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Determinants of Educational Procrastination among Medical Students at Shahid Beheshti University of Medical Sciences

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Introduction: Educational procrastination is a pervasive issue among students, influenced by a range of demographic, psychological, and behavioral factors. This study aimed to assess the prevalence and determinants of educational procrastination among medical students at Shahid Beheshti University of Medical Sciences, focusing on the unique challenges posed by remote learning and Internet use.

Methods: A quantitative, cross-sectional study was conducted involving 200 medical students who had completed the basic sciences courses. Data were collected using a demographic questionnaire, Solomon and Rothbloom's academic procrastination questionnaire, and a researcher-made questionnaire assessing the factors contributing to procrastination. Statistical analyses, including t-tests, chi-square tests, and regression analyses, were performed using SPSS version 24.

Results: The study found a high prevalence of severe procrastination among medical students. Age, gender, and Internet addiction emerged as significant predictors of procrastination, with younger students, females, and those with higher levels of Internet addiction exhibiting greater procrastination tendencies. Other factors, including educational status, second job, work experience, marital status, living arrangements, socioeconomic status, GPA, psychological issues, self-confidence, stress during tests, and motivation, did not significantly predict procrastination. These findings underscore the complexity of academic procrastination and its multifaceted determinants.

Conclusion: Interventions to reduce procrastination should consider key demographic and psychological factors, especially focusing on younger students, females, and those with high levels of Internet addiction. Further research is required to explore causal relationships and develop targeted strategies for addressing procrastination in medical education.

Keywords: Academic; Procrastination; Medical students; Internet addiction

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Introduction

Procrastination, the habitual delaying of tasks, is a behavior observed in many individuals and is considered by researchers to be an innate human tendency (1, 2). It is a widespread phenomenon influenced significantly by

cultural contexts (3). For instance, a study by Barat revealed that people often procrastinate to avoid criticism (4). While procrastination is not inherently problematic, it can usually lead to undesirable and irreparable consequences, such as the prevention of personal development and failure to achieve goals (5). Among the various forms of procrastination, academic procrastination is particularly prevalent.

Academic procrastination, the tendency to delay academic tasks, is commonly associated with anxiety. A clear example is students postponing their study sessions until the night before an exam (2). This phenomenon is widespread among university students (6). Studies examining the effects of this type of procrastination have shown mixed results; some suggest negative impacts on learning and academic performance (7), while others indicate potential positive effects on educational progress (8). Procrastination is generally linked to poor mental health (9) and overall negative consequences on physical and psychological well-being, as well as individuals' ability to achieve their goals (10).

Psychological research indicates that academic procrastination is related to various personality and behavioral factors. Despite numerous definitions and perspectives on work procrastination, its underlying causes remain somewhat ambiguous, with studies often yielding contradictory results (11). Factors influencing procrastination include personality traits, age, gender, fear of failure and success, perfectionism, and environmental factors such as family and economic pressures, social and cultural factors and unpredictable events (12). Recently, psychological factors such as mental health, anxiety, depression, and behavioral addictions like Internet addiction have also been identified as contributing factors (13, 14).

Procrastination tendencies among students are influenced by various factors, including shifts in academic environments and evolving educational demands. Since early 2020, the transition to virtual learning environments has introduced significant challenges for students, professors, and academic professionals. This shift has been associated with reduced participation, increased absenteeism, and heightened psychological distress (15, 16). Challenges in online education, such as poor time management (17), misuse of online peer strategies (17, 18), feelings of isolation, lack of motivation, and issues related to online communication, have amplified the need for self-regulation among students, exacerbating procrastination behaviors. Moreover, the rapid adaptation to online learning has posed difficulties for both students and professors (13, 14, 19, 20), highlighting the importance of understanding the factors contributing to procrastination. This study aims to assess academic procrastination among medical students at Shahid Beheshti University of Medical Sciences and explore its determinants in recent educational transformations.

Methods

Study Design

This study was a quantitative, cross-sectional study conducted to evaluate the prevalence and factors associated with academic procrastination among medical students during the COVID-19 pandemic. The main objective of the study was to determine how often medical students at Shahid Beheshti University of Medical Sciences procrastinate as to their studies in 1402. Additionally, the study aimed to explore the association of academic procrastination and various demographic characteristics such as age, gender, marital status, place of residence, employment status, and academic level. This study was approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences under the code of IR.SBMU.SME.REC.1402.012.

Study Population and Sample Size

The study population included medical students who had completed the basic sciences courses at Shahid Beheshti University of Medical Sciences. Using Sullivan's formula and considering a margin of error of 10% and a 95% confidence level, the sample size was estimated to be 200 participants. Sampling was conducted consecutively. Students eligible for this study had to be currently enrolled in Shahid Beheshti University of Medical Sciences and had to have completed the basic sciences courses. Participants were asked to provide informed consent and complete the study questionnaires. Students who had not completed the basic sciences courses and those who were unwilling or unable to provide informed consent were excluded from the study.

Data Collection and Tools

The data were collected using the following tools:

Demographic Questionnaire: This included questions on age, gender, educational status (trainee or intern), marital status, residence (dormitory, private home, or with family), and economic status.

Solomon and Rothbloom's Academic Procrastination Questionnaire: This 27-item scale measures procrastination in homework preparation, exam preparation, and term paper

preparation. The questionnaire uses a 5-point Likert scale, with scores ranging from 1 (never) to 5 (always). Items 2, 4, 6, 11, 15, 16, 21, 23, and 25 are reverse-scored. Procrastination levels are categorized as low [27-54], moderate [54-81], and high (above 81). The reliability of this questionnaire was confirmed by Nikbakht et al. with a Cronbach's alpha of 0.86, and its validity was assessed by Jokar and Delavarpour [45].

Researcher-Made Questionnaire on the Relationship Between the COVID-19 Pandemic and Procrastination: This questionnaire includes items related to the impact of the pandemic on various aspects of academic procrastination, scored using a Likert scale (ranging from "no effect" to "definitely had an effect"). It coveres areas such as term paper writing, exam preparation, weekly study, academic executive work, meetings with supervisors, and general homework completion. This questionnaire was piloted among 20 students and 3 professors to ensure clarity and relevance.

Data Collection Procedure

After obtaining ethics committee approval, was collected the data in various educational hospitals affiliated with Shahid Beheshti University of Medical Sciences. Students were recruited through consecutive sampling, and the questionnaires were distributed among those who volunteered to participate. The data collection tools ensured anonymity and confidentiality.

Data Analysis

Data analysis was conducted using SPSS version 24 software. Statistical tests, including t-tests and chi-square tests, were applied to evaluate the relationships between variables and determine the prevalence and the correlates of academic procrastination. Additionally, regression coefficients were used to quantify the strength and direction of the relationships between academic procrastination and the demographic variables, as well as the impact of the COVID-19 pandemic.

Ethical Consideration

This study adhered to the ethical guidelines and principles outlined in the Declaration of Helsinki, ensuring that all research activities were conducted in a manner that respected the dignity, rights, and welfare of the participants. Ethical approval for this study was obtained from the ethics committee of Shahid Beheshti University of Medical Sciences, with the code of IR.SBMU.SME.REC.1402.012.

Table 1: Demographic Characteristics of Participants

Characteristic	Count (%)
Educational Status	
Extern	153 (78.5%)
Intern	41 (21.5%)
Age	
25-30 y	179 (91.3%)
< 25 y	14 (7.1%)
> 30 y	3 (1.5%)
Gender	
Male	91 (46.3%)
Female	103 (52.6%)
Second Job	
Yes	35 (17.9%)
No	159 (81.9%)
Work Experience Duration	
< 2 y	172 (88.7%)
2-5 y	20 (10.3%)
5-10 y	1 (0.5%)
> 10 y	1 (0.5%)
Marital Status	
Single	187 (96.4%)
Married	7 (3.6%)
Divorced	0 (0.0%)
Living Status	
Family	106 (54.1%)
Alone	27 (13.8%)
Dorm	61 (31.1%)
SES (Socioeconomic Status)	
Low	12 (6.2%)
Intermediate	102 (52.6%)
Good	73 (37.6%)
Excellent	7 (3.6%)
GPA	
< 14	12 (6.2%)
14 - 16	52 (26.8%)
16 - 18	98 (50.5%)
18 - 20	32 (16.5%)
Current Psychological Issue	
Yes	78 (40.0%)
No	116 (59.5%)
History of Psychological Issue	
Yes	84 (42.9%)
No	106 (54.1%)
Self-Confidence Level	
Very high	18 (9.3%)
High	62 (32.0%)
Intermediate	97 (50.0%)
Low	17 (8.8%)
Stress During Test	
Yes	111 (56.7%)
No	80 (41.0%)
Motivation About Studying	
Very high	8 (4.1%)
High	69 (35.6%)
Intermediate	87 (44.8%)
Low	30 (15.5%)
Internet Addiction Level	
Very high	31 (15.9%)
High	84 (43.1%)
Intermediate	65 (33.3%)
Low	13 (6.7%)

Table 2: Effect of COVID-19 on Procrastination from Students' Perspective

Procrastination Type	No Effect	Minimal Effect	Sometimes Effective	Usually, Effective	Always Effective
Education procrastination	26 (13.4%)	45 (23.2%)	40 (20.6%)	45 (23.2%)	38 (19.6%)
Research procrastination	37 (19.1%)	49 (25.3%)	46 (23.7%)	26 (13.4%)	36 (18.6%)
Exam preparation procrastination	28 (14.4%)	41 (21.1%)	56 (28.9%)	28 (14.4%)	41 (21.1%)
Weekly study procrastination	21 (10.8%)	44 (22.7%)	61 (31.4%)	27 (13.9%)	41 (21.1%)
University executive procrastination	37 (19.1%)	54 (27.8%)	48 (24.7%)	24 (12.4%)	31 (16.0%)
Teacher connection procrastination	34 (17.5%)	45 (23.2%)	51 (26.3%)	24 (12.4%)	40 (20.6%)
Homework procrastination	42 (21.6%)	47 (24.2%)	44 (22.7%)	26 (13.4%)	35 (18.0%)

Results

The study included 200 medical students from Shahid Beheshti University of Medical Sciences. The majority of participants were externs (78.9%) and most of them were aged between 25-30 years (92.3%). Gender distribution was relatively balanced, with 46.9% male and 53.1% female participants. A significant number of students did not have a second job (82.0%), and the majority had less than 2 years of work experience (88.7%). Most students were single (96.4%) and lived with their families (54.6%). Regarding socioeconomic status, over half of the participants reported an intermediate level (52.6%), while 37.6% indicated a good socioeconomic status. In terms of academic performance, half of the students had a GPA between 16-18 (50.5%). Psychological issues were prevalent among 40.2% of participants currently, and 43.3% had a history of psychological issues. Self-confidence levels varied, with most students rating their confidence as intermediate (50.0%). Stress during tests was reported by 57.2% of the students, and motivation about studying was predominantly intermediate (44.8%). Internet addiction levels were notably high, with 43.3% of participants experiencing high levels of Internet addiction. Demographic characteristics of the study participants are displayed in Table 1.

Table 2 and Figure 1 illustrate the students' perspectives on how the COVID-19 pandemic affected various types of academic procrastination. The results showed that for education procrastination, a combined 42.8% of students felt that the pandemic had an "almost always" or "always" effective impact. Research procrastination was perceived similarly, with 32.0% of students indicating that the pandemic had a significant impact. Exam preparation procrastination was notably affected, with 28.9% of students considering it "sometimes effective" and another 21.1% rating it as "always effective." Weekly study procrastination was considered "sometimes effective" by 31.4% of students, with 21.1% finding it "always effective." University executive procrastination and teacher connection procrastination also showed considerable impacts, with notable percentages of students reporting them as "sometimes effective" or higher. Homework procrastination was significantly impacted, with 18.0% of students reporting it as "always effective." Overall, the data suggest that the COVID-19 pandemic substantially influenced the students' procrastination habits across various academic activities.

The descriptive statistics for the total Solomon score, which measures academic procrastination, indicated that among the 194 participants, the scores ranged from a minimum of 27 to a maximum of 126, with a mean score of 83.62 and a standard deviation of 14.66. When categorizing the degree of procrastination, the data showed that most of the students (58.8%) exhibited severe procrastination, while 39.2% had intermediate procrastination, and only 2.1% fell into the low procrastination category.

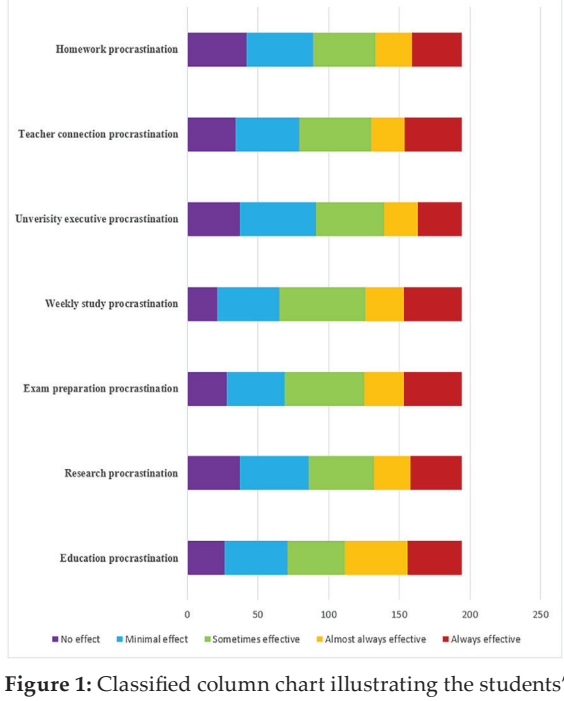

Figure 1: Classified column chart illustrating the students' perspectives on the impact of COVID-19 on various aspects of academic procrastination, including education, research, exam preparation, weekly study, university executive tasks, teacher connections, and homework.

Table 3: Degree of Procrastination by Various Characteristics

Characteristic	Low Procrastination	Intermediate Procrastination	Severe Procrastination	P
Educational Status				
Extern	2 (1.0%)	64 (33.0%)	87 (44.8%)	0.154
Intern	2 (1.0%)	12 (6.2%)	27 (13.9%)	
Age				
25-30 y	3 (1.5%)	69 (35.6%)	107 (55.2%)	0.446
< 25 y	1 (0.5%)	6 (3.1%)	7 (3.6%)	
> 30 y	0 (0.0%)	1 (0.5%)	0 (0.0%)	
Gender				
Male	2 (1.0%)	36 (18.6%)	53 (27.3%)	0.985
Female	2 (1.0%)	40 (20.6%)	61 (31.4%)	
Second Job				
Yes	0 (0.0%)	15 (7.7%)	20 (10.3%)	0.592
No	4 (2.1%)	61 (31.4%)	94 (48.5%)	
Work Experience Duration				
< 2 y	4 (2.1%)	67 (34.5%)	101 (52.1%)	0.841
2-5 y	0 (0.0%)	8 (4.1%)	12 (6.2%)	
5-10 y	0 (0.0%)	0 (0.0%)	1 (0.5%)	
> 10 y	0 (0.0%)	1 (0.5%)	0 (0.0%)	
Marital Status				
Single	4 (2.1%)	73 (37.6%)	110 (56.7%)	0.915
Married	0 (0.0%)	3 (1.5%)	4 (2.1%)	
Divorced	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Living Status				
Family	4 (2.1%)	44 (22.7%)	58 (29.9%)	0.282
Alone	0 (0.0%)	8 (4.1%)	19 (9.8%)	
Dorm	0 (0.0%)	24 (12.4%)	37 (19.1%)	
SES (Socioeconomic Status)				
Low	0 (0.0%)	5 (2.6%)	7 (3.6%)	0.988
Intermediate	2 (1.0%)	38 (19.6%)	62 (32.0%)	
Good	2 (1.0%)	30 (15.5%)	41 (21.1%)	
Excellent	0 (0.0%)	3 (1.5%)	4 (2.1%)	
GPA				
< 14	0 (0.0%)	7 (3.6%)	5 (2.6%)	0.294
14 - 16	1 (0.5%)	14 (7.2%)	37 (19.1%)	
16 - 18	3 (1.5%)	40 (20.6%)	55 (28.4%)	
18 - 20	0 (0.0%)	15 (7.7%)	17 (8.8%)	
Current Psychological Issue				
Yes	0 (0.0%)	29 (14.9%)	49 (25.3%)	0.203
No	4 (2.1%)	47 (24.2%)	65 (33.5%)	
History of Psychological Issue				
Yes	0 (0.0%)	28 (14.4%)	56 (28.9%)	0.265
No	4 (2.1%)	46 (23.7%)	56 (28.9%)	
Self-Confidence Level				
Very high	0 (0.0%)	7 (3.6%)	11 (5.7%)	0.617
High	0 (0.0%)	24 (12.4%)	38 (19.6%)	
Intermediate	4 (2.1%)	39 (20.1%)	54 (27.8%)	
Low	0 (0.0%)	6 (3.1%)	11 (5.7%)	
Stress During Test				
Yes	1 (0.5%)	42 (21.6%)	68 (35.1%)	0.546
No	3 (1.5%)	32 (16.5%)	45 (23.2%)	
Motivation About Studying				
Very high	0 (0.0%)	5 (2.6%)	3 (1.5%)	0.598
High	0 (0.0%)	27 (13.9%)	42 (21.6%)	
Intermediate	3 (1.5%)	32 (16.5%)	52 (26.8%)	
Low	1 (0.5%)	12 (6.2%)	17 (8.8%)	
Internet Addiction Level				
Very high	0 (0.0%)	10 (5.2%)	21 (10.8%)	0.617
High	2 (1.0%)	30 (15.5%)	52 (26.8%)	
Intermediate	2 (1.0%)	28 (14.4%)	35 (18.0%)	
Low	0 (0.0%)	8 (4.1%)	5 (2.6%)	

Table 4: Regression Analysis of Variables Affecting Procrastination

Variable	Regression Coefficient (B)	95% Confidence Interval	P
Educational status	-2.13	-7.460 to 3.201	0.432
Age	-8.123	-15.594 to -0.653	0.033
Gender	4.757	0.258 to 9.257	0.038
Second job	0.009	-6.127 to 6.145	0.998
Work experience duration	2.119	-3.733 to 7.971	0.476
Marital status	2.996	-8.431 to 14.423	0.606
Living status	1.29	-1.215 to 3.794	0.311
SES	-0.096	-3.548 to 3.356	0.956
GPA	-1.602	-4.334 to 1.129	0.249
Current psychological issue	-1.739	-7.036 to 3.559	0.518
History of psychological issue	-4.828	-9.671 to 0.014	0.051
Self-confidence level	-1.522	-4.411 to 1.366	0.300
Stress during test	-1.633	-5.843 to 2.578	0.445
Motivation about studying	0.474	-2.451 to 3.399	0.750
Internet addiction level	-3.441	-5.977 to -0.904	0.008

Table 3 presents the degree of procrastination among medical students based on different characteristics and the corresponding P-values from the chi-square tests. For educational status, 44.8% of the externs and 13.9% of the interns exhibited severe procrastination, with a P-value of 0.154, indicating no significant difference. 55.2% of students aged 25-30 years showed severe procrastination (p=0.446). Gender did not significantly affect procrastination levels, with a p value of 0.985. Second job status, work experience duration, marital status, and living status also did not show significant differences in procrastination levels, socioeconomic status (SES) and GPA showed no significant differences with P-values of 0.988 and 0.294, respectively. Psychological issues, both current and historical, as well as self-confidence levels, stress during tests, motivation about studying, and Internet addiction levels also did not significantly affect procrastination levels, as indicated by their P-values.

Table 4 presents the regression analysis results for various variables affecting procrastination among medical students. The regression coefficients (B) indicate the direction and magnitude of the relationship between each variable and the level of procrastination. Significant predictors of procrastination include age, gender, and Internet addiction level. Age negatively affected procrastination, with older students less likely to procrastinate (B=-8.123, P=0.033). Gender was positively associated with procrastination, with females more likely to procrastinate (B=4.757, P=0.038). Internet addiction level also showed a significant negative effect, indicating that higher Internet addiction is associated with higher procrastination (B=-3.441, P=0.008). Other variables, such as educational status, second job, work experience duration, marital status, living status, SES, GPA, current and history of psychological issues, self-confidence level, stress during tests, and motivation about studying, were not significant predictors of procrastination.

Discussion

The study revealed that a significant number of medical students experienced severe procrastination, with notable differences based on demographic and psychological factors. Age and gender emerged as significant predictors, with younger students and females showing higher levels of procrastination. Internet addiction was also strongly associated with increased procrastination. Despite these findings, other factors such as educational status, second job, work experience, marital status, living arrangements, socioeconomic status, GPA, current and historical psychological issues, self-confidence, stress during tests, and motivation about studying did not significantly predict procrastination levels. These results highlight the multifaceted nature of academic procrastination and suggest that interventions should consider these demographic and psychological dimensions.

The regression analysis of this study revealed three significant predictors of academic procrastination among medical students: age, gender, and Internet addiction. Older students were less likely to procrastinate, which may be attributed to their greater maturity, better time management skills, and more experience with handling academic pressures compared to younger students. As students' progress through their academic journey, they are more likely to develop more effective strategies for coping with deadlines and balancing various responsibilities, reducing the tendency to procrastinate. Gender

was another significant factor, with female students more likely to procrastinate than their male counterparts. This finding could be explained by a variety of factors, including higher levels of academic stress and anxiety often reported by female students, potentially driven by societal pressures to excel academically or to balance academic and personal responsibilities. Female students may also be more prone to perfectionism, leading to delays in task completion as they strive for ideal outcomes. Lastly, Internet addiction was significantly associated with higher levels of procrastination, a finding that underscores the negative impact of excessive online activity on academic performance. Students with higher levels of Internet addiction may struggle to manage their time effectively, spending more hours on non-academic activities such as social media or entertainment, which distracts them from their studies. The accessibility of the Internet, especially during the COVID-19 pandemic when students relied heavily on online learning, may have exacerbated this behavior, making it harder for students to focus on their academic responsibilities and contributing to higher procrastination rates. This combination of age, gender, and Internet addiction highlights the complex interplay of personal characteristics and behavioral factors that influence procrastination, suggesting the need for targeted interventions to address these specific predictors.

Comparison of the findings of Karimi Moonaghi et al.'s review (2016) with our study revealed that both recognize the widespread nature of academic procrastination; also, Munghi focused on personality traits and psychological issues while our study found 58.8% of students had severe procrastination (20, 21). We provided statistical evidence showing age, gender, and Internet addiction as significant factors, offering more detailed insights than Munghi's qualitative approach. Similarly, Mortazavi (2015) highlighted multifactorial causes of procrastination, but our research added significant predictors such as Internet addiction, further clarifying the influence of behavioral factors (22-24).

Cheharzad (2016) found that 69.5% of students exhibited moderate procrastination, while our study reported 58.8% with severe procrastination; although both studies recognized gender differences, Cheharzad found that females had higher procrastination levels, contrasting with our findings where gender did not significantly impact procrastination (21). Odachi's (2011) research focused on problematic Internet use, showing no direct relationship with procrastination, while our study found that internet addiction significantly increased procrastination levels, highlighting different angles of the impact of Internet-related behavior (23).

Peixoto (2021) emphasized the protective role of enthusiasm against procrastination, which was not explored in our study. However, both studies linked procrastination with negative outcomes, such as life dissatisfaction and psychological distress. Our study also found Internet addiction to be a significant factor, in the same line with Peixoto's psychological findings (25). Hong's (2021) study emphasized how procrastination reduced online learning effectiveness, paralleling our findings of Internet addiction negatively impacting procrastination, but Hong focused more on learning behaviors (26).

Comparing the results of Hayat (2020) with our study revealed both emphasized the significant effect of Internet addiction on procrastination though Hayat found lower rates of procrastination (28.85%) compared to our 58.8%. While Hayat identified male students and dorm residents as more prone to procrastination, our study did not find gender or living place to be significant predictors (13, 27). Finally, Mohammadi (2018) highlighted metacognitive beliefs as contributing to procrastination, but our research focused more on demographic and behavioral factors like Internet addiction, providing a broader analysis of influences (28).

This study had several limitations, including its cross-sectional design, which limits the ability to establish causality between the variables and procrastination. The reliance on self-reported questionnaires may also introduce response bias. Additionally, the study was conducted at a single institution, which may limit the generalizability of the findings to other settings. Despite these limitations, the study had several strengths. It provided valuable insights into the factors influencing academic procrastination among medical students during the COVID-19 pandemic, highlighting significant predictors such as age, gender, and Internet addiction. The use of well-established measurement tools enhances the reliability and validity of the results. Furthermore, the sample size in this study is robust, allowing for a comprehensive analysis of various demographic and psychological factors.

Conclusion

This study demonstrates a high prevalence of academic procrastination among medical students at Shahid Beheshti University of Medical Sciences, with a majority of students exhibiting severe procrastination. While demographic and educational factors such as

academic status, socioeconomic status, and GPA were not significantly related to procrastination, younger age, female gender, and higher levels of Internet addiction emerged as the key predictors. These findings underscore the importance of targeted interventions that address the challenges of increased online activity and promote effective time management strategies to reduce procrastination in medical education.

Authors' Contribution

All authors listed have contributed sufficiently to the project to be included as authors. To the best of our knowledge, no conflict of interest, financial or other, exists. All authors have agreed to the submission and that the manuscript is not currently under submission in any other journal.

Conflict of Interest

The authors declare no conflicts of interest.

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