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# GENDER DIFFERENCES IN INTELLIGENCE AMONG THE BACHELOR DEGREE OF DENTISTRY STUDENTS IN KABUL UNIVERSITY OF MEDICAL SCIENCES BASED ON EXAM SCORE: A PROSPECTIVE OBSERVATIONAL STUDY

Education is one of the basic necessities of every person which is accepted by the United Nations as one of the basic rights of the individual male and female. Gender differences in educational achievements have long been the focus of researches. Several studies have reported that female students outperform their male counterparts. The purpose of this study is to identify the percentage of intelligence level between male and female based on their exam score taking. The sample size estimation was created on the consecutive sampling where all cases are accessible in a given period of time. In a cross-sectional study out of a total of 610 students of the Dentistry Department of Kabul University of Medical Sciences which is one of the top public universities in Afghanistan, 278 were males and 332 females. The results of final exams of fall semester 2019 of Dentistry Department have been collected, then the percentage of each class have been calculated separately to find out which gender group is due to be among top ten students in each class. And in addition we have calculated how many students of both gender show above 80 percent. Two Sample T Test and Ms. excel were used for statistical analysis. This research showed that the numbers of Female students are more in top ten than male students in each class of Dentistry Department. We can accomplish that female students are more hardworking compared to male students.

**Key words:** Gender, Intelligence, Education, Afghanistan, Student, Intelligence quotient.

## Introduction

Gender refers to the socially constructed roles, behaviors, expressions and identities of girls, women, boys, men, and gender of diverse people. These differences and their important role in social lives are generally agreed upon and observed by scholars, policy makers, and other stakeholders[1]. Education is one of the basic necessities of every person which is accepted by the United Nations as one of the basic rights of the individual male and female [2]. High quality training and effective content can be challenging to develop for educational programs targeting resource-poor environments. The University Support and Workforce Development Program (USWDP) supported the education system to improve higher education conditions and workforce capacity in Afghanistan from 2013 to 2019[3].

Studies from around the world have reported significant differences in the academic performances of male and female students at various levels. Many studies reported better performance of female students as compared to their male counterparts [4-6]. However, a study conducted among Kenyan secondary schools reported better results among male students compared to females[7]. Few studies did not report any significant difference in academic performance of male and female students[8]. Creating mobility in education among students is one of the methods that urge them to have better score. In order to create more mobility among students, exams are taken from students.

In a country like Afghanistan where patriarchy is still dominant in various aspects of life, gender differences are still clearly evident. The social status of women in Afghanistan is generally low, a situation attributable to both the general poverty of the country and the gender-based distribution of power and resources in the family and in society. Afghan women, in general, have not been able to become active participants in development activities due to illiteracy, poor health, poverty, traditionally conservative attitude towards them and lack of their access to productive resources and information and technology. Discrimination against women begins right from birth. The religious, cultural, traditional beliefs and political scenario promote such discrimination. As a result, wide gender disparity is seen in every sphere of national development.

Afghanistan in many years has been facing with internal wars, political issue, poverty, immigration, ethical and traditional issues. All these can impact women's achievement that many times are ignored due to gender difference, traditional customs, and cultural issues. Education for all has been a good slogan of the government of Afghanistan. Furthermore, expanding opportunities for accessibility of women in education has been one of the objectives of the education sector under different national development plans of Afghanistan. The government of Afghanistan has received grants from various international organizations like United Nations, World Bank, and United States Agency for International Development (USAID) to strengthen gender equality in various aspects of lives of the people across the country. In this context, the government of' Afghanistan, international organizations and NGOs have been concentrating on ensuring complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes for all girls and boys by 2030 as guided by the Sustainable Development Goals[9]. Despite vigorous efforts from the government and non-government sectors to ensure gender equality in education, there is still a serious gap between boys and girls in academic performance and achievement. There are very limited studies focused on the issues of gender differences in academic performance of students. The purpose of this study is to find out the differences in gender intelligence based on grades and scores between female and male students of Dentistry Department of Kabul Medical University of Medical Sciences.

## Materials and Methods

The cross-sectional prospective study was conducted upon approval of the scientific research and ethic center of the Allied Health Kabul University of Medical Sciences committee, under protocol no. REC: 23/1399. All aspects of this study follow the ethical standards of the relevant national and institutional committees on studies also subsequent revisions.

The sample size estimation was created on the consecutive sampling where a common practice is to select all cases which are accessible in a given period of time or to select a sample size based on a previous study[10].We obtained a list from the Dentistry Department of Kabul University of Medical Sciences.

All the Dentistry Department students who attended the classes and participated in the final exam of fall semester of 2019 academic calendar year were included in the study. Students who could not join the classes and did not participate in the final exam, were excluded from the study.

The study team collected the required data first by going through result sheets of exams and then using the electronic data records from Dentistry Department. Then the percentage of attendance has been calculated separately to find which group (Male or Female) is more among top ten students in each class. And also, we have calculated how many students (Male or Female) have percentage higher than 80 percent in each class. And 610 students (332 females, 278 male) were participated in this study. Two Sample t- test and MS Excel were used for statistical analysis of our Prospective Observational Study.

## Results and Discussion

From a total of 610 Dentistry Department of Kabul University of Medical Sciences students which is one the top public universities in Afghanistan, 278 were males and 332 females. Similar to our study, Mankumari Parajuli assisted the academic performance based on gender differences which engaged 240 public and private school students in 2016[1].

The total number of students in the first class was 174 (87 male and 87 female). Out of them 47 female and 30 male students got scores higher than 80% (Figure 1). Moreover, four males and six female students of the same class were among the top 10 students. The average score of female students was 77 out of 100, while the average score of male students was 67 out of 100 (Table 1). Independent sample T-test showed that the difference between the scores of female and male in first class was significant ($p < 0.0001$).

The total number of students in the second class was 154 (71 male and 83 female). Out of them 33 female and 14 male students got more than 80% (Figure 2). Moreover, two male and eight female students of the same class were among the top 10 students. The average score of female students was 75 out of 100, while the average score of male students was 66 out of 100 (Table 2). Independent sample T-test showed that the difference between the mean scores of female and male in the second class was significant ($p < 0.0001$).

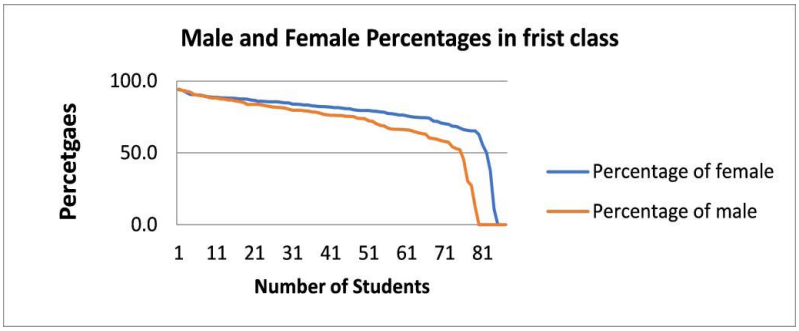


**Figure 1** – Difference between male and female percentages in the first class

**Table 1** – Statistical analysis of scores in the first class.

| Descriptive statistics | Female score | Male score |
|---|---|---|
| Mean | 77 | 67 |
| Median | 81.2 | 78 |
| Mode | 88.7 | 0 |
| Standard deviation | 16.9 | 25.7 |
| standard error | 1.8 | 2.7 |

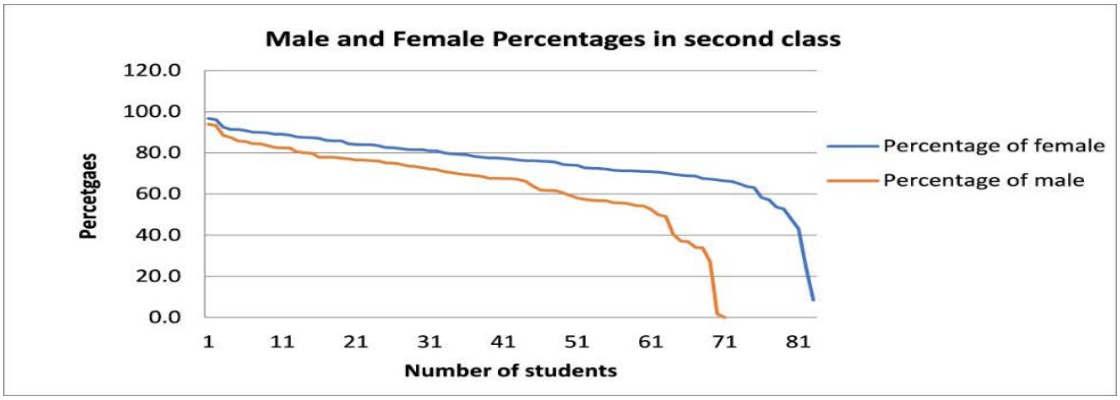


**Figure 2** – Difference between male and female percentages in the second class

**Table 2** – Statistical analysis of scores in the second class

| Descriptive statistics | Female score | Male score |
|---|---|---|
| Mean | 75 | 66 |
| Median | 77 | 69 |
| Normal | 91 | 77 |
| Standard deviation | 14 | 18 |
| Standard error | 1.5 | 2.1 |

The total number of students in the third class was 160 (69 male and 91 female). Out of them 57 female and 23 male students got scores higher than 80% (Figure 3). Moreover, two male and eight female students of the same class were among the top 10 students. The average score of female students was 79.2 out of 100, while the average score of male students was 74.4 out of 100 (Table 3). Independent sample T-test showed that the difference between the mean scores of female and male in the third class was significant ($p < 0.0001$).

The total number of students in the fourth class was 122 (51 male and 71 female). Out of them 42 female and 17 male students got scores higher than 80% (Figure 4). Moreover, three male and seven female students of the same class were among the top 10 students. The average score of female students was 80.5 out of 100, while the average score of male students was 72.8 out of 100 (Table 4). Independent sample T-test showed that the difference between the mean scores of female and male in the fourth class was significant ($p < 0.0001$).

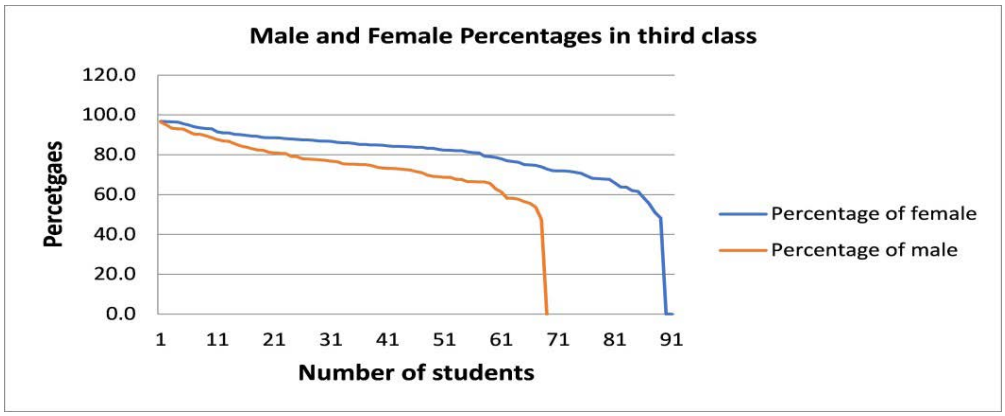


**Figure 3** – Difference between male and female percentages in the third class

**Table 3** – Statistical analysis of scores in the third class

| Descriptive statistics | Female score | Male score |
|---|---|---|
| **Mean** | 79.2 | 74.4 |
| **Median** | 83.8 | 75.3 |
| **Mode** | 91 | 75 |
| **Standard deviation** | 15.8 | 14.1 |
| **standard error** | 0.04 | 0.04 |

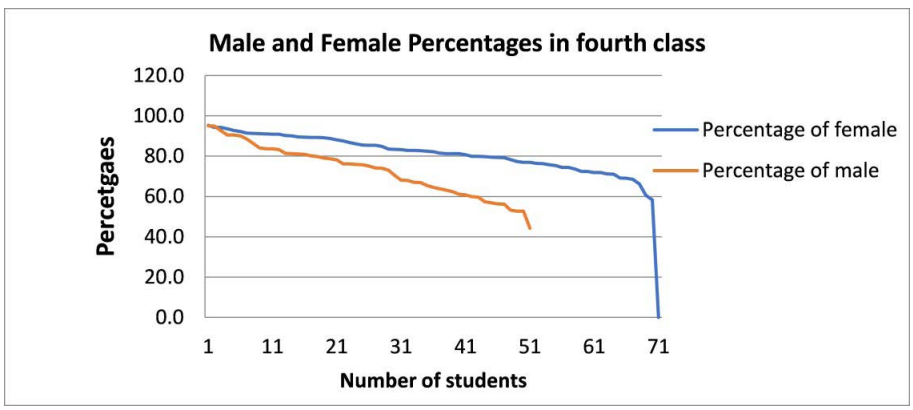


**Figure 4** – Difference between male and female percentages in the fourth class

**Table 4 –** Statistical analysis of scores in the fourth class

| Descriptive statistics | Female sco | Male score |
|---|---|---|
| Mean | 80.5 | 72.8 |
| Median | 82.2 | 75 |
| Mode | 90.9 | 90.4 |
| Standard deviation | 12.7 | 12.5 |
| standard error | 1.5 | 1.7 |

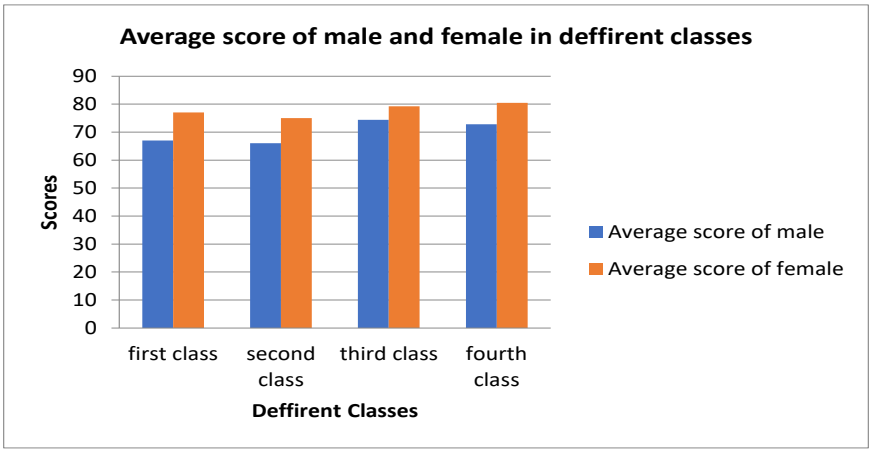


**Figure 5** – Difference between average score of male and female in different classes

This study showed that the average score of female students is higher than male students, and also the number of female students is higher in top 10 students than male students in each class (Figure 5). This research showed that the number of female students is higher in top ten than male students in each class of Dentistry Department. The number of female students, with percentage higher than 80%, exceeded the number of males in different classes of Dentistry Department which is similar to the study of Parajuli et. al., which concludes that female students seem to do better than their male counterparts in terms of academic performance such as results, homework, attendance and determination [1].Steven a. haist et. al., indicates that female students performed better than men on the clinically based performance examinations in medicine. There has been a research on the analysis of success in medical school regarding the effect of gender. Koenig et. al., reveal that men performed better than women in certain settings, while women performed better than men in other settings. Men have performed better than women on several standardized written examinations.[11]

Many studies have shown that women score higher in self-assessed empathic behavior and emotional intelligence. One reason for this could be that women often express more emotions and have shown higher skills for effective interpersonal relationships and communication[12]. However, some studies have suggested that this self-assessment could be falsified by socially prescribed role models. Brain, Chamorro-Premuzic and A.Arteche et.al., stated that hormone types are different between male and female such Testosterone, androgen and progesterone so the same intelligence of male and female is different[12]. It is difficult to say that both are equal, or one has higher or lower indicatorsthan the other. that the findings across countries show that males have performed better on Mathematics tests than females, but the male-female difference in math scores is related to gender inequality in social roles. Studies have shown that girls spend more time reading than boys and read more for fun. They also proposed that discrimination, lack of opportunity, women's responsibilities in motherhood, or emotional factors may have accounted for the fact that few women had careers in intellectual fields[12].

In contrast, Karel Kleisner, Chratatora and J.Fleger et.al., stated that Perceived Intelligence is associated with measuring intelligence in men but not women. They were able to estimate intelligence with an accuracy. Higher then chance from static facial photographs of men but not from photos of women. At the same time, they found no differences in the

abilities of men and women to assess intelligence from static facial photos [13] Fisher et al. could show that men rated lower in self-reported emotional intelligence but showed the same perception for emotions as women[13]. These statements are supported by studies which have shown that when empathy was assessed by patients and simulated patients, gender had no influence. Other authors suspect a difference between men and women not necessarily to be connected with global emotional intelligence but more with single facets of emotional intelligence [14]

However, in research of Uner Tan et al., on the relationship between serums total testosterone level and the fluid intelligence was studied in men and women. There were no significant differences between IQs (intelligence quotient) of men and women. There was an inverse curvilinear relationship between IQ and serums total testosterone level in women. The same was found also in men, but the declining part of the regression line at high T levels was not as pronounced as in women. It is concluded that serums total testosterone level may be related to IQ, even in subjects exhibiting no sex difference in IQ tests; too low or too high T levels may be disadvantageous for the fluid intelligence, especially in women[15].

Psychologist Lewis Terman in his 1916 study of children's IQs, concluded that "the intelligence of girls, at least up to 14 years, does not differ materially from the boys". He did, however, find "rather marked" differences on a minority of tests. For example, he found boys were "decidedly better" in arithmetical reasoning, while girls were "superior" at answering comprehension questions[16].

M. Khaleel stated that females have better educational skills than males, but males have better intelligence[17]. An alternative study found that learning different concepts differed between the sexes and related to brain structure and socio-cultural factors. Family is effective in education. It has also been found in this study that the male students have more achievements in mathematics and the females have more achievements in science[18] which is analogous to our study.

## Conclusion

Our finding showed that percentage of female students were better compared to male students in all grades. Also, female students appear more often in top ten than male students in each grade, and the number of female students who have gotten more than 80 percent were higher than male students in the first, second, third and fourth classes of dentistry department. So, we can conclude that female students are better in medical subjects and they are diligent in their lessons compared to male students.

## Limitations

The findings of this study are representative of students of the Dentistry Department of Kabul University of Medical Sciences. A larger sample size with widespread variable would provide a broader idea of the topic.

## Suggestion

The authors would like to suggest the following:

1. Further multicentre study with a larger sample size should be conducted in this particular topic to assess the possible personal property of mental power of both genders.
2. For the reason that female gender was better compared to male gender, the necessary attention should be paid to providing opportunity of standard educational system not only in religious studies but also in science and technology.

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