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Procrastination and Achievement Motivation Among Undergraduate Medical Students During COVID-19 Pandemic in Malaysia

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Abstract

During the COVID-19 pandemic, many colleges and universities in Malaysia have undergone transitions from classroom teaching to online teaching due to the lockdown and campus closure. Therefore, there is an emergence of the tendency to procrastinate which can lead to detrimental impact on the students. The aim of this study was to determine the relationship between procrastination and achievement motivation as well as the other related variables among students of MUCM during the lockdown. This cross-sectional study was conducted among all MBBS and BDS students of Manipal University College Malaysia (n=153) from January 2021 to March 2021. An online questionnaire was distributed and a total of 159 responses were received. The Ray-Lynn AO scale which consists of 14 items and the Lay procrastination scale which consists of 20 items were used after getting institutional ethical approval. Statistical tests (Unpaired t-test, ANOVA test and correlation) were done using Epi Info software (version 7.2.4.0). High procrastination score (≥62) was seen among 20.1% of the students, moderate procrastination score (56-61) was found among 23.3% of the students and low procrastination score (≤55) was found among 56.6% of the students. Findings revealed that there were significant associations between gender and procrastination (P=0.046), ethnicity and procrastination (P=0.289), parental education level and procrastination (P=0.198) as well as extracurricular involvement and procrastination (P=0.001). However, achievement motivation was found to be negatively correlated with procrastination (r=-0.56 and P < 0.001).

Keywords

Procrastination, Achievement Motivation, COVID-19 Pandemic, Undergraduate Medical Students, Cross-sectional Study, Malaysia

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1. Introduction

As we are all aware, the COVID-19 pandemic has brought about a worldwide lockdown which has tremendously affected all aspects of our lives. Many people have the tendency to procrastinate in the midst of lockdown, especially students who are taking online courses. [1] Procrastination is an intended course of voluntary action to delay despite expecting to be worse for the delay. [2] It is generally common among students especially in terms of academics which negatively affects the well-being and performance. [3] It can also lead to anxiety and emotional distress, thus reducing quality of life. [3] Some studies suggested that approximately 50% to 95% of college students procrastinate on a regular basis [4] and the rate of academic procrastination was within 70%-95%. [4] Based on a study

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regarding the nature of the student's academic procrastination that had been conducted on university students in Malaysia, it was found that none of the students were categorized as 'Not Procrastinators', 21% fell under the category of "Not Serious Procrastinators", 67% fell under the category of "Procrastinators", and 12% of the students fell under the category of "Serious Procrastinators". [4]

Achievement motivation referred to as the need for achievement, is an important determinant of effort, persistence and aspiration when an individual assumes that his performance will be evaluated aligning with some standard of excellence. A person with such behavior is known to be achievement-oriented. [5] In a previous study on Procrastination and Achievement motivation, it was found that these two variables had a negative correlation. [6] When reviewing the previous literature about achievement motivation, it was evident that there were many other factors that influenced it. Two of the main factors were the learner [7] and the learning environment [7-8]. In particularly, factors like parental support and motivation [9], positive emotional response [9], prior grades and performance feedback [10], extracurricular activities [11-12], positive rewards when scoring well in exams [13], parental education level [14], being some of them. Nevertheless, some factors affecting procrastination, were on par with the above mentioned achievement motivation factors. The parenting style [15], high perceived parental expectations and criticism [15], fear of failure [16] were such overlapping factors.

Previously, a study conducted among dental undergraduate students in Melaka Manipal Medical College, Malaysia showed negative association between academic procrastination and self-efficacy. [17] However, procrastination and achievement motivation during the COVID-19 pandemic has yet to be studied. We have also expanded our sample group to include in not just dental but medical students as well. [17] Not only that, many researches have been conducted on how procrastination affects academic achievement. However, this can also occur in a form of chain reaction where a person's achievement motivation affects their procrastination level, hence leading to an overall effect on their academic achievement. [18] Thus, investigating the factors affecting achievement motivation are important as well. [18] Our research mainly concentrates on understanding how pandemic affects the achievement motivation and leads to procrastination.

The objective of this cross sectional study is to determine the relationship between procrastination and achievement motivation as well as the effect of certain variables such as gender, living environment, parental education level, extracurricular involvement (sports, music, art), extracurricular academic involvement (online workshop, poster presentation), positive rewards upon obtaining good scores, being scolded upon obtaining bad scores, and motivation upon obtaining good scores on achievement motivation and procrastination among the undergraduate medical students of Manipal University College Malaysia, Malacca and Muar Campus, Malaysia during the COVID-19 pandemic.

2. Methods

2.1. Study Design, Study Setting, Study Time and Study Population

A cross sectional study was conducted from January 2021 to March 2021 in Manipal University College Malaysia (MUCM). MUCM is a private institute which consists of two campuses; one is based in Muar, Johor and the other in Bukit Baru, Malacca. It generally offers 3 courses; Foundation in Science (FIS), Bachelor of Medicine & Bachelor of Surgery (MBBS) as well as Bachelor of Dental Surgery (BDS). With respect to this study, we included students only from MBBS and BDS courses which comprises a total amount of 1675 students (BDS and MBBS courses have approximately 375 and 1300 respectively).

2.2. Sample Size

According to a previous study on achievement motivation and procrastination, the results showed a negative correlation between the two variables. [6] Hence the sample size (n) was calculated using the table given in the textbook "Sample size tables for clinical studies", 3rd edition [19], chapter 12 on the correlation coefficient. The previous study had given a Pearson correlation (ρ) of -0.222, Sig. (2 tailed) of 0.026 (statistically significant). [6] Using these test results, and according to the above mentioned reference book, ρ of 0.2, with power (1-β) as 0.8 gave a sample size (n) of 153. The one-sided $\propto$ was 0.05.

2.3. Sampling

One of the non-probability sampling methods, purposive sampling method was used in enrolling students for this study. This method was chosen after considering the study objectives and what was feasible with the study population. The inclusion criteria in the study were that the student must be a student of MUCM, has agreed voluntarily to participate in the study and completed the given google form including the initial consent form. The exclusion criteria included duplication of data by same student, students who have not given consent, students from the Foundation course in MUCM.

2.4. Data Collection

Data was collected by the distribution of online google form questionnaires through individual and whatsapp group chat to the targeted undergraduate students in Manipal University College Malaysia (MUCM). The independent variables included achievement motivation, parental education level of the students, current residency of students, extra-curricular engagements such as sports, music, arts, online workshops and poster presentation, and any positive rewards upon obtaining good scores or being scolded upon obtaining bad scores. The dependent variable was procrastination. The questionnaire included three parts.

The first part was about the informed consent (a brief note on the study with the participant's willingness to participate in the study and the knowledge of the participants right), and also about sociodemographic data (age, gender, ethnicity, nationality, programme and academic year, current residency, parental education level, and etc.)

Second part was about achievement motivation using Ray-Lynn AO scale [20] which consisted of 14 items with the response options of "Yes", "Maybe (?)" and "No". When "Yes" was being selected, 3 marks were allocated; 2 marks were allocated when "Maybe" was selected; 1 mark was allocated when "No" was selected. There were 7 items in the scale that can be scored directly while 7 items have reverse scoring. The total score of this achievement motivation scale ranged between 14 and 42. Total score was obtained by adding up all the marks of 7 items and reverse coding of other 7 items.

Third part was a procrastination scale which was developed by Lay in 1986 [21] and was used in this study. It consisted of 20 items and students were asked to respond to the questionnaire based on five-point Likert scale, which included extremely uncharacteristic (1 point), moderately uncharacteristic (2 points), neutral (3 points), moderately characteristic (4 points) and extremely characteristic (5 points). 10 items of the questionnaire were scored directly while other 10 items have reverse scoring. The score of the procrastination scale ranged between 20 and 100. Total score was obtained by adding up all points of 10 items and reverse coding of the other 10 items. Total score of procrastination scale was categorized into low (≤55 points), moderate (56-61 points), high (≥62 points). [17]

2.5. Data Processing and Data Analysis

The data obtained from the Google Forms was processed with Microsoft Excel. Duplicated responses were removed and the data was analyzed using Epi Info version 7.2.4.0. In the study, the frequency and percentage of qualitative variables such as gender, ethnicity, nationality, programme and academic year, current residency, parental education level, extracurricular and extracurricular academic involvement, positive rewards upon obtaining good scores, being scolded upon obtaining bad scores and motivation upon obtaining good scores were calculated. On the other hand, mean and standard deviation of quantitative variables such as age, achievement motivation and procrastination were calculated as well. Odds ratio was calculated using the analyzed data. Statistical tests used for hypothesis testing were decided based on the independent and dependent variables that are shown in Table 1 below. Level of significance was 0.05.

Table 1. Statistical test used based on relationship of independent and dependent variables.

Independent Variables	Dependent Variables	Statistical Tests
Age	Procrastination	Unpaired t-test
Gender	Procrastination	Unpaired t-test
Ethnicity	Procrastination	ANOVA
Nationality	Procrastination	Unpaired t-test
Programme and academic year	Procrastination	ANOVA
Current Residency	Procrastination	ANOVA
Parental Education Level	Procrastination	ANOVA
Extracurricular involvement	Procrastination	Unpaired t-test
Extracurricular academic involvement	Procrastination	Unpaired t-test
Positive rewards upon obtaining good scores	Procrastination	Unpaired t-test
Being scolded upon obtaining bad scores	Procrastination	Unpaired t-test
Motivation upon obtaining good scores	Procrastination	Unpaired t-test
Achievement motivation	Procrastination	Correlation

2.6. Ethical Consideration

The participants were informed that participation was completely voluntary and a written informed consent was collected. Simultaneously, the participants were assured that the responses were confidential throughout and being used only for research purposes. Given the applicability, the participants were encouraged to answer the questionnaire on the spot. The research was approved by the Research Ethics Committee, Faculty of Medicine of Manipal University College Malaysia, Malaysia.

3. Results

Table 2. Sociodemographic characteristics of undergraduate's medical students (n=159).

Variables	Frequencies (%)
Age	
<22yrs	64(40.3)
≥22yrs	95(59.8)
Mean (SD)	21.9(1.6)
Minimum - Maximum	18.0 - 27.0
Gender	
Male	48(30.2)
Female	111(69.8)
Ethnicity	
Chinese	53(33.3)
Indian	48(30.2)
Malay	17(10.7)
Others	41(25.8)
Nationality	
Malaysian	120(75.5)
International student	39(24.5)
Current Residency	
Alone outside campus	2(1.3)
At hostel	48(30.2)
Friends outside campus	13(8.2)
Parents/Relatives	96(60.4)
Parental Education Level	
High School and below	38(23.9)
Diploma and Degree	85(53.5)
Post Graduate	36(22.6)
Extracurricular involvement (sports, music, art)	
Yes	127(79.9)
No	32(20.1)
Extracurricular academic involvement (Online workshop, poster presentation)	
Yes	67(42.1)
No	92(57.9)
Positive reward for good score	
Yes	102(64.2)
No	57(35.9)
Being scolded upon obtaining bad scores by the parents	
Yes	51(32.1)
No	108(67.9)
Self-motivation upon obtaining good scores	
Yes	146(91.8)
No	13(8.2)

A total of 159 responses were received by our side. Table 2 shows the frequency and percentage of sociodemographic characteristics such as age, gender, ethnicity, nationality, current residency, parental education level, extracurricular involvement, extracurricular academic involvement, positive reward for good score, being scolded upon obtaining bad scores by the parents and self-motivation upon obtaining good scores of undergraduate's medical students. For age group, 40.3% of the students were from the age group <22 years while 59.8% of the students were from the age group ≥22 years. The mean age of the 159 total participants gives rise to a mean of 22 years of age in our sample size. Majority of the gender was females who were 69.8% compared to males who were 30.2%. Among our study sample majority of them was Chinese by 33.3%, then Indian by 30.2%, then the one belong to other ethnicity being 25.8%, and the lowest being Malay whom were 10.7%. 75.5% were Malaysians while 24.5% were international students.

In view of the ongoing Movement Control Order at the time of our study, 60.4% of students stayed with their parents or relatives, 30.2% of students stayed in hostel, 8.2% of students stayed outside campus with their friends, and only 1.3% of students lived outside campus alone. 22.6% of their parental education level were post graduates, 53.5% were diploma and degree holders, while 23.9% of their parental education level were high school graduates or below. Among our sample, 79.9% were involved in extracurricular activities such as arts, music and sports while 42.1% were involved in extracurricular academic activities such as crash courses. 64.2% of the students received positive rewards from their parents for scoring good grades and 35.9% of them did not get any rewards. 32.1% of the students in our sample got scolded for obtaining bad scores and 67.9% did not get any punishments. 91.8% of our sample students were motivated upon getting good results while 8.2% did not get motivated.

Table 3. Procrastination and achievement motivation among students (n=159).

Variables	Frequency (%)
Procrastination	
Low (≤55)	90 (56.6)
Moderate (56-61)	37 (23.3)
High (≥62)	32 (20.1)
Procrastination	54.0 (9.6)[a]
Achievement motivation	32.2(4.3)[a]
[a]Mean (SD). SD=Standard deviation	

Table 3 shows the categories of procrastination as well as the mean and standard deviation of procrastination and achievement motivation scores. Among the students, 56.6% of them had low procrastination, 23.3% had moderate procrastination and 28.5% had high procrastination. The mean (SD) of total procrastination score was 54.0 (9.6) whereas the mean (SD) of total achievement motivation score was 32.3 (4.3).

Table 4. Association between age, gender, ethnicity, nationality, current

residency, parental education level, extracurricular involvement, extracurricular academic involvement, positive rewards upon obtaining good scores, being scolded upon obtaining bad scores, motivation upon obtaining good scores and procrastination.

Independent variables	Procrastination Mean (SD)	Mean difference (95% CI)	P-value
Age			
<22	53.5(10.5)	-0.9 (-4.0, 2.1)	0.545
≥22	54.4 (9.0)		
Gender			
Female	53.0 (9.1)	-3.3 (-6.6, -0.1)	0.046
Male	56.3 (10.4)		
Ethnicity			
Malay	54.8 (7.7)		
Chinese	55.0 (9.1)	-	0.289
Indian	51.8 (9.8)		
Others	55.1 (10.7)		
Nationality			
International student	54.8 (10.8)	1.0 (-2.5, 4.5)	0.565
Malaysian	53.8(9.3)		
Current Residency			
Living with parents/relatives	53.9(10.3)		
With friends outside campus	53.5(8.9)	-	0.936
Alone outside campus	51.0(1.4)		
At hostel	54.6(8.7)		
Parental Education Level			
High School and below	56.1(9.3)		
Diploma and Degree	53.9(9.5)	-	0.198
Post Graduate	52.1(10.2)		
Extracurricular involvement			
Yes	52.7(9.6)	6.4(2.8,10.1)	0.001
No	59.2(8.2)		
Extracurricular academic involvement			
Yes	53.8(10.1)	0.3(-2.8,3.4)	0.839
No	54.2(9.3)		
Positive rewards upon obtaining good scores			
Yes	53.2(9.2)	2.2(-0.9,5.4)	0.161
No	55.5(10.2)		
Being scolded upon obtaining bad scores			
Yes	53.9(10.8)	0.2(-3.1,3.4)	0.917
No	54.1(9.1)		
Motivation upon obtaining good scores			
Yes	53.8(9.4)	2.5(-3.0,8.0)	0.373
No	56.3(12.2)		

Table 4 shows association between age, gender, ethnicity, nationality, current residency, parental education level, extracurricular involvement, extracurricular academic involvement, positive rewards upon obtaining good scores, being scolded upon obtaining bad scores, motivation upon obtaining good scores and procrastination among Manipal University College Malaysia students. Students who were <22 years old have a mean score of 53.5 (SD=10.5) and students who were ≥22 years old of age have a mean score of 54.4 (SD=9.0). The mean difference is -0.9% with 95% CI ranged from -4.0 to 2.1. The P value of 0.545 is more than 0.05, indicating that there is no significant association between age and procrastination. Females have a mean score of 53.0 (SD = 9.1), slightly lower than males with a mean score of 56.3 (SD = 9.1). The mean difference is -3.3 with 95% CI ranged from -6.6 to -0.1. The P value is 0.046 thus showing a significant association between gender and procrastination. With regards to ethnicity, Malay students have a mean score of 54.8 (SD = 7.7), the Chinese have a mean score of 55.0 (SD = 9.1), the Indians have a mean score of 51.8 (SD =. 9.8) and the others have a mean score of 55.1 (SD = 10.7). However, findings were not significant because p value is 0.289. International students have a mean score of 54.8 (SD=10.8) and Malaysian students have a mean score of 53.8 (SD = 10.8). The mean difference is 1.0 with 95% CI range of -2.5 to 4.5. The p value is 0.565 showing that there is no significant association between nationality and procrastination. Participants living with parents or relatives have a mean score of 53.9 (SD = 10.3). Living with friends outside the campus have a mean score of 53.5 (SD = 8.9). Living alone outside campus have a mean score of 51.0 (SD = 1.4). Living at the hostel have a mean score of 54.6 (SD = 8.7). The P value is 0.936 showing that there is no significant association between current residency and procrastination.

With reference to the participant's parental education level, the mean score with high school and below is 56.1(SD=9.3). The mean score for diploma and degree is 53.9 (SD=9.5). The mean score for post graduate is 52.1(SD=10.2). The P value is 0.198 thus showing that there is no significant association between the parental education level and procrastination. The mean score of students involved in extracurricular activities is 52.7 (SD = 9.6) while the mean score of those without extracurricular involvement is 59.2 (SD = 8.2). The mean difference is 6.4 with 95% CI range of 2.8 to 10.1. The P value of 0.001 showed that there is a significant relation between extracurricular activities and procrastination. In addition, the mean score if students were involved in extracurricular academic activities is 53.8 (SD = 10.1) and if there's no extracurricular academic involvement the mean score is 54.2 (SD = 9.3). The mean difference is 0.3 with 95% CI range of -2.8 to 3.4. The P value is 0.839 thus showing that there is no significant association between the extracurricular academic activities and procrastination. The mean score for students who received positive rewards for obtaining good scores is 53.2 (SD = 9.2) and in those who did not receive rewards is 55.5 (SD = 10.2). The mean difference is 2.2 with a 95% CI range of -0.9 to 5.4. The P value is 0.161 indicating that there is no significant association. The mean score for students who got scolded upon obtaining bad scores is 53.9 (SD = 10.8) and for students who did not get scolded is 54.1 (SD = 9.1). The mean difference is 0.2 with a 95% CI range of -3.1 to 3.4. The P value is 0.917 indicating that there is no significant association between getting scolded for bad grades and procrastination. The mean score for students who were motivated upon obtaining good scores is 53.8 (SD = 9.4) and the mean score for students who were not motivated upon

obtaining good scorers is 56.3 (SD = 12.2). The mean difference is 2.5 with a 95% CI range of -3.0 to 8.0. The P value is 0.373 showing that there is no significant association of motivation upon obtaining good grades and procrastination among the students of Manipal University College Malaysia.

Table 5 shows the association between achievement motivation and procrastination. The correlation between achievement motivation and procrastination is moderate negative. The association between achievement and procrastination is significant ($p<0.05$).

Table 5. Association between achievement motivation and procrastination.

Variable	Coefficient (r)	P- value
Achievement motivation & Procrastination	-0.56	<0.001

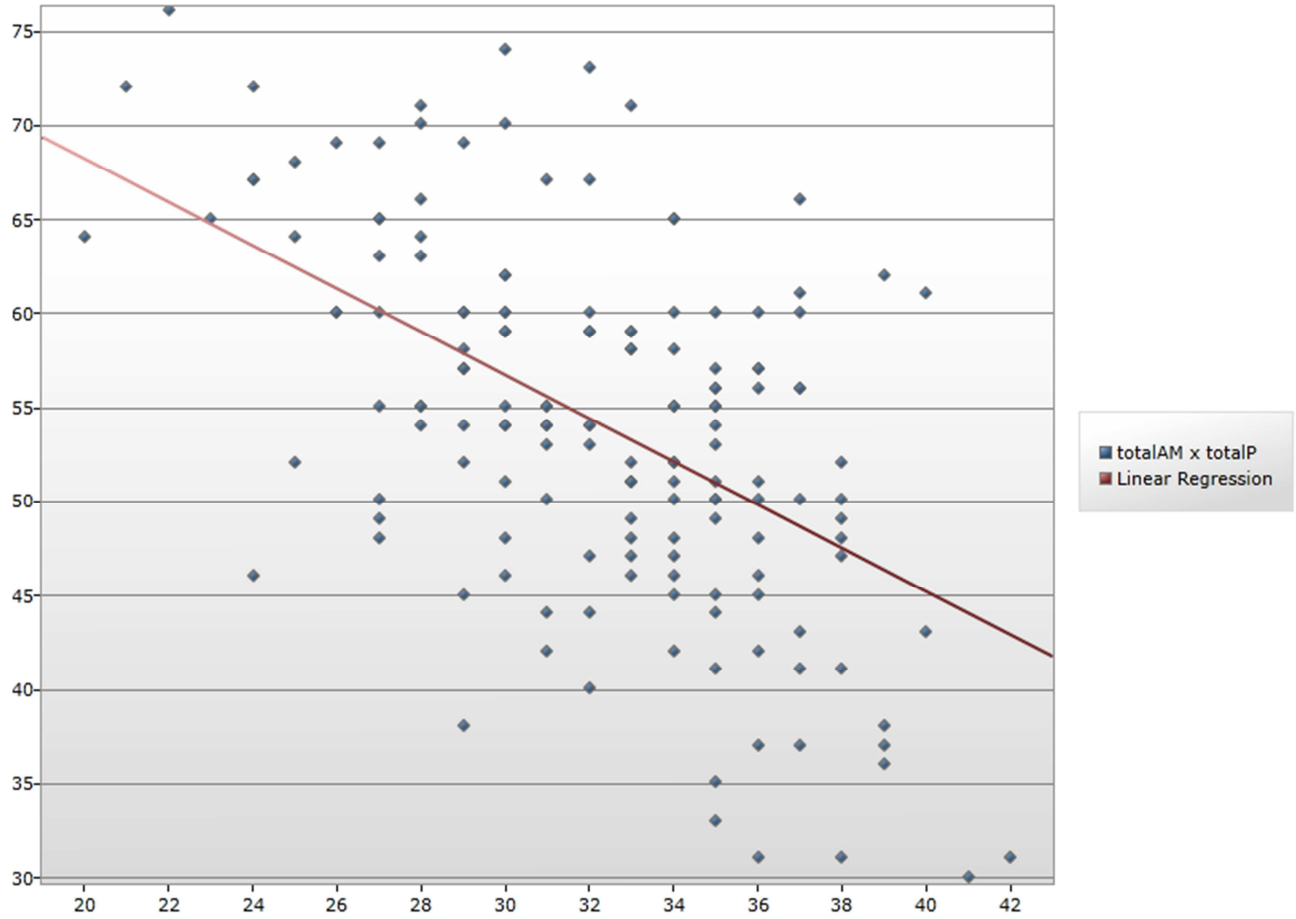

Figure 1. Correlation between achievement motivation and procrastination.

This scattered graph (Figure 1.) shows the correlation between achievement motivation and procrastination. There is moderate negative and significant correlation between achievement motivation and procrastination. This association is significant ($p<0.05$).

4. Discussion

The objective of this cross sectional study was to determine the relationship between procrastination and achievement motivation as well as the effect of certain variables such as gender, living environment, parental education level, extracurricular involvement (sports, music, art), extracurricular academic involvement (online workshop, poster presentation), positive rewards upon obtaining good scores, being scolded upon obtaining bad scores, and motivation upon obtaining good scores on achievement motivation and procrastination among the undergraduate medical students of Manipal University College Malaysia, Malacca and Muar Campus, Malaysia during the COVID-19 pandemic. According to our study, 56.6% of students had low procrastination (scored ≤55 in Lay's Scale), 23.3% of students had moderate procrastination (scored between 56 to 61), and 20.1% of students had high procrastination (scored ≥62). Nearly half of the students (43.4%) had moderate to high procrastination, which is 23.3% lower in comparison with a previous study done among undergraduate dental students in Melaka Manipal Medical College. One of the reasons that led to the difference of results was due to different study populations. We included not only

undergraduate dental students, but also all undergraduate medical students in the study. Not only that, our study was conducted during the COVID-19 pandemic while the previous study was carried out during normal times. Apart from that, based on a study which had been conducted on dental students of a university in India, over a quarter of dental students showed a significant extent of general procrastination which was also marginally higher than those described previously for the general population. [22] As university students generally have a huge workload to be completed simultaneously, especially students who are in the medical profession, they are more prone to academic stress. [23] Thus, students have the tendency to procrastinate and ultimately they are unable to complete their work in time.

This study showed there is significant association between procrastination and achievement motivation because the p value is <0.001, which is <0.05. Besides, there was moderate correlation between these 2 variables. Students that scored high in achievement motivation tend to score less in procrastination scale. A research conducted by Munavara T, Thomas S. [6] also showed significant association but they had negative correlation between procrastination and achievement motivation. A research conducted among the dentistry students [17] also showed negative correlation between self-efficacy and procrastination.

In our study, there were several non-significant findings that were discovered during the analysis, where there was no significant association between age, ethnicity, nationality, current residency, parental education level, extracurricular academic involvement, positive rewards upon obtaining good scores, getting scolded for bad grades, motivation upon obtaining good scores and procrastination among undergraduate medical students in Manipal University College Malaysia. On the other hand, there were significant associations between gender, extracurricular involvement, and procrastination. From the analysis we were able to identify that male students tend to procrastinate more compared to female students. Not only that, it also showed that students who were not involved in extracurricular activities tend to procrastinate more compared to those who were involved in extracurricular activities.

This study carried out on procrastination and self- motivation contained a variety of setbacks and limitations considering the ongoing global pandemic and the source restrictions. In terms of the duration of the study, the questionnaire was distributed among the medical and dental students of Manipal University College Malaysia for a time constraint of only 1 week, which was a significantly short amount of time for a large data collection. With regards to data collection, the MBBS clinical year had the highest number of responses while the BDS preclinical year had the lowest number. This could possibly be because the MBBS students were well-aware of the gravity and importance of the research project as they had been exposed to conducting studies themselves, as opposed to preclinical year students who have not carried out a research and hence would not have responded**.** In reference to the cross sectional study, a single questionnaire cannot determine the changes that can occur in the future. In terms of the questionnaire itself, the Lay 1986 was mainly designed to suit the westerners, so it may not be accurate for the non-westerners.

In addition to the above mentioned causes of the setbacks in data collection, some of the limitations we faced in terms of data analysis were the respondent being bias, possibility of manipulated entries due to the lack of facilities available to check the validity and reliability of the responses as well as incomplete entries. Since the questionnaire contained fixed answers, it has limited the participant's spectrum of responses as opposed to responding with what they truly feel.

The 2 findings that were significant in our study were the relationship between gender and extracurricular involvement (independent variables) with procrastination (dependent variable). The relationships with the other independent variables were not significant, and we recommend that such associations be researched with a larger sample to confirm the findings. Qualitative research could also be used to identify different opinions as well, as each student is different and quantitative research might not identify some factors. We only used some of the independent factors taken from the previous literature in this study. We would also like to suggest in depth research to be done with factors like lack of social interactions [24], digital barriers [24], confinement [13], fear of missing academic year [13], which are factors that could influence medical education during the pandemic. Also students' ability self-concepts [10], task values [10], learning goals [10], teaching methods and management skills of the teacher [9], were factors that were hard to access as our study was an online questionnaire and assessing these would have made the questionnaire longer. We would like to suggest associations between these factors and procrastination also to be done in future.

According to the positive findings, we would like to suggest universities to encourage extracurricular activities, and also have programs to encourage students academically (through talks, events, etc.). We believe this will decrease the level of procrastination in medical students, which would eventually be a building stone for their careers. Moreover, there was limited access to medical journals for the literature review, hence the reason we would like to suggest the college to provide access to medical journals and databases. Last but not least, to minimize selection bias, a randomized sampling method should be used instead of non-probability sampling.

5. Conclusion

According to the data analysis there was a negative correlation with achievement motivation and procrastination. Hence the reason students with higher achievement motivation had lower procrastination scores and vice versa. It was also evident that the male students tend to procrastinate more than the female students. The students who were involved in extracurricular activities had lower levels of procrastination than the ones who did only academic work. Other independent variables had no significant correlation with procrastination and should be researched more in depth in future studies. In conclusion we would also like to suggest the university to encourage more extracurricular activities and have programs to motivate students academically. Since procrastination is a definite enemy of the medical student, we believe recommendations as mentioned above will help medical students significantly.

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