ridge count, absolute finger ridge count, finger pattern intensity index, palmar main line index, maximal atd-angle, palmar a-b, b-c and c-d ridge count, among the Khurkhul people of Manipur. The Khurkhul is one of the largest scheduled caste *'Loi'* populations of Manipur. They are, by and large, endogamous. Intermarriage, of course, takes place with other cognate *lois*, such as the Sekmai and the Phayeng of Manipur. Racially, they belong to Mongoloid group.

MATERIAL AND METHOD

The material analyzed consists of bilateral finger and palmar prints of 50 couples and their 135 children (66males and 69 females) belonging to Khurkhul community of Manipur. The composition of males and females in the families are shown in table 1.

The procedure followed in the collection of prints as well as analyses were mainly after

Table 1: Composition of males and females in families of different size

No. of children in family	*No. of families*	*Males*	*Females*	*Total children*
Families of 1	8	7	1	8
Families of 2	13	9	17	26
Families of 3	17	28	23	51
Families of 4	10	17	23	40
Families of 5	2	5	5	10
Total	50	66	69	135

Cummins and Midlo (1961) and the ridge counting was done as per Holt (1968). Karl Pearson's coefficient of correlationship "r" and regression equation (y = a + bx) of different types of relationship, viz. Parent-child, father-child, mother-child, father-son, father-daughter, mother-son, and mother -daughter, have been calculated to reveal the extent of familial correlationship in respect of the following parameters: (i) Total ridge counts (ii) absolute ridge counts, (iii) pattern intensity index, (iv) palmar main line index, (v) atd-angle, (vi) palmar a-b, (vii) b-c, and (viii) c-d interdigital ridge counts. The sum value of the left and right sides is used as a single value. Again the average value of the father and mother is taken as "parent" and the average value of the sons and daughters is termed as "child". Correlation coefficient (r) and regression equation has also been calculated for the unrelated pairing of parental and offspring's generation. For example, the couple in the serial no.1 is paired with the children of the serial no. 26, the couple no. 2 with the children of no. 27 and so on, hence the pairings are not related ones. The values of "r" and regression of the parents and their respective (actual) children and those of unrelated pairings are shown together in the tables. This will provide the evidence of genetic contribution in shaping the quantitative dermatoglyphical traits.

RESULT AND DISCUSSION

The values of correlation coefficient 'r' and

regression equation for y (children) on x (parents) between actual parents and children and those of unrelated ones for total finger ridge counts (TFRC) are shown in the table 2. Statistical positive correlations between all the types of relationship, viz., parent-child, father-child, mother-child, father-son, father-daughter, mother-son, and mother-daughter are seen. The relationship between parent and child shows the greatest positive correlation ($r = 0.71 \pm 0.05$) than other relationships. This midparent-child correlation coefficient agrees with the theoretical value $1/\sqrt{2}$ or 0.71. The correlation values between father-child and between father-son are almost the same, $r = 0.54 \pm 0.07$ for the former, and $r = 0.55 \pm 0.07$ for the latter. The other remaining relationships show the value of "r" ranging from 0.44 ± 0.09 of mother and daughter to 0.48 ± 0.08 of mother and son. The present values of 'r' between father-son and between father-daughter are similar with the values of Holt (1956). Randomly paired unrelated persons show very low correlation values when compared with the familial correlation values. The values of 'r' among the unrelated ones ranges from -0.12 ± 0.09 to 0.33 ± 0.09. That means no significant relationship has been observed among the unrelated pairings. Subsequently, regression equations of the actual relatives and unrelated pairings show a great difference. Regression co-efficient of the unrelated ones is too weak to be compared with that of the actual relatives.

The values of 'r' and regression coefficient for absolute finger ridge count are shown in table 3. Randomly paired unrelated ones show very low correlation values of 'r' ranging between -0.06 ± 0.11 and 0.27 ± 0.10. Statistical positive correlations and linear regression equation between all the types of relationship viz., parent-child, father-child, mother-child, father-son, father-daughter, mother-son and mother-daughter are seen. It is observed that the father-son correlation is same with the parent -child correlation ($r = 0.69 \pm 0.05$). The value of correlation coefficient between father-child is $r = 0.64 \pm 0.06$ and between father-daughter is $r = 0.54 \pm 0.08$. The other remaining relationships show smaller values of 'r' ranging from 0.38 ± 0.08 for mother-child to 0.41 ± 0.09 for mother-son.

Table 4 shows the values of correlation coefficient 'r' and regression coefficient for finger pattern intensity index. The value of 'r' of father-son ($r = 0.71 \pm 0.05$) is the greatest followed by the parent- child correlation ($r = 0.64 \pm 0.06$). The values of "r" for other relationships are 0.62 ± 0.06 for father-child, 0.31 ± 0.09 for mother-child, 0.54 ± 0.08 for father-daughter, 0.37 ± 0.09 for mother-son and 0.33 ± 0.10 for mother- daughter. Randomly paired unrelated ones show very low correlation values of 'r' and regression coefficient.

Table 5 shows the values of correlation

Table 2: Values of correlation coefficient 'r' and regression of actual parents and children and of unrelated ones for total finger ridge count (TFRC)

Type of relationship	*No. of pairs (N)*	*Correlation coefficient / r ± p.e.*	*Regression equation y=a + bx*
Parent (x)-Child(y)Actual/Unrelated	50/50	0.71 ± 0.05/0.04 ± 0.10	y=20.02+0.73x/y=106.89+0.04x
Father (x)-Child(y)Actual/Unrelated	50/50	0.54 ± 0.07/0.18 ± 0.09	y=57.97+0.42x/y=93.21+0.14x
Mother(x)-Child(y)Actual/Unrelated	50/50	0.47 ± 0.07/-0.12 ± 0.09	y=72.07+0.33x/y=121.56+(-0.08)x
Father(x)- Son(y)Actual/Unrelated	42/42	0.55 ± 0.07/0.02 ± 0.10	y=52.16+0.49x/y=113.76+0.02x
Father(x)- Daughter(y)Actual/Unrelated	39/39	0.45 ± 0.09/0.08 ± 0.11	y=51.05+0.40x/y=94.02+0.08x
Mother(x) - Son(y) Actual/Unrelated	42/42	0.48 ± 0.08/0.33 ± 0.09	y=70.93+0.38x/y=85.15+0.26x
Mother(x)-Daughter(y)Actual/Unrelated	39/39	0.44 ± 0.09/-0.04 ± 0.11	y=61.22+0.37x/y=107.99+(-0.03)x

Table 3: Values of correlation coefficient 'r' and regression of actual parents and children and of unrelated ones for absolute finger ridge count (AFRC)

Type of relationship	*No. of pairs (N)*	*Correlation coefficient / r ± p.e.*	*Regression equation y=a + bx*
Parent (x)-Child(y)Actual/Unrelated	50/50	0.69 ± 0.05/0.02 ± 0.10	y=28.04+0.74x/y=149.00+0.02x
Father (x)-Child(y)Actual/Unrelated	50/50	0.64 ± 0.06/0.09 ± 0.09	y=64.56+0.52x/y=140.50+0.07x
Mother(x)-Child(y)Actual/Unrelated	50/50	0.38 ± 0.08/-0.05 ± 0.10	y=104.65+0.29x/y=158.77+(-0.04)x
Father(x)-Son(y)Actual/Unrelated	42/42	0.69 ± 0.05/0.16 ± 0.10	y=43.06+0.70x/y=134.00+0.17x
Father(x)-Daughter(y)Actual/Unrelated	39/39	0.54 ± 0.08/0.18 ± 0.10	y=53.80+0.47x/y=109.24+0.16x
Mother(x)-Son(y)Actual/Unrelated	42/42	0.41 ± 0.09/0.27 ± 0.10	y=104.48+0.34x/y=122.89+0.23x
Mother(x)-Daughter(y)Actual/Unrelated	39/39	0.40 ± 0.09/-0.06 ± 0.11	y=84.95+0.34x/y=145.13+(-0.05)x

coefficient 'r' and regression coefficient for palmar main line index. The correlation coefficient value of 'r' between the father-daughter and between parent -child are very close, r = 0.56 ± 0.07 for the former, and r = 0.55 ± 0.07 for the latter. The values of 'r' between father-son (r = 0.13 ± 0.10) and between mother- daughter (r = 0.17 ± 0.10) are very low when compared with other relationships. The correlation coefficient value of 'r' between parent-child and between father-child of the present finding is in conformity with the findings of Pons (1954,1959). Unrelated ones show very reduced correlation and regression coefficient values.

With regard to the maximum atd-angle, table 6 demonstrates that the unrelated pairs show very low correlation and regression coefficient values, ranging the value of 'r' from –0.27 ± 0.10 to 0.13 ± 0.09. But stronger and positive correlation and linear regression equations in all the types of relationship are seen. The relationship between parent and child shows greater positive correlation (r = 0.60 ± 0.06) than others. The correlation values between father- daughter (r = 0.26 ± 0.10) and between mother-son (r = 0.27 ± 0.10) are weak. The estimated value of 'r' of the father-child is 0.40 ± 0.08 and that of father-son correlation is 0.49 ± 0.08.

The values of correlation coefficient 'r' and regression coefficient between parents and children and those of unrelated ones for palmar a-b, b-c and c-d ridge counts are presented in tables 7 to 9. Statistical positive correlation and linear regression equation between all the types of relationship, viz., parent-child, father-child, mother-child, father-son, father-daughter, mother-son, and mother- daughter in all three interdigital ridge counts are found. But significant statistical positive correlation between parent and child is seen in respect of a-b (r = 0.51 ± 0.07) interdigital ridge count (table 7). The correlation coefficient values of 'r' between parent-child in respect of b-

Table 4: Values of correlation coefficient 'r' and regression of actual parents and children and of unrelated ones for finger pattern intensity index (PII)

Type of relationship	*No. of pairs (N)*	*Correlation coefficientr ± p.e.*	*Regression equation y=a + bx*
Parent (x)-Child(y)Actual/Unrelated	50/50	0.64 ± 0.06/0.02 ± 0.10	y=4.17+0.70x/y=13.44+0.02x
Father (x)-Child(y)Actual/Unrelated	50/50	0.62 ± 0.06/0.12 ± 0.09	y=7.05+0.50x/y=12.47+0.09x
Mother(x)-Child(y)Actual/Unrelated	50/50	0.31 ± 0.09/-0.09 ± 0.09	y=10.21+0.25x/y=14.72+(-0.07)x
Father(x)-Son(y)Actual/Unrelated	42/42	0.71 ± 0.05/0.23 ± 0.10	y=4.39+0.73x/y=10.90+0.24x
Father(x)-Daughter(y)Actual/Unrelated	39/39	0.54 ± 0.08/0.20 ± 0.10	y=6.90+0.46x/y=10.85+0.17x
Mother(x)-Son(y)Actual/Unrelated	42/42	0.37 ± 0.09/0.27 ± 0.10	y=9.10+0.35x/y=10.35+0.26x
Mother(x)-Daughter(y)Actual/Unrelated	39/39	0.33 ± 0.10/-0.01 ± 0.11	y=9.17+0.29x/y=13.24+(-0.01)x

Table 5: Values of correlation coefficient 'r' and regression of actual parents and children and of unrelated ones for palmar main line index (PMLI)

Type of relationship	*No. of pairs (N)*	*Correlation coefficient / r ± p.e.*	*Regression equation y=a + bx*
Parent (x)-Child(y)Actual/Unrelated	50/50	0.55 ± 0.07/0.07 ± 0.09	y=6.20+0.52x/y=12.33+0.07x
Father (x)-Child(y)Actual/Unrelated	50/50	0.41 ± 0.08/0.08 ± 0.09	y=9.62+0.27x/y=12.50+0.06x
Mother(x)-Child(y)Actual/Unrelated	50/50	0.37 ± 0.08/0.02 ± 0.10	y=9.62+0.26x/y=13.10+0.01x
Father(x)-Son(y)Actual/Unrelated	42/42	0.13 ± 0.10/0.06 ± 0.10	y=11.96+0.09x/y=12.32+0.06x
Father(x)-Daughter(y)Actual/Unrelated	39/39	0.56 ± 0.07/0.39 ± 0.09	y=7.19+0.45x/y=8.95+0.31x
Mother(x)-Son(y)Actual/Unrelated	42/42	0.42 ± 0.09/0.07 ± 0.10	y=8.38+0.35x/y=12.41+0.06x
Mother(x)-Daughter(y)Actual/Unrelated	39/39	0.17 ± 0.10/0.11 ± 0.11	y=11.13+0.14x/y=11.81+0.09x

Table 6: Values of correlation coefficient 'r' and regression of actual parents and children and of unrelated ones for maximal atd-angle

Type of relationship	*No. of pairs (N)*	*Correlation coefficient / r ± p.e.*	*Regression equation y=a + bx*
Parent (x)-Child(y)Actual/Unrelated	50/50	0.60 ± 0.06/0.05 ± 0.10	y=30.24+0.66x/y=81.14+0.06x
Father (x)-Child(y)Actual/Unrelated	50/50	0.40 ± 0.08/-0.10 ± 0.09	y=59.12+0.32x/y=92.36+(-0.08)x
Mother(x)-Child(y)Actual/Unrelated	50/50	0.38 ± 0.08/0.13 ± 0.09	y=65.47+0.24x/y=78.50+0.09x
Father(x)-Son(y)Actual/Unrelated	42/42	0.49 ± 0.08/-0.07 ± 0.10	y=52.89+0.37x/y=88.46+(-0.05)x
Father(x)-Daughter(y)Actual/Unrelated	39/39	0.26 ± 0.10/-0.27 ± 0.10	y=64.77+0.28x/y=110.91+(-0.29)x
Mother(x)-Son(y)Actual/Unrelated	42/42	0.27 ± 0.10/-0.14 ± 0.11	y=67.82+0.20x/y=92.59+(-0.06)x
Mother(x)-Daughter(y)Actual/Unrelated	39/39	0.43 ± 0.09/-0.09 ± 0.11	y=63.50+0.28x/y=92.59+(-0.06)x

Table 7: Values of correlation coefficient 'r' and regression of actual parents and children and of unrelated ones for palmar a-b ridge count

Type of relationship	*No. of pairs (N)*	*Correlation coefficient / r ± p.e.*	*Regression equation y=a + bx*
Parent (x)-Child(y)Actual/Unrelated	50/50	0.51 ± 0.07/0.11 ± 0.09	y=27.95+0.55x/y=59.00+0.11x
Father (x)-Child(y)Actual/Unrelated	50/50	0.40 ± 0.08/0.25 ± 0.09	y=44.11+0.31x/y=52.66+0.20x
Mother(x)-Child(y)Actual/Unrelated	50/50	0.34 ± 0.08/-0.11 ± 0.09	y=48.54+0.27x/y=72.91+(-0.08)x
Father(x)-Son(y)Actual/Unrelated	42/42	0.16 ± 0.10/-0.12 ± 0.10	y=57.44+0.14x/y=75.56+(-0.10)x
Father(x)-Daughter(y)Actual/Unrelated	39/39	0.41 ± 0.09/0.14 ± 0.11	y=42.40+0.33x/y=58.01+0.12x
Mother(x)-Son(y)Actual/Unrelated	42/42	0.13 ± 0.10/0.02 ± 0.10	y=59.48+0.12x/y=66.76+0.02x
Mother(x)-Daughter(y)Actual/Unrelated	39/39	0.46 ± 0.09/-0.03 ± 0.11	y=41.28+0.38x/y=68.79+(-0.03)x

Table 8: Values of correlation coefficient 'r' and regression of actual parents and children and of unrelated ones for palmar b-c ridge count

Type of relationship	*No. of pairs (N)*	*Correlation coefficient / r ± p.e.*	*Regression equation y=a + bx*
Parent (x)-Child(y)Actual/Unrelated	50/50	0.39 ± 0.08/0.33 ± 0.09	y=26.11+0.36x/y=28.64+0.30x
Father (x)-Child(y)Actual/Unrelated	50/50	0.22 ± 0.09/0.23 ± 0.09	y=35.50+0.14x/y=34.92+0.15x
Mother(x)-Child(y)Actual/Unrelated	50/50	0.36 ± 0.08/0.24 ± 0.09	y=31.11+0.26x/y=34.67+0.17x
Father(x)-Son(y)Actual/Unrelated	42/42	0.52 ± 0.08/0.30 ± 0.09	y=22.74+0.43x/y=31.42+0.25x
Father(x)-Daughter(y)Actual/Unrelated	39/39	0.05 ± 0.11/0.02 ± 0.11	y=38.74+0.05x/y=39.99+0.02x
Mother(x)-Son(y)Actual/Unrelated	42/42	0.29 ± 0.10/0.03 ± 0.10	y=33.81+0.22x/y=41.96+0.03x
Mother(x)-Daughter(y)Actual/Unrelated	39/39	0.40 ± 0.09/0.32 ± 0.10	y=21.99+0.44x/y=25.65+0.36x

Table 9: Values of correlation coefficient 'r' and regression of actual parents and children and of unrelated ones for palmar c-d ridge count

Type of relationship	*No. of pairs (N)*	*Correlation coefficient / r ± p.e.*	*Regression equation y=a + bx*
Parent (x)-Child(y)Actual/Unrelated	50/50	0.28 ± 0.09/-0.04 ± 0.10	y=45.45+0.25x/y=63.96+(-0.04)x
Father (x)-Child(y)Actual/Unrelated	50/50	0.12 ± 0.09/0.01 ± 0.10	y=57.12+0.07x/y=61.22+0.01x
Mother(x)-Child(y)Actual/Unrelated	50/50	0.25 ± 0.09/-0.07 ± 0.09	y=51.71+0.16x/y=64.32+(-0.04)x
Father(x)-Son(y)Actual/Unrelated	42/42	0.14 ± 0.10/0.001 ± 0.10	y=55.64+0.10x/y=62.06+0.00x
Father(x)-Daughter(y)Actual/Unrelated	39/39	0.03 ± 0.11/-0.04 ± 0.11	y=58.68+0.03x/y=62.66+(-0.04)x
Mother(x)-Son(y)Actual/Unrelated	42/42	0.13 ± 0.10/-0.04 ± 0.10	y=56.84+0.08x/y=63.63+(-0.02)x
Mother(x)-Daughter(y)Actual/Unrelated	39/39	0.21 ± 0.10/-0.09 ± 0.11	y=45.43+0.23x/y=66.77+(-0.10)x

c ($r = 0.39 \pm 0.08$) and c-d ($r = 0.28 \pm 0.09$) are comparatively very low. An interesting feature seen from tables 7 to 9 is that the parent-child correlationship between a-b ridge counts seems to be closer than that of the b-c and c-d interdigital ridge counts. Greater value of father-son correlation coefficient ($r = 0.52 \pm 0.08$) than between the parent-child correlation ($r = 0.39 \pm 0.08$) is observed in b-c ridge count. The relationship between father and daughter on palmar b-c and c-d ridge count is too weak to be accounted ($r = 0.05 \pm 0.11$ and $r = 0.03 \pm 0.11$ respectively). Randomly paired unrelated persons show very low correlation values when compared with the familial correlation values of all three interdigital ridge counts.

It appears from the study that quantitative traits of finger print show greater similarity between parents and offsprings than do by the quantitative traits on palm. In other words, heretability of quantitative dermatoglyphic traits is more distinct on finger regions than on the palms. Palmar b-c ridge count, in particular, reveals very weak and rather confusing "r" values. The values of "r" of the unrelated pairings are elevated very close to those of the related ones, with one case of overtaking the related pairing of father and child (table 8). All the palmar ridge counts, of course, generally exhibit weak and insignificant correlation values. Nevertheless, the values are greater among the related pairing-that can still be considered as influence of heredity.

CONCLUSION

It is generally accepted that dermatoglyphic traits are controlled by genetics although the nature of inheritance is exceedingly complex. Dermatoglyphic triats are said to be paratypic because of several possible influences during the formative stage. Nobody has ever claimed totality of inheritance in dermatoglyphics. Evidence at

hand, so far, is "the closer the relationship the greater the similarity". The present study on familial correlationship of eight quantitative dermatoglyphical traits, viz. total finger ridge count, absolute finger ridge count, pattern intensity index, palmar main line index, atd- angle, palmar a-b, b-c and c-d ridge counts among the Khurkhul community of Manipur, just adds one more evidence of heretability into the jargon of dermatoglyphics. Some of the pertinent findings observed in the present study may be recapitulated: (i) In all the studied quantitative dermatoglyphic features, randomly paired unrelated persons show very low correlation values when compared with the familial correlation values (except father-child correlation value of palmar b-c). (ii) Highly significant correlation values, greater than the theoretical value of 0.5 of parent-child for quantitative dermatoglyphic feature (except palmar b-c, c-d ridge counts) suggest strong genetic component in the expression of these traits. (iii) *Paternal* influence (father-child correlation value) is found to be slightly stronger than *maternal* influence (mother-child correlation value) for most of the dermatoglyphic feature except palmar b-c and c-d ridge counts, but the differences do not reach statistical significance, thereby suggesting the contributive role played by both the parents in shaping the traits of their offspring. (iv) Greatest correlation values are observed when the averages of the two parents (mother and father) and children (daughter and son) are taken into consideration and (v) Heritability estimates are found to be higher on finger than on the palm. There is no doubt that the quantitative dermatoglyphic character is genetically controlled, although the familial correlation values indicate that environmental factors exert greater effect on the palmar ridges in early prenatal life than do on the finger.

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