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Variations of Index (2D) Finger Length among Adult Bangladeshies

Karim Rezwan Hasan[1], Shamim Ara[2], Mahamuda Begum[3]

Abstract:

Context: *In human hand, the lengths of all digits are not the same. By virtue of evolutionary changes digital lengths vary from person to person according to age, sex, races, occupation or even environmental influences. It has been found that the digital lengths are not even same in both hands of an individual. In this study, this variation of the index finger (2D) length has been analyzed and compared among the adult population of Bangladesh.*

Materials & Methods: *A cross sectional analytical study was conducted in the department of Anatomy, Dhaka Medical College, Dhaka, from July 2012 to June 2013. The study was performed on 200 MBBS students (18 years of age) of Dhaka Medical College, Dhaka. Among them 100 were male and 100 were female. With the help of digital vernier caliper measurements of digital lengths were recorded. Paired and unpaired students t tests were done for statistical analysis of the results.*

Results: *The mean length value of right index finger (R2D) and left index finger (L2D) was greater in male than female (P<0.001). Significant difference between the length of right index finger (R2D) and left index finger (L2D) was observed in male (P<0.05) where left index finger length (L2D) was slightly higher than right index finger length (R2D) but in female the difference was not significant (P> 0.05).*

Conclusion: *Digital lengths especially index (2D) and ring (4D) finger lengths are often use to determine sexual dimorphism. Also, study over the variations of digital lengths have great medicolegal importance to determine age, sex and race of an individual.*

Keywords: *Index finger/ 2nd digital length (2D)*

Introduction:

It has been known for a long time that any measurements of body parts can change with the alterations in size of the organs involved or general body size and this concept was defined concisely by Levinton[1].Throughout the following decades, one such study has been a marked increase in interest, that is measurements of digital length and its sexual variations. The index finger located between thumb and middle finger is the second digit (2D) which is usually the most dexterous and sensitive fingers of a human hand[2]. Researchers claimed that the relative lengths of digits are set before birth[3] and interestingly in human hands, the relative lengths of the index finger differs between male and female[4]. More recently, the researchers explored the relationship between the index to ring digit ratio (2D: 4D) and a wide variety of human characteristics as 2D:4D ratios appear to correlate with a variety of sex-dependent behavior as stated by Manning J.T. & Fink B.[5], including personality traits like dominance, aggression, reproductive success and sexual performance, sexual orientation, hand preference, verbal skills, physical and mental health and diseases and musical and sporting talents. These associations appear to be often stronger for the right hand[6]. In the study of Manning[7], it is seen that smaller index fingers in men have been associated with higher levels of physical aggression throughout their life[8]. Men with less smaller index finger are reported as being

1. Assistant Professor, Department of Anatomy, Ad-din Women's Medical College, Dhaka.
2. Professor and Head, Department of Anatomy, Dhaka Medical College, Dhaka.
3. Professor & Head, Department of Anatomy, Ad-din Women's Medical College, Dhaka.

Correspondence: Dr. Karim Rezwan Hasan

more masculine and dominant in nature and tend to perform better in a number of physical activities[9]. In human, number of physical and behavioral traits depends on index finger length (2D) in both sexes which were statistically proven. For example, males with smaller index finger are more fertile and have high life time reproductive success. Also, they are more aggressive and assertive in nature and have high musical and sports aptitudes[10]. Again, male with excessive smaller index finger often has some attributes like left-handedness, good visuo-spatial ability[11], fast running speed[12] but they may also experience some severe health related problems like autism, Asperger's syndrome, prostatic carcinoma, Hepatitis-B related hepatocellular carcinoma, urolithiasis and rheumatoid arthritis but male having longer index finger often has higher risk of early heart disease[11]. On the other hand, females with long index finger are more fertile, have high reproductive success but also having higher risk of breast cancer and endometrial cancer. Again, female with an excessive long index finger are associated with good verbal fluency but higher risk to have neurodegenerative disorders but, females with smaller index finger have greater tendency towards homosexuality/ bisexuality, spontaneous abortion, polycystic ovaries and also they are more aggressive and assertive in nature[10].

Materials & Methods:

The study was performed on two hundred (200) medical students of Dhaka Medical College, Dhaka age ranging from 20-25 years. Out of them one hundred (100) were male and one hundred (100) were female. With the help of a digital vernier caliper index finger length (2D) was recorded in centimeters. Length of the index finger length was measured by measuring the crease-tip (c-t) length where "c" is the midpoint of proximal crease at the base and "t" is extreme end (tip) of the index finger that is furthest from the hand. The distance between these two points indicates the length of index finger (2D). Measurements were taken three times independently and the maximum length was taken for analysis. The right index finger length was termed as R2D and left index finger length was termed as L2D. Data was expressed as mean ± Standard deviation (±SD) as descriptive statistics in both sexes. Paired and unpaired Student's t-test was done to analyze the differences between lengths of right (R2D) and left (L2D) index finger and those between male and female respectively. Statistical significance was accepted at ($P < 0.05$).

Procedure of measurement of index finger is shown in Fig: 1 and Fig: 2i, ii, iii, iv.

Ethical clearances:

This work was approved by the Ethical Review Committee (ERC) of Dhaka Medical College, Dhaka.

Results:

Results are shown in Table-I, Table-II, Fig-3 and Fig-4

Table-I

Comparison of index finger length between male and female

Variable	Male (n = 100) mean ± SD	Female(n = 100) mean ± SD	*P-value*
R2D	7.140 ± 0.367	6.710 ± 0.369	P <0.001
(cm)	(6.359 - 8.124)	(5.952 - 7.813)	
L2D	7.170 ± 0.379	6.720 ± 0.362	P <0.001
(cm)	(6.319 - 8.183)	(5.765 - 7.912)	

Figures in parentheses indicate range. Comparison of index finger lengths between male and female was done by unpaired Student's 't' test,

*** = significant at P < 0.001

Table-II

Comparison between the length of right (R2D) and left (L2D) index finger

Variables	Groups	
	Male (n=100)	Female (n=100)
R2D	7.140 ± 0.367	6.710 ± 0.369
	(6.359 - 8.124)	(5.952 - 7.813)
L2D	7.170 ± 0.37 9	6.720 ± 0.362
	(6.319 - 8.183)	(5.765 - 7.912)
P - value	*P* <0.05*	*P* > 0.05 ns

Figures in parentheses indicate range. Comparison between the length of right (R2D) and left (L2D) index finger was done by paired Student's 't' test, ns = not significant, * = significant at P <0.05

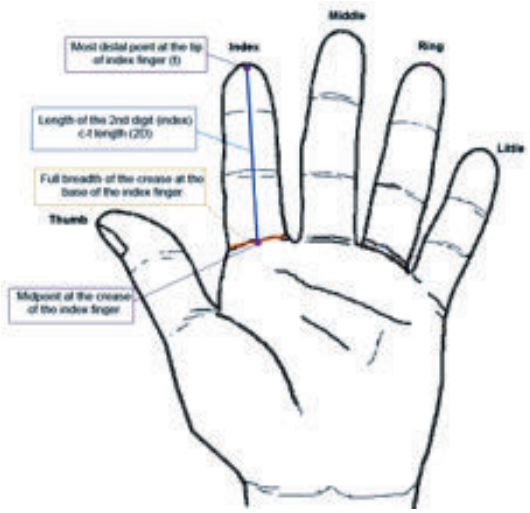

Fig-1: *landmarks for measuring index finger length*

Fig.2 (i)

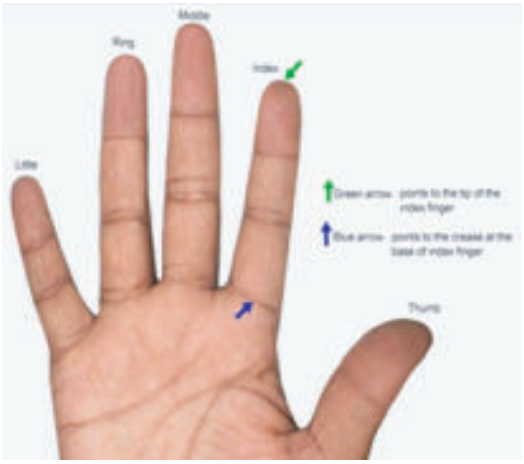

Fig.2 (ii)

Fig.2 (iii)

Fig-2 (iv): Photograph showing the midpoint (blue 'dot' over the crease) of the proximal crease of the index finger. (v): Photograph showing measurement of the length of the index finger (c-t length).

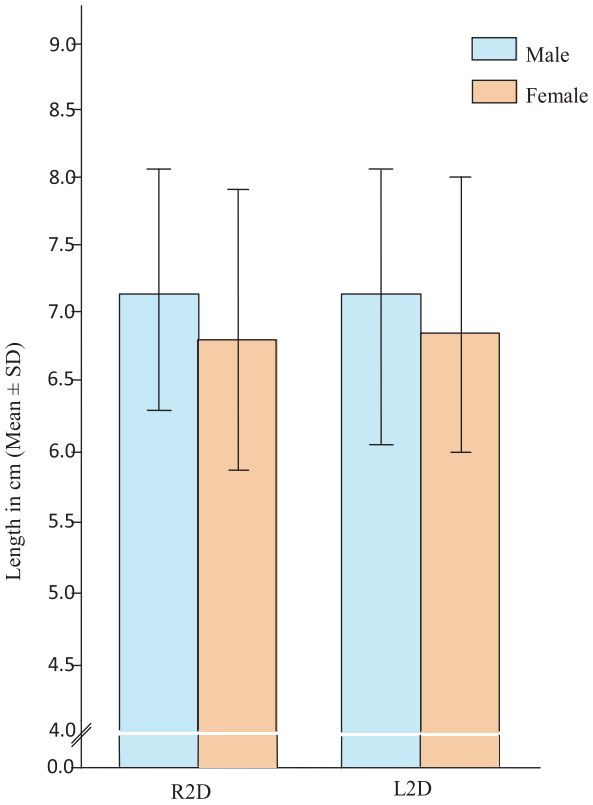

Fig-3: *Comparison of index finger lengths between male and female*

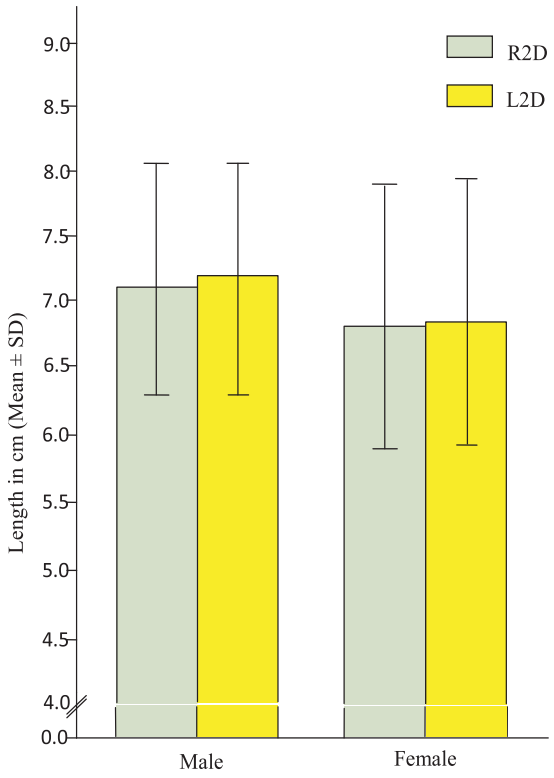

Fig-4: *Comparison between the length of right (R2D) and left (L2D) index finger*

Discussion:

Male have longer index finger (2D) length than female in both hands which was significant (P<0.001). Also, the length of left index finger (L2D) was significantly higher than right index finger (R2D) in male (P<0.05) but in female the difference was not significant (P> 0.05). Similar kind of study was conducted by William et al.[13], Lippa, R.A.[14], Rahman Q.[15], Wilson GD.[16], KOSÏF R. and Diramali M. B.[17], Danborno et al.[18] and Ibegbu A.O. et al.[19] where in both sex, the length of right (R2D) and left (L2D) index finger were significantly higher than that of present study (P<0.001) but in the study of Shima M. A. et al.[20] the mean length of both index fingers (R2D and L2D) of their study were significantly lower than that of present study in both sexes (P<0.001).

Conclusion:

The present study showed that Bangladeshi male have larger index finger length than that of female (P<0.001) in both hands. In male, the length of left index (L2D) finger is more than right index (R2D) finger (P<0.01) but in female, there is no significant difference between right (R2D) and left (L2D) index fingers (P>0.05).

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