

Factors affecting academic achievement of third-year students of Bursa Uludağ University Faculty of Medicine

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Abstract

The present study aimed to investigate the determinants of academic performance among third-year students in the Faculty of Medicine. A survey consisting of 45 questions was administered to 357 third-year students in the academic year 2017-2018, with a response rate of 233 participants. The academic achievement was assessed by evaluating the grade point average (GPA) scores, with a threshold of 3. The results revealed that several factors were significantly associated with a GPA score of 3 and above, including age ($p=0.011$), relationship with parents and positive parental attitude ($p=0.001$), staying with family ($p=0.015$), and school selection to "be a doctor" ($p=0.044$). The results also showed that negative parenting behaviors and smoking were associated with an increased risk of academic failure. However, no significant association was found between academic performance and gender, physical exercise, parents' education, and employment status. This study highlights the crucial factors impacting academic achievement in medical education. The results demonstrate the importance of age, relationship with parents, parental attitude, reasons for choosing a medical school, smoking habits, and extracurricular activities in determining GPA outcomes. The findings have important implications for the future planning of students, the development of education, and the formulation of new policies.

Keywords: Academic achievement, medical education, third-year medical student, Turkey

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Introduction

The universities aim to train “...manpower suitable for the needs of the nation and the country in an order based on contemporary education and training principles” that consist of different education periods and processes [1]. Universities primarily aim to provide education and training to individuals to prepare them for various careers and professions. This education is typically based on contemporary principles of teaching and learning, which may involve a combination of classroom instruction, laboratory work, fieldwork, internships, and other practical experiences. The ultimate goal of this education is to produce a skilled and knowledgeable workforce equipped to meet the needs of the nation and the country in various fields and industries. This may include training individuals for positions in healthcare, engineering, business, education, the arts, and many other areas [2].

University education can be both exciting and stressful for students, as it is a time of radical changes that can positively and negatively affect their lives. Students may struggle with various issues such as family problems, quality of education, economic difficulties, stress, communication problems, future anxiety, friend problems, learning problems, continuing an education that one does not want, academic achievement, etc. [3-7]. Academic achievement is one of the essential responsibilities of students who go through a challenging exam marathon to gain admission to the university, satisfy their families and plan the future [8,9].

Unlike “success”, “academic success/achievement”, which also expresses/determines career choice and professional competence, is generally an essential output of universities to raise qualified personnel [10-12]. Academic achievement, which can be described with terms such as “Grade Point Average (GPA)”, “Passing Grade”, and “Cumulative Weighted Grade Point Average (CGPA),” is the most easily measurable output and is a determinant of the cognitive skills and proficiency and ‘performance’ shown in lessons [13,14]. This ‘performance’ is an essential indicator for families’ and students’ post-graduation career planning [15,16].

Although the factors determining the students’ performance are discussed in many fields, the primary determinant is the GPA [17].

The faculty of medicine is known to have the longest education period among all the units in university education. This is due to the extensive training required to become a medical professional, including theoretical coursework and practical experience. The main purpose of education in medical faculties is to train good physicians to protect, develop and improve health. Medical education is a highly demanding and challenging process that requires significant commitment and dedication from students. As such, it is essential to understand the factors that influence the academic achievement of students in medical schools. There are discussions that the effects of the stress experienced by medical students on their success will indirectly impact the delivery of health services. This situation has led to the need to determine the reasons for students’ academic success or failure, as well as the factors that influence them, resulting in the conduction of numerous studies. [15,18-21]. Although it has been examined under three main headings, cognitive, affective, and environmental, different classifications have been made, such as

- Age [13, 22-26],
- Gender [5,10,13,17,22,26-35],
- Socioeconomic Status [5,15,34,36-41],
- Parental Education [8,32,34,36,42,43],
- Parental Attitudes [14,43-46],
- Extracurricular Activity [25,33],
- Physical Activity [47-49],
- Work/Living Environment [10,22,33,34,36,50, 51],
- Stress/Depression [7,49,52-54],
- Learning Styles [55-57] etc.

Academic achievement, although it varies individually, can be a determining factor, especially in terms of the professional competencies of medical students after graduation, so it is essential to identify the factors that affect success. This study aims to identify

these factors, specifically in the pre-clinical period of medical school, to provide insights that can be used to improve medical education and develop new education policies. By exploring the factors, we can better understand how to support and promote academic achievement in medical schools. Additionally, the findings of this study may help develop interventions that can assist students struggling with academic or personal difficulties during their medical education.

This study is designed to investigate the factors that impact students' academic achievement in the pre-clinical medical school period. The main objective of the study is to evaluate these factors and their effects on the academic achievement of students of Bursa Uludağ Medical Faculty, which accepts the first 6000 students in the university entrance exam and allows approximately 300-350 students to graduate and join the healthcare sector every year.

Materials and Methods

This cross-sectional study was conducted with third-year students of Bursa Uludağ University Faculty of Medicine. Ethics committee approval was obtained from Uludağ University Clinical Trials Ethics Committee for the study (2017-1/19; 2020-10/23).

The research population comprises 357 students in the 2017-2018 academic year. The study was completed with 233 students (65.2%) who agreed to participate. The reasons for limiting the analysis to third-year students were;

- Implementation of a new and different education system (integrated education) at the faculty in the 1st and 2nd years,
- The potential of the adaptation process to medical education on suppressing other factors in the 1st and 2nd years,
- Continuation of classical medical education in 3rd year,
- And since the 3rd year was the last period of preclinical, it was possible to approach the factors affecting academic success more consistently.

Data and Data Collection Process

In the study, a survey form consisting of 45 questions, in which demographic, individual,

and school-related factors are questioned, prepared by the researchers with the support of the literature, is used. Surveys were distributed to the students and collected by the researchers after filling them.

To evaluate academic achievement in the study, the general academic Grade Point Average (GPA) calculated at the end of the year, on which written, oral, and practice exams affect at different rates, has been used. The GPA scores of the 3rd year students participating in the study are calculated in the 4-point system. According to Bursa Uludağ University Associate and Undergraduate Education Regulation, students must have a GPA score of 3 and above to receive the honor/high honor award. Since academic success is the basis of the study, it is determined as the threshold value because it is included in the regulation and because the GPA scores are median 3. It is examined whether there was a difference between the students with a GPA score of 3 and above and those with a GPA below 3 in terms of the variables studied.

Statistical Analysis

The *Shapiro-Wilk* test examines whether the data showed normal distribution. Descriptive statistics are expressed as the mean and standard deviation for quantitative data and frequency and percentage for qualitative data. The *t*-test is used to compare two groups for normally distributed data. The *Pearson* Chi-square test and *Fisher's* Exact Chi-square test are used to analyze categorical data. The *Bonferroni* test was used as a multiple comparison test. Binary logistic regression analysis examines factors affecting the GPA score below 3. The significance level is determined as $\alpha=0.05$. Statistical analysis of the data is performed in the statistical package program IBM SPSS 28.0 (IBM Corp. Released 2021. IBM SPSS Statistics for Windows, Version 28.0. Armonk, NY: IBM Corp.).

Results

The mean age of the 233 third-year students participating in the study was 20.77 ± 0.88 (19-25). Of the students, 134 (57.5%) were female, and 99 (42.5%) were male. While 148 (63.5%) students had a GPA score of 3 and above, 85 (36.5%) had a GPA below 3. A statistically significant

difference was found between the students with a GPA score of three and above and below three according to age ($t(230)=2.557$; $p=0.011$ (Table 1).

The effect size for the difference between the groups was calculated using Cohen's d , resulting in a value of 0.349, considered a small to medium effect. "The average age of students with a GPA score of 3 and above was lower than the others. However, there was no statistically significant difference when the students were compared regarding gender, whether the mother and father were alive, their relationship status, education level, and working status ($p>0.05$).

A statistically significant difference was found in comparing the students' GPA scores and their relationship with their parents (effect size

$w=0.252$; $p=0.001$) (Table 2).

The rate of positive parental attitude (61.5%) was higher in students with a GPA score of 3 and above, while the rate of negative parental attitude was higher in students with a GPA score of less than 3 (58.5%). While there was a statistically significant difference in the comparison made according to the current place of residence, the rate of staying with a family (26.5%) of the students with a GPA score of 3 and above was found to be higher than those with a GPA below 3 (12.9%) (effect size $w=0.159$; $p=0.015$). There was no statistically significant difference between the two groups regarding the answers to whether a drug is used continuously and whether they do sports for 35 minutes a day, five days a week.

Table 1. Comparison of sociodemographic characteristics.

		GPA \geq 3 (n=148)	GPA<3 (n=85)	<i>p</i>
Age		20.66 \pm 0.82	20.96 \pm 0.94	0.011
Gender	Female	88 (59.5%)	46 (54.1%)	0.427
	Male	60 (40.5%)	39 (45.9%)	
Mother	Alive	145 (98%)	85 (100%)	0.556
	Dead	3 (2.0%)	0 (0%)	
Father	Alive	146 (98.6%)	84 (98.8%)	1.000
	Dead	2 (1.4%)	1 (1.2%)	
Parental coexistence status	Together	137 (94.5%)	80 (94.1%)	1.000
	Divorce / separated	8 (5.5%)	5 (5.9%)	
Mother's education level	High school graduate and below	101 (68.7%)	60 (70.6%)	0.883
	University graduate and above	46 (31.3%)	25 (29.4%)	
Father's education level	High school graduate and above	78 (53.4%)	42 (50%)	0.681
	University graduate and above	68 (46.6%)	42 (50%)	
Mother's job status	Having a job	50 (34.2%)	29 (34.1%)	0.984
	None	96 (65.8%)	56 (65.9%)	
Father's job status	Having a job	119 (81.5%)	72 (85.7%)	0.413
	None	27 (18.5%)	12 (14.3%)	

Descriptive statistics are expressed as mean \pm standard deviation or n (%).

While the reason for choosing a medical faculty was statistically significant, students with a GPA score of 3 and above had a higher rate of choosing “to be a doctor”.

In comparison, students with a GPA score below 3 had a higher rate of preferring to be a doctor (effect size $w=0.133$; $p=0.044$). A statistically significant difference was found when the students in the two groups were compared in terms of attending any course to improve their education, self-improvement, and smoking. The rate of attending the course (34.5%) and smoking rate (27.1%) were higher in students with a GPA

score below three than in students with a GPA score of 3 and above. “Which class hours are more productive for listening to the lesson?” No statistically significant difference was found in the answers to the question ($p=0.094$).

When the factors affecting the GPA score below three are examined as multivariate, the results are given in Table 3. According to this result, a 1-unit increase in the age variable increases the risk of a low GPA score by OR=1.554 times. When the student’s relationship with their parents is examined, it is seen that students whose parents display positive behaviors have a lower risk of

Table 2. Comparison of the variables according to GPA level.

		GPA \geq 3 (n=148)	GPA<3 (n=85)	<i>p</i>
Relationship with parents	Negative parenting attitude	53 (35.8%) ^a	48 (58.5%) ^b	0.001
	Positive parenting attitude	91 (61.5%) ^a	29 (35.4%) ^b	
	Indifferent parents	4 (2.7%)	5 (6.1%)	
Current place of stay	With family	39 (26.5%)	11 (12.9%)	0.015
	Other	108 (73.5%)	74 (87.1%)	
Regularly drug use	No	139 (93.9%)	74 (87.1%)	0.072
	Yes	9 (6.1%)	11 (12.9%)	
Reason for choosing a medical school	Because I want to be a doctor	99 (67.3%)	67 (79.8%)	0.044
	Because my score is high	48 (32.7%)	17 (20.2%)	
Exercising for 35 minutes a day, five days a week	No	115 (77.7%)	74 (87.1%)	0.079
	Yes	33 (22.3%)	11 (12.9%)	
Attending any course for education and self-development	No	114 (78.1%)	55 (65.5%)	0.037
	Yes	32 (21.9%)	29 (34.5%)	
Smoking	No	135 (92.5%)	62 (72.9%)	<0.001
	Yes	11 (7.5%)	23 (27.1%)	
Which class hours are more productive in terms of listening to the lesson?	Between 8:00-11:00 hours	67 (45.9%)	27 (32.5%)	0.094
	Between 11:00-14:00 hours	63 (43.1%)	41 (49.4%)	
	Between 14:00-17:00 hours	16 (11%)	15 (18.1%)	

Descriptive statistics are expressed as frequency (n) with (%).

ab symbols were used to indicate groups that differed due to the *Bonferroni* test from multiple comparison tests following the identification of significant differences in overall comparison.

having a GPA score below three than students whose parents demonstrate negative behaviors (OR=0.249). Smoking increases the risk of having a GPA score below 3 (OR=5.079).

Discussion

In this study, conducted with third-year students at Bursa Uludağ University Faculty of Medicine during the 2017-2018 academic year, various factors affecting academic achievement were evaluated. The results showed a significant difference between age and academic achievement, with the average age of students with a GPA score above 3 being lower. This finding supports the idea that there is a negative correlation between age and academic achievement, which is consistent with the results of Nto et al [24]. However, other studies have found a positive relationship [22,25] or no relationship [13,23,52] between age and academic

achievement. This suggests that the relationship between age and academic achievement is complex and may be influenced by factors such as study habits, family support, and individual characteristics. Previous research suggests that female students tend to be more successful in terms of academic achievement when compared to male students [5,10,17,22,29-34]. However, our study did not find a significant difference in terms of gender, which is consistent with the results of Taşlıyan et al [13]. Furthermore, the literature suggests that socioeconomic level plays an essential role in shaping the outcome of a challenging and long-term medical education and its impact on success in terms of the psychological-social autonomy it brings [12,15,34,38,39,58]. But our study did not find a relationship between socioeconomic status and academic achievement. This result is in parallel with the studies conducted by Koç et al [5], and

Table 3. Examining the factors affecting the low GPA with binary logistic regression analysis.

		Beta	<i>p</i>	OR	95% CI	
Age		0.441	0.022	1.554	1.066	2.266
Relationship with parents	Positive vs. Negative	-1.390	<0.001	0.249	0.124	0.499
	Indifferent vs. Negative	-0.011	0.988	0.989	0.221	4.423
Current place of stay	Other vs. With family	0.776	0.084	2.172	0.901	5.235
Regularly drug use	Yes vs. No	0.585	0.308	1.796	0.583	5.531
Reason for choosing a medical school	My score is high vs. I want to be a doctor	-0.711	0.074	0.491	0.225	1.071
Exercising for 35 minutes a day, five days a week	Yes vs. No	-0.519	0.24	0.595	0.25	1.415
Attending any course for education and self-development	Yes vs. No	0.575	0.13	1.776	0.844	3.739
Smoking	Yes vs. No	1.625	0.001	5.079	2.016	12.796
Which class hours are more productive in terms of listening to the lesson?	11:00-14:00 vs.	0.736	0.052	2.088	0.994	4.387
	8:00-11:00					
	14:00-17:00 vs. 8:00-11:00	0.751	0.142	2.118	0.777	5.772

OR: Odds ratio; CI: Confidence Interval

Al Shawwa et al [40]. The literature suggests that parental education level and occupation can positively impact academic achievement [8,14,15,36], with some studies indicating that the father's educational status is more influential and others showing that the mother's educational status is more effective [32,33,43]. However, our study did not find a significant difference in parents' education levels or professions. This result is similar to previous studies such as those conducted by Ayyıldız et al [22], Yousif et al [36], and Al Shawwa et al [40].

Furthermore, the literature suggests that family relations can impact student education [43,44,58], but there is limited research on the specific effect of family relations on academic achievement in medical school students. Our study found that family relations significantly impact academic achievement ($p=0.001$). Specifically, students with positive family relationships have better academic success than those with negative or indifferent family relationships (Table 2). This result is consistent with previous research, such as a study by Kuzay [53] with health field students and Kaya et al [14] with Faculty of Education and Science and Letters students, which supports the idea that a positive and supportive family environment can contribute to academic success in medical school.

In our study, we investigated the impact of place of residence on academic achievement and found that students who stayed with their families had better academic success ($p=0.015$; Table 2). This finding is supported by previous research, such as a study by Bakouei et al [50] and Tiruneh et al [51], which also found that university students studying in Health Sciences faculties stayed with their families were more successful. However, there are differing opinions on the impact of place of residence on academic achievement in the literature. Al Shawwa et al argue that students with high GPAs have quiet and uninterrupted study habits [40]. On the other hand, Yıldırım et al [10] and Ogenler et al [34] found that students staying in the dormitory / hostels were more successful than students living alone and working alone in the library. The relations with family/friends can also explain these results. Dormitories are safe places for students who

must study away from their families after gaining admission to a university. However, many factors, such as the lack of single rooms for individuals, being in a crowded environment, and the physical and administrative features of the dormitory, can affect the student. In such overcrowded environments, a student used to studying quietly and calmly may not be able to find a particular area, which can hinder their quality of work and result in a decline in academic success.

On the other hand, a crowded working environment can positively affect students' success in the same faculty by allowing them to come together and work together. Similarly, in a family home prepared for the student in a supportive environment by parents, a good study environment can be created, whereas in unresponsive/uncommunicative or socioeconomically disadvantaged family homes, such an opportunity may not be available [10,31,34,46]. It is seen that more research is needed on this topic.

Our study found no significant relationship between participation in sports and academic achievement. In contrast, a study by Slade et al [48] showed that students who regularly participate in sports activities on campus have better academic performance, likely due to the stress-reducing effects of sports. However, our results differ from a study conducted in our country that found that students who engage in regular sports had higher academic success than those who do not or engage in sports only periodically. Additionally, our study found that smoking has a negative effect on academic achievement, with a statistically significant difference in the academic performance of smokers and non-smokers (27.1%). This finding is consistent with Ogenler et al [34], who also found a negative correlation between smoking and academic achievement.

Conclusion

Academic achievement is an important factor in determining the success of medical students. It is used to measure the student's knowledge, skills, and abilities in their field of study and is an indicator of their preparedness for future work

in the medical field. Additionally, academic achievement is essential for students and their families as it can influence their future job opportunities and earning potential. It is crucial to evaluate and track academic achievement throughout the medical education process to ensure that students are meeting the necessary standards and are on track to succeed in their future careers [43].

Medical education is an extensive and demanding process that requires not only a significant investment of time and effort from students but also support and guidance from their families. The academic achievement of medical students is paramount, as it indicates their preparedness for future work in the healthcare field. Furthermore, students' academic performance can significantly impact their future job prospects and earning potential. In light of this, it is imperative to consider the role of families in medical education, as their attitudes and support can significantly affect students' academic success. In this regard, it may be beneficial to hold seminars for families to educate them about appropriate attitudes toward students and provide support for students experiencing difficulties in their family relationships.

Furthermore, the physical environment in which medical students study and learn also plays a crucial role in their academic achievement. Providing new study spaces and redesigning lecture halls and classrooms can enhance the learning experience for students. Additionally, attention must be given to the accommodation conditions of students living in dormitories, as suitable living environments can positively impact students' academic success. In the end, identifying the factors that contribute to the success or failure of medical students during their education is crucial for advancing education and developing new educational policies.

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Conflict of interest

There are no conflicts of interest in connection with this paper.

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