







The Relation Between Academic Procrastination, Symptoms of Attention Deficit Hyperactivity Disorder, and Academic Performance in Medical Students

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Abstract

Objective: Procrastination is putting off intended tasks that are necessary to reach a goal. Attention deficit hyperactivity disorder (ADHD) is characterized by excessive inattention, impulsivity, and hyperactivity. We aimed to understand the association between academic performance, procrastination, and ADHD.

Methods: A group of medical students were screened for procrastination and ADHD by self-report scales. First-, second-, third-, and fourth-year medical students were included in the study. Background information, including birth orders, parents' education status, department satisfaction, sex, and age, were collected. Tuckman procrastination scale and the adult ADHD self-report scale were applied. Grade point average (GPA) was noted, and it was accepted as an indicator of academic performance.

Results: A total of 318 (age: 19.7 ± 1.6 ; 46% male) volunteer medical students were included. Students with lower GPA had higher tendency to procrastinate than those with high GPA. Even though ADHD self-reported scores were positively correlated with procrastination scores, regression analyses showed that there was no statistically significant association between ADHD symptoms and academic performance.

Conclusion: In conclusion, procrastination led to poor academic performance, and nearly half of the students had a tendency to procrastinate. Moreover, students with probable ADHD symptoms tended to procrastinate more. Therefore, students with poor academic performance should be screened for procrastination and ADHD symptoms.

Keywords: A Attention Deficit Hyperactivity Disorder, procrastination, academic performance, medicine education

Introduction

Academic procrastination means the chronic and needless delay of academic tasks.¹ The tendency to put off academic tasks, including studying for an exam and doing homework, may have negative long-term outcomes such as stress and anxiety, in addition to poor academic performance and lower exam scores.²⁻⁴ Prevalence of procrastination among college students has been reported ranging from 46% to 80%.^{5,6} Hayat et al reported that nearly 30% of medical students had a high level of academic performance.⁷ However, there are a limited number of studies regarding the prevalence of procrastination and its effect on academic performance among medical students.

Underlying reasons for procrastination can be attributed to fear of failure, task averseness, risk-taking, laziness, rebellion against control, and perfectionism.^{8,9} Low levels of self-efficacy and

self-esteem might be other reasons for procrastination behavior.^{10,11} Long-term procrastination is associated with unemployment and lack of partnership, higher stress, decreased life satisfaction, more depression, fatigue, and anxiety.¹²

Self-regulation is defined as regulation of behavior, emotions, and impulses.¹³ Failure of self-regulation is one of the underlying reasons for procrastination.¹⁴ Impulsivity is considered a manifestation of self-regulation. Studies highlight the link between impulsivity and procrastination.^{15,16} Moreover, a study by Gustavson and colleagues suggests that procrastination and impulsivity share genetic influences.¹⁷

Attention deficit hyperactivity disorder (ADHD) is a self-regulation deficit that causes inattention, impulsivity, and hyperactivity.¹⁸ Even though the prevalence of ADHD is decreasing with age, it has been estimated that 2%-8% of college and university students show clinically significant ADHD symptoms.^{19,20} In a study from Cameroon highlighted that 24.4% of medical students had ADHD symptoms.²¹ Although procrastination was not considered to be one of the main symptoms of ADHD, it has been reported that students with ADHD symptoms tend to procrastinate more.²² Attention deficit hyperactivity disorder can be linked to procrastination because both of them are self-regulation problem.

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Motivation and academic achievement of medical students have become important topics for health educators. Many studies have been conducted in this field.^{23,24} However, only a few of them investigate the role of ADHD and procrastination on the academic performance of medical students.^{25,26} Medical education is an intense process that requires good time management. Therefore, the detection of procrastination and ADHD symptoms is vital for medical students. The purpose of the study is to understand relation between academic procrastination and ADHD on academic performance.

Methods

Study Design, Setting, and Data collection

We performed a cross-sectional survey in the Cerrahpaşa Medicine Faculty. First-, second-, third-, and fourth-year of medical students who volunteered were included. Students who had a previous ADHD diagnosis and failed the class were excluded.

Grade point average was accepted as an indicator of academic performance. We constructed 4 groups according to the GPA of the students as follows: for groups 1, 2, 3, and 4, the GPA ranges were 2.0-2.5, 2.6-3.0, 3.1-3.5, and 3.6-4, respectively.

Tuckman Procrastination scale and the adult ADHD self-report scale were applied. The scales were administered to volunteers in a classroom. Participants were informed about the objectives and purposes of the study. Students disclosed their names.

The following background information was collected: age, sex, GPA, satisfaction with medicine education, whether pursuing medicine was their dream before they were enrolled, their parents' education situation, and birth order.

Ethical clearance was obtained from the local medical ethics committee (number: BENFFLYLK). Informed consent is obtained from students.

Tuckman Procrastination Scale

Tuckman procrastination scale was developed by Tuckman²⁷ and translated to Turkish by Uzun Ozer, Sackes, and Tuckman.²⁸ The scale is a self-report questionnaire. The English version consisted of 16 questions, and the Turkish version consisted of 14 questions with a single-factor structure. Respondents were asked to rate themselves on a 5-point Likert scale. Higher scores indicate a greater tendency to procrastinate.

Adult Attention Deficit Hyperactivity Disorder Self-Report Scale

The adult ADHD self-report scale was developed in conjunction with the World Health Organization (WHO), and the Workgroup on Adult ADHD²⁹ and Turkish version were validated by Dogan and colleagues.³⁰ It has 18 items, and each of them is rated on 5-point Likert scale. A score of 24 or greater suggests highly likely to have ADHD, and a score below 16 implies unlikely to have ADHD. A score between 17 and 23 shows likely to have ADHD.

Table 1. Background Information of Students

	Group 1 (GPA 2-2.5) n = 88	Group 2 (GPA 2.5-3) n = 111	Group 3 (GPA 3-3.5) n = 87	Group 4 (GPA 3.5-4) n = 32	P
Sex, n (%)					
Female	40 (45.5)	72 (64.9)	41 (47.1)	19 (59.4)	.02
Male	48 (54.5)	39 (35.1)	46 (52.9)	13 (40.6)	
Birth order, n (%)					
First born	42 (47.7)	57 (51.4)	47 (54.0)	18 (56.3)	.541
Middle	27 (30.7)	26 (23.4)	16 (18.4)	5 (15.6)	
Last born	19 (21.6)	28 (25.2)	24 (27.6)	9 (28.1)	
Satisfaction status from department, n (%)					
Satisfied	65 (73.9)	96 (86.5)	74 (85.1)	28 (87.5)	.08
Not satisfied	23 (26.1)	15 (13.5)	13 (14.9)	4 (12.5)	
Education status of mother, n (%)					
Primary school	31 (35.2)	38 (34.2)	22 (25.3)	9 (28.1)	.849
High school	22 (25.0)	27 (24.3)	23 (26.4)	9 (28.1)	
University	35 (39.8)	45 (40.5)	42 (48.3)	14 (43.8)	
Education status of father, n (%)					
Primary school	17 (19.3)	21 (18.9)	13 (14.9)	6 (18.8)	.534
High school	14 (15.9)	23 (20.7)	17 (19.5)	11 (34.4)	
University	57 (64.8)	66 (59.5)	57 (65.5)	15 (46.9)	

GPA, grade point average.

Table 2a. Procrastination Scores of 4 Groups

	Group 1 (GPA 2-2.5) n = 88	Groups 2 (GPA 2.5-3) n = 111	Groups 3 (GPA 3-3.5) n = 87	Group 4 (GPA 3.5-4) n = 32	P
Procrastination Score	41 (16-60)	41 (22-59)	39 (18-58)	37 (21-53)	.006

GPA, grade point average.

Statistical Analysis

Descriptive data were presented as mean \pm standard deviation (SD) and median and range for the continuous variables and frequency and percentages (%) for the categorical variables. Continuous variables were evaluated for normality distribution using the Shapiro–Wilk test. GPA groups were compared with the Kruskal–Wallis test for the non-normally distributed variables, or a one-way ANOVA test was used for normally distributed variables. Categorical variables were compared using Pearson’s chi-square test or Fisher exact test. Spearman’s correlation analysis was used to examine the correlation between ADHD and procrastination scores. Linear regression analysis was used to determine the association between ADHD and academic performance and ADHD and procrastination scores. Additionally, in linear regression analysis, a dummy variable was used in order to assess each GPA group’s ADHD scores.

All significant tests were two-tailed, and values of $P < .05$ were considered statistically significant. All statistical analyses were performed by Statistical Package for the Social Sciences Statistics software, version 21 (IBM SPSS Corp.; Armonk, NY, USA).

Results

A total of 318 (mean age: 19.7 ± 1.6 ; 46% male) students participated in the study. Seventy-two students were in their first year of medicine school; 131 were in their second year; 83 were in their third year; and 32 were in their fourth year of medicine faculty. There were 88 students in group 1, 111 in group 2, 87 in group 3, and 32 in group 4. The ages of the students ranged from 19 to 24. Background information was similar between all groups, as shown in Table 1.

The mean frequency of procrastination score was 39.83 ± 7.45 on the Tuckman scale. According to the Tuckman scale, 45% of students had a tendency to procrastinate. There was a statistically significant difference between procrastination scores of 4 groups and academic performance ($P = .006$). In linear regression

analyses, students with higher academic performance had smaller procrastination scores. Academic performance was an effective variable of procrastination. Effects of academic performance on procrastination were analyzed by the dummy variable for each group. Procrastination scores of all groups, linear regression, and dummy analyses are shown in Tables 2.

The mean ADHD score was 31.87 ± 9.6 . There was no statistically significant difference between all groups in terms of ADHD score or academic performance ($P = .358$).

Linear regression analyses revealed that ADHD was an effective variable for procrastination (β (95% CI) = 0.339 (0.263-0.415); Standard error: 0.039; $P < .001$). Students who had higher ADHD scores were more likely to procrastinate. There is a positive, statistically moderately significant relationship between procrastination and ADHD ($r_s = 0.393$; $P < .001$).

According to univariable ordinal logistic regression parameter estimation, procrastination was associated with academic performance. One point decrease in the procrastination score corresponded to 1.044-fold increase in academic performance (95% CI, 1.017-1.073, $P = .002$). There was no statistically significant association between ADHD and academic performance ($P = .142$) (Table 3).

Discussion

We found that nearly half (45%) of the medical students had a tendency to procrastinate. The prevalence of procrastination among medical students has been reported to be 28.85%-29.25%.^{7,25} We found a higher rate than previously demonstrated. This might be due to the profile of medical students or the type of procrastination scale. Hayat et al used the Procrastination Assessment Scale – Students score to measure procrastination prevalence. Moreover, in line with our result, some studies found that almost half of the college students had a tendency to procrastinate.⁵ In our cohort, students who had higher academic performance tend to procrastinate less and vice versa. Some authors suggested that academic performance and procrastination are independent variables³¹ However, studies highlighted that procrastination and academic performance were positively associated, in line with our results.^{32,33} To boost the academic achievement of medical students, educators should be aware of procrastination behavior. Furthermore, future studies could be conducted to show when they become a procrastinator, before or after the administration of medicine faculty.

Table 2b. Academic Performance and Procrastination Linear regression Analyses and Dummy Variable Analyses

	β (95% CI)	Std. Error	P
Academic performance (for all groups)	-1.441 (-2.286 to -0.596)	0.430	.001
Academic performance			
GPA 2-2.5	1.986 (0.161-3.81)	0.927	.033
GPA 2.5-3	0.846 (-0.876-2.569)	0.875	.334
GPA 3-3.5	-1.310 (-3.148-0.529)	0.934	.161
GPA 3.5-4	-3.640 (-6.343 to -0.937)	1.347	.008

GPA, grade point average.

Table 3. Univariable Ordinal Logistic Regression Parameter Estimations

	Odds Ratio (95% CI)	Std. Error	P
Procrastination	1.044 (1.017-1.073)	0.014	.002
ADHD	1.015 (1.005-1.037)	0.011	.142

Academic performance is the dependent variable.
ADHD, attention deficit hyperactivity disorder.

We found that ADHD was an effective variable for procrastination. Students with a high probability of ADHD symptoms had a greater tendency to procrastinate. However, we did not find an association between academic performance and ADHD symptoms. On the other hand, Jangmo et al suggest that students with ADHD are more likely to have lower academic performance.³⁴ It was noted in a study that attention deficit was distinctly related to procrastination, but it was not correlated with hyperactivity or impulsivity.³⁵ The association between inattention and procrastination was examined, and it was suggested to be based on executive function impairment.²² On the contrary, Ferrari J. R. did not find an association between procrastination and attention deficit.³⁶

There were some limitations in this study. The main limitation was our small sample size. Another significant limitation was that our data was based on self-reports and reflected the output of 1 semester.

Conclusion

Procrastination was prevalent among medical students, and academic performance was affected by procrastination. Moreover, students with probable ADHD symptoms had a tendency to procrastinate more. Therefore, students with lower academic performance should be screened for procrastination.

Data Availability Statement: All data generated or analyzed during this study are included in this article.

Ethics Committee Approval: Ethical committee approval was received from the Ethics Committee of Istanbul University-Cerrahpaşa (Approval no: BENFFLYLK, Date: July 7, 2020).

Informed Consent: Verbal informed consent was obtained from the patients who agreed to take part in the study.

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