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A Study on Fingerprint Loop-Ridge Count in Relation to Gender

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ABSTRACT Gender classification from fingerprints is an important step in forensic anthropology in order to identify the gender of a criminal and minimize the list of suspects search. The objective of the present study was to study the differences in the finger loop ridge count among male and female subjects. ANOVA analysis revealed no significant mean difference in the finger loop ridge counts among gender in the present study.

INTRODUCTION

Fingerprints of an individual have been used as one of the vital parts of identification in both civil and criminal cases because of their unique properties of absolute identity (Nandy 2001). Since 700 AD, this science of fingerprint has been used for the purpose of identification (Subrahmanyam 2001). The main objective of the present study was to report the differences of ridge counts of loop patterns amongst genders.

MATERIALS AND METHODS

The sample of the present study comprised of 100 subjects (50 male and 50 female) from Amritsar city of Punjab, belonging to age group of 18-45 years. The fingerprints were collected in the life sciences laboratory of B.B.K.D.A.V. College for Women, Amritsar during 2009-10. 50 male and 50 female fingerprint cards were selected from ink rolled cards. The loop pattern types selected from each card were taken in the standard rolling sequence. Starting with the right hand: thumb (1), index finger (2), middle (3), ring (4), and little (5), followed by the left hand: thumb (6), index (7), middle (8), ring (9), and little (10). The first three legible finger loop pattern ridges were counted and averaged for each of the 50 male and 50 female subjects. Ridge counts were done after Holt (1968).

RESULTS

ANOVA analysis was done for the data collected. The mean number of ridge counts for the entire sample was 10.94 (SD = 2.09). Analysis revealed no significant mean difference in the loop ridge counts across gender represented by these 100 subjects, $F(1,108) = .427$, $p > .05$, MSE= 4.417. There was no difference in the number of loop ridge counts that males had (10.80, SD = 2.27) than did females (11.12, SD =1.86) (Tables 1 and 2).

DISCUSSION

Entries made in Tables 1 and 2 revealed that the initial hypothesis of significant differences in the loop ridge count of male subjects compared to that of female subjects, in that female subjects will have a higher loop ridge count than males was false, resulting in the null hypothesis of no significant difference in loop ridge counts amongst gender to be accepted. This find-

Table 1: Descriptive statistics for sample population

	N	*Mean*	*Std. deviation*	*Std. error*	*95% Confidence interval for mean*		*Minimum*	*Maximum*
					Lower bound	*Upper bound*		
Male	50	10.3200	2.10384	.29753	9.7221	10.9179	6.00	16.00
Female	50	10.6318	1.96553	.27797	10.0732	11.1904	7.00	15.00
Total	100	10.4759	2.03160	.20316	10.0728	10.8790	6.00	16.00

Table 2: ANOVA results for sample population

	Sum of squares	*df*	*Mean square*	*F*	*Sig.*
Between groups	2.430	1	2.430	.586	.446
Within groups	406.182	98	4.145		
Total	408.612	99			

ing agrees with that deduced from recent study reported by Namouchi (2011), which showed that Tunician population did not differ on ridge count with respect to gender. However, it is contrary to findings of Kunter and Ruhl (1995) that reported significant differences in the total amount of ridge values in males and females. However, they also considered the handedness while determining the ridge counts. It also contradicts the results obtained from dermatoglyphic analysis of south Indian population (Nithin and Preethi 2011). A possible explanation for the null hypothesis being accepted may be due to a low sample size as sample size of one hundred was probably not the best representation of the population. Secondly, by not accounting for handedness inadvertently, more loop patterns may have been used from one hand as opposed to the other, causing lower ridge count averages. Improvements for this study would include increasing the size of the sample to get a more accurate representation of the population. Further, there is a dearth of studies done exclusively on loop ridge counts as most of such studies are focused on total finger ridge count (TFRC) and are thus not fully comparable to the present one. More of such studies are required to generalize the results for any population.

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