

## Gender Performance on Intelligence Quotient Test among Medical Students in a Government Medical College

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### Abstract:

**Background:** Now-a-days in this competitive world many factors can influence the academic performance of medical students in a medical college.

**Aim and Objective:** This study was done to evaluate the intelligence quotient of medical students based on their gender and to evaluate the relationship between IQ and their academic performance.

**Materials and Methods:** A cross-sectional, comparative study was done with a sample size of 140 students. Out of which 90 were female students and 50 were male students. Participants signed a consent form. The intelligence quotient was assessed by (Wechsler Adult Intelligence Scale) WAIS test and data was analyzed by SPSS-12.

**Results:** From this study, it was noticed that 21% of females and 5% of male students come under IQ -Grade I (0-39). 10% of females and 4% of males were of IQ -Grade II (40-69). 37% of females and 11% of males come under IQ-Grade III (70-85). 11% of females and 5% of males were having IQ -Grade IV (86-115). 5% of females and 16% of males had IQ-Grade V (116-130). 3% of females and 4% of males had IQ -Grade VI (131-145). 3% of females and 5% of males had IQ -Grade VII (>145). This study showed that majority of females had IQ of below average -Grade III (70-85) and majority of male students had above average IQ of grade IV (85-115).

**Conclusion:** From this study it was evident that the IQ of male students is better than female students and IQ was not related to the disparity in academic performance between the genders.

**Keywords:** Brain anatomy, Gender discrimination, Intelligence quotient, Medical student, Wais test.

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### I. Introduction

Medicine is a branch of science where there should be no gender discrimination. From the past studies on medical students, it was clearly noticed that the number of female to male admissions in medical colleges are drastically increasing every year and at the same time the performance of female students was also better than male students both in theoretical examinations and in practicals. So this study was done whether any difference in Intelligence Quotient (I.Q) was a reason for this disparity in their academic performance. The Intelligence quotient is a score represented by a number, whose purpose is to define our intelligence. It can be defined as a number representing a person's reasoning ability (measured using problem solving methods) as compared to the statistical norm or average for their age, taken as 100. The abbreviation "IQ" comes from the German term Intelligence-Quotient, originally coined by Psychologist William Stern, his term for a scoring method for intelligence tests he advocated in a 1912 book<sup>(1)</sup>. IQ scores have been shown to be associated with such factors as morbidity and mortality<sup>(2,3)</sup>, parental social status<sup>(4)</sup>, and to a substantial degree, biological parental IQ. While the heritability of IQ has been investigated for nearly a century, there is still a debate about the significance of heritability estimates<sup>(5,6)</sup> and the mechanisms of inheritance<sup>(7)</sup>.

The specific objective of the current study is to assess whether there is any statistically significant difference between male and female medical students in scores on a structured, standard, robust test of intellectual ability. The original Wechsler Adult Intelligence Scale - WAIS (form 1) was published in February 1955 by David Wechsler as a revision of the Wechsler-Bellevue Intelligence Scale that has been released in 1939<sup>(8)</sup>. The fourth edition of the test (WAIS-IV) was released in 2008 by Pearson. Wechsler's scale defined intelligence as the global capacity of a person to act purposefully, to think rationally and to deal effectively with his environment<sup>(9)</sup>. The General ability index (GAI) was included which consists of the similarities, vocabulary, and information subtests from the verbal Comprehension Index and the Block Design, Matrix reasoning and

visual puzzles subtests from the perceptual Reasoning Index. The GAI is clinically useful because it can be used as a measure of cognitive abilities that are less vulnerable to impairments of processing and working memory.

**II. Materials And Methods**

This was a cross-sectional study conducted in the department of pharmacology, Sri Venkateswara Medical College, Tirupati, Andhra Pradesh. Female students (n=90) and Male students (n=50) of the age groups 18-20 years had participated. Students of third semester were selected for the study. The participants were informed about aim of the study and their informed consent was taken. The subjects were then assessed for intellectual ability using the Wechsler Adult Intelligence Scale (WAIS), a test designed to measure intelligence in adults and statistical analysis was carried out. The software package SPSS-12 was used to apply chi-square test on the categorical data generated by wais test and the statistical significance was taken as p.p value was 0.000 which showed that there was a statistically significant difference between male and female students regarding their IQs.

IQ	MALE	FEMALE	TOTAL
1;	5	21	26
2	4	10	14
3	11	37	48
4	5	11	16
5	16	5	21
6	4	3	7
7	5	3	8
Total	50	90	140

Table 1: Wais score: IQ score of male, female students

**III. Results**

Mean age of the students was 18+2 years. The wais score categories were shown in Table – I. Graphical representation shown in fig I.

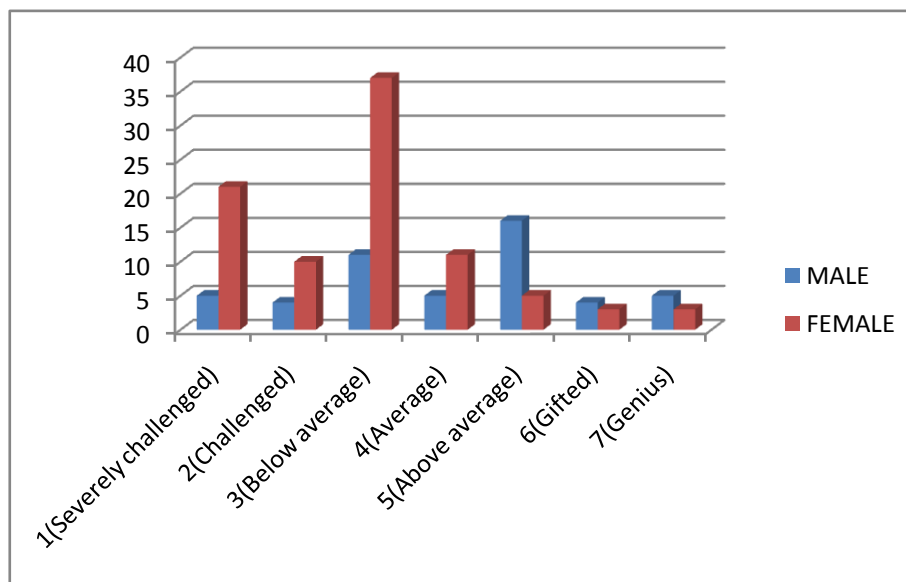


Fig1: Graphical representation of IQ of male and female medical students

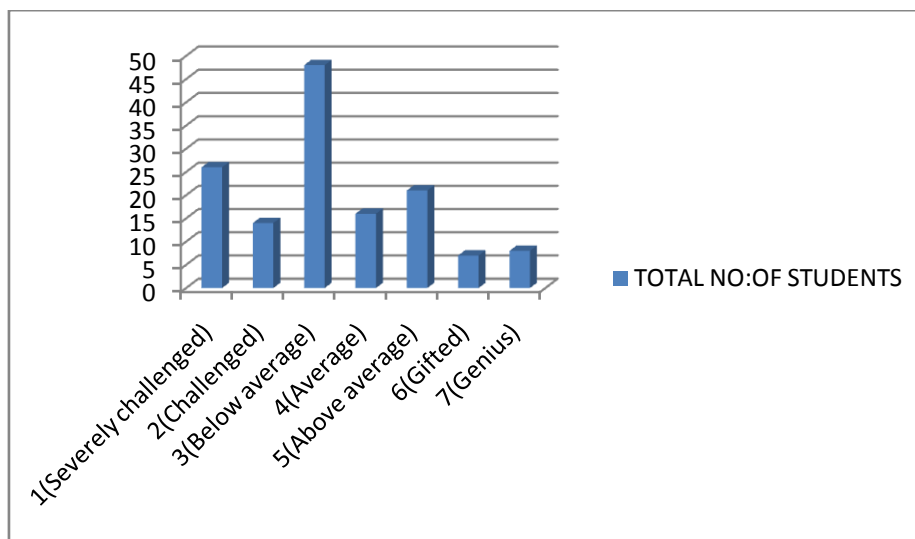


Fig 2: Graphical representation of IQ of total medical students participated in the study

From this study (Tab-1, Fig-1) it was noticed that 21% of females and 5% of male students come under IQ of severely challenged-Grade I (0-39). 10% of females and 4% of males were of IQ of challenged range – Grade II (40-69). 37% of females and 11% of males have IQ of below average-Grade III (70-85). 11% of females and 5% of males were having IQ of average – Grade IV (86-115). 5% of females and 16% of males had IQ of above average-Grade V (116-130). 3% of females and 4% of males had IQ of gifted range-Grade VI (131-145). 3% of females and 5% of males had IQ of genius range – Grade VII (>145). This study showed that majority of females had IQ of below average – Grade III (70-85) and majority of male students had above average IQ of Grade IV (85-115)<sup>(10)</sup>

#### IQ Score Chart

According to Fig-2

Grade-I 0-39- Severely challenged (18.57% of the population)

Grade II 40-69-Challenged (10% of the population)

Grade III 70-85-Below average (34.28% of the population)

Grade IV 85-115 -Average (11.42% of the population)

Grade V 115-130 -Above average (15 % of the population)

Grade VI 130-145 -Gifted (5% of the population)

Grade VII 145+ -Genius (5.71% of the population)

#### IV. Discussion

From this study, it has been noticed that the male IQs were better than female IQs of medical students. From different studies conducted earlier it was proved that IQ scores can differ to some degree for the same person on different IQ tests, a person does not always belong to the same IQ score range each time the person is tested. IQ can change to some degree over the course of time<sup>(11)</sup>. The different causative factors that influence the IQ may be genetic, environmental, biological, or social. Environmental and genetic factors play a great role in determining IQ. Their relative importance has been the subject of much research and debate. Environment and intelligence research investigated the impact of environment on intelligence. This is one of the most important factors in understanding human group differences in IQ test scores and other measures of cognitive ability. It is estimated that genes contribute about 20-40% of the variance in intelligence in childhood and about 60% in old age. Thus the environment and its interaction with genes account for the remaining approximate 50% of intelligence. A very large proportion of the over 17000 human genes are thought to have an effect on the development and the functionality of the brain<sup>(12)</sup>

Several neuro physiological factors have been correlated with intelligence in humans. Researchers have been able to identify correlates of intelligence within brain and its functioning. These include overall brain volume<sup>(13)</sup>, grey matter volume<sup>(14)</sup>, white matter volume<sup>(15)</sup>, white matter integrity<sup>(16)</sup>, cortical thickness<sup>(17)</sup> and neural efficiency<sup>(18)</sup>. Research studies have been carried on brain anatomy of male and female, general intelligence, and gender differences. It was noticed that male brain has more capacity than female brain by about 11-12%. Women have larger corpus callosum, deeper fissures and sulci. Men had six times more grey matter than females in areas related to intelligence while women had ten times more white matter than men in these areas. The specific regions that show the most robust correlation between volume and intelligence are the

frontal, temporal, and the parietal lobes of the brain<sup>(19,20,21)</sup>. Therefore it can be safely concluded that larger brains predict greater intelligence<sup>(22)</sup>

It was proved that sex hormones like testosterone and estrogen had a great role in the development of brain and its functions. The hormonal fluctuations can change the cognitive abilities of the individual. These changes have been noticed during menstrual cycles in women. By earlier studies it was proved that on spatial questions men tend to perform better, while on reading and other verbal skills women showed better performance compared to men. It was also noticed that health also plays a key role in development of brain. So, proper care should be taken from childhood towards food habits. There are other factors also which influence the IQ, like the social relations which should not be neglected. Further research has to be carried out on the various factors that are responsible for the difference in the intelligence of men and women.

In spite of higher IQ of male students than females, it has been noticed that the male admissions in the medical colleges have been decreasing every year and at the same time the outcome performance of female students has been far better than the male students. The reason for this is not known. So it has become very essential on behalf of medical education unit to know the hindering factors for the underperformance of male students in spite of their wonderful IQs.

## V. Conclusion

From this study, it was evident that the IQ of male students was better than female students and IQ was not related to the disparity in academic performance between the genders. Further studies have to be made to evaluate the factors for the underperformance of male students and for the decrease in the number of male admissions into the medical colleges in spite of their superior IQ over female medical students.

## Acknowledgement

I sincerely thank our Professor and Head of the Department Dr. Vasundara Devi. B for her guidance in completing the study. I also thank my staff, post graduates and medical students for their support in completing the study.

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