ASSOCIATION OF DEMOGRAPHIC CHARACTERISTICS AND STUDY HABITS TO MEDICAL STUDENTS' ACADEMIC PERFORMANCE; A CASE CONTROL STUDY

Faiza Kiran, Memoona Mansoor*, Shazia Irum**

Army Medical College/National University of Medical Sciences (NUMS) Rawalpindi Pakistan, *Islamabad Medical and Dental College Islamabad Paksitan, **Shifa College of Medicine Islamabad Pakistan

ABSTRACT

Objective: Identify the association of demographic risk factors and study habits to academic performance of medical students.

Study Design: Non interventional case control study.

Place and Duration of Study: Shifa college of Medicine, from year 2015 to 2017.

Material and Methods: A structured questionnaire was developed after thorough literature search and focus group discussion with few students who were low achievers. Students, who obtained less than 50% marks in professional examination, were labelled as cases whereas all those who passed, gave consent and filled the questionnaire were labelled as controls. Ratio of cases to controls obtained was 1:2. Data was analyzed using IBM SPSS statistics version 23. Chi square test was applied to obtain value of significance (p-value ≤0.05) and Odds ratio was calculated to observe relative risk of underperformance.

Results: It is evident that 21-23 year age group (0.05), male gender (0.002, RR is 2.44), second year (0.00) is associated with highest risk of failing whereas premedical mode of exam (0.06), boarding (RR 1.6) and nationality (RR 0.4) were found to have lower risk of affecting students' performance. Studying daily (0.003) for more than 2 hours (0.08) and making own notes (0.015) is associated with good academic performance while last hour attempt at exam (0.001) and selective study (0.021) are associated with poor performance. Most of the failed students (0.05) do reflect on changing their study schedule and style.

Conclusion: Our study concludes that certain demographic characteristics and study habits of medical students have strong association with their academic performance. Few factors can be dealt with, by medical college administration and faculty, by adjusting admission criteria (e.g. age and preadmission calibre) and making positive changes in curriculum (e.g. modifying modules of second year). However, to change the course of their losing, students need to study regularly, in depth and that too, for increased number of hours. They should avoid superficial, last hour, half hearted attempts at exams and strive to get good grades by meaningful and deep learning.

Keywords: Academic performance, Case control study, Demographic characteristics, Medical students, Study habits.

INTRODUCTION

Students' academic achievements play a significant role in producing physicians who can be great leaders, meet the challenges of 21st century, and contribute towards society in areas of health and fitness. Therefore, faculty members, medical school selection committees, curriculum planners as well as instructional designers always show concern over medical students' performance[1].

Undergraduate medical education is famous for being extensive and ardently taxing[2]. In a third world country such as Pakistan, despite the availability of hardworking teachers, academic performance of medical students is deteriorating. As a result, physicians produced are not putting up with societal demands, efficiently, in daily practice[3].

Across the globe, many factors affecting students' achievement are identified such as personal characteristics, lifestyle, learning environ-

Correspondence: Dr Faiza Kiran, Medical Education Dept, Army Medical College Rawalpindi Pakistan
Email: drfaizakiran@gmail.com
Received: 01 Jun 2019; revised received: 14 Jun 2019; accepted: 17 Jun 2019

ments, study skills, study habits, study attitudes, motivation and instruction activities[4-6].

Some researches attribute underperformance to stress[7], others to sociodemographic factors[6] but there is little evidence regarding risk factors associated with academic failure of medical students in our region, particularly Pakistan.

Our study was designed to find the association of demographic risk factors and study habits of students to their academic performance in a medical college.

Demographic characteristics include age, sex, residence/living condition, religion, marital status, educational level/class etc. Study habits mean theme setting of subjects to be learned or investigated and the tendency of pupils to study when the opportunity is provided to them[8].

Efficient study methods play a cumbersome role in the development of cognitive and practical skills. Strengthening and modifying study habits do enhance academic performance of students and by time management and self-regulation, they plan out their future career.

The principle research question addressed in this study was: Is there any association of demographic characteristics and study habits of medical students to their academic performance?

The objectives of our study were to identify the specified risk factors associated with academic performance of medical students.

MATERIAL AND METHODS

After obtaining ethical approval from ethical committee and Institutional Review Board-IRB, a non-interventional, case control study was conducted in a private medical college of Pakistan.

Few students who failed were selected from second year for focus group discussion, as the frequency of failing was high in this class. They were asked open-ended questions like "what do you think are the reasons of your failing?" Students' identity was kept anonymous which gave them confidence to reflect and analyze the reasons of their failure. After thorough literature search, a questionnaire was developed which was pilot tested on the same students. Based on their feedback, the questionnaire was modified. The final questionnaire consisted of total 22 questions with many demographic, cognitive and non-cognitive variables, requiring answers in Yes or No format, representing factors associated with students' failure in exams. The data were collected from year 2015 to 2017. Questionnaire was distributed to all students, studying currently, in each year of medical college. No student was forced to fill the questionnaire. Students, who obtained less than 50% marks in professional examination, were labelled as cases whereas all those who passed, gave consent and filled the questionnaire were labelled as controls. Those who were reluctant and did not gave consent were excluded and questionnaires filled inappropriately were discarded, whereas all those who never failed were labelled as controls. Ratio of cases to controls obtained was 1:2.

Data was analyzed using IBM SPSS statistics version 23. As the responses of students represent dichotomous variables, Chi square test was applied to obtain value of significance (p-value ≤ 0.05). Hence association of few factors to academic failure was obtained. Odds ratio was calculated to observe relative risk of underperformance in struggling students. In this article, only those variables concerning demographic profile of students, boarding status, premedical mode of exam and study habits are mentioned.

RESULTS

Out of 225 students who took part in this study, 75 were cases and 150 were controls. Data showed that second year of medical college has highest frequency of failing (41%) followed by first year (25%). This frequency abruptly declined in third (5%) and fourth year (8%) when students progress towards their clinical years. A second smaller peak is observed in final year (20%).

Table-I shows that there is strong association of age (p-value 0.05), gender (0.002) and year (0.00) in which student is studying in a medical college, to students' academic failure. It is evident that 21-23 years age group, male gender (RR is

2.44) and second year of medical college is at higher risk of failing. Premedical mode of exam has *p*-value of 0.06 where most of the students (cases-61%, controls-68%) were IGCSE certified, (only 21% controls and 33% cases) have done HSSC and few (5%) were high school graduates.

Being a foreign national (RR 0.4) and living away from home (RR 1.6) were found to have lower risk of affecting students' performance.

Table-II shows there is a vivid contrast in study habits of medical students who perform poor than those who pass. It is evident that poor performers donot study regularly rather they have habit of studying just few days before exams. They study few selected topics while good scorers prefer in depth study and make their own notes. Their daily study hours are less than 1 while controls usually study daily for 2-4 hours. Though the encouraging part is that after failing, most of them do consider about changing their study schedule and style which implies that they have no misgivings about their situation. Though college does offer remedial classes for students whose internal assessment grades are low, but only few attend these.

Table-I: Association of demographic variables to academic failure of medical students.

Variables	*p*-value	Cases	Controls	Odds Ratio	95% Confidence Interval	
					Lower	Upper
Year of study	0.00					
Second year		43%	41%			
Gender	0.002			2.44	1.37	4.33
Male		64%	42%			
Female		37%	58%			
Age in years	0.05					
18-20		17%	31.5%			
21-23		69%	60%			
24-26		9%	7%			
Living in hostel	0.122	35%	25%	1.606	0.878	2.937
Foreign student	0.130	7%1	13%	0.461	0.166	1.281
Preadmission mode of exam	0.069					
HSSC		33%	21%			
O/A levels		61%	68%			
Any other		5%	11.5%			

DISCUSSION

Our study highlighted that demographic characteristics more prone to underperformance in undergraduate medical education are male gender and age group of 21-23 years. Most of the under performers (cases) were IGCSE certified as compared to HSSC. We also observed that most of the undergraduate medical students faced failure in preclinical years and there was a significant difference in study habits of cases and controls (daily hours of study, time of preparation for the exam and study strategy).

Our study showed strong association of male gender with the students' underperformance. These findings are consistent with several other studies performed in varied parts of the world. Woolf *et al*, while exploring the underperforming year three students of three medical schools in UK, observed that male students fall behind their female counterparts in both written and OSCE[9]. They attributed this observation to relative deficiency in clinical knowledge of male students as well as to the learning styles and annulled the possibility of examiner bias. Roudbari *et al* while determining factors affecting students' academic

progress in Tehran University of Medical Sciences, concluded that females had fewer failures and are more successful in academics than male students[10]. Salem *et al* investigated the reasons of under-performance and confirmed that female medical students outperformed male peers by securing significantly higher CGPA. They reasoned that it was because of better English language skills of females as compared to male students[6].

In our institute, students were enrolled mainly from two different pre-medical backgrounds, the IGCSE and HSSC. It was observed that most of the underperforming students were IGCSE certified as compared to HSSC. However, this finding can be due to higher proportion (almost 90%) of IGCSE than those of HSSC in our study sample. Hassan *et al* compared the scores and study habits of the medical students from these two backgrounds and concluded that pre-medical educational background has no significant effect on students' academic performance[11].

Table-II: Association of study habits to academic failure of medical students.

Variables	*p*-value	Cases	Controls	Odds Ratio	95% Confidence Interval	
					Lower	Upper
I study few days before the exams mostly	0.001	72%	49%	2.712	1.493	4.928
I study regularly	0.003	19%	38%	0.374	0.192	0.730
I learn by making concept maps	0.525	19%	15%	1.267	0.610	2.633
I learn by making flow sheet diagrams	0.148	20%	12%	1.724	0.820	3.623
I learn by some senior students teaching	0.253	7%	3%	2.071	0.581	7.391
I learn by making my own notes	0.015	27%	43%	0.476	0.260	0.871
I learn by making study groups with friends	0.300	25%	19%	1.416	0.732	2.738
I learn by studying few selective topics which I considers important	0.021	24%	12%	2.316	1.123	4.774
Daily study hours	0.081					
0-1		56%	38%			
2-4		35%	53%			
5-6		5%	7%			
7-8		3%	1%			
>9		1%	0.7%			
Ever thought of changing study strategy	0.05	68%	54%	1.767	0.984	3.17
Ever taken remedial classes	0.131	24%	26%			

We observed that the students of age group 21-23 years had a higher rate of failure as compared to students below 20 years of age. Salem *et al* in their cross-sectional study had a comparable finding that older male students faced problems in academics as compared to younger male students[6].

Our study showed that the failure rate is more among early (pre-clinical) years as compared to clinical years. This observation can be due to an increased level of stress during early years of medical education as identified by

Abdulghani in a cross-sectional study in Saudi Arabia[12]. Yates and James while researching risk factors for poor performance in undergraduate medical students also precluded that poor performers are particularly at increased risk of stumbling during the pre-clinical years[13].

Interestingly the study habits of under-performing students are clearly distinct from those of controls. Underperforming students tend to study just before exams, in contrast to good performers who study regularly. Also preparing few selected topics and avoiding study groups shows the compromise underperformers make, in terms of study strategy. Our interpretations match the observations made by Mclaughlin in his reflective essay. He identified under-performers adopt ineffective study strategies, have poor time management and prefer to study alone rather than with peers in their study groups[14]. Salem *et al* too had mentioned that learning in peer groups significantly affects CGPA[6]. Studying just prior to exams is an unpleasant habit usually practiced by struggling students. Shah and Mumtaz, in a recent cross-sectional study at a private medical college in Pakistan, established an interesting fact that procrastination in medical students is usually associated with narcissistic personalities, traits of rebelliousness and overconfidence in students. He also observed that despite the tremendous workload of medical studies which does not leave much room for loitering, most students despite being aware of the consequences, still linger on and delay assignments given[15]. Khurshid *et al* in a study at university of Islamabad observed a positive correlation between study habits and academic achievements. In congruence to our findings, female studentswere high achievers and have effective study habits than their male counterparts. Their study showed that day scholars have better study habits[16], whereas we cannot preclude any such finding. Looyeh *et al*, gave intriguing explanation to findings similar to our study. According to them, students who make their own notes can remember educational materials longer. In addition, they write down key points, which lead to better understanding. On the other hand, students who do not take notes will copy their classmates' notes, in order to preparefor exams, which will result in poor academic performance[17,18].

Generally, results of our study showed that study habits have strong correlation with academic performance and achievement. As the academic performance will determine the future career of graduates, a careful and intensive series of monitoring students' performance and their further training to learn efficient study skills like mind mapping, flow charts, making own concept maps/summaries/notes, is required. In addition, time management and self-regulation skills are vital to learn to become lifelong learners.

CONCLUSION

Our study concludes that certain demographic characteristics and study habits of medical students have strong association with their academic performance. Few factors can be dealt with, by medical college administration and faculty, by adjusting admission criteria (e.g. age and preadmission calibre) and making positive changes in curriculum (e.g. modifying modules of second year). However, to change the course of their losing, students need to study regularly, in depth and that too, for increased number of hours. They should avoid superficial, last hour, half hearted attempts at exams and strive to get good grades by meaningful and deep learning.

LIMITATION OF STUDY

This study was done in one institute so the results cannot be generalized. As cases to control ratio is 1:2, other factors may show strong correlation, if sample size is increased.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

REFERENCES

1. Abulaban AA, Abulaban AA, Merdad A, Baghlaf S, Algethami A, Abu-shanab J, et al. Factors potentially influencing academic performance among medical students. Adv Med Educ Pract 2015; 6: 65-75.
2. Al Shawwa L, Abulaban AA, Abulaban AA, Merdad A, Baghlaf S, Algethami A, et al. Factors potentially influencing academic performance among medical students. Adv Med Educ Pract 2015; 6: 65.

3. Mandal A, Ghosh A, Sengupta G, Bera T, Das N, Mukherjee S. Factors affecting the performance of undergraduate medical students: A perspective. Indian J Community Med 2012; 37(2): 126-29.
4. Todres M, Tsimtsiou Z, Sidhu K, Stephenson A, Jones R. Medical students' perceptions of the factors influencing their academic performance: An exploratory interview study with high-achieving and re-sitting medical students. Medical Teacher 2012; 34(5): e325-31.
5. Şahin E, Çekin R, Yazıcılar Özçelik İ. Predictors of academic achievement among physical education and sports under-graduate students. Sports 2018; 6(1): 8.
6. Salem RO, Al-Mously N, Nabil NM, Al-Zalabani AH, Al-Dhawi AF, Al-Hamdan N. Academic and socio-demographic factors influencing students' performance in a new Saudi medical school. Medical teacher 2013; 35(suppl-1): S83-89.
7. Shah M, Hassan S, Malik S, Sreeramareddy CT. Perceived Stress, Sources and Severity of Stress among medical undergraduates in a Pakistani Medical School. BMC Medical Education 2010; 10: 2.
8. Bajwa N, Gujjar A, Shaheen G. A comparative study of the study habits of the students from formal and non-formal systems of education in Pakistan. Intl J Business Social Sci 2011; 2: 175-86.
9. Woolf K, Haq I, McManus IC, Higham J, Dacre J. Exploring the underperformance of male and minority ethnic medical students in first year clinical examinations. Adv Health Sci Edu 2008; 13(5): 607-16.
10. Roudbari M, Ahmadi A. The effective factors on the academic progress of the students of Tehran University of Medical Science. JPMA 2014; 64(1): 42-45.
11. Hassan U, Sadaf S, Aly SM, Baig LA. Study Habits. Professional Med J 2018; 25(03): 466-72.
12. Abdulghani HM, Alrowais NA, Bin-Saad NS, Al-Subaie NM, Haji AM, Alhaqwi AI. Sleep disorder among medical students: Relationship to their academic performance. Med Teach 2012; 34(suppl-1): S37-S41.
13. Yates J, James D. Risk factors for poor performance on the undergraduate medical course: Cohort study at Nottingham University. Med Edu 2007; 41(1): 65-73.
14. Mcloughlin CS. Characteristics of Students Failing Medical Education: An Essay of Reflections. Med Educ 2009; 14.
15. Shah S. Alarming trend of procrastination and narcissism among medical undergraduates. Biomedica 2017; 33(4): 1-5.
16. Khurshid F, Tanveer A, Qasmi FN. Relationship between study habits and academic achievement among hostel living and day scholars' university students. Brit J Humanities Socl Sci 2012; 3(2): 34-42.
17. Looyeh HR, Fazelpour S, Fateme S, Masoule SR, Nejad K. The Relationship between the Study habits and the Academic performance of Medical Sciences Students. J Holistic Nursing Midwifery 2017; 27(2): 65-73.
18. Khurshid F, Tanveer A, Qasmi F. Relationship between study habits and academic achievement among hostel living and day scholars' university students, British Journal of Humanities and Social Sciences 2012; 3: 34-42.

.....