Section: Community Medicine

Original Research Article

ASSESMENT OF FACTORS AFFECTING ACADEMIC PERFORMANCE OF UNDERGRADUATE MEDICAL STUDENTS IN INDIA

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Received : *30/11/2024*
Received in revised form : *09/01/2025*
Accepted : *25/01/2025*

Keywords:
Academic performance, Undergraduate Medical Students, Factors Affecting performance.

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DOI: 10.47009/jamp.2025.7.1.205

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2025; 7 (1); 1053-1059

Abstract

Background: Academic performance of medical students is influenced by multiple factors. Identification of these factors can help in improvement of learning and academic performance of students. The objective is to estimate the pattern of academic performance of undergraduate medical students and determine the association between different factors and academic performance of study subjects. **Materials and Methods:** A cross sectional study was conducted by the Department of Community Medicine among medical students who appeared for final year part I examination. Self administered questionnaire containing background information, academic performance, extracurricular activities, time spent on studies, teaching methods useful was used. Students were scaled based on average marks obtained. **Result:** The mean age of participants was 22.5 ± 1.27 years (range 21–25). About 25% of the students had scored <60% marks, while 75% had scored more than that. High-performing students were found to spend more time on hobbies as well as on physical activities and less time on social networking sites as compared to the average-performing students. Study and sleep habits of high performers were significantly different from average performers. Similarly practicals was most effective method of learning for students. **Conclusion:** Many factors were found to have a significant association with academic performance of students such as joined medical profession by will, spending time on personal hobbies and social networking sites, time spent on study, and duration of sleep a day before examination, practical classes, black-board teaching,studying alone, feedback from teachers.

INTRODUCTION

Medicine is one of the longest and most stressful course of Undergraduate study program. Under-graduate medical education in India and many developing nations is facing new challenges. The primary aim of undergraduate medical education is to generate doctors who are competent enough to carry out their duties and responsibilities. In the past few years, there has been an increased focus on the shortage of doctors in our country and the need for increasing the number of medical seats. As a result, the number of undergraduate medical seats has increased considerably, but the quality of medical education is facing challenges. As medical teachers, our focus should be to identify these challenges and rectify them wherever possible.

In India, undergraduate medical students has to undergo a period of 4 years followed by a year of compulsory rotating internship. During this time, the students are subjected to various assessments. An important indicator of the quality of medical education is students' academic performance which is a known predictor of professional competence in long-term careers. Weak academic per-formance and high failure rate remains a persistent problem which leads to extra burden on the stu-dents as well as parents. Research has shown that students with poor academic performance are at increased risk of subsequent professional misconductand indicated difficulties in adjusting to new enviornment.[1,2] Recognition of different factors which influence academic performance of stu-dents can help in reducing the failure rate in medical students. The study related to these factors becomes more

ISSN (O): 2687-5365; ISSN (P): 2753-6556

important under these circumstances as it can provide information to improve educa-tional programs. Hence this study was conducted with following objectives.

Objective

1. To estimate the pattern of academic performance of undergraduate medical students.
2. To determine the association between different factors and academic performance of undergrad-uate medical students.

MATERIALS AND METHODS

A cross-sectional study was conducted by the department of community medicine of a medical in-stitute of Haryana in December 2023. The study participants included all the medical students who appeared for their final professional examinations part I. They were informed about the purpose of the study and explained that their participation is purely voluntary and they can opt out of the study if they feel so. They were asked to complete a feedback form which was self-administered and filled anonymously. This feedback form contained questions regarding the academic performance of students in all the professional examinations of MBBS along with background characteristics of students like the place of residence, schooling, education, and occupation of parents. Academic per-formance was measured by average marks obtained in all the university professional examinations. The students were categorized into two groups based on the average marks obtained by them. Those who obtained more than 60% marks were categorized as high performers and the students having less than 60% marks were included in the average performer category.

Factors affecting academic performance were divided into individual factors, teacher related fac-tors, impact of teaching-learning methods used, factors related to learning enviornment and factors related to family. Individual factors included information regarding time spent by students on ex-tracurricular activities such as hobbies, physical activities, television, social media, and study was also recorded. They were inquired about their habits and pattern of study and sleep, on routine days as well as a day before examinations, problem with language. Teacher related factors were ap-proachability of teachers, feedback from teachers, time table, regular class test. In impact of teach-ing- learning methods, best method of teaching (lecture, small group discussion, practical, tutorial) were enquired. Factors related to learning enviornment and family included hostel enviornment, use of library, senior guidence, family pressure and family issues. Likert scale was used for the different factors.

Data entry and statistical analysis was carried out using EPI INFO version 7.2.6.0. The primary out-come was the proportion of students in different levels of academic achievement. The secondary outcome was the factors associated with different levels of academic achievement. Independent variables which were assessed include background characteristics of students such as age, place of residence, education of parents, their schooling, coaching taken for clearing entrance examination, and other factors like time spent on hobbies, physical activities, social networking sites, and on study. The dependant variable includes academic performance. Descriptive statistics were used to describe the distribution of all variables. For finding out the association, an analysis using Chi-square test was done for qualitative data. Likert scale used for different factors in which percentage of agree or strongly agree for each factor is calculated.

Ethical consideration

The feedback forms were collected anonymously without any identifying information. The students filled the forms voluntarily and their confidentiality was maintained. Approval from the institutional ethics committee was taken before the beginning of study.

RESULTS

The proforma was completely filled by 184 students who were included in the final data analysis. The mean age of participants was 22.5 ± 1.27 years. The students were divided into high performer and average performer groups based on the average marks obtained during all the MBBS professional examinations taking 60% as cutoff point. About 25% of the students had scored <60% marks, while 75% had scored more than that.

The majority of the students (79.3%) belonged to urban areas. A considerably large proportion of students did their schooling from private schools. Nearly 94.5% had studied in private schools till middle school level and 94% had studied from private schools after senior secondary school level. Almost 90% of the students' fathers were educated up to a minimum of graduate level, while mothers of 76.6% of the students had studied up to graduation or higher level. About 13.5% of the students had at least one parent who was doctor. There was significant association between performance and female gender (P value=0.001). 91% of students joined medical profession by their own will but no significant association was found out with performance [Table 1].

In our study we found out that medical students devote much time to their hobbies. Only 11.5% of students never spend any time on hobbies, but the high-performing students were found to spend time on hobbies significantly more frequently as compared to the average-performing students ($P < 0.05$) [Table 2]. The time spent on physical activities by the students is also very less with a slightly less than one-fourth of the students never doing any physical activity. High-performing students were found to spend more time on physical activities as compared to average-performing students, although it is not statistically significant [Table 2]. Similarly,

ISSN (O): 2687-5365; ISSN (P): 2753-6556

watching TV is not very popular among medical students, and it was not found to have any significant relationship with academic performance ($P > 0.05$).

However, using social networking sites was found to be quite popular among the students. The high-performing students used to spend significantly lesser amount of time on social networking sites than the average-performing students ($P < 0.01$). This shows that spending too much time on social networking sites negatively impacts academic performance [Table 2].

Almost all of the high-performing students used to study daily on routine nonexamination days with a very large proportion studying for 2 to 4 h daily, whereas in the average performing group, only half used to study for more than 2 h daily. This difference was found to be statistically highly significant ($P < 0.05$). When asked about the time spent on studying a day before examination, the maximum number of high-performing students (82%) reported studying for more than10 h, while in case of average-performing students, they studied either < 10 h (30.43%) or more than 15 h (60.87%) with only one-fourth of the students studying for 10–15 h. The two groups differed significantly in this aspect also ($P < 0.001$) [Table 3].

As far as the preferred time for study is concerned, maximum students (65%) preferred to study late night. The proportion of students who preferred to study early morning was similar (35.5%) in the high-performing group as well as the average-performing group. A majority of students (72.83%) preferred to study alone rather than group study. We did not find any significant association of academic performance of students with preferred time or preferred method of study ($P > 0.05$) [Table 3].

This study shows that a majority of students in both average- and high-performing categories slept for more than 6 h on routine days. Almost two-third of the students (65.22%) from high-performing group and half (58.7%) from average-performing group reported sleeping for 6–8 h on nonexamination days. Students from both the groups used to sleep for lesser time on the day before examination as compared to routine days. However, a majority of high-performing students slept for 4–6 h, while the majority of average performers slept for less than 4 h. This difference between the two groups was found to be statistically highly significant ($P < 0.01$) [Table 4].

Most effective method of learning for 60% of students was by practical and 75% of students found learning helpful by blackboard teaching. According to students, factors which improve learning were found out to be personal attitutude in 61% and teachers (41%). Factors which adversely affect performance were personal attitude in 52% and health issues in 47%.

Likert scale was used for finding out about different factors affecting performance of students. These factors which help in improving performance were divided into factors related to teachers, related to individual and factors which affect performance adversely. In individual factors, 64 % of students agreed that they are able to understand the topics and 43.8 % agreed that they retain carry home message after each class. In teacher related factors, 59.5% agreed on approachibility of teachers after class,47.1% on feedback from teachers help in improving performance. 72.7 % responded that case-based learning and 52.4% responded that regular class tests were useful [Table 5].

Table 1: Demographic profile of average and high performing students.

Background characteristics	Average performers	High performers	Total	P value
Residence				
Rural	11(23.91)	27(19.57)	38(20.65)	0.52
Urban	35(76.09)	111(80.43)	146(79.35)	
Sex				
Female	22(47.83)	102(73.91)	124(67.39)	0.001
Male	24(52.17)	36(26.09)	60(32.61)	
Schooling upto middle				
Government	5(10.87)	5(3.62)	10(5.43)	0.04
Private	41(89.13)	133(96.38)	174(94.57)	
Schooling senior secondary and after that				
Government	3(6.52)	8(5.80)	11(5.98)	0.549
Private	43(93.48)	130(94.2)	173(94.02)	
Education of father				
Below graduate	6(13.04)	11(7.97)	17(9.24)	0.32
Graduate and above	40(86.96)	127(92.03)	167(90.76)	
Education of mother				
Below graduate	15(32.61)	28(20.29)	43(23.37)	0.04
Graduate and above	31(67.39)	110(79.71)	141(76.63)	
Occupation of father				
Doctor	3(20)	18(13.05)	21(11.41)	0.23
Any other	43(93.48)	120(86.96)	163(88.59)	
Occupation of mother				
Doctor	0(0)	4(2.9)	4(2.18)	0.31
Any other	46(100)	134(97.1)	180(97.83)	
Place of living				
Hostel	43(93.48)	128(92.7)	171(92.9)	0.579
Home	3(6.52)	10(7.3)	13(7.1)	

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Joined medical profession by own will				
Yes	40(86.96)	127(92.03)	167(90.76)	0.161
No	6(13.04)	11(7.97)	17(9.24)	

Table 2: Time spent on extracurricular activities among average and high performing students

	Average performers	High performers	Total	P value
Time spent on hobbies				
Everyday	10(32.61)	33(20.59)	43(23.63)	<0.05
Atleast twice a week	8(17.39)	40(27.94)	48(25.27)	
Atleast once a week	10(28.26)	34(22.79)	44(24.18)	
Atleast once a month	6(13.04)	22(16.18)	28(15.38)	
Never	4(8.7)	17(12.5)	21(11.54)	
Time spent on physical activities				
Everyday	20(43.48)	56(40.58)	76(41.3)	>0.05
Atleast twice a week	13(28.26)	45(32.61)	58(31.52)	
Atleast once a week	3(6.52)	16(11.59)	19(10.33)	
Atleast once a month	3(6.52)	12(8.7)	15(8.15)	
Never	7(15.22)	9(6.52)	16(8.7)	
Time spent in watching TV per day				
Do not watch	35 (76.09)	91(65.94)	126(68.48)	>0.05
< 2 H	6(13.4)	33(23.91)	39(21.2)	
>2H	5 (10.87)	14(10.14)	19 (10.33)	
Time spent on social networking sites per day (h)				
< 2h	21(45.65)	56(40.58)	77(41.85)	<0.05
2-4	17(36.96)	61(44.2)	78(42.39)	
>4 h	8(17.39)	21(15.22)	29(15.67)	

Table 3: Pattern of study habits among average and high performing students

	Average performers	High performers	Total	P value
Time spent on study during non-examinations day				
Do not study daily	3(10.87)	21(13.77)	24(13.04)	<0.05
<2 h	15(36.96)	40(27.54)	55(29.89)	
2-4h	18(43.48)	69(48.55)	87(47.28)	
>4 h	2(8.7)	16(10.14)	18(9.78)	
Time spent on study a day before examination				
<10 h	14(30.43)	25(18.12)	39(21.19)	<0.001
10-15 h	4(8.6)	62(44.93)	66(35.86)	
>15 h	28(60.87)	51(36.96)	79(42.93)	
Preferred time for study				
Early morning	16(34.78)	49(35.51)	65(35.33)	>0.05
Late night	30(65.22)	89(64.49)	119(64.67)	
Preferred method for study				
Studying alone	34(73.91)	100(72.46)	134(72.83)	>0.05
With a friend	7(15.22)	33(23.91)	40(21.74)	
Studying in groups	5(10.87)	5(3.62)	10(5.43)	

Table 4: Pattern of sleep habits among average and high performing students

	Average performers	High performers	Total	P value
Duration of sleep on non-examination days(h)				
<6 h	10(21.74)	20(14.49)	30(16.3)	>0.05
6-8 h	27(58.7)	90(65.22)	117(63.59)	
>8 h	9(19.57)	28(20.29)	37(20.11)	
Duration of sleep a day before examination(h)				
<4 h	26(56.52)	60(43.48)	86(46.74)	<0.01
4-6 h	15(32.61)	58(42.03)	73(39.67)	
>6 h	5(10.87)	20(14.49)	25(13.59)	

Table 5: Likert scale for different factors affecting performance of students

	Strongle agree	Agree	Neutral	Disagree	Strongly disagree
Factors which help in Improving performance					
Related to teachers					
Approachability of teachers after class	9.6	44.9	39.6	3.2	2.7
Able to ask questions during class	4.8	34.2	50.8	7.5	2.7
Feedback from teachers	9.1	38	46	5.3	1.6
Regular class test	9.6	42.8	39.6	4.3	3.7
Time table is well suited	5.9	20.9	52.9	14.4	5.9
Classroom teaching	8	33.2	48.7	7.5	2.7
Case based learning/problem based learning	19.8	52.9	24.1	1.1	2.1
Related to individual					
able to concentrate & understand topic	7	57.2	32.6	3.2	0

ISSN (O): 2687-5365; ISSN (P): 2753-6556

able to retain carry home message after each class	3.2	40.6	48.7	5.9	1.6
Guidance from seniors	16	40.1	34.2	4.8	4.8
Hostel enviornment	3.7	20.9	45.5	15.5	14.4
Learning resources (library)	19.3	38	34.2	6.4	2.1
Factors which Affect performance adversely					
Problem with English	1.1	9.6	26.7	36.9	25.7
Frequent extra curricular activities	1.1	10.7	35.3	35.8	17.1

DISCUSSION

Discovering methods to improve students' knowldge and skills is a challenge. The present study focused on the factors that affect the academic performance of medical students. Around 75% of the students had scored more than 60% average marks in MBBS. A majority of students (94%) did their schooling from private schools and 74% of the students were from urban area. The reason for this may be that private schools are supposed to provide academically better environment which will, in turn, help in clearing medical entrance examination. Kumwenda et al. have reported that students from independent private schools performed better than students from state-funded schools.[3]

The parents of majority of students had studied at least up to graduation level. We did not find any association of educational status of father with the academic performance of the students but we find significant association of educational status of mother with academic performance of the students. However, only 11% of the students either parent were doctors but no significant association was found out between doctor parent and performance. But in study involving medical students conducted in the Netherlands and India which shows that most students had parents with a higher level of education, and approximately 13% of the students had at least one parent with a medical background.[4,5]

We assessed the time spent by the students on their hobbies. Interestingly, only 11.5% of students never spend any time on hobbies, but the high-performing students were found to spend more time on hobbies as compared to the average-performing students. This difference was found to be statistically significant. This shows that spending time on hobbies has a positive association with academic performance which was also found out in study by Priyanka et al.[5] Hence, medical students should be encouraged to spend some time on their hobbies and recreational activities which would be expected to improve their academics.

As far as time spent on physical activities is concerned, high-performing students spent more time on physical activities as compared to average-performing students, although it is not statistically significant. Overall, this shows that medical students lead a very sedentary life which may not be a healthy practice. Results of another study by Stroebele et al. show that less physical activity by stu-dents is related to lower academic performance.[6]

Almost 68% of the participants did not watch TV and a slightly lower proportion watched it for <2 h in a day. We did not find any association of spending time watching TV and academic performance. Similar results have been reported from other studies,[7] but study by Strobelle et al showed the association of hours of TV watching with academic performance.[6] We found that watching TV is not very popular among our study participants and only a minority of students watched TV for more than 2 h in a day.

However, in our study, students reported that they spent a considerable amount of time on social networking sites. All the students were active on these sites. The high-performing students used to spend a lesser amount of time on social networking sites than the average-performing students. We found this association significant ($P < 0.05$). It can possibly act as a distraction from academics and would lead to a wastage of time which could better be utilized for academic purposes by the students. This aspect needs further exploration, and there is a need to conduct extensive research in this area to identify not only the extent of the problem but also the reasons and remedies for it. Al Shawwa et al. have also found similar results stating that the amount of time spent on social net-working had a significant effect on students' performance.[7] Another study by Rithika and Selva-raj shows that students use social media extensively, and there is a significant relationship between social media usage and student's academic performance.[8]

A maximum proportion of high-performing students reported studying more than 2 h a day on routine nonexamination days compared to average performing students. The proportion of average-performing students who studied <2 h daily and who do not study daily is more as compared to high-performing students. This difference was found to be statistically significant. This clearly reflects that spending more than 2 h a day on the study on a regular basis is a positive predictor of better academic performance and irregular study habits deteriorate students' performance in examination.

We also found a statistically significant difference in the time devoted to studying on the day be-fore examination in both the groups. While a majority of high performers typically spent 10–15 h on study, a large proportion of average performers spent either <10 h or >15 h on study on the day be-fore examination. These findings are in contrary to another research which shows no effect of duration of study prior to examination and number of hours of studying on the day before examination on academic achievement.[7] Our results might reflect that not studying on regular basis and spending excessive time on study (more than 15 h) on the day before

ISSN (O): 2687-5365; ISSN (P): 2753-6556

examination has a negative effect on academic performance of students which is also there when students devote <10 h to studying be-fore examination. Our results are consistent with findings of Alos et al. who have concluded that it is important to study over a period of days rather than waiting and leaving everything till last minute.[9] A major proportion of students preferred to study late night than early morning, but no significant difference was found in the two groups with regard to the preferred time of study and preferred method of study which included studying alone, studied with a friend, or studying in groups, although a larger proportion of students in both the groups preferred to study alone rather than with friends. These findings are in accordance with the results of a similar research conducted in Iran and India.[5,10] Other studies have reported a significant difference in the method of study where high-performing students preferred to study alone, and students with lower performance preferred group study.[7,11]

This study shows that a lack of sleep a day before examination adversely affects the academic performance and sleeping for a duration of >6 h before examination also results in decline in academic performance. This may be because of the vast medical curriculum which requires a long time for re-vision, for which the students have to compromise their sleep, but sleep duration of <4 h may result in mental exhaustion, thereby adversely affecting the recall capacity during the examination, which will ultimately deteriorate students' performance. Similarly, Shareef et al. have reported that to comply with large academic load, many of medical students do not devote much time to rest or sleep, especially when it is close to their examinations.[12] Veldi et al. have reported that complaints about sleep problems are common in young medical students and sleep quality is significantly associated with academic progress.[13] A study conducted by Al Shawwa et al. in Saudi Arabia also shows that a significantly higher proportion of medical students with low grade point average tend to sleep for longer duration a day before the examination as compared to students with high grade point average.[7] In contrast to our findings, Reddy et al., from Uttrakhand, have found no correlation between the duration of sleep before the examination and academic performance.[14] Another study conducted among school students shows that sleeping for >9 h/night is associated with better grades. This difference could be due to the difference in course standards.[6]

Our study shows that factors perceived by students improving their performance were personal attitude and teachers. In this frequent class test, feedback from teachers, approachiability of teachers, case based learning, carry home meassage after class were found to be helpful in improving performance. Similar results were found in study by Sharma et al.[15] Our study shows that factors which adversely affect performance were personal attitude and health issues. But in study by Pinyoporn-parish et al found that factors which affect performance was personal attitude in 79% of students.[16] In our study, most effective method of learning for 60% of students was by practical and 75% of students found learning helpful by blackboard teaching. In study by Sharma et al lectures and tutorial were found out to be most effective method.

CONCLUSION

The study participants had an overall good academic performance, with 75% scoring more than 60% marks. Many factors were found to have a significant association with academic performance of students like sex (females), education of mother, schooling, spending time on personal hobbies, spending time on social networking sites, time spent on study, and duration of sleep a day before examination. We found that not studying on a regular basis and spending excessive time on study and sleeping <4 h a day before examination has a negative effect on academic performance. We did not find any association of place of living, time spent on physical activities, and watching TV and preferred time and method of study on academic achievement of medical students. We found that personal attituide and teachers play important part in performance of students. We suggest that to improve academic performance, medical students should be encouraged to spend some time regularly on extracurricular activities like hobbies. They should also devote a minimum of 2 h daily to studying on a regular basis and sleep for 4–6 h on the night before examination. Excessive use of social networking sites should be discouraged, as it may interfere with academics. Approchiability of teachers, regular class test, more attendance in classes and small group teaching should be encouraged to improve performance of students.

Limitation

- The academic performance of students was measured by the information self-reported by the students themselves and could not be cross-verified
- To make better inferences, we need a more comprehensive evaluation of variables by interviewing students.

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ISSN (O): 2687-5365; ISSN (P): 2753-6556