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Academic performance of male in comparison with female undergraduate medical students in Pharmacology examinations

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Abstract

Objective: To compare the academic performance of male and female medical students in Pharmacology examinations.

Methods: The comparative study was conducted at Rehman Medical College, Peshawar, Pakistan, from March to August 2015. For evaluating the students' academic performance, male and female students of academic sessions 2013-14 and 2014-15 were divided into 4 groups. Group 1: < 50% marks; Group 2: 50-69% marks; Group 3: 70-79% marks; and Group 4: ≥80% marks. SPSS 20 was used for data analysis.

Results: Of the 200 medical students enrolled, 102(51%) were male and 98(41%) were female. There was no significant difference in the academic performance in terms of gender in multiple choice questions (p=0.811) and short essay questions (p=0.515). The effect of attendance was also insignificant (p=0.130). Significant difference was found between the academic records of urban male and female students compared to rural students (p=0.038). Boarder students' results were insignificantly different from those of day scholars (p=0.887).

Conclusion: There was no significant difference between the academic performance of male and female students.

Keywords: Education. Academic performance, Pharmacology, Multiple choice question, Short essay questions.
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Introduction

Education is considered the first step for every human activity in this era of globalisation and technological revolution.[1] Awareness to get education among masses is on the rise. The number of schools, colleges and universities has sufficiently increased to house the increasing number of students. As there is a common perception that professional education helps in getting good jobs, therefore the trend to go for professional education has surprisingly increased. Because of better infrastructure facilities such as roads and modes of transportation the trend of getting education is increased even in higher secondary education institutions of rural areas.[2]

A host of factors affect the academic performance. These include individual and household characteristics such as motivation from the family and environment provided to student at home, student's ability and the quality of secondary education obtained. Along with other factors, gender of students may also be an important factor in determining student's academic performance. Gender issues are currently a matter of high concern worldwide, especially among academics and policy formulators.[3]

The proportions of female students in medical and other schools is increasing with time, but concerns remain about differing performance in examinations. In Saudi Arabia, between 1970 and 2007 the number of female students in tertiary education in the kingdom rose six-fold compared to male enrolments during the same period.[4] In the 21st century many large-scale studies were stimulated due to the increasing influence of feminist perspectives.[5]

The current study was planned to depict the picture of a specified region and is likely to add a developing country's perspective to such a multifaceted edifice which will somewhat resolve the conflict of better academic performance between male and female students and may also form the basis for paying much attention and doing more hard work with the weaker group in order to improve the academic performance. The study may be helpful for policy-makers to design and implement policies to improve students' performance of the weaker group.

Very limited data is available on the comparison of academic performance of male and female students from the developing countries. This study is a bit different from the previous ones as most of the students in this study belong to the Pakistani province of Khyber Pukhtunkhwa where due to security crisis in the past few years the female students have faced a lot of hurdles in getting education.

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Subjects and Methods

The comparative study was conducted at Rehman Medical College, Peshawar, Pakistan, from March to August 2015, and comprised third year medical students. The confidentiality of the students was maintained as their names were not disclosed. The sample was picked up using universal sampling technique. The course contents included general pharmacology, autonomic nervous system, cardiovascular system, central nervous system, gastrointestinal tract, blood, autacoids, respiratory system, endocrine system and chemotherapeutic agents. All the pharmacology examinations of third year MBBS were evaluated and compared on the basis of previous records of fortnightly, end-of-module, midterm and end-of-session examinations. The written theory paper consisted of two components: part-I Multiple Choice Questions (MCQs) single best answer type, and part-2; Short Essay Questions (SEQs). Structured key was provided to the examiners in order to eliminate the bias when the papers were evaluated.

For evaluating the students' academic performance, male and female students of academic sessions 2013-14 and 2014-15 were divided into 4 groups. Group 1: < 50% marks; Group 2: 50-69% marks; Group 3: 70-79% marks; and Group 4: ≥80% marks. Data was analysed using SPSS 20. Data for MCQs and SEQs marks was described by using mean, standard deviation, median, interquartile range (IQR), frequency and percentages. Three-way analysis of variance (ANOVA) was used to see for any interaction effect of demographic variables and attendance on exam performance. Main effects were compared by using Mann Whitney U test. Chi-square analysis was used to see any difference among marks categories for gender, locality, residential status and attendance. P≤ 0.05 was considered significantly different.

Results

Of the 200 medical students enrolled, 102(51%) were male and 98(41%) were female. The academic performance of male and female students in MCQs and SEQs was not significantly different (p=0.811; p=0.515) (Table-1). In MCQs 22(21.6%) male students scored <50% marks, 61(59.8%) were found in the range of 50-69%, 17(16.7%) got marks between 70-79% and only 2(2%) scored ≥80% marks. The distribution of male students according to the categories of marks in SEQs was as follows; 25(24.5%) in <50%, 44(43.1%) in 50-69%, 25(24.5%) in 70-79% and 8(7.8%) in ≥80%. Similarly, in MCQs 20(20.4%) female students scored <50% marks, 61(62.2%) were found in the range of 50-69%, 17(17.3%) got marks between 70-79% and none (0%) of the students scored ≥80% marks. The distribution of female students according to the categories of marks in SEQs was as follows; 32(32.7%) in <50%, 36(36.7%) in 50-69%, 20(20.4%) in 70-79% and 10(10.2%) in ≥80% (Table-2, Figure).

Table-1: Comparison of the Academic performance of male and female students in MCQs & SEQs examination.

		Male	Female	p-value
% MCQs	Median	59.0	58.0	0.811
	Q1	50.0	50.0	
	Q3	68.0	68.0	
% SEQs	Median	57.0	57.0	0.515
	Q1	50.0	40.0	
	Q3	72.0	75.0	
Overall total	Median	57.2	57.0	0.468
	Q1	48.2	44.3	
	Q3	71.8	70.9	

MCQs: Multiple Choice Questions
SEQs: Short Essay Questions.

Table-2: Distribution of student by their performance in MCQs & SEQs examinations by gender.

		Gender						
		Male		Female		Total		P-value
		N	%	N	%	N	%	
MCQs	<50%	22	21.6	20	20.4	42	21.0	0.569
	50 - 69%	61	59.8	61	62.2	122	61.0	
	70 - 79%	17	16.7	17	17.3	34	17.0	
	?80%	2	2.0	0	0.0	2	1.0	
	Total	102	100.0	98	100.0	200	100.0	
SEQs	< 50	25	24.5	32	32.7	57	28.5	0.501
	50 - 69%	44	43.1	36	36.7	80	40.0	
	70 -79%	25	24.5	20	20.4	45	22.5	
	?80%	8	7.8	10	10.2	18	9.0	
	Total	102	100.0	98	100.0	200	100.0	

MCQs: Multiple Choice Questions
SEQs: Short Essay Questions.

Table-3: Effect of attendance, locality and residential status on academic performance of male and female students.

	Attendance (%)			Locality (MCQs & SEQs)			Residential status (MCQs & SEQs)		
	Male	Female	P-value	Urban (Male & Female)	Rural (Male & Female)	P-value (Male & Female)	Boarder (Male & Female)	Day scholar	P-value
Median	84.0	85.0	0.130	56.4	64.3	0.038*	56.4	57.4	0.887
Q1	77.0	79.0		44.6	51.8		47.1	45.9	
Q3	92.0	93.0		70.9	73.8		70.9	71.8	

MCQs: Multiple Choice Questions
SEQs: Short Essay Questions.

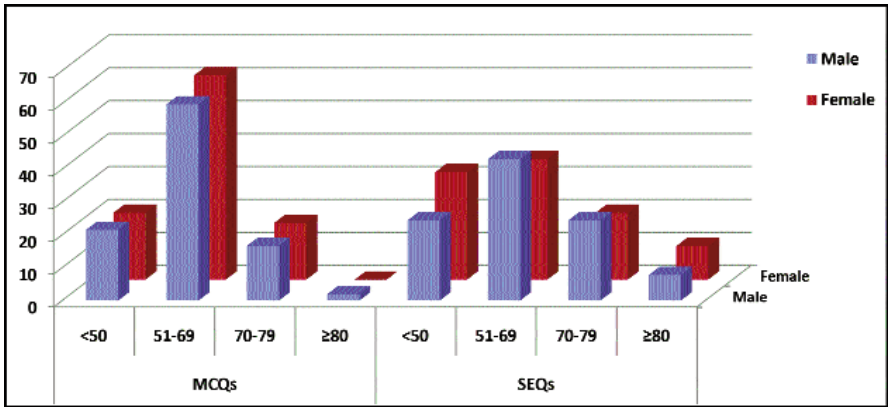

Figure: Comparison of the academic performance of male and female students in Multiple Choice Questions (MCQs) and Short Essay Questions (SEQs) exams.

The effect of attendance on the academic performance of the male and female students was also found to be insignificant (p=0.130). When the academic performance of the male and female students was further evaluated on the basis of their locality, rural male and female students performed better than urban male and female students (p=0.038). When the male and female boarder students were compared with the male and female day scholars, the results were insignificant (p=0.887) (Table-3).

Discussion

Education is certainly the supreme instrument and is devised by man for his own progress. Therefore all societies get education in one form or the other but the use in which it is put varies. Over the years, the investigations of the factors that influence academic performance of students have attracted the interest and concern of teachers, researchers and school administrators. Gender is found to be one of the important factors affecting the academic performance and over the last few decades the number of females getting admission in professional schools has risen progressively especially in developing countries.[6]

Prior researches on the differences in classroom performance between male and female students showed mixed results. While no differences existed in some studies, others showed significant differences.[7] Results of some studies showed female gender to be better academically while the other suggests the male gender.[6] Moreover, such studies were done in developed countries. This study aimed at contributing to this gender discourse by using a developing country (Pakistan) setting. As has been asserted: 'Researching gender performance is like building a wall. No single study provides the whole wall - just one of the bricks.'[8]

We compared the academic performance of male and female students in MCQs and SEQs examination. Total 200 MBBS students of the session 2013-14 and 2014-15 were enrolled of whom 102 were male and 98 were female. No significant difference was found when the academic performance of the male and female students in MCQs and SEQs was compared. The effect of attendance on the academic performance of the male and female students was also found to be insignificant. When the male and female students were further evaluated on the basis of their locality (urban and rural), rural male and female students performed better than their urban counterparts. Similarly, when the male and female boarder students were compared with the male and female day scholar students, the results were once again insignificant.

One study showed that in overall test assessment female medical students outperformed male students. Although this study suggested an evidence of male dominance in enrolment proportion, but female students were dominant in performance.[9] Similar facts of female students outperforming male students were also found in the field of agricultural science.[10]

The grade point averages (GPAs) of the University of Jordan undergraduate students from 2002 to 2007 were studied to determine gender differences in academic performance. The data was analysed to reveal the role of gender on the students' academic achievement. The results of the study showed that female undergraduate students were found to outperform male undergraduates in their GPAs.[11] A study in Jordan compared the academic performance of male and female students and found that the academic performance of females was much better than males.[12] Another study was conducted to evaluate the performance of male and female students academically with 300 male and 300 female students. Girls were found better than their male counterparts.[1] Saudi female students demonstrated superior academic performance to male students in pre-clinical courses at medical schools.[4]

Conger and Long reported that in 11 public institutions having 4-year programme in Florida, males obtained 0.43 less credits than females in the first semester and got even lesser in subsequent semesters. By the end of the sixth semester, males had a cumulative disadvantage of 6.6 credits. Moreover, in each year of college, females got better grades than males.[13]

Contrary to the above-mentioned studies, a study was conducted in Nigeria where the male students were with higher academic performance than their female counterparts.[14] The findings of another study in Nigeria also showed better performance of male students.[15] A study found that male students performed better than their female counterparts academically.[16] Another study found the same results of male dominancy over their female counterparts regarding the academic performance.[17]

Another study in Ireland favoured male students.[18] A similar study in Ethopia found significant gender difference in academic performance, favouring the males.[19] Similar evidence of male students outperforming female students was found in a study in Nigeria.[20]

On the other hand, no gender-based statistically significant difference was found in a study that compared the academic performance of 40 male and 38 female students at college level.[21] Another study in the West Indies for the comparison of academic performance between male and female students found the gender difference to be insignificant.[22] Similarly, studies in Kenya and Nigeria[23,24] also observed no significant difference by comparing the academic records of male and female students. And so did some other studies.[25,26]

Conclusion

There was no significant difference between the academic performance of male and female students. The intellectual capabilities of females were the same as the males.

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