

Research Report

The Incidence of Finger Ridge Counts among the Christian Population of Mysore, India.

Somayyeh Samehsalari*¹, K.Rajasekhara Reddy² and Koohyar Mohsenpour³

**corresponding author*

¹Ph.D Research Scholar, Department of Studies in Anthropology, University of Mysore, ManasaGangothri, Mysore-570006, Karnataka, India. Email: salarisonya@yahoo.com

²Professor and Chairman, Department of Studies in Anthropology, University of Mysore, ManasaGangothri, Mysore-570006, Karnataka, India. Email: rsreddyk@gmail.com

³Ph.D Research Scholar, Department of Studies in Anthropology, University of Mysore, ManasaGangothri, Mysore-570006, Karnataka, India. Email: koohyar_mohsenpour@yahoo.com

Abstract - The present study was attempted to obtain the occurrence total and absolute finger ridge counts from 102 unrelated Christian populations (60 males and 42 females) of Mysore city, Karnataka state of India. Data were collected by biometric scanner (USB finger print reader). The mean values of Total finger ridge count and Absolute finger ridge count were higher among the males than females, with sex difference significant, they were compared with several previous studies on different endogamous population the mean values of total finger ridge count of our study were more similar to Naga people of Mysore.

Keywords: finger Ridge count, Christian population, Mysore

Introduction

Dermatoglyphic (derma, skin + glyphic, carve) is the phrase applied to describe ridge patterns of the skin of the fingers, palms, toes and soles (Das 2008). Finger prints are dermal ridge configurations having grooves in between them (Umraniya et al. 2013). It remains stable from the time of formation of fetus to death, it cannot be changed by environmental factors or aging during life span (Zhang et al. 2010; Namouchi 2011). Hereditary characteristics of a person can be shown by finger print patterns, and physiological behavior of a person can be determined by these patterns (Kumar et al. 2013). It is useful tool to study population variation (Cummins 1935). The study of the patterns and ridges of finger is very effective to diagnosis of many diseases; especially those are created by chromosomal disorders and aberrations (Verbov 1970). It is considered as a substitute of signature of individuals patterns (Kumar et al. 2013). There are two types of finger print studies, qualitative and quantitative; survey about finger print pattern types is qualitative study whereas finger ridge count on the finger print is an instance of quantitative study (Nanakorn and Kutanan 2013). Golton first determined three types of finger patterns, Whorl, Loop, Arch; Henry later classified finger patterns into Whorl, Loop, Arch and Composites (Das 2008). A straight line is drawn from core of fingerprint to its triradius known as a ridge count; all ridges touched by this line are counted except triradius and core. When performing ridge counts, Whorl pattern has two triradii and Loop pattern contains one, arch receives a score of zero and thus two counts are there, first Total finger ridge count (TFRC) utilizes higher value of whorls (true and composite) and the second one is Absolute finger ridge count (AFRC) includes both values of whorls and related patterns (Holt 1968). These finger patterns are important tool for the study of anthropology, human biology, medicine, forensic and genetics (Bali and Chaube 1994). The main purpose of current study is to reveals percentage of Total finger ridge count and Absolute finger ridge count, among the Christian population of Mysore city, Karnataka state, India. Christianity is a minority religion within Mysore city. There are two category (Protestant and Catholic) among them. Most of the Christian people of Mysore belong to Catholic.

Materials and methods

a. Sample size and inclusion criteria

Finger prints were obtained from 102 unrelated individuals (60 males and 42 females) of Christian population living in Mysore city of Karnataka State of India. The age ranged from 14 to 30 years (mean age = 22 years). All subjects were informed about the purpose and nature of the study. Only healthy individuals with no visible signs of any disease, deformities, trauma to any finger were included.

b. Methods

Finger prints were taken by a USB finger print reader (Biometric Scanner). According to its protocol, software was installed on a computer, drivers were installed. USB fingerprint reader connected to the computer, then the subjects were requested to wash their hands after drying, the finger balls of the subjects were pressed at the center of the sensor of Biometric Scanner. For more accuracy every finger was printed twice, every possible care was taken to obtain more clear prints of fingers.

c. Analysis

The finger prints were analyzed according to the suggestions recommended by (Cummins and Midlo 1961). SPSS 16 (SPSS INC. released 2007. SPSS (version 16.0) statistics for Windows, Chicago) was used for analyzing data.

d. Statistical analysis

To ascertain the sex difference within the group for male as well as female series regarding the quantitative aspects by dermatoglyphic data, the 't' test is employed in the present study. The quantitative finger dermatoglyphic characters like TFRC, AFRC have been taken into account and their means and S.E.s were computed to see the sex difference within the population, A p-Value of <0.05 was considered as significant

Results and discussion

The bilateral finger prints were analyzed for the incidence of Total finger ridge count, Absolute finger ridge count and compared with several endogamous population.

Total Finger Ridge Count (TFRC)

The TFRC is found out according to the method suggested by Holt (1968) by taking higher values of the whorls as well as the count on the loops to represent size ○ a pattern of

all the fingers. The distribution of Total finger ridge count among the males and females in different class intervals is shown in table 1 and 2 as also Fig. 1 and 2. For TFRC the highest number of males (24.5%), fall in the range of 121-160 while more number of females (15.7%) fall in the range of 121-160, the mean value of TFRC among the males (156.88 ± 4.17) is greater than among the females (137.50 ± 5.90). However, the bisexual difference in TFRC are found to be significant ($p < 0.05$).

Table 1. Distribution of Total Finger Ridge Count (TFRC) among males and females

Ranges of ridges	Males		Females		Males + Females	
	No.	%	No.	%	No.	%
0-40	0	0.00	0	0.0	0	0.00
41-80	1	1.00	3	2.90	4	3.92
81-120	7	6.90	12	11.80	19	18.62
121-160	25	24.50	16	15.70	41	40.19
161-200	22	21.60	10	9.80	32	31.37
201-204	5	4.90	1	1.00	6	5.80
Total	60	58.80	42.00	41.20	102	100.00

Table 2. Total Finger Ridge Count (TFRC)

Sex	Number tested	Mean \pm S.E.	S.D.	V	t-value for differences	Sig(p-value)
M	60	156.88 ± 4.17	32.33	1045.23	-2.745	0.007
F	42	137.50 ± 5.9	38.27	1465.79		

M = male , F = female S.D = standard deviation , S.E = standard error V = variance
Statistical significant was set at $p < 0.05$

Fig. 1: Histogram of frequency distribution values of Total Finger Ridge Count among the males

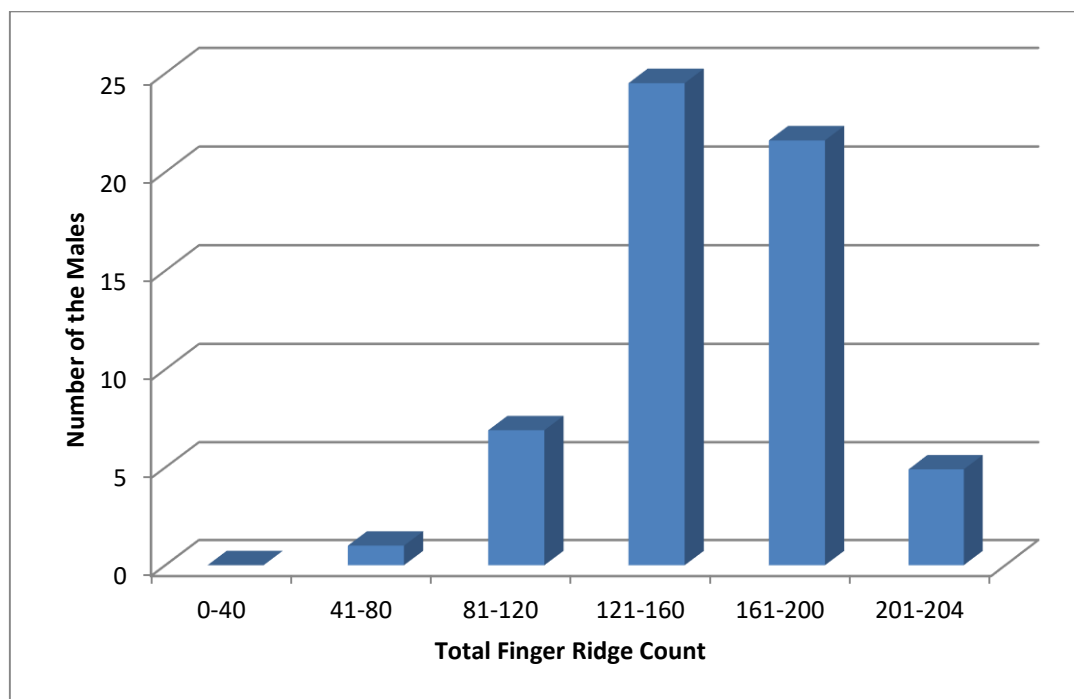
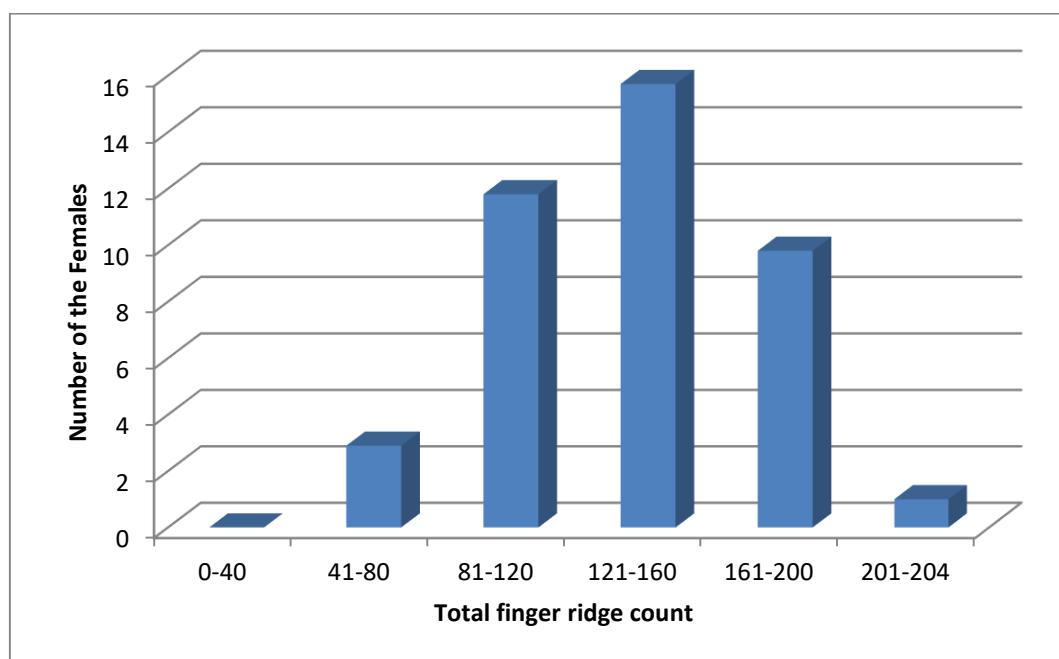


Fig. 2: Histogram of frequency distribution values of Total Finger Ridge Count among the Females



Absolute Finger Ridge Count (AFRC)

The AFRC is obtained by adding ridge count of whorls on both sides as well as the count on the loops of all ten fingers. Since the whorl contains two triradii two counts are made one from each triradius to get the value. The value for all the ten fingers is summed up to get the AFRC. The distribution of Absolute finger ridge count (AFRC) of males and females in different class intervals is shown in Table 3 and 4, and in Fig.3 and 4. For AFRC highest number of males (18.7%) fall in the range of 161-200 whereas the highest number of females (14.7%) fall in the range of 121-160, the mean value of AFRC among the males (213.07 ± 9.26) is greater than among the females (174.83 ± 11.38). However the bisexual difference is found to be significant ($P < 0.05$).

Table 3. Distribution of Absolute Finger Ridge Count (AFRC) among the males and females

Ranges	Males		Females		Males + Females	
	No.	%	No.	%	No.	%
0-40	0	0.00	0	0.00	0	0.00
41-80	0	0.00	3	2.90	3	2.90
81-120	6	5.90	6	5.90	12	11.76
121-160	7	6.90	15	14.70	22	21.56
161-200	16	15.70	3	2.90	19	18.62
201-240	10	9.80	5	4.90	15	14.70
241-280	10	9.80	7	6.90	17	16.66
281-320	7	6.90	2	2.00	9	8.82
321-360	2	2.00	0	0.00	2	1.96
361-400	2	2.00	1	1.00	3	2.94
Total	60	58.80	42.00	41.20	102	100.00

Table 4. Absolute Finger Ridge Count

Sex	Number tested	Mean \pm S.E.	S.D.	V	t-value for differences	Sig(p-value)
M	60	213.07 \pm 9.26	71.75	51.49	-2.618	0.010
F	42	174.83 \pm 11.38	73.79	54.45		

M = male, F = female, S.D = standard deviation, S.E = standard error V = variance
 Statistical significant was set at $p < 0.05$

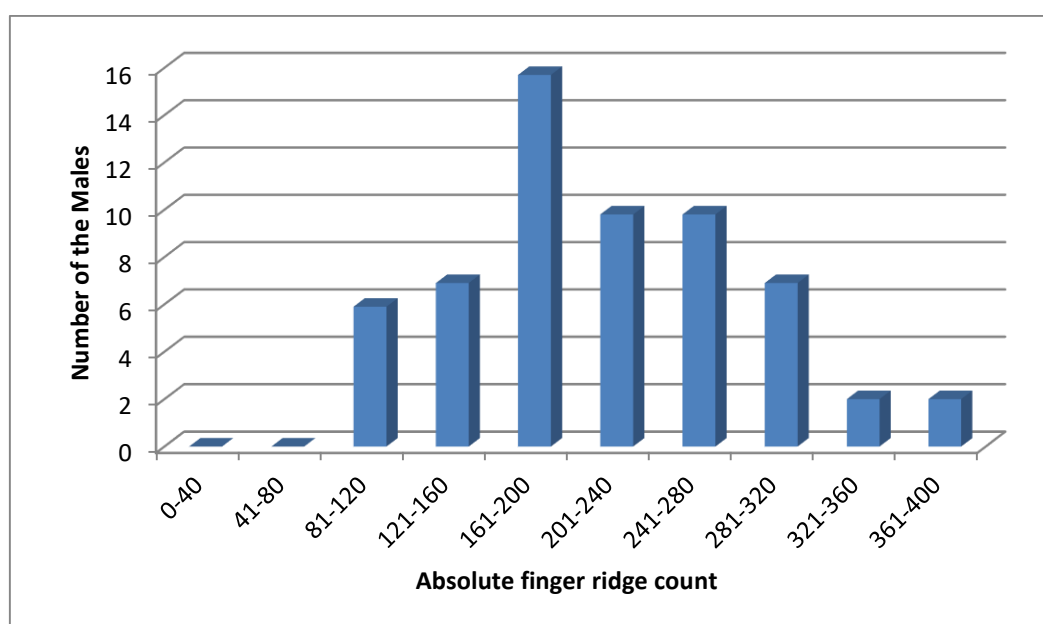
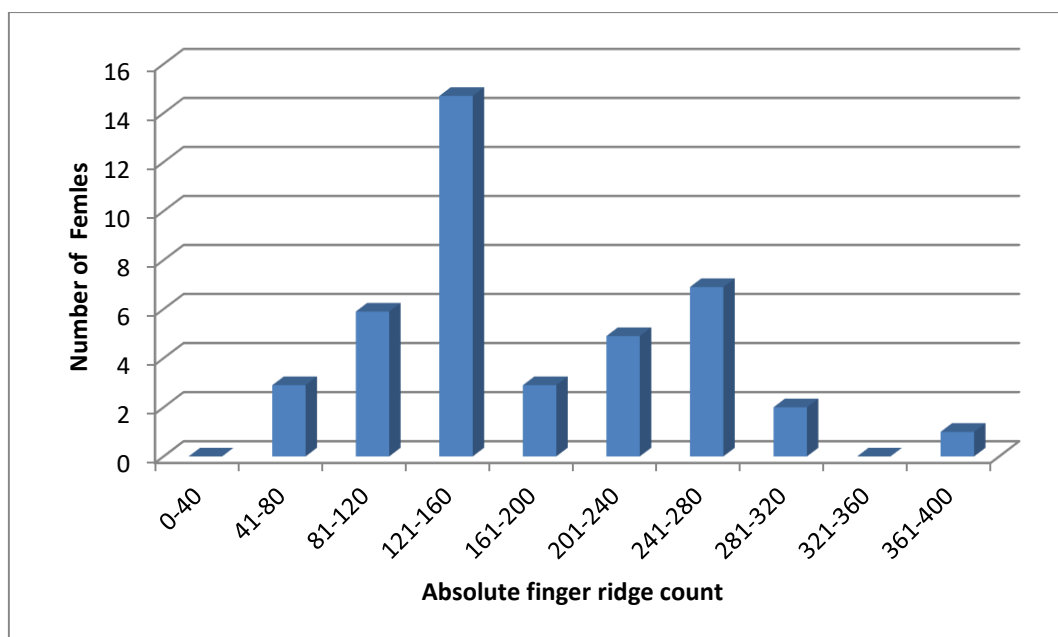
Fig 3. Histogram of frequency distribution values of Absolute Finger Ridge Count among the Males

Fig 4. Histogram of frequency distribution values of Absolute Finger Ridge Count among the Females



The Total finger ridge count of Christian population are compared with several previous studies on different endogamous population in Table 5. The mean values of our study among the males (156.88) and the females (137.50) come closely to Naga males (152.17) and females (134.25). The mean total of finger ridge count values are relatively more in male population than female population in general. This may be due to large pattern size in the males' series than in females' series.

Table 5. A comparison of Total Finger Ridge Count of Christian Population with several other endogamous populations

Population	Area	Sex	Number tested	Mean \pm S.E.	Author(s)
Christian	Mysore city	M	60	156.88 \pm 4.17	Present study
		F	42	137.50 \pm 5.9	
Nagas	Mysore city	M	60	152.17 \pm 2.53	Yhom 2014
		F	20	134.25 \pm 6.71	
Vokkaligas	Mysore city	M	121	131.33 \pm 44.94	Basu 1976
		F	100	131.26 \pm 44.41	
Lingayaths	Mysore city	M	104	137.30 \pm 43.45	Basu 1976
		F	105	125.33 \pm 48.63	
Iyengars	Melukote	M	60	137.30 \pm 5.46	KanthaRaju 1999
		F	50	111.00 \pm 6.26	
KuruhinaShettys	Melukote	M	72	120.95 \pm 5.01	KanthaRaju 1999
		F	50	117.20 \pm 5.38	

Conclusion

The mean revealed higher values of total finger ridge count and absolute finger ridge count than females, with sex difference significant. In general, the mean values of total finger ridge count of our study are more similar to Naga population of Mysore.

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