Predictors of Student Performance in Foundation Year of Medical School

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ASTRACT

Medical school worldwide adopt different admission criteria. While the high school grades and English proficiency levels are the common criteria for selection, some medical schools use entrance tests or interviews along with other methods to screen the student population. Keeping in mind the diversity in the educational background of students, these admission criteria need to be evaluated and updated on a regular basis. Admission is granted to the College of Medicine, Ajman University on the basis of English proficiency, SAT scores, high school grades and student performance in an interview. Our study aims to determine any correlation(s) between gender, nationality, English proficiency, SAT scores, high school grades, curriculum type, and students' scores at the end of the foundation year. Medical terminology course is included in the medical curriculum in a bid to improve the comprehension of students and is likely to have an impact on their performance. We also aim to look at the correlation between the student scores in medical terminology and other subjects in the foundation year of medicine.

A cross-sectional study design was used. Test scores of 50 students were analyzed at the end of the foundation year. It was found that student gender, nationality and high school grades have no significant correlation with any of the foundation year subjects. However, the type of curriculum followed in high school is found to have significant correlation with the scores in human biology. Medical terminology scores also show significant correlation with the rest of the scores in the semester. Our results also show significant correlations between proficiency in English language and performance in the first semester of foundation year. An important issue is the fact that in the local curriculum all science subjects are delivered in Arabic language These results strongly suggest addressing the issue of English proficiency in countries where English is not the native language.

Key words: High School, English Proficiency, Students Performance, SAT Scores

INTRODUCTION

Obtaining a medical degree could be a very challenging not only in terms of the efforts and money involved but also getting admission to the program to start with. Proper selection of students during admissions aids in ensuring better student compliance and performance. Selection of ideal candidates from a sizable pool of applicants is by itself an overwhelming task that needs incredible exertion.

The admission criteria employed in medical schools vary worldwide adopt keeping in mind the diversity in the educational background of students and the expected outcomes. The curriculum followed by the students in their high school and their high school grades could predict students' future performance.[1,2] Admission interviews are employed to assess the non-cognitive areas that could affect student performance. [3] English being the medium of instruction in medical school, it is evident that English proficiency has an important role to play in the academic standing of the student. This becomes an important criterion to screen the student applications especially in the Middle East where a great proportion of applicants are from Arabic medium schools. Admission requirements to the College of Medicine, Ajman University include English proficiency (IELTS), SAT scores, high school GPA and student performance in an interview.

The MBBS curriculum at Ajman University extends over 6 years with the first year being the foundation year. In the foundation year, the subjects offered to the students in the first semester are biochemistry I, human biology I, medical physics and their associated lab sessions. The second semester includes biochemistry II, human biology II, their corresponding labs as well as a medical terminology course. Medical terminology is included in the medical curriculum in a bid to improve the comprehension of students and is likely to have an impact on their performance.

Our study aims to determine any correlation(s) between, English proficiency, gender, nationality SAT scores, GPA of secondary school, curriculum type, and students' scores at the end of the foundation year. We also aim to look at the correlation between the student scores in medical terminology and other subjects in the foundation year of medicine.

MATERIALS AND METHODS

Subjects

All the 49 students enrolled in the foundation year of the MBBS program of the Ajman University, college of Medicine for the academic year 2018-19 were included in this cross-sectional study.

Data collection and analysis

Demographic details of the students like gender and nationality, educational background including high school curriculum type, high school GPA, SAT scores and scores in English proficiency tests were gathered from their admission database. The scores of the students in Biochemistry I & II (BIC011, BIC021) Biochemistry 1 & II lab(BIL011, BIL021), Human Biology 1 & II (HBG012, HBG022), Human Biology Lab1 & II (HBL012, HBL022), Medical physics (MPY023), Medical physics lab (MPL023) and Medical terminology (MLT023) subjects of the foundation year were collected from the assessment database.

Data was analyzed using SPSS version 19. For data analysis t-test was used to assess gender differences in student achievement. The relation between the other admission (independent) variables and the student performance (the dependent variable) was analyzed by Pearson correlation coefficient. The degree of statistical significance was set at a p-value of 0.05

RESULTS

Table1 shows the comparison between the performance of male and female students in the foundation year courses. No significant difference was noted in the performance of males and females across all the courses in the year and also in their CGPA. There was no significant correlation between the high school grades and students' academic performance in foundation year (Table 2). Same was the case with the high school curriculum type and SAT scores. It was found that there is a significant correlation between the level of English proficiency and the student performance across the courses in foundation year (Table3).

A significantly positive correlation was seen between the scores of the students in the medical terminology course and their scores in all the other courses of the second semester (Table 4)

Table 1: Comparison between the performance of male and female students

	Gender	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
BIC011	F	30	82.50	8.87	-0.037	45	0.97
	M	17	82.59	5.96			
BIL011	F	31	88.71	6.72	0.495	47	0.62
	M	18	87.83	4.36			
HBG012	F	30	81.50	9.15	1.206	46	0.23
	M	18	78.18	9.38			
HBL012	F	30	83.96	8.58	0.189	45	0.85
	M	17	83.49	7.38			
MPY013	F	31	80.32	11.09	-0.341	47	0.73
	M	18	81.33	7.77			
MPL013	F	31	85.13	6.77	0.133	47	0.89
	M	18	84.89	4.60			
HBL022	F	31	86.75	9.79	1.547	47	0.129
	M	18	81.89	11.88			
HBG022	F	31	81.86	12.73	-0.177	46	0.860
	M	17	82.47	8.32			
MLT023	F	31	89.44	7.76	0.572	47	0.570
	M	18	88.14	7.54			
BIC021	F	31	81.61	10.22	0.936	47	0.354
	M	18	78.94	8.46			
BILO21	F	31	93.19	6.91	-0.163	47	0.872
	M	18	93.47	2.87			
CGPA	F	31	3.10	0.86	0.061	47	0.952
	M	18	3.08	0.55			

Table 2: Correlations between high school grades and academic achievement of students.

		BIC011	BIL011	HBG012	HBL012	MPY013	MPL013	HBL022	HBG022	MLT023	BIC021	BILO21
HIGH SCHOOL GRADES	Pearson Correlation	0.068	0.110	0.093	0.111	0.164	0.168	0.131	0.233	0.024	0.220	0.107
	Sig. (2-tailed)	0.651	0.451	0.529	0.459	0.260	0.248	0.371	0.110	0.870	0.129	0.466

**. Correlation is significant at the 0.01 level (2-tailed).					
*. Correlation is significant at the 0.05 level (2-tailed).					

Table 3: Correlations between English proficiency (IELTS) and the achievement of medical students in their foundation year courses, Semester1

		BIC011	BIL011	HBG012	HBL012	MPY013	MPL013	HBL022	HBG022	MLT023	BIC021	BILO21
IELTS (N=49)	Pearson Correlation	.352*	.295*	.411**	.455**	.321*	.327*	.331*	.322*	.509**	0.251	.347*
	Sig. (2-tailed)	0.015	0.039	0.004	0.001	0.024	0.022	0.020	0.026	0.000	0.082	0.015
**. Correlation is significant at the 0.01 level (2-tailed).												
*. Correlation is significant at the 0.05 level (2-tailed).												

Table 4: The correlation between achievement of medical students in medical terminology course and the achievement in their second semester foundation year courses

		HBL022	HBG022	BIC021	BILO21
MLT023 (N=49)	Pearson Correlation	.763**	.787**	.729**	.669**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000
**. Correlation is significant at the 0.01 level (2-tailed).					

DISCUSSION

The results show that gender and high school grades have no significant correlation with any of the foundation year subjects. This is in contract with other studies which showed that the academic performance of female medical students was better than male students both in preclinical and clinical years [4-6]

Majority of the studies looking at the predictive validity of pre-admission criteria and medical student performance claim that cumulative high school average is usually statistically predictive of performance in medical school.[7,8] Our findings are in accordance with Al-Rukban et al and Dabaliz et al who reported that cumulative high school average was not predictive of cGPA at either pre-clinical or clinical years.[9,10]

The type of curriculum followed in high school was found to have significant correlation with the scores in human biology course of the foundation year. This could be explained by the varying extent of biology addressed in different high school curricula. Seyfang A et al found the performance in the first course of medical school curriculum was improved in students with pre-medical education in molecular biology or biochemistry.[11]

We also found that scores in Medical terminology course administered in the second semester shows significant correlation with the rest of the scores of all courses given in the semesters. Understanding the "jargons" of medicine is usually difficult. A course in medical terminology makes it easier for students to comprehend the difficult terms used across various subjects in medicine and improve their academic performance in the same.

There is significant correlation between proficiency in English language and performance in the first semester of foundation year. This finding is supported by other studies which demonstrated English language proficiency as an indicator of academic performance at tertiary intuitions.[12] In the present scenario it is perhaps as a reflection of the fact that the local curriculum delivers all science subjects in the Arabic language, though the importance of the medium of instruction and the correlation with academic performance in medicine is not limited to the Arab world and has been discussed in the context of other regions too.[13] Our results show proficiency in English language is the most important predictor to success because of the comprehension domain. The assessment tools in the college of medicine include basic question in human biology requiring legit written answers as well as best answer MCQs. Students with higher proficiency in the language have more chances of high scores in these exams.

Observations of how students solve their weakness in English proficiency show interesting facts. When students first join foundation year lectures, they write Arabic translation of ordinary as well as scientific English words in pencil on the power point slides of the lectures. These translations get rarer as time elapses and, as difficult words become familiar in consequent lectures. Weaker students tend to sit at the back of the class next to classmate friends who would whisper the meanings of the lecture delivered by the instructor. These students are not necessary all weak students and their potentials shows slowly overtime. They are shy to ask or share their views with their classmates, or if selected to speak or give answer they frequently rely on others to help them. Female students are shyer to ask questions during the lecture but

frequently have more queries after the lecture. Male students more frequently demand the Arabic equivalence of a medical term during the lecture but soon demur when refused by the lecturer. Several of the above shortcomings overcome by the beginning of the second semester when medical terminology course commences.

Teaching medical English in the second semester concurrently with basic science subjects improved students' comprehension in all subjects. This may surpass efforts of some universities, which offer two English courses, sometimes three; to improve English proficiency of medical students.

Our study shows a direct relationship between IELTs scores and GPA scores in the foundation year. However, this relationship is less obvious in the following semesters, as hardworking students excel in their studies. Admission policies should recognize the potential of such candidates. Admission of students based on high secondary school results alone may be misleading, and leads to missed opportunity to select students with meliorate qualities making them good future doctors. Student preparedness for hardworking is a better predictor of future performance in the medical career. Students who can work under pressure and show persistence overtime are more likely to succeed than their counterparts are. Differences in gender, nationality or SAT scores do not show any relevance to GPA outcome in the foundation year. This reveals that admission criteria should concentrate on the quality of the students and their ability to problem solving, ability to working hard and under stress and on leadership qualities.

Our results show proficiency in English language is the most important predictor to success because of the comprehension domain. The assessment tools in the college of medicine include basic question in human biology requiring legit written answers as well as best answer MCQs. Students with higher proficiency in the language have more chances of high scores in these exams. Teaching medical terminology course is more effective if it is structured and integrated into the subjects throughout the semester. Introduction of vocabulary, grammar and scientific writing to consolidate the English learning process. Summative assessments to test higher level of integration between English vocabulary, English grammar and the knowledge domain of learning outcome of core subjects should help raising the standards. Poor proficiency in the English language hinders information-handling, communication and presentation skills; elements required for success in the medical program. Appropriate curriculum models should contextualize integrating these skills within the discipline courses preparing the graduates to lifelong learners. Even within high achieving students some report lack of confidence in writing practical reports, answering short essay questions and communicating with the teachers; all related to lack of proficiency in the English language. It is difficult for the teachers to interpret silence and lack of questions during the lectures as shyness, part of the culture or lack of understanding of the subject. However most if not all of these behaviors gradually fade away as confidence build up. The difficulty in the issues raised in this study is not unique to this college of medicine but global to this region, as English language become the undisputed logistic currency for medical education

Admission to medical schools is a very competitive and requiring meeting the admission requirements for that particular medical school. Apart from high academic achievements, the school may arrange for an admission exam, an interview, or multiple mini interviews, which shall decide their admission. Mini multiple interviews (MMI) for admission to medicine panels designed to test different skills of the candidates. They test leadership qualities, ability for teamwork, problem-solving skills and you may extend to test empathy and ethics.[14] This is very useful but how much weight they carry out of the whole admission is controversial. Recommendation letters from the school are sometimes useful if the school use them as part of the academic routine of evaluation, otherwise their value is very limited.

Medical school candidates already know the long years of study and they are expected to at least pass all the subjects and be prepared to work long hours mostly in groups to achieve a common result. This coerces the colleges to take the best academic achievers with superfluous potentials to start the journey. All examinations in the medical college are high stake exams and the students should score at least the minimum to proceed to the next phase, delay means loner periods in the medical schools, which may include more fees to be paid. All this calls for the periodic scrutiny and restructuring of the admission criteria employed to ascertain that the invested effort and money when made, would have a worthy outcome; i.e. production of safe competent doctors

LIMITATIONS
The sample size for our study is limited by the fact that we are a relatively new school with only two batches of students so far. But as more students join us, we would be able to explore the predictability of pre-admission variables on student performance in the advanced years of their course.

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