Correlation of Anxiety with Thumb Length and Intelligent Quotient in Phase - I MBBS Students

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ABSTRACT

INTRODUCTION
Anxiety is one of the common psychiatric disorder characterized by sad feeling and too much of anticipation. This anxietic character of a person not only leads to somatic changes in the body, but also to cognitive changes. So this study was done to correlate anxiety with thumb length and Intelligent Quotient (IQ) of the individuals.

MATERIALS AND METHODS
The sample size was 99 MBBS students studying first and second year in AIIMS, Mangalagiri were taken into the study. Their thumb length, intelligent quotient and anxiety scores were calculated and the anxiety score was compared and correlated with thumb length and intelligent quotient.

RESULTS
There was statistically significant correlation between anxiety score and thumb length. The study participants with high anxiety score had lengthy thumb. There was no significant correlation of higher anxiety score with intellectually superior participants though the percentage was more.

CONCLUSIONS
There is significant correlation with thumb length, IQ and anxiety and these conclusions can be helpful in identifying IQ and anxiety score semi quantitatively using thumb length of the patients.

KEYWORDS
Anxiety, IQ, Intelligence, Palpitations, Thumb

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INTRODUCTION

Anxiety Disorder

Anxiety disorders are one of the most common psychiatric disorders in the developing countries like India characterized by restless, unease condition leading to fear or worry, palpitations and may coexist with other psychiatric disorders which may lead to poor health outcomes and poor quality of life with mortality indicating its importance to diagnose and treat. There are two types of anxiety: state and trait anxiety. State anxiety is temporary emotional state of feeling perceived during tension heightened by autonomic nervous system activity which fluctuates and vary. The trait anxiety is a generalized response to perceived threats in the environment and it doesn't vary in an individual which is more harmful than state variety.[1] There are lots of studies done correlating anxiety disorder with that of depression, generalized nutritional status, obesity and alcoholic status, but there are no studies correlating anxiety with that of finger or thumb length and intelligence. There are no studies correlating the intelligent quotient and anxiety on healthy individuals.

Intelligence

Humans are the most intelligent and evolved species and that make them vulnerable to psychiatric illness. The most important factor that decides the intelligence of an individual is the connectivity between and across the neurons. This connectivity improves the processing of the information to give better outcome of the skill in the form of intelligence.[2] The white matter of the cerebrum contains myelinated axon which is very important in establishing connectivity not only between the neurons also between the other axons through axonal gap junctions involving in neuronal processing.[3] There are many studies showing the correlation between white matter volume in the whole brain and in specific regions to the intelligence.[4] The white matter volume plays a vital role in the evolution of human brain and its significance in the prefrontal areas. The volume of the prefrontal area is more in the human than in any non - human primates and that decides the intelligent quotient of any individual.[5] Results of this study may prove useful in the sense of presuming the intelligent quotient and their thumb length which is easy to measure can be compared with anxiety, this will also be helpful in saying about the vulnerability of the individual to develop several anxiety related disorders and psychiatric disorder.

MATERIALS AND METHODS

This cross - sectional study was conducted on MBBS students of All India Institute of Medical Sciences, Mangalagiri with age 17 years and above. The sample size was 99 MBBS students with male students 60 and female students 39 selected randomly after their willingness and ethical clearance was obtained. The procedure was clearly explained to the students in detail and then the written consent form was obtained signed from students above 18 years and if the students age is 17 years, the consent form from the Parents was undertaken and the assent form from the student was also obtained. As advised by the Institute ethics committee the results were not disclosed to any students and all the data were kept confidential. The students not willing to participate were excluded from this study and the eligible students were assessed for Anxiety and intelligent quotient in two separate days.

Assessment of Anxiety

The anxiety of the students was assessed by State - Trait Anxiety Inventory (STAI) questionnaire. This consist of 2 sets of 20 questions each on self - report basis, the participants rated themselves in a four point frequency scale like not at all, somewhat, moderately and very much within 40 minutes. The scores ranging from 20 to 80 per set so total of 160 for response, when higher the score greater the anxiety and lower the score lesser the anxiety. The score of more than 54 in each set was taken as anxiety disorder and less than 54 was taken as normal.[6]

Intelligent Quotient (IQ) and Thumb Length

The intelligent quotient was assessed by Standard Progressive Matrices with maximum 45 minutes duration. The Standard Progressive Matrices consist of 5 sets (A to E) of 12 questions in each set (e.g. A1 to A12) so totally 60 questions with increasing difficulty on each sets.[7] the number of correct response was counted and the intelligent quotient capacity grade was determined. The intelligent capacity grade from standard progressive matrices was determined by counting the raw score, if the score is between 55 to 60 they are intellectually superior, if the score is between 50 to 54 then it is above average intellectual capacity and if the score is 45 to 49 then it is average intellectual capacity. In this study the number of students in each range of IQ was listed and then the students with IQ score above 55 and less than 55 is compared with anxiety score for any correlation. Also the thumb length of the dominant hand in extended position is measured using measuring tape from the proximal thumb crease to the tip. The measurements were tabulated in centimeters with students roll numbers. Anxiety and Intelligent Quotient scores were also tabulated with their roll numbers and compared.

Statistical Analysis

Data entering and analysis was done using Epic - info software. The categorical variables were summarized as frequency with percentages and continuous variables were summarized as mean and SD. The association between continuous variable were analyzed as correlation co-efficient and the

association between continuous and categorical variables were analyzed using t - test.

RESULTS

Nearly 85 % of students had normal anxiety and 15 % of students had higher anxiety (Table 1). When male and female students are compared separately there was no significant difference between them.

Items	Sub groups	Normal N (%)	High Anxiety N (%)	P - value
Gender	Male	49 (81.7)	11 (18.3)	0.51
	Female	35(89.7)	4 (10.3)	
Total		84 (84.8)	15 (15.2)	

Table 1. Comparison of Anxiety Score.

Correlation of Anxiety Score with Thumb Length

In this study there were 15 students had anxiety score above the 54 in each set and remaining were having normal anxiety (Table 2). When thumb length of the participants were compared with anxiety score above 54 per set, there was significant correlation between the parameters (Table 3 and Figure 1). The mean thumb length of study participants with normal anxiety level is 7.2 cm with SD 0.5 cm whereas the mean thumb length of study participants with higher anxiety level has 7.6 cm with SD 0.6 cm. This mean difference of 0.41 cm is statistically significant after applying independent t test.

Anxiety Score	Frequency	Percent
Normal (≤ 108)	84	84.8
Higher Anxiety (> 108)	15	15.2
Total	99	100

Table 2. Anxiety Score Distribution of Study Participants.

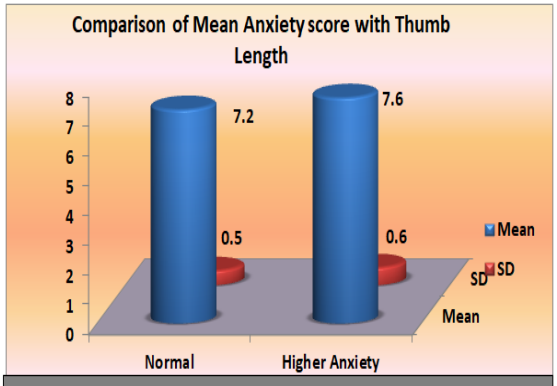

Figure 1. Comparison of Mean Anxiety Score with Thumb Length Showing Significant Correlation.

Anxiety Level	N	Thumb Length (cm) Mean ± SD	P-value
Normal	84	7.2 ± 0.5	0.012*
Higher Anxiety	15	7.6 ± 0.6	

Table 3. Comparison of Anxiety Score with Thumb Length.

Correlation between Anxiety Score and Intelligent Quotient

Comparison of anxiety score with IQ score, the study participants with the higher anxiety score have comparatively higher IQ, and around 46 % of participants have IQ score more than 55. Whereas 41% of study participants with normal anxiety level have IQ more than 50th Percentile but this difference is not statistically significant (p value- 0.718) (Table 4) (Figure 2).

Anxiety Level	IQ Score 55 & below IQ N (%)	IQ Score above 55 N (%)	P - value
Normal	49 (58.3)	35 (41.7)	0.72
Higher Anxiety	8 (53.3)	7 (46.7)	

Table 4. Correlation of Anxiety Score with IQ Score and the Correlation are Found.

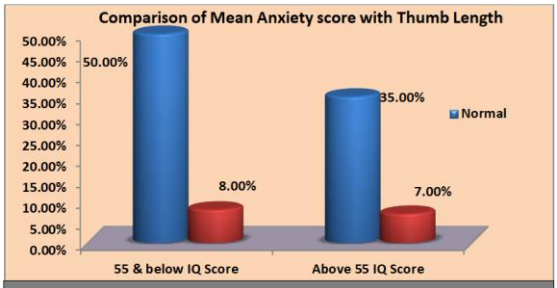

Figure 2. Comparison of Mean Anxiety Score with IQ level Showing Higher Anxiety Higher the IQ.

Correlation between Thumb Length and Intelligent Quotient

There were 42 students above the IQ score of 55 *i.e.* Grade 1 (Intellectually superior) when these students are compared with that of thumb length there was statistically significant correlation (Table 5 and Figure 3).

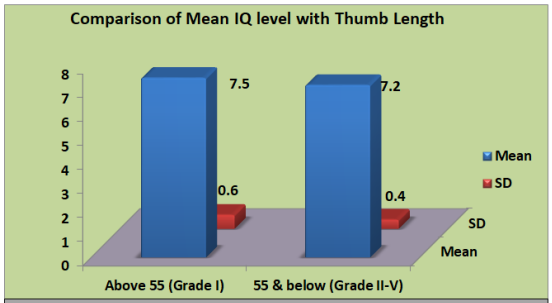

Figure 3. Comparison of Mean IQ with Thumb Length Showing Higher the Thumb Length Higher the IQ.

IQ Score	N	Thumb Length (cm) Mean ± SD	P - value
Above 55 (Grade I)	42	7.5 ± 0.6	0.022*
55 below (Grade II - V)	57	7.2 ± 0.4	

Table 5. Comparison of IQ Level with Thumb Length.

DISCUSSION

Thumb Length and Anxiety

This study showed significant correlation between thumb length and higher anxiety score. There were no studies showing correlation between thumb length and anxiety levels and this is the first study to discuss about it. This study for the first time showed significant positive correlation between thumb length and higher anxiety levels. The gonadal hormones play an important role on sexually dimorphic finger development and sexually dimorphic behavior variations. Males are more vulnerable in developing learning and behavioral disorders because males are exposed more to steroid hormones prenatally leading to specific male like brain behavioral pattern. This exposure to steroid hormones can be assessed by ratio on index finger (2D) and ring finger (4D) which varies between males and females, the males have lower 2D:4D ratios than female usually.[8] One of the study showed that there was significant correlation between masculine finger length ratios and development of Attention Deficit Hyperkinetic Disorder (ADHD) in boys and insignificant in girls.[9] This was also supported by a study where they proved association between feminine 2D:4D ratio and anxious behavior in the childhood.[10] Comparing our result with all these studies, there is a definite positive correlation and the reason may be due to hormonal effects.

Mechanism Correlating Anxiety with Thumb Length and Intelligent Quotient

Repeated finger movements activates medial wall of hemisphere and this activates the lingual gyrus which is concerned in expressing anxiety behavior. The areas in the medial wall of hemisphere integrate movements of hand, arm and vision which are useful in grasping objects and to perform a skill during learning. This medial wall of hemisphere along with parietal reach regions and interparietal areas, the physical activity is linked with anxiety behavior.[11,12]

But this correlation is correlated positively with patients suffering from generalized anxiety disorder and not in control patients.[13] As far as the old studies were concerned there was negative correlation between intelligence and anxiety (Figure 4).

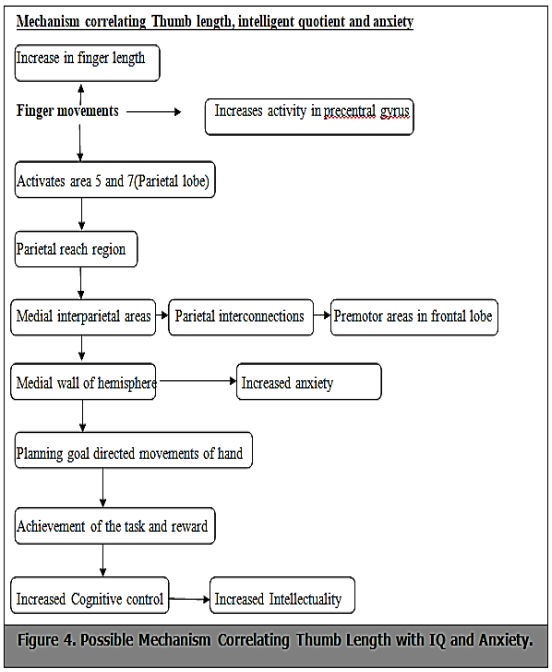

Figure 4. Possible Mechanism Correlating Thumb Length with IQ and Anxiety.

Anxiety Levels and Intelligent Quotient

This study showed there was some correlation between grades I intelligent quotient score and higher anxiety level but it was not statistically significant. But there are studies showing positive correlation between intelligent quotient and anxiety by correlating dorsolateral prefrontal cortex and hippocampal formation. But this correlation is correlated positively with patients suffering from generalized anxiety disorder and not in control patients.[13] As far as the old studies were concerned there was negative correlation between intelligence and anxiety. The reason given for this negative correlation was individuals with low intelligence may not response in activities leading to success resulting in development of anxiety.[14] Another study showed that the individuals with higher IQ have greater psychological fragility resulting in personality disorders, anxiety disorders and obsessional behavior.[15] the high IQ was correlated positively with higher worry scores in patients with generalized anxiety disorder and there was low metabolite accumulation in the subcortical white matter studied through proton magnetic resonance spectroscopic imaging.[16]

CONCLUSION

This study concludes that the anxiety and the thumb length are positively correlated. Though there was positive correlation of high anxiety score and intellectually superior participants, it was not statistically significant. These conclusions can be helpful in identifying IQ and anxiety score semi quantitatively using thumb length of the patients.

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DECLARATION OF CONFLICTS OF INTEREST

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

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