



UNIVERSITI PUTRA MALAYSIA

***ACADEMIC PERFORMANCE AND ITS ASSOCIATED FACTORS
AMONG MEDICAL UNDERGRADUATES IN UNIVERSITI PUTRA
MALAYSIA***

GROUP 11

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ABSTRACT

Introduction: Medical course is known as one of the hardest courses due to its heavy workload and challenges. Nonetheless, as in any courses undertaken, students aim to pass the examinations and to be able to secure a career at the end of the academic years. Good academic performance is also important due to individual, family and societal expectations. Many factors influence a student's academic performance. These include individual, socioeconomic, learning environment, and health conditions. Thus, this research was carried out to determine the factors which influence medical undergraduate students' academic performance in Universiti Putra Malaysia.

Objective: To determine the prevalence and factors associated with the academic performance of medical undergraduates in Universiti Putra Malaysia.

Methodology: This was a cross sectional study which was conducted among medical undergraduate students who were currently in their academic Year Two and Three, 2020/2021 session, in the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia. The calculated sample size after taking into account 20% non-response was 214. The total number of students in Year Two and Year Three was 219. Therefore, universal sampling of all the students was conducted. The data was collected by a self-administered questionnaire via online Google form. The dependent variable was academic performance, which referred to the final examination result of the previous year and was divided into pass, and, fail and resit. The independent variables were divided into individual factors, socioeconomic factors, learning environment, and health conditions. The questionnaire consisted of four sections, namely Section A: Individual factors (age, gender, ethnicity, academic year, previous academic performance,

lifestyle); Section B: Socioeconomic factors (parental factors, housing facilities, and academic sponsorship); Section C: Learning environment (learning style using VARK [Visual, Auditory, Reading/writing, and Kinesthetic] instrument, study habits and preferred teaching method); and Section D: Health condition (physical health and mental health using DASS-21 instrument [Depression, Anxiety, and Stress Scale]). Data collection was carried out from 1st to 15th March 2021. The total duration of the study was from 20th December 2020 to 31st May 2021. Data analysis was carried out using IBM Statistical Package for Social Sciences (SPSS) version 26.0. Data presentation included descriptive results in frequency, percentage, median (Interquartile Range (IQR)), and bivariate analysis results using chi-square. The significant value was set at $p < 0.05$.

Results: A total of 181 students participated in this study, with a response rate of 83.79%. The prevalence of passing the final examination was 94.5%. It was found that ethnicity ($p = 0.049$), fast food/ processed food intake ($p < 0.001$), mother's education level ($p = 0.032$), and study consistency ($p = 0.045$) were significantly associated with academic performance of medical undergraduates in Universiti Putra Malaysia.

Conclusion: Further studies on the modifiable factors such as fast food/ processed food intake and study consistency would be beneficial for development of intervention programmes to improve students' academic achievement.

ABSTRAK

Pengenalan: Kursus perubatan merupakan salah satu jurusan yang sangat sukar kerana beban akademik yang tinggi dan banyak cabaran yang perlu dihadapi. Sama seperti jurusan lain, pelajar jurusan doktor perubatan perlu lulus dalam keputusan peperiksaan supaya dapat tamat pengajian dan meneruskan kerjaya sebagai doktor perubatan. Prestasi akademik yang bagus juga penting kerana mereka menjadi harapan keluarga dan masyarakat. Terdapat banyak faktor yang mempengaruhi prestasi akademik seseorang. Ini termasuklah faktor individu, sosioekonomi, persekitaran pembelajaran dan faktor kesihatan. Oleh itu, penyelidikan ini telah dilaksanakan untuk menentukan faktor yang mempengaruhi prestasi akademik pelajar perubatan di Universiti Putra Malaysia.

Objektif: Untuk menentukan prevalens dan faktor-faktor yang mempengaruhi prestasi akademik pelajar perubatan di Universiti Putra Malaysia.

Metodologi: Kami telah melaksanakan penyelidikan secara irisan lintang dalam kalangan pelajar perubatan Tahun 2 dan 3 pada sesi 2020/2021 di Fakulti Perubatan dan Sains Kesihatan, Universiti Putra Malaysia. Saiz sampel setelah mengambilkira 20% kadar tiada respons yang terdapat adalah 214. Jumlah pelajar perubatan Tahun 2 dan 3 adalah 219. Oleh itu, data telah dikumpulkan dengan cara pensampelan universal. Data telah dikumpulkan melalui atas talian secara *Google Form* dan merupakan soal selidik yang dijawab sendiri. Pembolehubah bersandar merupakan prestasi akademik pelajar perubatan, iaitu keputusan akhir yang terkini dan telah dibahagi kepada dua kategori iaitu lulus, dan gagal dan setelah menduduki semula peperiksaan. Pembolehubah tak bersandar adalah faktor individu, sosioekonomi, persekitaran pembelajaran dan faktor kesihatan. Soal selidik ini melibatkan empat bahagian, Bahagian A: Faktor individu

(umur, jantina, kaum, tahun akademik, sejarah prestasi akademik sebelumnya, gaya hidup.) ;
Bahagian B: Faktor sosioekonomi (faktor ibu bapa, fasiliti perumahan, dan penajaan akademik);
Bahagian C: Persekitaran Pembelajaran (cara belajar menggunakan instrumen *VARK [Visual, Auditory, Reading/writing, and Kinesthetic]*, tabiat belajar dan cara mengajar yang digemari);
and Bahagian D: Faktor kesihatan (kesihatan fizikal dan mental dengan menggunakan instrumen *DASS-21 [Depression, Anxiety, and Stress Scale]*). Pengumpulan data telah dilaksanakan dari 1hb hingga 31hb Mei 2021. Tempoh keseluruhan penyelidikan adalah dari 20hb Disember hingga 31hb Mei 2021. Analisis data telah dilakukan dengan menggunakan *IBM Statistical Package for Social Sciences (SPSS)* versi 26.0. Pembentangan data termasuk keputusan deskriptif secara frekuensi, peratus, median (*IQR*) dan analisa bivariat secara ujian *chi-square*. Nilai signifikan dinilai pada $p < 0.05$.

Keputusan: Seramai 181 orang pelajar telah terlibat di dalam kajian ini dengan kadar respons 83.79%. Prevalen lulus di dalam peperiksaan akhir adalah 94.5%. Kami telah mendapati bahawa kaum ($p=0.049$), pengambilan makanan segera/ makanan diproses ($p<0.001$), tahap pendidikan ibu ($p=0.032$), dan pembelajaran konsisten ($p=0.045$) adalah berkait secara signifikan dengan prestasi akademik pelajar perubatan Universiti Putra Malaysia.

Kesimpulan: Kajian lebih lanjut terhadap faktor-faktor bolehubah seperti pengambilan makanan segera/ makanan diproses dan pembelajaran konsisten dapat membantu di dalam pembentukan program intervensi untuk meningkatkan prestasi akademik pelajar

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LIST OF ABBREVIATIONS

ACHA-NCHA	American College Health Association-national College Health Assessment
A-Level	Advanced Level
AUSOMA	American University School Of Medicine Aruba
BCM	Baylor College Of Medicine
BMI	Body Mass Index
CDC	Centers For Disease Control And Prevention
CGPA	Cumulative Grade Point Average
COVID-19	Coronavirus Disease 2019
DASS-21	Depression, Anxiety, And Stress Scale
df	Degree Of Freedom
ESJ	European Scientific Journal
FMHS	Faculty Of Medicine And Health Sciences
GHQ-28	Goldberg General Health Questionnaire
GPA	Grade Point Average
IQR	Interquartile Range
JKEUPM	Ethics Committee For Research Involving Human Subjects Upm
LSI	Learning Style Index
MCO	Movement Control Order
MCQ	Multiple-choice Question
N	Population Size
OECD	Organisation For Economic Cooperation And Development
OSCE	Objective Structured Clinical Examination
OSPE	Objective Structured Practical Examinations

p	Significant Association
P	Proportion Of Students
PBL	Problem-based Learning
PhD	Doctor Of Philosophy
PMR	Lower Secondary Assessment
PMS	Premenstrual Syndrome
PSQI	Pittsburgh Sleep Quality Index
SAT	Scholastic Assessment Test
SEQ	Short Essay Question
SPM	Malaysian Certificate Of Education
SPSS	Statistical Package For Social Sciences
STPM	Malaysian Higher School Certificate
TBL	Team-based Learning
TFEQ	Three-factor Eating Questionnaire
UK	United Kingdom
UPM	Universiti Putra Malaysia
VARK	Visual, Auditory, Reading/Writing, And Kinesthetic
WBLT	Web-based Lecture Technology
WHO	World Health Organization
χ^2	Chi-square (X2) Statistic
Z	Standard Deviations

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Academic performance is the outcome or result of an individual to accomplish their goals in the instructional environment either in school, college or university (Steinmayr et.al , 2014). It is a quantified result obtained during the learning process, based on the evaluations carried out by the teachers or lecturers through objective test or examination evaluations. The grading system varies according to types of courses and institutions. Examples of grading systems are the GPA (Grade Point Average) grading or a pass/fail grading system depending on the passing marks set by the institution (Jayanthi et al., 2014).

Medical school requires highly competitive students due to several reasons. Firstly, medical students typically have a heavier workload than other courses. Medical students have more credit hours to fulfill to graduate. For instance in Universiti Putra Malaysia (UPM) , the total credit hours is 203 compared to other courses such as Bachelor of Biomedical Sciences which requires only 136. Intellectual endurance and persistence are required to last for five years. The large amount of knowledge needs to be absorbed well enough to enable them to apply during health and medical management and often during emergencies.

In addition to the high academic workload, medical students are also required to fulfill co-curriculum activities organized by college, faculty, university or any student clubs. The reward for participating in the activity, also known as merit, is required for the students who stay

in the institution's residential college. This adds to the students' workload and limits their time to study.

Studies have found that medical students have higher stress levels compared to other courses.. Elias et al. (2011) reported that among 376 undergraduates in UPM, medicine and health sciences' students have the highest mean stress score compared to students in other courses.

Being successful in medical school implies obtaining good results in their examination and to obtain a degree in medicine upon graduation. This is important for the students especially in these three aspects. Firstly, from an individual aspect, it is important to increase the competency of medical undergraduates and to develop and maintain their capability to enable them to endure their academic assessments. Glauser (2019) stated that about 5% of the medical students quit every year, and another 26.7% were expelled for poor academic performance. Poor performance can lead a student to end their academic journey to be a medical doctor.

Secondly, from the family aspect, parents' have high expectations that their children undergoing a medical course will excel and they will be parents when their children graduate as medical doctors. In addition, the fee of a medical course is usually higher than other courses. For example, in UPM, the medical course fee for local students is the highest, which is around RM2787, while the second highest is Bachelor of Engineering which costs RM 2637 (Universiti Putra Malaysia, 2017).

Thirdly, from the societal aspect, a medical doctor is expected to be an expert in the medical field and they expect good treatment with a high recovery rate. Reader et.al (2014) reported that 22.1% of the complaints about medical management is about the treatment, 16.6% is about poor communication, and 10% is about the error in diagnosis. Thus, medical undergraduates should have a good command of medical knowledge to ensure optimum treatment to their patients in the future.

Several factors influence students' academic performance. These include individual factors, socioeconomic factors, learning environment, and health conditions of the medical students. These will be elaborated further in Chapter 2. Thus, this research was carried out to study the factors associated with academic performance among medical undergraduates in UPM.

1.2 Problem Statement

It is important to produce well trained medical doctors with good qualities in various aspects including clinical skills, personality, attitude and especially knowledge. It was found that there was a decline in the medical students' academic performance. In the 2018/ 2019 session, with 109 students, only 4 students had to repeat their Year One academic year; while in the 2019/2020 session, with 104 students, 7 students had to repeat their Year One academic year. There is an increment from 3.67% to 6.73% of students who had to repeat their academic year.

Dropping out from medical school can have a very big impact on students. It was found that around 81.6 to 84.3 percent of four-year medical program students graduate from American

University School of Medicine Aruba (AUSOMA). The others had to leave medical school due to failure in the final examination (Cooley, 2020). There are several pathways for students who dropped out. They either get enrolled in other courses, or just stop pursuing their studies. Some of the students got involved in other careers. It was found that the average employment rate of tertiary-educated individuals is over 88%, 74% for people with upper secondary and post-secondary non-tertiary education and for those without an upper secondary education is just below 56% (Organisation for Economic Cooperation and Development (OECD), 2012). However, there is also a probability that they could not find a job and end up jobless.

1.3 Significance of study.

The findings of this study will provide information on the factors associated with academic performance among medical students. This will help the academic administrators to plan programmes to assist students in improving their learning methods or learning environment. It can also assist in the improvement of teaching methods among academic staff to further enrich students' understanding of the medical curriculum.

Information on the factors can also assist in identifying students at risk of poor achievement in their examinations. Thus, early intervention can be provided by the institution to ensure an optimum environment and good learning skills among the students. This will also be beneficial for the students in building their learning abilities and performance during examinations. Higher achievements among the students will also reflect good governance of the institution.

1.4 Research questions.

- i. What is the prevalence of academic performance among medical undergraduates in Universiti Putra Malaysia?
- ii. What are the factors associated with academic performance among medical undergraduates in Universiti Putra Malaysia?

1.5 Study Objectives

1.5.1 General Objectives

The general objective of this study is to determine the prevalence and factors associated with academic performance among medical undergraduates in Universiti Putra Malaysia.

1.5.2 Specific Objectives

The specific objectives of this study are to determine:

- i. the prevalence of academic performance among medical undergraduates in Universiti Putra Malaysia;
- ii. the individual factors, socioeconomic factors, learning environment and health condition of the respondents;
- iii. the association between individual factors (age, gender, ethnicity, academic year, previous academic performance, lifestyle) and students' academic performance;
- iv. the association between socioeconomic factors (parental factor, housing facilities, educational sponsorship) and students' academic performance;

- v. the association between learning environment (learning style, study habits, preferred teaching method) and students' academic performance;
- vi. the association between health conditions (physical and mental health) and students' academic performance.

1.6 Study Hypothesis

H1 There is significant association between individual factors and academic performance among medical undergraduates.

H2 There is significant association between socioeconomic factors and academic performance among medical undergraduates.

H3 There is significant association between learning environments and academic performance among medical undergraduates.

H4 There is significant association between health conditions and academic performance among medical undergraduates.

CHAPTER 2

LITERATURE REVIEW

2.1 Medical school academic curriculum and workload

Academic performance is defined as “performance outcomes that indicate the extent to which a person has accomplished specific goals that were the focus of activities in instructional environments, specifically in school, college, and university” (Steinmayr et.al , 2014). In a medical degree course, there are differences between preclinical and clinical years’ curriculum and students are assessed by different methods. This study focused on students’ preclinical academic performance which consists of final examination results in Year One and Year Two.

The medical school academic curriculum has evolved and improved over time to ensure effective delivery of education and enhanced students’ learning process. During the late 1950s, System Based Learning was developed and was first used by Case Western Reserve Medical School. The knowledge is learned based on the human system. As the students learn each of the human body systems, for example, the urinary system; the students will learn the anatomy of the organs involved, physiology, pathology, pharmacology and the management and prevention of diseases. It is still currently applicable and is most commonly used including UPM. The advantage of this approach is it enhances the absorption of knowledge because the knowledge is all linked and connected. However, there are still some weaknesses in this approach. It hardly covers conditions whereby multiple organs are involved and the pharmacological aspect is sometimes not being considered (Dubin, 2016).

Discipline Based Learning was introduced in the early 1950s (Dubin, 2016). A traditional discipline-based curriculum is still being used in some medical schools across the globe, including India, some other Asian countries, and some Caribbean medical schools. In this system, students are not exposed to clinical education or patients until the third year of their medical program. During the first two years of their medical education, the curriculum is completely focused on basic sciences. (Dharanipragada et.al, 2018).

Both System Based Learning and Discipline Based Learning are passive forms of learning. To overcome that, an active form of learning was introduced in the late 1960s, known as Problem Based Learning (PBL) was introduced by McMaster University Medical School in Canada. In this approach, students are divided into groups and an appointed facilitator guides them in doing problem solving of a case study. This method is used in conjunction with System Based Learning and the cases are studied from one system to another (Dubin, 2016).

The workload of the medical undergraduates is higher compared to the undergraduates in other courses. In Universiti Putra Malaysia, the medical students' credit hours are higher than students in other fields of study. The total credit hours required for a medical student to graduate is 203 credit hours compared to the Bachelor of Biomedical Sciences which requires only 136 credit hours; Bachelor of Dietitian requires 147 credit hours; Bachelor of Science Environmental and Occupational Health with Honors needs 143 credit hours; Bachelor of Science Nutrition and Community Health with Honors requires 143 credit hours as well and Bachelor of Nursing

requires 143 credit hours (Faculty Of Medicine And Health Sciences (FMHS), 2020). From Baylor College of Medicine, similarly, the medical students have high credit hours where 79.25 semester credit hours for Foundation Science are needed with 16 semester credits for elective courses and 65.5 credit hours of Clinical Sciences Instruction (Baylor College of Medicine, 2018). Hence, we can see from these statistics where the medical students' have high credit hours to cover with and can lead to more assignments as well. Thus, the evolution of academic structure always changes to adapt the medical students to the environment and the technology era so that we will have trained and skillful doctors in the future in Malaysia.

2.2 A study of Academic Performance among Medical Undergraduates

Medical schools require the student to have a good academic performance in order for them to graduate on time. There are multiple types of evaluation of medical students during their medical training, such as written examination, clinical examination, case studies, Objective Structured Clinical Examination (OSCE) and Objective Structured Practical Examination (OSPE). Maziah et. al. (2019) stated that good academic performance is important for students to be competent doctors in the future. A study by Ekwochi et. al. (2019) showed that failure to achieve consistent good academic performance resulted in dismissal from the medical school. These studies showed that it is important for medical students to achieve good and consistent academic performance throughout their training.

According to the oxford bibliography report, there are various methods of academic evaluation for different purposes. For instance, Grade Point Average (GPA) is an internationally recognised

calculation used to find the average result of all grades achieved throughout a certain course. For selection purposes, a standardized assessment known as the Scholastic Assessment Test (SAT), is one of the assessments used to evaluate students' eligibility to continue study in a higher educational institution (Steinmayr et. al., 2014). In the assessment of medical academic achievement, different universities use different grading systems. For example, University of Malaya (UM) uses the Cumulative Grade Points Average (CGPA) system, while in UPM a pass and fail system is used whereby a score of above 50 marks is the passing mark for examinations. If a student fails in an examination, he/ she is required to resit the examination. Subsequently, if the student fails the resit examination, he/ she needs to repeat the year of study (Ekwochi et.al, 2019).

2.3 Factors Associated with Academic Performance among Medical Students

2.3.1 Individual Factors

2.3.1.1 Age

A candidate who applies for a medical programme is required to have a specified level of achievement and competence in either Malaysian Higher School Certificate or in Malay, *Sijil Tinggi Persekolahan Malaysia* (STPM), General Certificate of Education Advanced ("A") levels, matriculation, foundation or pre-medical programme, diploma or bachelor degree. Therefore, they may be at different ages at the time of registration. Marley & Carman (1999) found that younger students have less motivation in studying medicine, as they were still aimless after entering the course. In the same study in the University of Adelaide, it was found that only 52% of newly admitted medical students actually had the ambition to enter medicine. Young aged

students were found to be still unsure of their career and this may affect their academic performance due to low academic motivation.

Study by Schripsema et. al (2017), found that the higher application for graduate application in (what uni). At the end of the study they found significantly associated between age and academic performance by being able to get $p < 0.05$. This is due to the fact that increasing the student's age will make them able to have prior experience in an academic setting which will also make them be a professional that will be suited to the medical student environment. This will help them be able to cooperate with any obstacle while learning in medical school. This will make them able to perform well once they get into medical school.

The age shows some significant changes on the academic performance, thus it should be considered as one of the factors to affect the academic performance too.

2.3.1.2 Gender

According to Fetterolf (2017), women have contributed to fourth tenth of the workforce in around 80 countries. When there is an increase in involvement of women in the career, of course, there will be an increase of women to be involved in academics in the medical field. Boyle (2019) stated that more than half of the medical students enrolled are female. And it is unbelievable that, in 2015, the female proportion is still 46.9%. It shows the increment in females involved in the medical field within 4 years. However, will gender affect academic performances in medical courses?

According to Nuzhat (2013), the female has a more diverse preference than male in multimodal learning and accumulates more GPA by getting 146 students by giving VARK to the students. However in Japan, among the 202 medical students in Tokyo Medical and Dental University, although there is a positive relationship states that male have higher academic performance where has higher graduation rate which is 71.8% than females with 28.2%, it shows that the significant value was significant which is less than 0.05 for the males students with low academic performance (Nawa et.al, 2020) .

Faisal et.al (2017) prove that under a pharmacological test that held 200 students with both male and female students, it was found that under Multiple-choice Question (MCQ), the male has higher percentage than female which is around 20% which have their score under 50%, and in Short Essay Questions (SEQ), almost 25% of male has under 50%, and female has higher rate which is more than 30%. Thus, it shows that the students' shows different performance in different types of questions. Although the result does not really support the statement, however, the result is narrowed into a subject in the medical field, we still need to conduct research to find out the gender effect on the academic performance.

The female was found to have more complex hormone distribution than male, and thus, this may affect the academic performance of the female as well. Hussein Shehadeh & Hamdan-Mansour (2017) proposed that there is an impact of Premenstrual Syndrome (PMS) symptoms on the academic performance measures (social involvement, academic involvement, self-determination,

and GPA scores) among female students. Thus, the female may face more difficulties than male too in their studies. Thus, in the studies which involve 858 female students in Jordan, there is no significant association between PMS and academic performance with a significant value of 0.7 however there is high significant value which is 0.001 between the syndrome and self determination level. Thus, it is still kept in view.

The genders should not be the stone that stops our pathway on our study journey, however, it is important to find out the gender effect on academic performance so it can be solved earlier.

2.3.1.3 Ethnicity

Malaysia is a country that consists of multiple races. Although a different proportion of ethnics entered the medical course, the students' result is judged the same by the lecturer and the university. So, how different ethnics can affect the medical undergraduate's academic performances? This may be due to the cultural changes, traditional habits, the family education and the languages spoken.

Bakar et.al (2010) found that there is a significant effect on academic performance of students by ethnicity. In the study, 1484 education, science, humanities, agriculture, technical and engineering programmes students in local universities were involved, and thus the results are still kept in view although it supports the statement where the significant value is less than 0.01 and reject the null hypothesis where there is no association between ethnicity and academic performance is rejected. In 2017, a study of the performance of 266 undergraduate Accounting

students in taxation courses at the University of Malaya was observed to see the ethnicity effects by Azmi & Anna (2017). In the results, it shows that the Chinese perform better than the Bumiputera after they were informed that the competition where the Chinese has a mean mark of 75.6 and Bumiputera has 57.91. However, before announcing the competition, Bumiputera has a higher mean mark which is 56.58 and Chinese has 55.60 marks. It may be due to cultural effects by their own family where the Chinese will have higher or more inspired if the results are compared or announced or in competition form and thus it was predicted that the exam will initiate their motivation to get better academic performance with a significant value of 0.03.

Since there is some evidence that supports that the ethnicity should be considered in associated factors, it is important to find it out as well to solve the clues or stereotypes in Malaysian. Thus, ethnicity is included in the research.

2.3.1.4 Academic Year

According to the Oxford Language academic year can be defined as the period of the year during which students attend school or university but for this research it is involving the period of student attendance to the university. As for medical courses, it is required of all medical students to attend the university for five years which is two year as a preclinical student in which they will only learn about the theory about all the pathogenesis of the disease. While another three years of medical school will be spent as a clinical student, they will study about how they are going to handle patients in the hospital, learn how to do physical examinations and learn about surgery. So in the academic year system they will have first year, second, third, fourth and fifth year. So

increasing our year of study will increase the academic performance due to the more things students will learn so the deeper they will understand about certain topics.

Based on the research that has been conducted by Kusurkar et. al. (2010). In the study there is a maturity factor simultaneously affected by the academic year. The reason why this factor is important is because students can score more in the examination if they are able to be mature. Maturity is important because it will help students to be more motivated and able handle stress in medical school.

Marley and Carman (1999) have conducted study in Australia and noticed only 52 percent of newly enrolled medical students actually had desire to pursue medicine, 19 percent entered because of biology curiosity, 13 percent entered because they got high marks, but they had no understanding of their profession and four percent could not provide any clear explanation. With low interest and low motivation, all this will lead to decreasing academic performance. This study has been proved that the factor of academic year does affect academic performance.

2.3.1.5 Previous Academic Performance

The academic performance which occurs previously is observed as well and it was expected to affect the current academic performance of the students.

It was found that the students who failed examinations before have an effect on their academic performance. This is related due to the students' academic emotions. According to Hayat et.al

(2018) it was found that the academic emotion is associated with the students' academic performance with a significant value of <0.01 . In this study, we noticed that emotions affect academic performance. According to Henry et.al (2018), it was found that the pre failure may cause another failure especially when the students cannot overcome itself. Rajandran et.al (2015) found that there is a relationship between previous examination results and the recent examination result. They compare the Cumulative Grade Point Average (CGPA) of entry admission and the result previously of around 100 first year undergraduate students with a significant value of <0.05 . Thus, we would like to know the effect of academic failure in students' academic performance during their academic year.

Thus, we would like to investigate the relationship between previous and current academic performance of the students.

2.3.1.6 Lifestyle

Lifestyle is closely related to the wellbeing and productivity of the students themselves which is one major component in the study environment that surely will impact their academic performance. Many students, especially medical undergraduates, tend to neglect their physical wellness because of the mindset of the need to sacrifice something in order to gain something. There are many elements in lifestyle which consist of: Physical activity-strength and flexibility; Nutrition and diet- nutrition and fluid intake and healthy digestion; Rest and sleep- periodic rest and sleep along with high quality sleep.

Centers for Disease Control and Prevention (CDC) (2017) have studied that the people in the age group of 18 to 60 years old required a 7 hours above sleeping duration. Yujia Hao etc. al. (2019) has conducted research to study this issue. This study was conducted to show the importance of physical fitness and lifestyle which is one of the elements of physical health conditions where they are positively related to the academic performance of the students. This study took place at Tongji University and involved a total of 316 students (212 medical students and 104 dental students) enrolled from 2012 to 2014. In this study annual physical test is done which is consist of five components which are morphological components: height, weight, and body mass index (BMI); musculoskeletal components: standing long jump test and crunch/pull up; motor component: speed test (50 meter run); flexibility component (hamstring and lumbar extensibility, sit and-reach test); cardiorespiratory components: vital capacity and 800 meter/1000 meter run (Yujia Hao etc al., 2019). The result shows that female students perform better than the male students in academic performance due to the better physical fitness and higher number of ratios in the university.

According to webmd.com (n.d), insomnia is a sleep disorder in which you have trouble falling and/or staying asleep. The condition can be short-term (acute) or can last a long time (chronic). It may also come and go.

Acute insomnia lasts from 1 night to a few weeks. Insomnia is chronic when it happens at least 3 nights a week for 3 months or more. Study conducted by Haile et. al (2017) shows how insomnia and its temporal association affects the quality of study. This study involved 422 undergraduate

students who were enrolled in 2014/2015 in which all of them were required to answer questionnaires. The questionnaires have five components which include, demographic characteristics, Pittsburgh Sleep Quality Index (PSQI) scale, substance use habit, physical and psychological complaints and sleep hygiene practice. There were a total of 388 students who answered the questionnaire which made up 91.9% while the other 8.1% did not answer the questionnaires due to the excuse of lack of interest and shortage of time. The results show that students with insomnia have an average of 0.04 (CGPA) lower than normal sleepers. Pagel and Kwiatkowski study also showed that insomnia significantly reduces academic performance.

Next research conducted by Valladares et al. (2016) which focuses more on the element of nutrition and diet of the students. This study was done to determine the association between eating behavior and academic performance of the students in the university which involved a total of 680 participants which consisted of 409 (60%) female students and 271 (40%) male students. The type of questionnaire that was used in this study were based on Three-Factor Eating Questionnaire (TFEQ) due to its ability to identify and evaluates 3 dimension of eating behavior; cognitive restriction (limiting own intake); uncontrolled eating (inclination to eat); and emotional eating (control of food intake in the context of negative emotions), (Valladares et al., 2016). The result showed that female students have better scores in emotional eating than male students and it is also being stated that female students with higher Grade Point Average (GPA) score lower on uncontrolled eating dimension. In this study, Valladares et al. (2016) also mentioned that there were no significant associations between eating behavior and academic

performance in male students while the relationship between eating behavior and academic success were clearly seen in female students.

Next, we have also checked the research or previous study regarding the time of students spent on social media. According to the Oxford University Press (2021), social media is the websites and applications that enable users to create and share content or to participate in social networking. Nowadays, there are many social media developed following the development of technology, for example, Facebook, Whatsapps, Instagram, Twitter et.al. There are pros and cons of social media platforms as it is not used to interact between people but is also involved in the education field nowadays. It helps to enhance our communication and make it efficient for us to convey the message, it can soon spread our information, and play a good role in any collaborative work. However, it also causes addiction between youngsters and may affect the daily mission.

Acheaw (2016) found that the academic performance of students is afflicted by the social media used by 1578 students in Koforidua Polytechnic, Ghana.. The hours of social sites usage and usage during lectures affected the academic performance of students significantly which is less than 0.01. Not only these, a study conducted on medical students from Khartoum University showed that facebook and WhatsApp were the most social sites used by medical students. Almost 66% of the students used social networks for more than 3 years (Daffala&Dimetry, 2014).

Alahmar (2016) also proposed that the time spent on Facebook by second year medical students in College of Medicine, University of Babylon, Iraq is about 5.07 ± 2.93 hours and on facebook messenger was 1.80 ± 1.45 hours per day. The portion of time per day that the medical students spend on social media is quite large which means that if the students do not explore the academic pages during these hours, the negative impact will occur on their academic performance. This is mostly related to the time management of the students as when they spend more time on social media, less time would be spent on their academics.

When it comes to pandemic Coronavirus Disease 2019 (COVID-19) that occurs significantly in 2020, we expect that there will be more time spent on social media as the students are isolated and the only pathways for them to connect within each other is through social media. Hence, it is believed that physical health has a great impact on students academic performance due to the optimal body functionality that allows the students to be more productive, thus improving their quality of study. “Intelligence comes into being when the mind, the heart and the body are really harmonious”- *Jiddu Krishnamurti*.

2.3.2 Socioeconomic Factors

2.3.2.1 Parental Factors

Socioeconomic status is most likely one of the debatable issues when it is related with academic issues. Socioeconomic status is commonly divided into three levels which are high, middle and low. These three levels are used to determine the status of a family or an individual may fall into due to several factors such as income, education and occupation of the parents. Usually in terms

of socioeconomic, parents will have a major impact. Students with a better parents' background and socioeconomic status tend to outscore their peers with lower socioeconomic status.

When the parents have a high income, they can provide a better accommodation for their child. This factor plays a main factor because nowadays medical students will be staying at home and having online classes. So if their parents have a high income they can provide good facilities so that it would not affect their study. Okioga (2013) has conducted a case study to investigate this factor which was done in Kisii University College, Kenya. The sample size was 186 students out of a population of 400 students. This research will be open to all undergraduate medical students due to consideration that they are staying in the college and have experience in taking the examination. Surprisingly, 94% respondent felt that socioeconomic status positively impacted the students' academic performance while the other 6% did believe that socioeconomic status does not play a role in students' academic performance.

Next, occupation and background study of the patient play along simultaneously because of the parents having high education so they will get high grade occupation and vice versa. So based on a study that has been done by Mandal et.al (2012). Based on the research, the aim of this study was to examine the relative effects of education, occupation and academic motivation of parents on the achievement of students. This research was conducted in the Departments of Pharmacology at a tertiary care and medical college in Eastern India. This study consisted of 150 students. This is because most parents will put a higher pressure on their children during the

study. Based on this study, there is a significant association between the perceived pressure from parents' who have high education with the students' academic performance. P value is 0.014.

Thus, these two studies indicate that socioeconomic status does give influence in academic performance where the students with higher level socioeconomic background have wide access to higher professional and quality education.

We would also like to investigate the parents' marital status which may affect the students' academic performance. Animasahun (2011) has stated that parental separation causes an impact on the students' academic performance. The investigation was done within 400 students from 8 faculties and the significant value was 0.019 which is statistically significant. While the parental divorce was also significant with a p-value of 0.016. Soria and Linder (2014) also found that students with divorced parents were less persistent in furthering their study and had lower CGPA. The study used secondary data from Cooperative Institutional Research Program on first year students.

2.3.2.2 Housing Facilities

Housing facilities in other words indicate the study environment of a student especially in this pandemic period. In this case, we will like to see whether the housing facilities can affect the academic performance of the medical undergraduates. Usually, there are few choices for the university students to choose their accommodation. However, most students are asked to stay at home during the pandemic era. According to the Law Insider Dictionary, the definition of Student Housing is a place provided to students for long term stay (LID, n.d.). And since the

students' accommodation occupies most of the students' life and plays a vital role in students' daily routine, we would like to find out how long the students usually stay in their accommodation and how it relates to the academic performance of the medical undergraduates or university students and see the effect of rural and urban to it.

According to Faisal et al (2016), they have done research among the rural and urban students and see their results to compare. In the experiments, students are divided into 4 groups according to their result. The significant value found is 0.038 which is less than 0.05 indicates a high significant association between the area of house with the academic performance.

In another research conducted by Zotorvie (2017), the results also show there is not really a correlation between the accommodation and the students' academic performance. However, Maina and Aji (2017) found that there is a direct linkage between the accommodation and the students' academic performance. It was discovered that the housing facilities play a more important role (p-value: 0.027) and water supply (p-value: 0.024).

The hypothesis on significant association between students' housing facilities with academic performance is rejected. However we believe that since the pandemic COVID-19 has occurred, we believe that the housing facilities will play a more important role during the Movement Control Order (MCO) because students spend most of their time at home.

2.3.2.3 Educational sponsorship.

Educational sponsorship is needed in order to achieve good academic performance because the students can give full attention to their study so they do not need to think about their financial situation. This is because the financial support is supported by the sponsor. But in order to get sponsorship, students need to have a consistent good academic performance. Only then they can apply for sponsorship. Based on research that has been conducted by Goga et. al. (2015) finds that average family income and student education sponsorship are very influential to students' academic performance.

Sponsorship can be given in the form of donations like cash, books, food and equipment. Next educational sponsorship can be in the form of scholarship, fellowships, full freeships, study loan and more. Studies have been done by Goga et. al. (2015) to identify how to improve the student academic performance. For this study it involved 11 027 students. The participant needs to tell about the family background factor and previous educational performance for example before and after entering university. Based on the result it showed that the average student who gets a sponsor is doing very well in the academic performance (Goga et. al., 2015). Hence, this study proves that students who get an educational sponsor do have a better academic performance.

2.3.3 Learning Environment

2.3.3.1 Learning Style

Every student has their own way to study. Learning style is an important factor that all medical students should focus on. This is because a good learning style and learning approaches have major implications on their quality of learning and academic success (Soundariya et.al. 2017).

There are numerous learning methods in medical education but most medical students adopt problem-based learning which is student centered and has a high rate of retaining the knowledge in memory (Bokhari & Zafar, 2019). In a recent study, Naimie et. al. (2010) study about the influence of matching or mismatching learning and teaching styles on the achievement of learners. This study involved 310 students that have been selected randomly and observed their Learning Style Index (LSI) . A survey questionnaire and interview have been done in order to collect data. This study does a comparison between learning style preference and achievement scores of matched-learning-teaching style with mismatched learning styles. The result from this study revealed the main learning style in students is active, sensing visual and global (Naimie et. al., 2010).

Another study that has been conducted by Papadatou et. al. (2018). This study is to prove to the teacher that learning style is important. So teachers can give approval about the learning style from the student. This is important to prove the learning style did help students in order to improve their academic achievement. There are 295 students with few teachers who participate in this study. The students are required to state whether they are auditory, visual or kinaesthetic learners and answer some tests while the teachers need to answer questionnaires. The results for this study is mostly students prefer to be visual, auditory or kinaesthetic (Papadatou et. al., 2018). So these two research studies showed that learning style is important in study and every student has their own style of learning and ways to approach during the learning session. So in order to improve students' academic performance they should figure out which one is their preference.

2.3.3.2 Study Habits

Study habits refers to the ways the students study and the habits or the routine the students carry out to perform in their study. There are variations of study habits between different individuals. It mostly relates to the students' personality. For example, will the students take note when he is doing revision, will the students set a goal per day to study on? It covers a wide range of students and directly affects the absorption of knowledge by the students, no matter whether they are medical students or not.

Kiran et.al (2019) has conducted a case control study among 225 students in Shifa College of Medicine to investigate the problem. Thus, a few students who failed were selected from second year for focus group discussion and answered open ended questions. And in the research, it is found that most of the undergraduate medical students failed their first and second year due to their study habits which in this case the time spent on studying is observed. The students who have a habit of doing revision at the last minute ($p < 0.001$), avoid group studying and skip some topics when they are studying ($p=0.021$). This indicates that the underperformed students may face difficulty in their exam which indicates their academic performance when their study habits are not planned well.

Not only this, a study is carried out to investigate the relationship of learning strategies, study habits and social networking activity of undergraduate medical students. It is carried out by Bickerdike et.al (2016). In this case, among 376 students in an Irish Medical School, it was found that time management is highly associated with academic performance with the p-value is

0.01. 47.1% of the sample identified themselves working last minute during the exam, with 49.7% reporting a consistent strategy. Surprisingly, the latter time management strategy was associated with higher mean year score percentage (Bickerdike et.al, 2016).

A recent study by Khanam et.al (2017) was conducted among medical students studying in one of the private medical colleges of Odisha showed that students who perform well in academics also had a high mean score on general time management and their dimensions except for short range planning. This provides strong proof that there is a strong association between time management skills and academic performances in medical students.

Cambridge Dictionary (2021) stated that peers are people who are the same age or have the same social position or the same abilities as other people. Vignery and Laurier (2020) stated that students' peer networks are important factors in the order to understand the studies and improve our academic performance. The reason why it is important is since we are children, friendships are sources of companionship, motivation, physical support, ego-support, social comparison, intimacy and affection are all important during the particular time of development of our growth (Schwartz, 2009).

There were a few studies that have been carried out. Vignery and Laurier (2019) have carried out study of student performance and student network is related to the centrality of a student within its peer group. The study involved 120 students to complete the survey in a questionnaire. The result from the study showed that students tend to reassemble with friends that share similar

levels of performance and in return the performance of these ties remain important in the prediction of students' future academic success (Vignery & Laurier, 2019). Hence, based on the study it showed that there was a great impact between students' centrality and students' achievement.

Next study is organized by Dechant (2011). The objective of this study is to see if variables like friendship can affect the length of friendship and time spent with friends, motivation and academic achievement. Approximately 93 participants from fifth grade and eighth grade, respectively, have been selected to complete 4 questions that involve demographic, friendship description, and friendship qualities scale and intrinsic versus extrinsic motivation scale. The result of this study is that more than half of the participants show eighth grade students more close to their peers that increase their academic performance compared to fifth grade students.

Friends' characteristics are important because in medicine the effective way to study is by doing study groups. So in order to do that friends play an important role to make it work. Based on research that has been done by Koles et. al. (2010) determine whether student success on exams is impacted by Team-based Learning (TBL) attendance and whether TBL favors students with lower or higher performance. This study involved 178 students (86 males, 92 females) and the result from this study is 5.9% which is higher than the mean score for the standard deviation that is 5.5%. So this shows that friends also play an important role in order for medical students to increase their academic performance.

So this study showed that peers do have a connection with academic performance. Plus students need to find a high level of performance among their peers in order to improve their academic performance.

2.3.3.3 Preferred Teaching Method

According to the Oxford language dictionary , lecturer is defined as a person who teaches at a university or college. Hence, the lecturer does play a major role in educating and teaching the students the knowledge that they need so that they will have a better understanding about the topic and thus surely will affect their academic performance. Communication between both parties are really important as the lecturer is someone who performs their lectures in front called teaching (Caroline, 2016). Meanwhile someone who receives the knowledge is called the learning process (Leki et al., 2006). Through this, it can build a better and improve students' attitudes also in thinking and writing (Bonwell & Eison, 1991).

There are few studies that have been carried out regarding this matter. Muzenda (2013) had done a study about the lecturers' competence. Adediwura & Tayo (2007) and Adu & Olatundun (2007) reveal that different elements of lecturer competence include lecturer's subject knowledge, teaching skills, lecturer attitude and lecturer attendance. For this study, it involved a total of 145 students but only 115 students were to answer the questionnaire which consisted of 77.4% female (n=89) and 22.6% male (n=26). The collected data from the questionnaire are based on students academic results and students' perception regarding their lecturer. The result

shows that the lecturer got 70.978% in subject knowledge which is the highest value among the other elements while the attendance of lecturer is 66.797% which is the lowest value

Another study done by Chapin (2018). This study was done to see the impact of web-based lecture recording and study quality web-based lecture technology (WBLT). This study also showed how well the students utilized the system and association with their academic performance. WBLT allows students access to recorded lectures delivered live to the classroom any time and to any device with internet, (Chapin, 2018). This study was conducted by giving an online self-report survey to the first year and second year undergraduate psychology students. Self-report surveying following the end of the semester was chosen for students to report their final results and behaviours, (Chapin, 2018). There are 71 students recorded to complete the surveys. A majority were full-time students (85.7%) and female (77.9%), (Chapin, 2018). It shows that about 58 students (75.3%) were recorded to report that they did use WBLT which make up the majority in this study.

This shows that the lecturer does make a strong connection with the students' academic performance due to the fact that they are the one that teaches and gives out knowledge to the students. "It is the supreme art of the teacher to awaken joy in creative expression and knowledge"- *Albert Einstein*.

2.3.4 Health Condition

2.3.4.1 Physical Health

According to the World Health Organization (WHO), health is defined as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. Health is a gift that should not be taken for granted as it can disappear in the blink of an eye. "Health is not valued till sickness comes"- *Thomas Fuller*. Students should take care and aware of their own health as it is important for their study especially on this era where the world is having a crisis with a new type of disease known as COVID-19 that are able to threaten the whole world.

Walid & Christiane (2010) had conducted a study on the health and wellbeing among the university students to see if there are any associations between the students academic performance. This study was done in the University of Gloucestershire which is located in the United Kingdom, UK. Two simultaneous cross-sectional surveys were used and given to the students where the first survey is about the general health of the students and the second survey is used to value students' satisfaction about their learning and teaching experiences based on certain aspects. The students' grades were obtained from the university database as the students used their registration number to answer the questionnaire thus linking it to the university database. The health & wellbeing questionnaire included socio-demographic information (e.g., gender, age, and financial situation), self-reported health data, as well as questions related to health behaviours (nutrition, physical activity, smoking and alcohol consumption), social support, quality of life and university study related questions (Walid & Christiane., 2010). The results of this study showed that 380 students answered the questionnaire which consisted of 195 male and 185 female students. One fifth of the students mentioned they sometimes or very often

experienced a sleep disorder or insomnia. As for general health, female students were reported to experience excellent health twice as likely as there are also more female students who reported that they kept a constant eye on their health. On the other hand, the male students were about twice more likely to report that their health was fair. When it came to the health status variables, students feeling better general health were more likely to rate their academic performance as being better relative to their fellow peers, (Walid et.al, 2010). It is also mentioned in this study that students having high health awareness (those who kept a constant eye on their health) also felt that general health was a key factor in order to achieve good grades.

Another study conducted by Suraya et al. (2015) which focused on the issues of obesity. This research was done to determine the relationship and impact of obesity on academic performance. This study was conducted at College of Medicine , King Saud University which involved only Saudi female medical students. This study was participated by 191 female medical students with an average of 21.31 years and body mass indices (BMI) 15 to 40 as criteria while the other 9 female students were excluded through interviews which make a total of 200 female students. Suraya et al. (2015) stated that the students who were smokers or having health related conditions like chronic anaemia, diabetes mellitus, visual problems, rheumatic fever or rheumatoid arthritis leading to limited physical activity were excluded from the study. The involved female students were given a well-structured English language questionnaire where the questionnaire consist of questions that asked information about age, gender, weight, height, body mass index, year of study and the overall academic grades were obtained to determine the association of overweight and obesity with academic grades [Grade Point Average-GPA]. As for

the result, it is recorded that most of the female students 85(44.50%) were having BMI 21-25. While the remaining were as follows: 53 (27.75%) had Body Mass Index range 15-20; 35 (18.32%) with BMI 26-30; 13 (6.81%) with BMI 31-35; and 5 (2.5%) with BMI more than 36 (Faryal Suraya et al., 2015). The result of this research also supported that there is a significant association between obesity and students' academic performance as the female medical students with BMI 21-25 and 26-30 achieved highest academic grades while female medical students with high BMI of 31-35 and greater than 36 record a poor academic success.

Even though there is a lack of study on this issue, these two studies are able to show that physical health does have a significant relationship between students' academic performance.

2.3.4.2 Mental Health.

According to mentalhealth.gov, mental health is defined as a human's emotional, psychological and social well-being. The state or the well-being of the mental health itself have a major role for the human to handle the important daily routine in life such as how we interact with others, deciding for choices, and how capable we are to handle stress. Mental health is important at every stage of life, from childhood and adolescence through adulthood (mentalhealth.gov), which also means that students or undergraduates are also one of the groups of people that fall under an individual that is most likely and frequently to undergo stress. For the mental health problem, we can observe through major three problems which included the depression, anxiety and stress scale of the students. There are some differences between them. According to Yesshow & Mossie (2017), depression refers to loss of feeling of interest or pleasure, anxiety is a response

from an individual toward threat and leading to certain symptom such as tension, high blood pressure, high respiratory rate while stress defined as an emotion initiated by an individual due to excess demand than resources.

One of the studies regarding this issue has been found which is conducted by Bostani et al. (2014) which covers the topic of the relationship between the mental health and student's academic performance. This study was conducted at Islamic Azad University Ahvaz Branch located in Iran where about 200 students were involved, 100 each from athletic and non athletic students. The participants were given questionnaires based on Goldberg general health questionnaire (GHQ-28) which contain 28 questions categorized into four areas of depression, anxiety, physical symptom and disorder social performance. As a result, Bostani et al. (2014) mentioned that the higher the students' level of mental health, the better their educational performance as there is a significant relationship between the mental wellness and academic performance.

In the next study conducted by Wyatt et al. (2017) which focused more on the relationship between the mental health and academic performance among the first-year college students. There are a total of 105,781 involved in this study where it is involved in secondary data analysis of the American College Health Association-National College Health Assessment (ACHA-NCHA) II spring 2011. In this study only those who are aged between 18-24 years were included as it was well established that graduate students have different mental health concerns. The ACHA-NCHA II consists of 66 items. To answer the research questions of this study, eight

items related to mental health and academic impact were examined in addition to five demographic items. Two items asked about diagnosis and treatment related to depression and anxiety in the last 12 months, (Wyatt et al., 2017). The results stated that the majority of the students reported no mental health diagnosis/treatment of anxiety (90.6%) or depression (91.4%) and it also stated that males students were less likely to be diagnosed/treated for both anxiety and depression when compared to female students. As for academic performance, stress, depression and anxiety are also having an influence on students' performance. Wyatt et al. (2017) mentioned that 67.0% who experienced anxiety did experience a negative academic impact, the most common response was a lower grade on an exam or project.

Hence, mental health can be seen as closely associated with students' academic performance as the brain or the mental wellbeing itself is one of key components when studying. Especially in this new norm that happens due to the pandemic of covid-19 where MCO has been implemented where the mental wellbeing of the students is the most concerning. We believe that mental health issues such as depression, anxiety and stress will be increased among undergraduates due to the tight situation that they are experiencing which will affect their study, hence affecting their academic performance. Everyone, especially students who have this problem should seek help from someone they trust such as family or close family or even having a counseling session as these issues cannot be taken lightly. "Just because no one else can heal or do your inner work for you, doesn't mean you can, should, or need to do it alone"- *Lisa Olivera*

2.4 Consequences of Medical Students if They Fail in Academic

There are many consequences that will happen if they fail to pass the required examination. Some students might want to drop out of university after facing failure. Some of them might have mental health problems for example stress, depression and anxiety. All of this will make them face more difficulties during learning in medical school. So when students fail it will make their academic performance decrease gradually.

So there are studies that have been done to prove that when students fail in their academics they more easily think to drop their study. Bowles and Brindle have stated that the authors categorize dispositional variables as traits such as self-confidence, behaviors, and values of an individual student (cited in Ajjawi et. al., 2019). Study that had been done by Ajjawi et. al. (2019) mainly to understand what systemic knowledge teaches us about the prevalence of loss and the danger of dropping out. Methods that have been used for this research are mixed methods with aggregated and anonymised data, a predominant qualitative online survey. This survey involved 2260 students and from all of them only 12% of them dropped out from the course and 28% retained in the course by repeating the academic year. So the percentage of students who drop from the course just because they fail is low.

Students who fail in their examination may face mental health problems such as stress and anxiety. A research was carried out by Spring et. al. to identify the effect of pass/fail grades on the well-being of medical students. This study was a systematic search of several databases which included PubMed, Ovid Medline, Ovid PsycINFO and ERIC (Educational Resources

Information Centre). The result from this research is 4 out of 5 papers showed that students still have a well being mental status.

2.5 Conceptual Framework

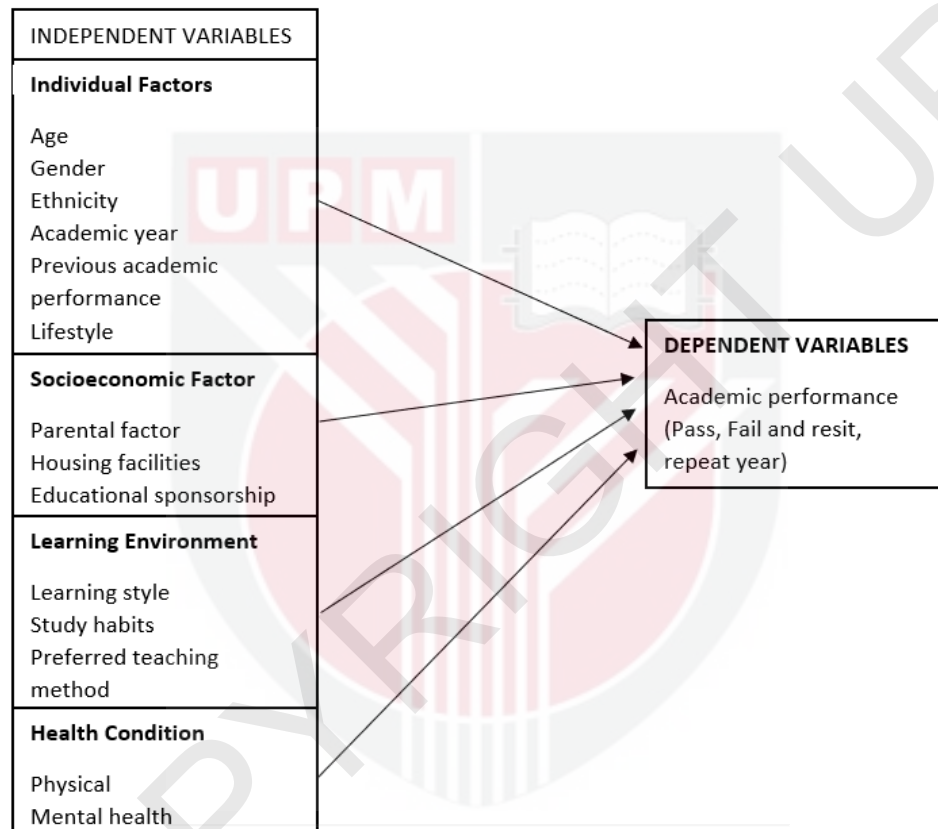


Figure 1: Conceptual framework on factors associated with academic performance among medical undergraduates in Universiti Putra Malaysia.

Figure 1 shows on the right side, the dependent variable that is academic performance while on the left side, independent variables that are individual, socioeconomic, learning and health condition factors. The arrow in the figure shows the association that will be included in the study.

CHAPTER 3

METHODOLOGY

3.1 Study Location

This research was conducted among medical undergraduates in the Faculty of Medicine and Health Sciences (FMHS), Universiti Putra Malaysia (UPM). This faculty offers many courses for undergraduate students for example, Doctor of Medicine, Bachelor of Biomedical Sciences with Honors, Bachelor of Science Environmental and Occupational Health with Honors, Bachelor of Science Dietetic with Honors, Bachelor of Science Nutrition and Community Health with Honors, and Bachelor of Nursing. The Doctor of Medicine Course consists of five academic years which is divided into two stages: preclinical and clinical years. The preclinical years are Year One and Year Two academic years, while clinical years consist of students in Year Three to Year Five of the academic years. Students need to pass their first professional examination at the end of Year Two to be eligible to enter the clinical years. The second professional examination is held at the end of the fifth academic year and students need to pass this examination to graduate. The passing mark for all the examinations is 50%.

Clinical students in Year Three to Five are posted to Serdang Hospital, Kajang Hospital, Kuala Lumpur Hospital and Universiti Putra Malaysia Teaching Hospital (HPUPM) for their clinical sessions. However, during the Movement Control Order (MCO), the clinical sessions are held only in Serdang Hospital and HPUPM. Students in the preclinical years do not have clinical sessions in the hospitals.

3.2 Study Duration

Data collection was carried out from 15th April 2021 to 30th April 2021. The total duration of the study was from 20th December 2020 to 31st May 2021.

3.3 Study Design

This was a cross-sectional study.

3.4 Study Population

All medical undergraduates in the FMHS, Universiti Putra Malaysia (UPM).

3.5 Sampling Population

This study involved medical undergraduates in the FMHS, UPM who fulfill the selection criteria.

3.5.1 Inclusion Criteria

- a) Students in Year Two and Year Three who were enrolled in the Doctor of Medicine course of FMHS, UPM.
- b) Currently studying in session 2020/2021.

3.5.2 Exclusion Criteria

Students who did not agree to participate in the study

3.6 Sampling Frame

A list of names of the medical undergraduates in Year Two and Year Three in the FMHS, UPM who fulfill the selection criteria.

3.7 Sampling Unit

A medical undergraduate in Year Two and Year Three in the FMHS, UPM who fulfill the selection criteria.

3.8 Sample Size

To determine associated factors that affect the academic performance of the medical undergraduates in the FMHS, UPM, we calculated the sample size for five independent variables. We used the formula for two-proportion sample size calculation by Lachenbruch et. al (1991).

$$n = \frac{\{Z_{1-\alpha} \sqrt{2p(1-p)} + Z_{1-\beta} \sqrt{P_1(1-P_1) + P_2(1-P_2)}\}^2}{(P_1 - P_2)^2}$$

$Z_{1-\alpha/2}$ = standard error associated with 95% confidence interval = 1.96

$Z_{1-\beta}$ = standard error associated with 80% power = 0.84

P_1 = P_2 = e.g: Proportion of students who passed and most of the time study with peers

$P_2 =$ P2 = e.g: Proportion of students who passed and most of the time do not study with peers

$$p^- = \frac{P_1 + P_2}{2}$$

This will give the value of 89.

To calculate for two groups = $2 \times 89 = 178$

To calculate for 20% non-response: $178 + (20\% \times 178)$

$$N = 178 + 36 = 214$$

The calculations for other variables are in Appendix 1.

3.9 Sampling Method

From the sample size calculated, the required sample size after including 20% non-response was 214. The total number of students in Year Two and Year Three was 219. Therefore, a universal sampling method was used for this study.

3.10 Study Instrument

An online, self-administered questionnaire using Google form was used during data collection.

The questionnaire consisted of four sections (Section A, B, C, and D).

i. Section A: Individual factors

- a. Age
- b. Gender
- c. Ethnicity
- d. Academic year
- e. Previous Academic Performance (in 2019/2020 session)
- f. Lifestyle

This includes sleeping hours, regular sleeping time, regular meals, consumption of caffeine drinks and fast food/ processed food, activities during free time and time spent on social media.

ii. Section B Socioeconomic Factors

- a. Parental factors

This includes parents' marital status, parents' educational level, parents' occupation, and household income.

- b. Housing facilities

This includes the location where respondents stay, in rural or urban areas. It also included questions on conducive study environment, adequate study space, stable internet connection, sufficient gadgets for studying, and water and electric supply.

c. Educational sponsorship

This identified whether the respondents have any academic sponsorship.

iii. Section C: Learning environment

a. Learning style

The questions for learning style were adapted from VARK learning style questionnaire which identifies four modalities of learning style: visual (V), auditory (A), reading/ writing (R) or kinesthetic (K) (Fleming & Mills, 1992). The questionnaire has 16 statements with four choices of answers. Each choice of answer indicates a category of learning style, either V, A, R or K. Table 3.1 shows the scoring chart for the VARK questionnaire. The respondent can choose either one answer which best explains his/ her preference, or choose more than one preference if there is no one single best preference.

Table 3.1 Scoring Chart for VARK Questionnaire

Question	A category	B category	C category	D category
1	K	A	R	V
2	V	A	R	K
3	K	V	R	A
4	K	A	V	R
5	A	V	K	R
6	K	R	V	A

7	K	A	V	R
8	R	K	A	V
9	R	A	K	V
10	K	V	R	A
11	V	R	A	K
12	A	R	V	K
13	K	A	R	V
14	K	R	A	V
15	K	A	R	V
16	V	A	R	K

The total number of each preference (V,A R, or K) is then counted. The preference with the highest total score indicates the learning style of the respondent. If there is more than one category with the same score, it means that the person has multiple preferences or multimodal learning styles. Table 3.2 shows the calculation chart for the respondent's score.

Table 3.2 Calculation Total Scoring

	Total Score
V	
A	
R	
K	

b. Study habit

This identifies the respondent habits of study which include number hours spent studying, consistency of studying, timely assignment submission, group preference, and preferred teaching method.

iv. Section D: Health condition factor

a. Physical health

This consists of 10 common chronic diseases among young adults.

b. Mental health

Mental health was measured using the DASS-21 instrument, which is the shorter version of DASS-21 42. This instrument was developed by Lovibond & Lovibond (1995). Each statement in the DASS-21 questionnaire is scored by a Likert scale of severity ranging from a minimum score of zero for 'did not apply to me at all' to a maximum score of three, 'applied to me very much or most of the time' for their experience in the past one week. The total DASS-21 score is multiplied by two in order to get the final score. Zero is the lowest final score and 42 is the highest score. Each DASS-21 subscale of depression, anxiety and stress has seven items and are graded into normal, mild, moderate, severe and extremely severe. Table 3.3 indicates the scoring for each category based on the psychological condition (Lovibond & Lovibond, 1995).

Table 3.3: DASS-21 Domains and its Scoring

Category	Depression Scale	Anxiety Scale	Stress scale
----------	------------------	---------------	--------------

Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely severe	28-42	20-42	34-42

3.11 Variables and operational definition

3.11.1 Dependant Variable

The dependent variable in this study was the academic performance among medical undergraduates. For Year Two students, this referred to their final examination in Year One, in the 2019/2020 session. For Year Three students, this referred to their First Professional Examination in Year Two, 2019/2020 session. The choice of answer was either pass, or, fail and resit.

3.11.2 Independent Variable

The independent variables in this study were as follows.

i. Individual Factors

a. Age

The respondents were asked their year of birth. This was then converted to their age in 2021.

b. Gender

The respondents were divided into male and female

c. Ethnicity

The ethnicity was self-reported as Malay, Chinese, Indian and Others. These were then categorized into Malay and Others.

d. Academic Year

The academic year was divided into two options, Year Two or Year Three for the 2020/2021 session.

e. Previous Academic Performance

For the previous academic performance, the options provided for respondents were 'Repeat Year One', 'Repeat Year Two' or 'Did not repeat any years'. This was then categorized into 'Ever repeat' and 'Never repeat'.

f. Lifestyle

Lifestyle questions involved sleep routines which consisted of sleeping duration at night (seven hours or more), regular sleeping time at night, intake of meals regularly, consumption of caffeine drinks and consumption of fast food/ processed food. These questions required the respondent to choose between yes or no. We also asked about their activities during their free time. The choices were online gaming, physical activity, social media, reading novels, or do not having free time. This was then categorised into 'Have an activity' and 'Do not have free time'. Besides that, we also asked regarding the number of hours spent on social

media per day. This was categorized into less than five hours, and five hours or more.

ii. Socioeconomic Factors

a. Parental Factors

Parental factors included questions about marital status. The options were married, divorced, separated, and widow/ widower. This was then categorized into married and Others. The educational level of their parents were divided into no formal education, primary school, Lower Secondary Assessment (PMR), Malaysian Certificate Of Education (SPM), Pre- University (STPM/ Foundation/Advanced Level (A-level)/ Diploma/ Polytechnic/ Matriculation), Bachelor, Master and Doctor Of Philosophy (PhD). These were then categorized into Low (for no formal education, primary school, PMR, and SPM) and High (Bachelor, Master and PhD). Parents' occupation was divided into:

1 = Agriculture, Food and Natural Resources

2 = Business Management and Business Administration

3 = Communication and Information System

4 = Engineering, Manufacturing and Technology

5 = Medical, Health, and Science and Technology

6 = Education and Training

7 = Government and Public Administration

8 = Human Services

9 = Law, Public Safety, Corrections and Security

10 = Jobless

11 = Retired

12 = Housewife / Househusband

These were based on a study by Torpey (2015). These were then categorised into two categories: working (for all types of job) and others (for jobless, retired, and housewife).

Household income in a month was divided into three categories, T20 (above RM10961), M40 (Between RM4851 to RM10960) and B40 (below Rm4850). In bivariate analysis, this was further categorized into low income (B40) and high income (M40 and T20).

b. Housing Facility

For housing facilities, the respondents self-reported whether they live in rural or urban areas. They were also asked whether they have a conducive study environment without disturbance, enough space to study, stable internet connection, adequate gadgets for learning (such as computer, handphone, etc), and water and electric supply at home. These questions had a yes or no option.

c. Educational Sponsorship

The respondents were asked to respond whether they have sponsorship or not from any agencies.

iii. Learning Environment

a. Learning Style

For the learning style, VARK questionnaire was used. This consists of 16 statements with four options within each statement. The respondents were to choose the best answer from the four options that matched their preference. If they do not have one best preference, then they can answer more than one. Each statement represents either one of V (visual), A (auditory), R (reading/ writing), and K (kinesthetic) as shown in Table 3.1. The score for each preference were then counted (Table 3.2). The preference with the highest score represents the respondent's preferred learning style. If more than one learning style had the same score, then the respondent was categorized as having 'Multiple learning style'. For bivariate analysis, learning style was categorized into 'One learning style' and 'Multiple learning style'.

b. Study Habits

Study habits consisted of a question on the number of study hours in a day. This was then categorized into less than five hours and five hours or more. In addition, there were also questions on whether they preferred to study last minute for their examination, whether they study consistently to prepare for their examination, and whether they mostly submit their

assignments on time. The responses were either Yes or No. We also asked whether they preferred to study alone or in a study group.

c. Preferred Teaching Method

The type of preferred teaching method was divided into live online class, YouTube videos, kahoot/ quiz, pre-recorded lecture, face-to-face teaching, or others. The respondents were to choose only one of the methods. This was then categorized into 'with lecturer/class' (for live online, pre-recorded lecture and face-to-face teaching) and others (for YouTube, Kahoot and Others).

iii. Health Condition

a. Physical Health

Respondents were to select the health condition(s) which they have. The health conditions that were listed were diabetes, high blood pressure, heart disease, asthma, cancer, tuberculosis, kidney disease, high cholesterol level, obesity, eating disorder, and others. They could choose more than one option and an option 'no' was given if they do not have any health conditions. These were then categorized into 'have any health conditions' or 'do not have'.

b. Mental Health

The DASS-21 instrument was used for mental health factors. This

instrument consisted of a self-measured scale on the emotions the respondent felt in the past one week. There were 21 statements, whereby each condition (depression, anxiety and stress) consisted of seven statements. The distribution of statements for each of the conditions is provided in Table 3.4 below. Each statement is scored by a Likert scale of zero to three whereby, 0= did not apply to me at all, 1= Applied to me on some degree, some of the time, 2= Applied to me to a considerable degree or a good part of time, 3= Applied to me very much or most of the time). The total score is multiplied by two and categorized into normal, mild, moderate, severe and extremely severe as in Table 3.3. This was then categorized into normal and have depression, anxiety or stress (for those having mild, moderate, severe and extremely severe conditions).

Table 3.4 Distribution of items for DASS-21 scales

DASS-21 scales	Item number
Depression	3, 5, 10, 13, 16, 17, 21
Anxiety	2, 4, 7, 9, 15, 19, 20
Stress	1, 6, 11, 12, 14, 19, 20

3.12 Data collection technique

Data collection was carried out by online method and communication through whatsapp/ calls.

The researchers contacted the class representatives of Year One and Year Two medical

undergraduates by whatsapp or any other means of communication. A consent form and Google form of the questionnaire was sent to the class representatives for them to share and deliver the questionnaires with their classmates through their class whatsapp group. The answers from each student were collected and recorded through the Google form system.

3.13 Quality Control

To ensure the quality and accuracy of the research, we carried out face validation with 10 medical undergraduate students in Year One, who were not involved in the actual study. We asked their opinion on any unclear questions or any doubted question, and improve it according to their suggestions and comments. This was to prevent any confusion and improve clarity and understanding of the questionnaire during data collection. A medical lecturer from the FMHS, UPM was selected for content validation of the questionnaire. Any amendments based on her professional comments and suggestions were carried out accordingly.

Validity coefficient is a coefficient that was used to evaluate the validity of the instrument. For VARK questionnaire, a validity test by Fitkov & Yeghiazarian (2015) showed that the majority of items in the four sub-constructs, Visual, Auditory, Read/Write and Kinaesthetic preferences for learning, match the data at 5% level of significance, and could be used as predictors for a person's learning preference orientation. Leite et.al (2009) found that the estimated reliability coefficient for the VARK subscales were 0.85, 0.82, 0.84, and 0.77 for the visual, aural, read/write, and kinesthetic subscales respectively, which indicates a high reliability (Leite et al., 2009).

Basha & Kaya (2016) stated that the DASS-21 Cronbach Alpha coefficients are 0.85, 0.81 and 0.80 which is high consistency for all three depression, anxiety and stress, respectively. A study by Akin et.al (2006) found that the Cronbach internal consistency of the entire scale was 0.89; the item-total correlations ranged from 0.51 to 0.75 and the test- retest and split-half reliability coefficient scores were 0.99 and 0.96 respectively. All the results proved that the DASS-21 is a reliable measurement tool to use for this research.

3.14 Data Analysis

Data analysis was carried out using IBM Statistical Package for Social Sciences (SPSS) version 26.0. Data analysis included descriptive analysis of frequency, percentage, median (IQR), and bivariate analysis using chi-square. The significant value was set at $p < 0.05$. For numerical data, distribution of data was evaluated for normality.

Table 3.5 : Data analysis and presentation.

Variables	Category numerical /	Categories	Statistic analysis
Age	Categorical	21 years old > 21 years old	
Gender	Categorical	Male Female	
Ethnicity	Categorical	Malay Others	
Academic Year	Categorical	Year Two Year Three	

Academic Performance	Categorical	Pass Fail and Resit
History of Previous Academic Performances	Categorical	Ever repeat year Never repeat year
Sleeping duration at night	Categorical	≥ 7 hours < 7 hours
Sleeping regularity	Categorical	Yes No
Caffeine consumption	Categorical	Often Not often
Fast food/ processed food intake	Categorical	Often Not often
Activities done during free time	Categorical	Have an activity Does not have free time
Time spent on Social Media	Categorical	< 5 hours ≥ 5 hours
Marital Status	Categorical	Married Others
Parental level of education	Categorical	Low High
Parents' occupation	Categorical	Working Others
Household income	Categorical	Low income High income
Housing area	Categorical	Rural Urban
Conducive study environment	Categorical	Yes No

Has internet connection and stability	Categorical	Yes No
Has adequate gadget	Categorical	Yes No
Has basic need of daily routine	Categorical	Yes No
Has Space to study	Categorical	Yes No
Has sponsorship	Categorical	Yes No
Learning style	Categorical	One learning style Multiple learning style
Study last minute	Categorical	Yes No
Study consistency	Categorical	Yes No
Submission assignment on time	Categorical	Yes No
Time management	Categorical	< 5 hours ≥ 5 hours
Study habits	Categorical	Study group Alone
Preferred teaching method	Categorical	With lecturer/class Others
Physical health	Categorical	Have health condition Do not have health condition
Depression	Categorical	Normal Have depression
Anxiety	Categorical	Normal Have anxiety

Chi-Square Test

Stress	Categorical	Normal Have stress	
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3.15 Ethical Approval

Ethical approval was obtained from the Ethics Committee for Research Involving Human Subjects of Universiti Putra Malaysia (JKEUPM). Approval from the Dean of Faculty of Medicine and Health Sciences, Universiti Putra Malaysia was obtained to conduct the study among the students. Written informed consent was obtained from each student in the first section of the Google form.

CHAPTER 4

RESULT

This research was a cross sectional study that was carried out to investigate the academic performance and its associated factors among the medical undergraduates in Universiti Putra Malaysia. The Statistical Package for the Social Science (SPSS) version 26 has been used for data analysis.

4.1 Response Rate

A total of 216 questionnaires in the form of Google form were distributed to Year Two and Year Three medical undergraduate students by whatsapp. A total of 181 students responded exceeding our minimum value of 178, giving a response rate of 83.79%. The non-response rate may be due to the dense time table for Year Three medical undergraduates to join the survey.

4.2 Normality Assessment and Statistical Testing

Normality test was carried out on numerical data which include time spent on studies and time spent on social media. Table 4.1 showed the result for normality testing. All the numerical data was not normally distributed.

Table 4.1 Normality test for continuous variables

Variables	Skewness (SE)		Kolmogorov- Smirnov			Histogram / Stem & Leaf / Box plot	Skewed to
	Statistic	Std. Error	Statistic	df	Sig.		
Time spent on social media	1.650	0.182	0.204	0.179	0.000	Not normally distributed	Right
Time spent on studies	2.649	0.182	0.182	0.179	0.000	Not normally distributed	Right

4.3 Data Analysis

4.3.1 Academic performance

The academic performance of students was categorized into two groups which were Pass and, Fail and resit. Majority of the respondents passed their recent final examination (94.5%), as shown in Table 4.2.

Table 4.2 Academic performance of students (N=181)

Academic Performance	Frequencies	Percentage (%)
Pass	171	94.5
Fail and Resit	10	5.5

4.3.2 Individual Factors

As shown in Table 4.3, the majority of the respondents were female (71.8%). The eldest age of respondents was 23 years and the youngest was 21 years which consists of nearly 54% of the

respondents. Majority of the respondents were of Malay ethnicity (59.1%). Among the 181 respondents, there were nine students (5%) who had ever repeated an academic year. There were 100 Year Two students (55.2%) who responded to the questionnaire and 81 Year Three students (44.8%). We have also discovered that the majority of the students (63.5%) did not have at least seven hours of sleeping time at night. Most of the students (58.6%) did not have a regular sleeping time either. Most of the students had regular meal intake (72.4%), did not consume caffeine drinks often (52.5%) and did not consume fast food / processed food often (53.0%). For the lifestyle, we observed the participants' hobby whereby the majority of them had a hobby of browsing social media (57.5%), followed by online gaming (11.6%) and physical activity (11.6%). Minority of them read novels (5%). Other hobbies (8.3%) include watching movie, and sleeping. There is also a small percentage of the students (6.1%) who do not have free time for hobby. While for time spent on social media, 71.8% of the students spend less than 5 hours. The minimum number of hours was 0 hour, and the maximum was 19 hours. The median was 3 hours (IQR 3.0).

Table 4.3 Distribution of individual factors (N=181)

Variables	Frequencies	Percentage (%)
Age		
21	97	53.6
22	78	43.1
23	6	3.3
Gender		
Male	51	28.2
Female	130	71.8

Ethnicity

Malay	107	59.1
Chinese	32	17.7
Indian	39	21.5
Others	3	1.7

Academic Year

Year Two	100	55.2
Year Three	81	44.8

History of previous academic performance

Ever repeat year	9	5.0
Never Repeat Year	172	95.0

Sleeping Duration at night

≥7 hours	66	36.5
< 7 hours	115	63.5

Sleeping Regularity

Regular	75	41.4
Not Regular	106	58.6

Meals Regularity

Regular	131	72.4
Not regular	50	27.6

Caffeine Consumption

Often	86	47.5
Not often	95	52.5

Fast Food / Processed Food consumption

Often	85	47.0
Not often	96	53.0

Hobby

Online Gaming	21	11.6
Social Media	104	57.5
Physical Activity	21	11.6
Reading Novel	9	5.0
Do Not Have a Free Time	11	6.1
Others	15	8.3

Time spent on social media**(hours per day)**

< 5 hours	130	71.8
≥ 5 hours	51	28.2

4.3.3 Socioeconomic factors

As shown in Table 4.4, it was found that the majority of the parent's marital status were married, which is 88.4%. Majority of the fathers (35.9%) and mothers (40.3%) had a bachelor degree. Majority of the respondents' fathers (82.9%) were working. Two most common field of career among the fathers were business, management and administration (24.9%), followed by engineering, manufacturing and technology (21.0%). Among the mothers, most of them were housewives (35.4%). The most common field of career among mothers was educational and training (28.7%).

For household income, the majority was between RM4851 to RM10960 which was 43.6%. Regarding housing, the majority of them were from urban areas (74%). For the study environment, most students had a conducive environment which is 79%. It was also found that most of them had adequate space to study (87.3%), stable internet connection (81.2%), and sufficient gadgets for them to study (81.2%). All the respondents had basic needs such as water

and electric supply. Lastly for socioeconomic factors, 87.8% of the respondents had sponsorship while the other 12.2% did not have sponsorship.

Table 4.4 Distribution of socioeconomic factors (N=181)

Variables	Frequency	Percentage (%)
Parents' Marital Status		
Married	160	88.4
Divorced	7	3.9
Separated	2	1.1
Widow/ widower	12	6.6
Father's level of education		
No formal education	2	1.1
Primary school	5	2.8
PMR	9	5.0
SPM	43	23.8
Pre- University(STPM/ Foundation/ A-level/ Diploma/ Politeknik/ Matriculation)	30	16.6
Bachelor	65	35.9
Master	16	8.8
PhD	11	6.1
Mother's level of education		
No formal education	2	1.1
Primary school	4	2.2
PMR	7	3.9
SPM	47	26.0
Pre- University(STPM/ Foundation/ A-level/ Diploma/ Politeknik/ Matriculation)	31	17.1
Bachelor	73	40.3
Master	12	6.6
PhD	5	2.8
Father's occupation		
Agriculture, Food And Natural Resources	10	5.5
Business , Management And	45	24.9

Administration		
Communication And	3	1.6
Information System		
Engineering, Manufacturing	38	21.0
And Technology		
Medical, Health And Science	12	6.6
Technology		
Educational and Training	15	8.3
Government And Public	15	8.3
Administration		
Human Services	5	2.8
Law, Public Safety,	7	3.9
Corrections And Security		
Jobless	3	1.7
Retired	28	1.5
Mother's occupation		
Agriculture, Food And	2	1.1
Natural Resources		
Business , Management And	18	9.9
Administration		
Communication And	4	2.2
Information System		
Engineering, Manufacturing	5	2.8
And Technology		
Medical, Health And Science	11	6.1
Technology		
Educational and Training	52	28.7
Government And Public	9	5
Administration		
Human Services	5	2.8
Law, Public Safety,	3	1.7
Corrections And Security		
Jobless	1	0.6
Retired	7	3.9
Housewife	64	35.4
Household Income		
Below RM4850	53	29.3
RM4851 to RM10960	79	43.6
Above RM10961	49	27.1

Housing area		
Rural	47	26.0
Urban	134	74.0
Conducive study environment		
Yes	143	79.0
No	38	21.0
Has space to study		
Yes	158	87.3
No	23	12.7
Has internet connection and stability		
Yes	147	81.2
No	34	18.8
Has adequate gadget		
Yes	176	97.2
No	5	2.8
Has basic daily needs		
	181	100.0
Has sponsorship		
Yes	159	87.8
No	22	12.2

4.3.4 Learning Environment

For the learning environment, under the learning style which conducted by the VARK analysis, it was discovered that most of the students had kinesthetic learning (35.9%), followed by 18.2% had aural learning style, 19.9% of them preferred reading and writing as learning style, and 8.8% of them had visual learning style. In general, 82.9% of 181 respondents only had one learning style whereas 17.1% of them had more than one.

Regarding study habits, the median of time spent on studying in a day was 4 hours (IQR 3.0). The minimum number of hours was 0 hours and the maximum value was 18 hours. Among the respondents, 54.1% of them were found to spend less than five hours on study per day. It was found that 62.4% of the respondents did not like to study at the last minute for the examination. Most of them studied consistently (61.9%) and submitted their assignments on time (96.1%). Majority of the students preferred to study alone (74.6%). The teaching method that students preferred the most was Face-to-Face Teaching which consists of 49.7% of them, followed by pre-recorded lectures (18.2%). Other teaching methods which one of the students (0.6%) preferred were a combination of face to face and live online class depending on the group size.

Table 4.5 Distribution of learning environment among the respondents (N=181).

Variables	Frequency	Percentage (%)
Learning Style		
Visual	16	8.8
Aural	33	18.2
Reading/Writing	36	19.9
Kinesthetic	65	35.9
More than one	31	17.1
Last Minute Study		
Yes	68	37.6
No	113	62.4
Consistent Study		
Yes	112	61.9
No	69	38.1
Homework Submission On Time		
Yes	174	96.1
No	7	3.9

Time spent on studying (hours per day)		
< 5 hours	99	54.7
≥ 5 hours	82	45.3
Study Habits		
Study Group	46	25.4
Alone	135	74.6
Preferred Teaching Method		
Live Online Class	17	9.4
Youtube videos	25	13.8
Kahoot	15	8.3
Pre-recorded Lecture	33	18.2
Face to Face Teaching	90	49.7
Others	1	0.6

4.3.5 Health Condition

Table 4.6 shows that most of the students (81.2%) did not have any chronic diseases. Among the respondents who had chronic disease, the majority had asthma (8.4%) and obesity (4.2%). We also found out that the majority (84.0%) of the respondents did not have depression, while 8.3% of them had mild depression and 6.6% of them were moderate with 1.1% of them had severe depression. For anxiety, almost 78% of the students did not have anxiety, 5.5% of 181 respondents had mild anxiety, followed by 11.0% of them had moderate anxiety, 11.0% also had mild anxiety, and 5.5% had severe anxiety. For stress, most of the respondents were normal (93.9%), and only 3.3% of them had mild stress and 2.8% of them had moderate stress.

Table 4.6 Distribution of physical health and mental health of respondents (N=181)

Variables	Frequency	Percentage (%)
Physical Health Condition		
Obesity	9	5.0
Asthma	19	10.5
High cholesterol level	2	1.1
Tuberculosis	3	1.6
Eating Disorder	1	0.6
No Chronic Disease	147	81.2
Depression		
Normal	152	84.0
Mild	15	8.3
Moderate	12	6.6
Severe	2	1.1
Anxiety		
Normal	141	77.9
Mild	10	5.5
Moderate	20	11.0
Severe	10	5.5
Stress		
Normal	170	93.9
Mild	6	3.3
Moderate	5	2.8

4.4 Bivariate analysis

Chi square test was carried out to determine the factors associated with academic performance among the respondents. The significant value is denoted by a p-value of 0.05.

4.4.1 Association between individual factors and academic performance

Under individual factors, the variables included age, gender, ethnicity, academic year, history of previous academic performance and lifestyle. Only ethnicity ($p=0.049$) and consumption of fast

food or processed food ($p < 0.05$) were significantly associated with academic performance.
(Table 4.7)

Table 4.7 Association between individual factors and academic performance (N=181)

Individual factors	Academic performance		χ^2	df	p
	Pass n (%)	Fail & Resit (%)			
Age group					
21 years	91 (93.8)	6 (6.2)			
>21 years	80 (95.2)	4 (4.8)		1	0.754*
Gender					
Male	48 (94.1)	3 (5.9)			
Female	123 (94.6)	7 (5.4)		1	1.000*
Ethnicity					
Malay	98 (91.6)	9 (8.4)			
Others	73 (98.6)	1 (1.4)		1	0.049* [^]
Academic year					
Year Two	94 (94.0)	6 (6.0)			
Year Three	77 (95.1)	4 (4.9)		1	1.000*
History of previous academic performance					
Ever repeat year	8 (88.9)	1 (11.1)			
Never repeat year	163 (94.8)	9 (5.2)		1	0.408*
Lifestyle					
Sleeping duration					
≥ 7 hours	62 (93.9)	4 (6.1)			
< 7 hours	109 (94.8)	6 (5.2)		1	1.000*

Sleeping regularity					
Yes	71 (94.7)	4 (5.3)	1	1.000*	
No	100 (94.3)	6 (5.7)			
Meals Regularity					
Regular	124 (94.7)	7 (5.3)	1	1.000*	
No Regular	47 (94.0)	3 (6.0)			
Caffeine consumption					
Often	81 (94.2)	5 (5.8)	1	1.000*	
Not often	90 (94.7)	5 (5.3)			
Fast food / processed food consumption					
Often	75 (88.2)	10 (11.8)	1	.000*^	
Not often	96 (100.0)	0			
Activities during free time					
Have an activity	160 (94.1)	10 (5.9)	1	1.000*	
Do not have free time	11 (100)	0			
Time spent on social media (hours per day)					
< 5 hours	123 (94.6)	7 (5.4)	1	1.000*	
≥ 5 hours	48 (94.1)	3 (5.9)			

*Fisher Exact Test value when expected count is less than 5 more than 20%

^ p significant at <0.05

4.4.2 Association between socioeconomic factors and academic performance

The associations are shown in Table 4.8. Under parental factors, we investigated the relationship between parents' marital status, parents' level of education, parents' occupation, household

income and students' academic performance. Only the mother's education level (p-value=0.032) was significantly associated with academic performance.

Under housing facilities, the factors that were studied include housing area, having a conducive study environment, enough space to study, stable internet connection, sufficient gadgets, and sufficient electric and water supply. All the variables were not significantly associated with academic performance of the students. Presence of sponsorship (p-value=0.349) was also not significantly associated with academic performance of the medical undergraduates.

Table 4.8 Association between socioeconomic factors and academic performance (N=181)

Socioeconomic factors	Academic performance		χ^2	df	p
	Pass n (%)	Fail & Resit n(%)			
Parents' Marital Status				1	0.608*
Married	150 (93.8)	10 (6.3)			
Others	21 (100.0)	0			
Father's level of education				1	1.000*
Low	56 (94.9)	3 (5.1)			
High	115 (94.3)	7 (5.7)			
Mother's level of education				1	0.032*^
Low	60 (100.0)	0			
High	111 (91.7)	10 (8.3)			
Father's occupation				1	1.000*
Working	141(94.0)	9(6.0)			
Others	30 (96.8)	1 (3.2)			

Mother's occupation				
Working	103(94.5)	6(5.5)	1	1.000*
Others	68(94.4)	4 (5.6)		
Household Income				
Low income	51(96.2)	2(3.8)	1	0.726*
High income	120(93.8)	8(6.3)		
Housing area				
Rural	46(97.9)	1(2.1)	1	0.457*
Urban	125(93.3)	9(6.7)		
Conducive study environment				
Yes	135(94.4)	8(5.6)	1	1.000*
No	36(94.7)	36(5.3)		
Has internet connection and stability				
Yes	139(94.6)	8(5.4)	1	1.000*
No	32(94.1)	2(5.9)		
Has adequate gadget				
Yes	167(94.9)	9(5.1)	1	0.250*
No	4(80.0)	1(20.0)		
Has space to study				
Yes	149(94.3)	9(5.7)	1	1.000*
No	22(95.7)	1(4.3)		
Has sponsorship				
Yes	151(95.0)	8(5.0)	1	0.349*
No	20(90.9)	2(9.1)		

*Fisher Exact Test value when expected count less than 5 is more than 20%

^ p significant at <0.05

4.4.3 Association between learning environment and academic performance

Under the learning environment, we focused on the students' learning style, time management, study habits and preferred teaching methods. Among the variables, it was found that only study consistency ($p=0.045$) was significantly associated with the academic performance of the students. (refer Table 4.9)

Table 4.9 Association between learning environment and academic performance (N=181)

Learning environment	Academic performance		χ^2	df	p
	Pass n (%)	Fail & Resit n(%)			
Learning Style					
One learning style	142 (92.7)	8 (5.3)		1	0.682*
Multiple learning style	29 (93.5)	2 (6.5)			
Last Minute Study					
Yes	63 (92.6)	5 (7.4)		1	0.505*
No	108(95.6)	5 (4.4)			
Consistent Study					
Yes	109 (97.3)	3 (2.7)		1	0.045*^
No	62(89.9)	7 (10.1)			
Homework Submission					
On Time				1	1.000*
Yes	164 (94.3)	10 (5.7)			
No	7 (100.0)	0			
Time spent on studying (hours per day)				1	1.000*
< 5 hours	93 (93.9)	6 (6.1)			
≥ 5 hours	78 (95.1)	4(4.9)			
Study Habits					
Study Group	43 (93.5)	3 (6.5)		1	0.716*
Alone	128(94.8)	7 (5.2)			

Preferred Teaching Method			1	0.697*
With lecturer/class	133 (95.0)	7(5.0)		
Others	38 (92.7)	3(7.3)		

*Fisher Exact Test value when expected count less than 5 is more than 20%

^p significant at <0.05

4.4.4 Association between Health Condition and Academic Performance

We studied both physical and mental health conditions of the respondents. Physical health condition showed no significant association with academic performances where the p value was 0.690. Depression (p=0.663), anxiety (p=0.231) and stress (p=0.116) were also not significantly associated with academic performance. The results are shown in Table 4.10.

Table 4.10 Association between health condition and academic performance (N=181)

Health Condition	Academic Performances		χ^2	df	p
	Pass n (%)	Fail & Resit n(%)			
Physical Health Condition					
Have any health condition	33 (97.1)	1 (2.9)		1	0.690*
Do Not Have	138(93.9)	9 (6.1)			
Depression					
Normal	144 (94.7)	8 (5.3)		1	0.663*
Have depression	27 (93.1)	2 (6.9)			
Anxiety					
Normal	135 (95.7)	6 (4.3)		1	0.231*
Have anxiety	36 (90.0)	4 (10.0)			

Stress				
Normal	162 (95.3)	8 (4.7)	1	0.116*
Have stress	9 (81.8)	2 (18.2)		

***Fisher Exact Test value when expected count less than 5 is more than 20%**



CHAPTER 5

DISCUSSION

5.1 Response Rate

The response rate was 83.79% when 181 respondents provided valid questionnaires to us. However, the respondents had reached our minimum required sample size which was 178 and this indicated 83.79% of the response rate among 216 medical undergraduates which the questionnaire was distributed. The table 4.3, 4.5, 4.6 and 4.8 above showed the frequencies of the respondents toward each variable.

5.2 Individual Factors among Medical Undergraduates of Universiti Putra Malaysia

For individual factors, the variables were age, gender, ethnicity, academic year, history of previous academic performance and lifestyle.

The age was categorized into 21 and more than 21 years old whereby 21 years old had the highest percentage of 53.6%, where more than 21 years old occupied 46.4%. This was due to mostly the Year Two students that had responded to our questionnaire. There was no significant association between the age ($p\text{-value}=0.754$) and the academic performance of the medical undergraduates in UPM. However, from previous studies, Marley & Carman (1999) It was found that older students performed better than those who went to school at an early age, it also showed that those students who had an opportunity to repeat some grades perform better at secondary school level and that late entrance and repetition improved academic performance

especially among older students. The significant value was less than 0.05 which was different from the studies that we had done. Age does not have a significant effect on the students' academic performance. However, in our studies, it was found that 93.8% of the 21 years old students passed the exam while the older students had a slightly higher passing rate of 95.2%. Marley & Carman (1999) believed that students with a larger age had more mature thinking and thus leading to the results. And it shows in our distribution, however, the test showed no significant association between age and academic performances.

With a higher frequency of 130 respondents which occupied 71.8%, the female was found to occupy a larger portion of the medical undergraduates. The male had only 31 of them among the respondents and there were 28.2%. This is similar to a study by Boyle (2019) whereby more than half of the medical students enrolled were female. There was no significant association between gender ($p\text{-value}=1.000$) and medical undergraduates' academic performance. Gender did not play a role in medical undergraduates' academic performances. However, we had found that 7 females had failed and retaken the paper while the other 3 were male. This may have been due to the large proportion of females that enroll in medical courses which we could've seen from table 4.3.

Malay occupied a majority of the respondents which were 59.1% , this might be due to the higher percentage of Malay students in public universities including UPM. Followed by Indian population which was 21.5% then Chinese for 17.7% and other races with 1.7% which in other words, Malay occupied 59.1% of the population and other races were 40.9%. There was a

significant association between ethnicity ($p\text{-value}=0.049$) and academic performance of medical undergraduates. This was similar to a study by Bakar et. al (2010) had found that there was a significant effect on academic performance of students by ethnicity where in the studies, 1484 students in local universities were involved, and supported the statement where the significant value was less than 0.01 and rejected the null hypothesis where there was no association between ethnicity and academic performance. This may be due to the high percentage of the Malay that enrolling in the course resulting in a biased result. Thus, the study proved that ethnicity played a role in academic performance.

Among the respondents who had answered the questionnaire, more than half (55.2%) were Year Two students and followed by 81 students (44.8%) of them were Year Three students. This indicated a higher response rate among the pre-clinical studied students. This may have been due to the clinical students having a denser time table than pre clinical and thus reducing their opportunity to read the message blasted. The academic year ($p\text{-value}=1.000$) was not statistically associated with the academic performances of the medical undergraduates in Universiti Putra Malaysia. According to the previous study conducted by Kusurkar et. al. (2010), there was a maturity factor simultaneously affected by the academic year. . However, in our studies, the academic year proved to not have been associated with academic performance.

There were 5% of the respondents who repeated Year One or Year Two studies and 95% of them did not repeat the year which indicates that the majority of the respondents had passed the examination or failed and retaked the paper. The history of previous academic performance

(p-value=0.408) was not significantly associated with the academic performance of the medical undergraduates. According to Henry et. al (2018), it was found that the pre failure may cause another failure especially when the students couldn't overcome itself. However, in our studies, it statistically proved that there was no significant association between the history of academic performance and academic performance.

For lifestyle, there were three things that we had observed which were the sleeping habits and eating habits and the time participants spent. For sleeping qualities, we found out that only 36.5% of the respondents had enough sleeping duration which was seven hours which according to CDC (2017) was a minimum required sleeping time for the age group of 18 to 60 years old. While others 63. 5% of the respondents had not reached the seven hours of sleeping time and were considered as insufficiency of sleeping duration. About the regularity of sleep, 41.4% of the respondents had regular sleeping while the other 58.6% did not. This indicated poor sleeping qualities among the medical undergraduates in Universiti Putra Malaysia. This may be due to the busy schedule of the medical students. The findings of this study shows that sleeping duration (p-value=1.000) and sleeping regularity (p-value=1.000) were not significantly associated with academic performance.

For eating habits, we observed their meal regularity, caffeine consumption and fast food/ processed food consumption. Meal regularity shows most of the respondents (72.4%) had regular meal intake every day. While for caffeine consumption, only a minority (47.5%) of the respondents took caffeine drinks such as coffee or tea often while remaining more than half of

them did not. Same as caffeine consumption, there was also only 47.0% of respondents who had an intake of fast food/processed food oftenly. This indicates a healthy eating habits among the medical undergraduates in Universiti Putra Malaysia. Fast food / processed food consumption which was associated with academic performance. This is similar to a study by Tobin (2011) whereby higher than average fast-food consumption was associated significantly with lower test scores in medical undergraduate academic performance. This may be related to what Ipatenco (2018) have stated where high calories can affect our cognitive ability. While meal regularity and caffeine consumption were not significantly associated with medical undergraduate academic performance in this study.

Among the respondents, 93.9% of the students had a hobby while the other 6.1% had no time to carry out their hobby based on Table 4.3. According to Table 4.9, there was no association between both hobbies ($p\text{-value}=1.000$) and time spent on social media ($p\text{-value}=1.000$) with academic performance of medical undergraduates. However, it was a surprise where the majority of the students who had failed and retake the exam had spent less time on social media. But, it was found that 10 out of 10 of the respondents who failed and retake the exam had a hobby and 57.5% of the respondents had scrolling social media as their hobby. This may indicate that they had spent more time on their hobby compared to studying which we would observe in chapter 5.4.

5.3 Socioeconomic Factor among Medical Undergraduates of Universiti Putra Malaysia.

Under parental factor, we discovered that the majority of the respondents' parents are married (88.4%). The parents' marital status was not significantly associated with the academic performance of the medical undergraduates. This is different from a previous study by Animasahun (2011) which found that parental separation was significantly associated with the students' academic performance ($p=0.019$).

The next variable that we have observed in the parental factor is the level of education of the father. The majority of fathers have a bachelor certificate that consists of 35.9% ($n=65$) from the respondents' father. The remaining of them were from the other level like SPM 23.8% ($n=43$), PMR 5.0% ($n=9$), Pre- University 16.6% , primary school 2.8% ($n=5$), Master 8.8% ($n=16$), PhD 6.1% ($n=11$) and no formal education 1.1% ($n=2$). Based on table 4.9, the level of education for medical students' fathers is not associated with the academic performance of the medical undergraduate. There is no significant association between the level of educational father and academic performance of medical undergraduate students. The next variable that has been observed is the level of education for mothers. We observed that the majority of mothers also have a Bachelor level of education (73%), while the rest are from primary school 2.2% , PMR 3.9%, SPM 17.1%, Pre- University 17.1%, Master 6.6%, PhD 2.8% and never had any education 1.1%. The educational level of the mother was significantly associated with the students' academic performance ($p=0.32$).

Next, we had also observed the father's occupation. The majority of them are working 82.9% , jobless 1.7% , and already retired 1.5%. At the same time, we also observed the mother's occupation. Majority of the mothers are working 60.2% , housewives consume 35.4% while the rest are retired 3.9% and jobless 0.6% . Both fathers' and mothers' occupation was not significantly associated with the students' academic performance. However, a study by Mandal et.al (2012) found a significant association between parents' education and parents' occupation with the students' academic performance. This was because a parent's level of education and occupation can motivate the students in their study.

For household income per month, the majority of them was between RM4851 to RM10960 which consisted of 43.6%. This may be due to the majority of the fathers' level of education being bachelor, which implies they have a higher grade of job level. This study also showed that there was no significant difference between the household income with the academic performance of medical undergraduate students.

For the housing facilities factors, we have observed that the majority of them came from urban areas (74%). This showed that many of them easily get facilities due to sitting in urban areas compared to rural areas. This study showed that there was no significant association between housing area and academic performance. However, according to a previous study by Faisal et.al (2016), there was significant association between housing areas with academic performance ($p=0.038$).

Next, we also observed whether the students had a conducive study environment or not and most of them had a conducive area 79% . However, according to a previous study by Maina dan Aji (2017) there was a significant association between study environment and academic performance ($p=0.027$).

Besides, we also asked the student whether they have a stable internet connection because during studying students tend to search everything on the internet and based on the result most of them have a stable internet connection 81.2% while the remaining mention that they did not have a balanced internet connection 18.8% . The unstable internet connection may be due to them staying in the rural area. After we had done the Chi-Square Test, it revealed that there was no significant correlation between internet connection and stability and academic performance. The significant value is 1.000.

Moreover we also observed whether students had adequate gadgets for them to study or not and the majority of them stated that they have gadgets for them to search the info and to finish the assignment. After that we observed the student's basic daily routine, for example the gases and water. This is important because when they receive sufficient amounts of basic needs it will help them to live in a comfortable environment. The majority of them with 97.2% have adequate gadgets to study. There is no significant difference between having an adequate gadget with academic performance because it shows the p value is 0.250.

All of the respondents had sufficient basic needs for their daily routine so there were 100% who had basic needs of daily routine so the significant value was unidentified. However, a study by Maina and Aji (2017) found that sufficient basic needs for daily routines significantly associate with students' academic performance ($p=0.019$).

Lastly, we also observed whether the students had their own space to study or not and based on the respondents' feedback, the majority of them claimed that they had enough space for them to study, which was 87.3%. There was no significant association between the space studied and the academic performance ($p=1.000$). However, based on previous study by Maina and Aji (2017), there was significant association space to study with academic performance ($p=0.027$).

For educational sponsorship we observed the students whether they had a sponsorship from the private agency or from the government. Based on the result that had been shown, it stated that most of them had sponsorship 87.8%. There was no significant association sponsorship and academic performance ($p=0.349$) which showed a similar result as the study conducted by Sheline(1984) which proved that it was not significantly associated with academic performance either. Because $5.78 - 10.06\%$ bivariate = 19-22% from the total participant motivated by having sponsorship. Based on the significant values that had been obtained, it showed that socioeconomic factors which consist of parental factors, housing facilities and sponsorship status were not significant with academic performance. Therefore the null hypothesis for this factor was not rejected.

5.4 Learning Environment Among Medical Undergraduates of Universiti Putra Malaysia

From table 4.5, we could've seen that 35.9% of the respondents were more kinesthetic learning style where they were more used to studying used movement, testing, trial and error and a non-traditional learning environment was more suitable for them. Followed by almost 20% of them were more used to reading or writing learned style. And 18.2% of the respondents were more used to aural learning styles which mostly involved the sense of hearing and 8.8% were visual. However, a portion of the respondents had more than one learned style which in another word was multimodal learning which means that 17.1% of the students had a multimodal learning style while the other 82.9% had only one. The learned style ($p\text{-value}=0.682$) was not significantly associated with the academic performance of medical undergraduates. This was also the same as Soundariya et. al. (2017) with a significant value of 0.860. According to Soundariya et. al. (2017), it was found that a successful learned results only when the teaching and assessment methods were in alignment with the student's learned preferences. Therefore in our studies, it was proven that there was no significant association between students' learning style and academic performance because each student had a different way of approaching the subject and studied.

The students had answered whether they were studying last minute, 37.6% of the respondents studied last minute, while the others 113 or 62.4% of them did not. According to table 4.10, the last minute study was not associated with the academic performance of the medical undergraduates. There was no association between the last minute studies ($p\text{-value}=0.505$) and

academic performance of medical undergraduates in UPM. This was different from studies that had been done by Kiran et. al. (2019) with p-value less than 0.001 which involved 225 students in shifa college of medical where it was observed that students who did last minute studies were underperforming and facing difficulty in their exam resulting in low academic performance.

We also found out that almost 62% of the respondents studied consistently while the remaining 38.1% did not. The study showed that study consistency (p-value=0.045) is significantly associated with the medical undergraduates' academic performance. In our studies, we had found that among the 10 students who failed and retake the exam, 7 of them did not have a habit of consistent studying. We also found that 97.3% of students who studied consistently had passed the examination. This proves that consistent studying habits had significantly associated with academic performance of the students.

And among 181 respondents, 96.1% of them had submitted their assignment on time and only 3.9% had not. Other than that, based on table 4.10, we would conclude that homework submission (p-value=1.000) was not significantly associated with academic performance of medical undergraduates.

Studying time spent on studying also found that 54.7% of them were spending less than 5 hours per day on studying. The time spent on studies showed that there was no significant association between time spent on studying (p-value = 1.000) and students academic performance.

They were also asked about their preference of studying in groups or alone and only 25.4% of them preferred the group while the remaining 74.6% preferred to study alone. The study showed that there was no significant difference between studying habits ($p\text{-value}=0.716$) and academic performance.. This might have been due to the distraction that could've caused lack of focus when studying with friends. This has somewhat shown that it was different from the studies conducted by Kiran et. al. (2019) which showed there was significant association between studied habits of either studied in group or alone and academic performance with significant association of 0.021.

The respondents were asked about their opinion toward the preferred teaching method as well. Almost half of the respondents (49.7%) preferred face to face teaching, while 18.2% of the respondents preferred pre-recorded lectures, 13.8% of them preferred to include youtube videos, 8.3% of them preferred to have *Kahoot* quiz after the lecture, and there was only one respondent who preferred to do online class if it involved all classmates and do face-face class if it was in a small group of people. In other words, 77.3% of the respondents preferred to have class with the lecturer while 22.7% preferred the method of self-references. However this might have been associated with the condition which we were facing at the moment in which online learning was used mostly and required the lecturers to change their teaching method, and simultaneously, the students needed to adapt to a new environment for lecture class. There was no significant association between preferred teaching method ($p\text{-value}=0.697$) and academic performance of medical undergraduates in Universiti Putra Malaysia. The result was similar to the study conducted by Laurie a Chapin (2018) where found that there was no significant association

between the lecturers' attendance or access to lecture recording with the students' academic performance.

5.5 Health Condition among Medical Undergraduates of Universiti Putra Malaysia

According to table 4.8 in chapter 4, there were 18.8% of the students had chronic disease where 19 of them had the problem of asthma, 9 of them faced the problem of obesity, 2 of them had high cholesterol levels, 3 with tuberculosis infection while 1 had an eating disorder issue while 81.2% of them did not have any physical health problems. The physical health condition was not significantly associated with the academic performance of the medical undergraduates with the significant value of 0.690. This result was different from Walid & Christiane (2010). Walid & Christiane (2010) stated that there was a significant association between physical health and student's academic performance. Based on this study, it involved 380 participants and mentioned that students with better health were more likely to get higher academic performance compared to students who are sick. However, based on our findings, it showed that most of the students who fail and retake the exam were good physically and show no significant association with the medical undergraduates' academic performance.

According to table 4.8 in chapter 4, most students had normal mental health conditions. However, there were still a portion of students who had the problem of depression, anxiety and stress. No severe stressed respondents were found.

For the issue of depression, 84% of the respondents were normal, and 8.3% of them had mild depression, 6.6% had moderate and only 1.1% of them had severe depression. 84% were found to have been free from depression while the other 16% were suffering from depression.

For issues of anxiety, almost 78% of the respondents were normal, 5.5% of the respondents were mild, which was the same as severe anxiety respondents. While 20 of the respondents had moderate anxiety.

For stressed conditions, almost 94% of the respondents were normal, 3.3% were mildly stressed and 2.8% of the respondents were moderate.

According to table 4.12, depression ($p\text{-value}=0.663$), anxiety ($p\text{-value} = 0.231$) and stress ($p\text{-value}=0.116$) were not significantly associated with medical undergraduate academic performance. This was different from a study conducted by Wyatt et.al (2017) where it showed that mental health, anxiety, depression and stress thus had influence in students academic performance. According to Wyatt et. al. (2017), 67.0% who experienced anxiety did experience a negative academic impact

CHAPTER 6

CONCLUSION

6.1 Conclusion

This was a cross sectional study which was carried out among 181 Year Two and Three medical undergraduates in Universiti Putra Malaysia. Majority of the respondents were female and Malay. It was also found that the majority of the students (94.5%) passed their final examination, with only about 5.0% of them failing and retaking the examinations. Ethnicity, fast food/processed food consumption, educational level of mothers and study consistency was significantly associated with the academic performance of the respondents. Other variables were not significantly associated with the academic performance of medical undergraduates in UPM. Among these variables, fast food/ processed food consumption and study consistency were modifiable factors and can contribute to further intervention studies to improve students' academic performance.

6.2 Strength of study

The strength of the study includes lower financial expenditure and duration of study as the study was a cross sectional study, as compared to other studies which take a long time such as cohort study. The duration of data collection was only within a month. Furthermore, data was collected by an online method and this reduced financial needs for printing. It also eased communication on the questionnaire responses and it shortened the duration of data collection.

In this study, we obtained the prevalence of the academic performance and distribution of the factors among the students. This will be useful for further planning of future studies related to students' academic performance related to FMHS, UPM specifically. The data provided was also recent data as they were related to the most recent final examinations. This reduced the effect of changes in the curriculum.

6.3 Limitation of study

However, during the whole research process, there were a few problems that we faced especially during the data collection phase. In the initial phase of data collection, we had poor response from the students. However, we managed to obtain 181 respondents with the response rate of 82.65%. This was achieved by frequent follow-ups with the class representatives as well as direct communication with the students.

Furthermore, the movement control order (MCO) limited communication and close discussion with fellow group mates. Communication and discussions were carried out through social media such as Whatsapps and meetings via video call. These methods sometimes resulted in miscommunication and reduced fluidity of the research work.

Since the study was a cross sectional study, the study could not form a causal relationship between the dependent and independent variables. In addition, this study was conducted among medical undergraduates in UPM. Thus, the results cannot be generalized to medical

undergraduates in other medical schools. Recall bias may also occur though the variables were of recent experiences.

6.4 Recommendations

Based on this study, we found that though a high percentage of the students (95.0%) passed their final examinations, there was a small percentage of 5.0% who failed and resit. Further investigation on other factors that can affect the academic performance can be carried out. We also recommend making a study with long term study design, such as cohort, to investigate the causal relationship of the factors. Further exploration with qualitative study on the modifiable factors, fast food/ processed food consumptions and study consistency, could be beneficial and may assist in development of intervention studies to improve students' achievement.

Studies can also be carried out among students in both public and private universities to enable comparison among the different academic environments and sociodemographic background. Further studies can also be carried out to compare between medical students and students from other courses. As the challenges between the different courses differ, the factors might be different as well.

Research can also be carried out among the clinical year students to determine the factors which influence their performance as they have different curriculum which consists more of clinical sessions. The study can also assist in improving teaching and learning experiences for the clinical year students and lecturers.

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APPENDIX 1

Sample Size Estimation

Independent Variables	Formula, Proportion, Confidence level, Precision	Sample Size
To investigate the relationship between gender and academic performance of medical undergraduates.	$n = \frac{\{Z_{1-\alpha}\sqrt{2p(1-p)} + Z_{1-\beta}\sqrt{P_1(1-P_1) + P_2(1-P_2)}\}^2}{(P_1 - P_2)^2}$ In this case, P1: Males students with passing grades P2: Females students with passing grades P1: $0.495/(0.495+0.756)=0.396$ P2: $0.505/(0.505+0.244)=0.674$ (took from Salem, R. O., Al-Mously, N., Nabil, N. M., Al-Zalabani, A. H., Al-Dhawi, A. F., & Al-Hamdan, N. (2013). Academic and socio-demographic factors influencing students' performance in a new Saudi medical school. Medical Teacher, 35(sup1), S83–S89. https://doi.org/10.3109/0142159x.2013.765551)	n = 53 For 2 groups, 2 x n = 106 Non response rate: 20% 106 x 20% = 21.2 =22 N: 106 + 22 = 128

To investigate the relationship between Students' income and academic performance of Medical Undergraduates	$n = \frac{\{Z_{1-\alpha}\sqrt{2p(1-p)} + Z_{1-\beta}\sqrt{P_1(1-P_1) + P_2(1-P_2)}\}^2}{(P_1 - P_2)^2}$ In this case, P1: High monthly allowance in passing grade student P2: Low monthly allowance in passing grade students P1: $0.13 / (0.13 + 0.27) = 0.325$ P2: $0.92 / (0.92 + 0.74) = 0.554$ (took from Ekwochi, U., Osuorah, C. D. I., Ohayi, S. A., Nevo, A. C., Ndu, I. K., & Onah, S. (2019). Determinants of academic performance in medical students: evidence from a medical school in south-east Nigeria. <i>Advances in Medical Education and Practice</i>, Volume 10, 737–747. https://doi.org/10.2147/amep.s210557)	n = 73 For 2 groups, $2 \times n = 146$ Non response rate: 20% $146 \times 20\% = 29.2$ = 30 N: $146 + 30 = 176$
To study the relationship between study habits and	$n = \frac{\{Z_{1-\alpha}\sqrt{2p(1-p)} + Z_{1-\beta}\sqrt{P_1(1-P_1) + P_2(1-P_2)}\}^2}{(P_1 - P_2)^2}$ In this case,	n = 39 For 2 groups, $2 \times n = 78$

academic performance of medical undergraduates	P1: Proportion of students with time management and have passing grades P2: Proportion of students with no time management and have passing grades P1: $0.293/(0.293+0.337) = 0.465$ P2: $0.707/(0.707+ 0.663) = 0.516$ (took from Salem, R. O., Al-Mously, N., Nabil, N. M., Al-Zalabani, A. H., Al-Dhawi, A. F., & Al-Hamdan, N. (2013). Academic and socio-demographic factors influencing students' performance in a new Saudi medical school. Medical Teacher, 35(sup1), S83–S89. https://doi.org/10.3109/0142159x.2013.765551)	Non response rate: 20% $78 \times 20\% = 15.6$ $= 16$ Total Sample Size: 78 + 16 = 94
To study the relationship between the study habits and academic performance	$n = \frac{\{Z_{1-\alpha} \sqrt{2p(1-p)} + Z_{1-\beta} \sqrt{P_1(1-P_1) + P_2(1-P_2)}\}^2}{(P_1 - P_2)^2}$ P1: Proportion of students who passed and most of the time study with peers	$n = 89$ For 2 groups, $2 \times n = 178$ Non response rate:

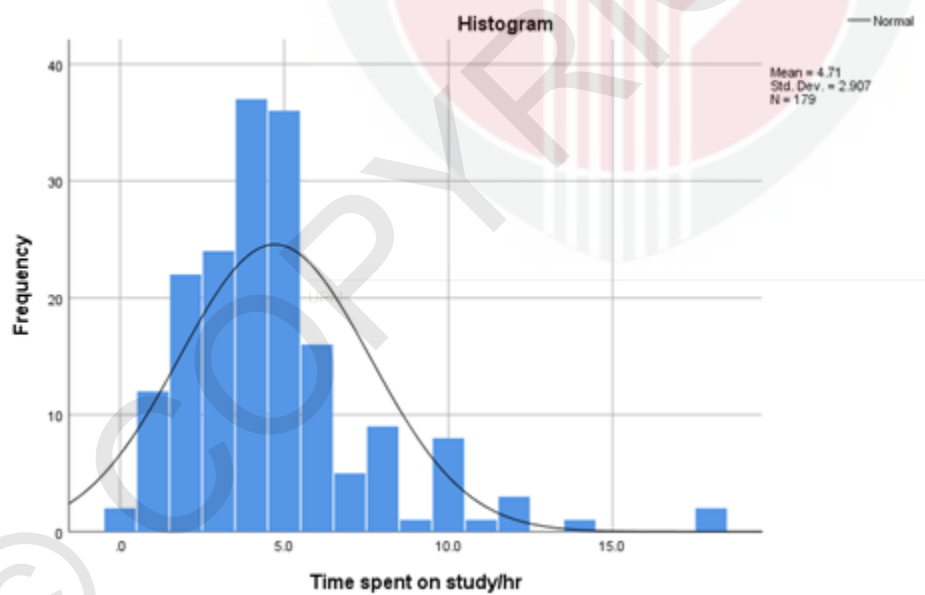
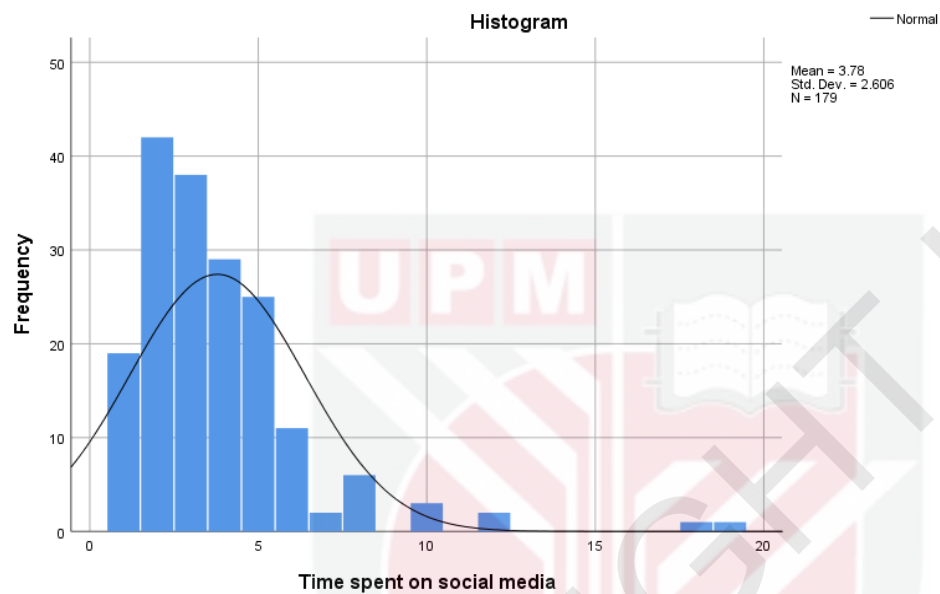
of medical undergraduate students	P2: Proportion of students who passed and do not study with peers In this case, P1: $0.455/(0.455+0.477) = 0.488$ P2: $0.121/(0.121+0.058) = 0.676$ (took from Salem, R. O., Al-Mously, N., Nabil, N. M., Al-Zalabani, A. H., Al-Dhawi, A. F., & Al-Hamdan, N. (2013). Academic and socio-demographic factors influencing students' performance in a new Saudi medical school. Medical Teacher, 35(sup1), S83–S89. https://doi.org/10.3109/0142159x.2013.765551)	20% $178 \times 20\% = 35.6$ $= 36$ N: $178 + 36$ $= 214$
To study the mental health and academic performance of medical undergraduate students	$n = \frac{\{Z_{1-\alpha} \sqrt{2p(1-p)} + Z_{1-\beta} \sqrt{P_1(1-P_1) + P_2(1-P_2)}\}^2}{(P_1 - P_2)^2}$ In this case, depression level, P1: Proportion of student that passed have depression P2: Proportion of student who passed and do not suffer depression P1: $0.228/(0.228+0.533) = 0.3$ P2: $0.771/(0.771+0.467) = 0.623$	$n = 31$ For 2 groups, $2 \times n = 62$ Non response rate: 20% $62 \times 20\% = 12.4$

	(took from Al-Khani, A.M., Sarhandi, M.I., Zaghloul, M.S. <i>et al.</i> A cross-sectional survey on sleep quality, mental health, and academic performance among medical students in Saudi Arabia. <i>BMC Res Notes</i> 12, 665 (2019). https://doi.org/10.1186/s13104-019-4713-2) In this case, anxiety level, P1: Students with anxiety and passed P2: Students do not have anxiety and passed P1: $31.5 / (31.5 + 65.0) = 0.326$ P2: $68.6 / (68.6 + 35.0) = 0.662$ (took from Al-Khani, A.M., Sarhandi, M.I., Zaghloul, M.S. <i>et al.</i> A cross-sectional survey on sleep quality, mental health, and academic performance among medical students in Saudi Arabia. <i>BMC Res Notes</i> 12, 665 (2019). https://doi.org/10.1186/s13104-019-4713-2)	=13 N = 62+ 13 = 75 n = 34 For 2 groups, 2 x n = 68 Non response rate: 20% $68 \times 20\% = 13.6$ =14 N: 68+ 14 = 82 n = 15
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	In this case, stress level, P1: Proportion of students with high stress and passed P2: Proportion of students who has normal stress level and passed P1: $88.6 / (88.6 + 58.3) = 0.603$ P2: $11.4 / (11.4 + 41.7) = 0.215$ (took from Al-Khani, A.M., Sarhandi, M.I., Zaghloul, M.S. <i>et al.</i> A cross-sectional survey on sleep quality, mental health, and academic performance among medical students in Saudi Arabia. <i>BMC Res Notes</i> 12, 665 (2019). https://doi.org/10.1186/s13104-019-4713-2)	For 2 groups, $2 \times n = 30$ Non response rate: 20% $30 \times 20\% = 6$ $N: 30 + 6 = 36$
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APPENDIX 2

Normality Test Graph



TABLES

Academic performance of students (N=181)

Academic Performance	Frequencies	Percentage (%)
Pass	171	94.5
Fail and Resit	10	5.5

Distribution table of individual factors (N=181)

Variables	Frequencies	Percentage (%)
Age		
21	97	53.6
22	78	43.1
23	6	3.3
Gender		
Male	51	28.2
Female	130	71.8
Ethnicity		
Malay	107	59.1
Chinese	32	17.7
Indian	39	21.5
Others	3	1.7
Academic Year		
Year Two	100	55.2
Year Three	81	44.8

History of previous academic performance

Ever repeat year	9	5.0
Never Repeat Year	172	95.0

Sleeping Duration at night

≥7 hours	66	36.5
< 7 hours	115	63.5

Sleeping Regularity

Regular	75	41.4
Not Regular	106	58.6

Meals Regularity

Regular	131	72.4
Not regular	50	27.6

Caffeine Consumption

Often	86	47.5
Not often	95	52.5

Fast Food/Processed Food consumption

Often	85	47.0
Not often	96	53.0

Hobby

Online Gaming	21	11.6
Social Media	104	57.5
Physical Activity	21	11.6
Reading Novel	9	5.0
Do Not Have a Free Time	11	6.1
Others	15	8.3

Time spent on social media (hours per day)

< 5 hours	130	71.8
≥ 5 hours	51	28.2

Distribution table of socioeconomic factors (N=181)

Variables	Frequency	Percentage (%)
Parents' Marital Status		
Married	160	88.4
Divorced	7	3.9
Separated	2	1.1
Widow/ widower	12	6.6
Father's level of education		
No formal education	2	1.1
Primary school	5	2.8
PMR	9	5.0
SPM	43	23.8
Pre- University(STPM/ Foundation/ A-level/ Diploma/ Politeknik/ Matriculation)	30	16.6
Bachelor	65	35.9
Master	16	8.8
PhD	11	6.1
Mother's occupation		
No formal education	2	1.1
Primary school	4	2.2
PMR	7	3.9
SPM	47	26.0
Pre- University(STPM/ Foundation/ A-level/ Diploma/ Politeknik/ Matriculation)	31	17.1
Bachelor	73	40.3
Master	12	6.6
PhD	5	2.8

Father's occupation

Agriculture, Food And Natural Resources	10	5.5
Business , Management And Administration	45	24.9
Communication And Information System	3	1.6
Engineering, Manufacturing And Technology	38	21.0
Medical, Health And Science Technology	12	6.6
Educational and Training	15	8.3
Government And Public Administration	15	8.3
Human Services	5	2.8
Law, Public Safety, Corrections And Security	7	3.9
Jobless	3	1.7
Retired	28	1.5

Mother's occupation

Agriculture, Food And Natural Resources	2	1.1
Business , Management And Administration	18	9.9
Communication And Information System	4	2.2
Engineering, Manufacturing And Technology	5	2.8
Medical, Health And Science Technology	11	6.1
Educational and Training	52	28.7
Government And Public Administration	9	5
Human Services	5	2.8
Law, Public Safety, Corrections And Security	3	1.7
Jobless	1	0.6
Retired	7	3.9
Housewife	64	35.4

Household Income

Below RM4850	53	29.3
RM4851 to RM10960	79	43.6
Above RM10961	49	27.1

Housing area

Rural	47	26.0
Urban	134	74.0

Conducive study environment

Yes	143	79.0
No	38	21.0

Has space to study

Yes	158	87.3
No	23	12.7

Has internet connection and stability

Yes	147	81.2
No	34	18.8

Has adequate gadget

Yes	176	97.2
No	5	2.8

Has sponsorship

Yes	159	87.8
No	22	12.2

Distribution table of learning environments (N=181)

Variables	Frequency	Percentage (%)
Learning Style		
Visual	16	8.8
Aural	33	18.2
Reading/Writing	36	19.9
Kinesthetic	65	35.9
More than one	31	17.1
Last Minute Study		
Yes	68	37.6
No	113	62.4
Consistent Study		
Yes	112	61.9
No	69	38.1
Homework Submission On Time		
Yes	174	96.1
No	7	3.9

**Time spent on studying
(hours per day)**

< 5 hours	99	54.7
≥ 5 hours	82	45.3

Study Habits

Study Group	46	25.4
Alone	135	74.6

**Preferred Teaching
Method**

Live Online Class	17	9.4
Youtube videos	25	13.8
Kahoot	15	8.3
Pre-recorded Lecture	33	18.2
Face to Face Teaching	90	49.7
Others	1	0.6

Distribution table of Health Conditions (N=181)

Variables	Frequency	Percentage (%)
Physical Health Condition		
Diabetes	9	5.0
Asthma	19	10.5
High cholesterol level	2	1.1
Tuberculosis	3	1.6
Eating Disorder	1	0.6
No Chronic Disease	147	81.2
Depression		
Normal	152	84.0
Mild	15	8.3
Moderate	12	6.6
Severe	2	1.1

Anxiety		
Normal	141	77.9
Mild	10	5.5
Moderate	20	11.0
Severe	10	5.5
Stress		
Normal	170	93.9
Mild	6	3.3
Moderate	5	2.8

Association between Individual Factors and Academic Performances (N=181)

Individual factors	Academic performance		χ^2	df	p
	Pass n (%)	Fail & Resit n (%)			
Age group					
21 years	91 (93.8)	6 (6.2)	1		0.754*
>21 years	80 (95.2)	4 (4.8)			
Gender					
Male	48 (94.1)	3 (5.9)	1		1.000*
Female	123 (94.6)	7 (5.4)			
Ethnicity					
Malay	98 (91.6)	9 (8.4)	1		0.049*^
Others	73 (98.6)	1 (1.4)			
Academic year					
Year Two	94 (94.0)	6 (6.0)	1		1.000*
Year Three	77 (95.1)	4 (4.9)			

History of previous academic performance

Ever repeat year	8 (88.9)	1 (11.1)	1	0.408*
Never repeat year	163 (94.8)	9 (5.2)		

Lifestyle

**Sleeping duration
≥ 7 hours**

≥ 7 hours	62 (93.9)	4 (6.1)	1	1.000*
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< 7 hours

Sleeping regularity

Yes	71 (94.7)	4 (5.3)	1	1.000
No	100 (94.3)	6 (5.7)		

Meals Regularity

Regular	124 (94.7)	7 (5.3)	1	1.000*
No Regular	47 (94.0)	3 (6.0)		

Caffeine consumption

Often	81 (94.2)	5 (5.8)	1	1.000*
Not often	90 (94.7)	5 (5.3)		

Fast food / Processed Food consumption

Often	75 (88.2)	10 (11.8)	1	.000*^
Not often	96 (100.0)	0		

Hobby

Have a hobby	160 (94.1)	10 (5.9)	1	1.000*
Do Not Have a Hobby	11 (100)	0		

**Time spent on
social media (hours
per day)**

< 5 hours	123 (94.6)	7 (5.4)	1	1.000*
≥ 5 hours	48 (94.1)	3 (5.9)		

***Fisher Exact Test value when expected count less than 5 is more than 20%**

^ p significant at <0.05

Association between socioeconomic factors and academic performance (N=181)

Socioeconomic factors		Academic performance		χ^2	df	p
		Pass n (%)	Fail & Resit n(%)			
Parents' Marital Status						
Married					1	0.608*
Others		150 (93.8)	10 (6.3)			
		21 (100.0)	0			
Father's level of education						
Low		56 (94.9)	3 (5.1)		1	1.000*
High		115 (94.3)	7 (5.7)			
Mother's level of education						
Low		60 (100.0)	0		1	0.032*^
High		111 (91.7)	10 (8.3)			
Father's occupation						
Working		141(94.0)	9(6.0)		1	1.000*
Others		30 (96.8)	1 (3.2)			

Mother's occupation

Working	103(94.5)	6(5.5)	1	1.000*
Others	68(94.4)	4 (5.6)		

Household Income

Low income	51(96.2)	2(3.8)	1	0.726*
High income	120(93.8)	8(6.3)		

Housing area

Rural	46(97.9)	1(2.1)	1	0.457*
Urban	125(93.3)	9(6.7)		

Conducive environment study

Yes	135(94.4)	8(5.6)	1	1.000*
No	36(94.7)	36(5.3)		

Has internet connection and stability

Yes			1	1.000*
No	139(94.6)	8(5.4)		
	32(94.1)	2(5.9)		

Has adequate gadget

Yes	167(94.9)	9(5.1)	1	0.250*
No	4(80.0)	1(20.0)		

Has space to study

Yes	149(94.3)	9(5.7)	1	1.000*
No	22(95.7)	1(4.3)		

Has sponsorship

Yes	151(95.0)	8(5.0)	1	0.349*
No	20(90.9)	2(9.1)		

*Fisher Exact Test value when expected count less than 5 is more than 20%

^ p significant at <0.05

Association between learning environment and academic performance (N=181)

Learning environment	Academic performance		χ^2	df	p
	Pass n (%)	Fail & Resit n(%)			
Learning Style					
One learning style	142 (92.7)	8 (5.3)	1		0.682*
Multi learning style	29 (93.5)	2 (6.5)			
Last Minute Study					
Yes	63 (92.6)	5 (7.4)	1		0.505*
No	108(95.6)	5 (4.4)			
Consistent Study					
Yes	109 (97.3)	3 (2.7)	1		0.045*^
No	62(89.9)	7 (10.1)			
Homework Submission					
On Time	164 (94.3)	10 (5.7)	1		1.000*
Yes	7 (100.0)	0			
No					
Time spent on studying (hours per day)					
< 5 hours	93 (93.9)	6 (6.1)	1		1.000*
≥ 5 hours	78 (95.1)	4(4.9)			
Study Habits					
Study Group	43 (93.5)	3 (6.5)	1		0.716*
Alone	128(94.8)	7 (5.2)			
Preferred Teaching Method					
			1		0.697*
With lecturer/class	133 (95.0)	7(5.0)			
Self reference	38 (92.7)	3(7.3)			

*Fisher Exact Test value when expected count less than 5 is more than 20%

^ p significant at <0.05

Association between health conditions and academic performance (N=181)

Health Condition		Academic Performances		χ^2	df	p
		Pass n (%)	Fail & Resit n(%)			
Physical Health Condition					1	0.690*
	Have Chronic Disease	33 (97.1)	1 (2.9)			
	No Chronic Disease	138(93.9)	9 (6.1)			
Depression					1	0.663*
	Normal	144 (94.7)	8 (5.3)			
	Depressed	27 (93.1)	2 (6.9)			
Anxiety					1	0.231*
	Normal	135 (95.7)	6 (4.3)			
	Anxiety	36 (90.0)	4 (10.0)			
Stress					1	0.116*
	Normal	162 (95.3)	8 (4.7)			
	Stress	9 (81.8)	2 (18.2)			

*Fisher Exact Test value when expected count less than 5 is more than 20%

APPENDIX 3



**JAWATANKUASA ETIKA UNIVERSITI UNTUK PENYELIDIKAN
MELIBATKAN MANUSIA (JKEUPM)
UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG,
SELANGOR, MALAYSIA**

FORM 2.4: RESPONDENT'S INFORMATION SHEET AND INFORMED CONSENT FORM

Please read the following information carefully and do not hesitate to discuss any questions you may have with the researcher.

1. STUDY TITLE: Academic performance and its associated factors among medical undergraduates in Universiti Putra Malaysia

2. INTRODUCTION:

This research is conducted by second-year medical undergraduate students under the supervision of Dr. Anisah Baharom. Medical course is known as one of the hardest courses due to its heavy workload and challenges. Nonetheless, as in any course undertaken, students aim to pass the examinations and to be able to secure a career at the end of the academic years. Good academic performance is also important due to individual, family and societal expectations. Many factors influence a students' academic performance. These include individual, socioeconomic, learning environment, and health condition. Thus, this research is carried out to determine the factors which influence medical undergraduate students' academic performance in Universiti Putra Malaysia.

3. WHAT WILL YOU HAVE TO DO?

If you agree to participate, you are required to fill in a self-administered questionnaire on google form that will be distributed through your class representative through whatsapp. The questionnaire consists of seven sections, which will take less than 20 minutes to answer it completely.

4. WHO SHOULD NOT PARTICIPATE IN THE STUDY?

This study involves medical undergraduates in year two and three in 2020/2021 session, who are registered with the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia. If you are not in the criteria mentioned, you do not need to participate in this study.

5. WHAT WILL BE THE BENEFITS OF THE STUDY:

(a) TO YOU AS THE SUBJECT?

The results of the study will help the academic administrators to improve the teaching-learning environment for students. This will eventually help you as students to improve your academic performance.

(b) TO THE INVESTIGATOR?

As researchers, this study will help in planning future interventions to improve students' academic performance. This will indirectly benefit the academic society in contribution of new knowledge.

6. WHAT ARE THE POSSIBLE RISKS?

This study only involves answering self-administered questionnaires by online google forms. There will be no expected bodily harm to participants. Your participation in this study is voluntary. You can withdraw from the study at any time without penalty.

7. WILL THE INFORMATION THAT YOU PROVIDE AND YOUR IDENTITY REMAIN CONFIDENTIAL?

Your identity will be kept confidential and the results will only be used for the purpose of this study only. Your identity will also be made confidential in any publication or presentation in conferences or seminars.

8. WHO SHOULD YOU CONTACT IF YOU HAVE ADDITIONAL QUESTIONS DURING THE COURSE OF THE RESEARCH?

If you have any further enquiries, you may contact the researchers as below: Supervisor: Dr.

Anisah Baharom: 019-2811948

Students:

Ho : +6011-23711567

Nabilah: +60 11-2850 2232

Syahmi: +60 11-1017 0881

The Ethics Committee for Research involving Human Subjects of UPM has approved the study, and may be reached through the following contact for information regarding rights of study participants, including grievances and complaints:

Office of the Deputy Vice Chancellor (Research & Innovation)

Universiti Putra Malaysia

43400 UPM Serdang

Selangor

Tel: 03-97691002

Email: tncpi@upm.edu.my

9. CONSENT

I Identity Card No.
address.....
..... hereby voluntarily agree to take part in the
research stated above *(clinical /drug trial/video recording/ focus group/interview-based/
questionnaire-based).

I have been informed about the nature of the research in terms of methodology, possible adverse effects and complications (as written in the Respondent's Information Sheet). I understand that I have the right to withdraw from this research at any time without giving any reason whatsoever. I also understand that this study is confidential and all information provided with regard to my identity will remain private and confidential.

I* wish / do not wish to know the results related to my participation in the research

I agree/do not agree that the images/photos/video recordings/voice recordings related to me be used in any form of publication or presentation (if applicable)

* delete where necessary

Signature

(Name)

Date :4th June 2021

I/C No. :

Signature

(Witness)

Name :

I confirm that I have explained to the respondent the nature and purpose of the above-mentioned research.

Date 27/01/2021

Signature (Researcher)

APPENDIX 4

Questionnaire for year 3

RESEARCH TITLE: Academic Performance and its Associated Factors among Medical Undergraduates in Universiti Putra Malaysia

SECTION A: INDIVIDUAL FACTOR

Please click at the answers which relate to you and fill in the blanks provided.

Year of birth: _____

Gender:

☐ Male ☐ Female

Ethnicity:

☐ Malay ☐ Chinese ☐ Indian Others: _____

Professional examination 1 for 2019/2020 session

☐ Pass ☐ Fail and Resit

History of previous academic performance:

☐ Repeat Year One ☐ Repeat Year Two ☐ Did not repeat any years

LIFESTYLE:

No.	Questions	Yes	No
1.	Do you sleep for 7 hours and above at night in your routine?		
2.	Do you have regular sleeping time at night?		
3.	Do you take your meal regularly?		
4.	Do you consume caffeine drinks (e.g. coffee, tea) often?		
5.	Do you consume fast food or processed food often?		

How do you spend your free time?

☐ Do Online gaming ☐ Do Social Media
☐ Do Physical activity. ☐ Do Reading novel
☐ I don't have any free time ☐ Others: _____

How many hours do you spent on social media per day? _____

SECTION B: SOCIOECONOMIC FACTORS

Please click at the answers which relate to your parents, or any one of your father or mother if your parent is a single parent.

PARENTAL FACTORS:

Parents' marital status:

☐ Married
☐ Divorced
☐ Separated
☐ Widow/Widower

Parents' highest Education Level

Parent	UPSR	PMR	SPM	Pre-University (STPM/ Foundation/ A-level/ Diploma/ Politeknik/ Matriculation)	Bachelor	Master	PhD	No formal education
Father								
Mother								

Parents' occupation

Parent	1	2	3	4	5	6	7	8	9	10	11	12
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Father												
Mother												

1 = Agriculture, Food and Natural Resources

2 = Business, Management and Administration

3 = Communication and Information System

4 = Engineering, Manufacturing and Technology

9 = Law, Public Safety, Corrections and Security

11 = Retired

5 = Medical, Health, Science & Technology

6 = Education and Training

7 = Government and Public Administration

8 = Human Services

10 = Jobless

12 = Housewife/ Househusband

Household Income:

[] Above RM10,961

[] Between RM4851 to RM10,960

[] RM4850 and below

HOUSING FACILITIES AND EDUCATIONAL SPONSORSHIP

Where do you stay?

[] Rural [] Urban

No.	Questions	Yes	No
1.	Do you have a conducive study environment without disturbance?		
2.	Do you have enough space to study?		
3.	Do you have a stable internet connection?		
4.	Do you have sufficient gadgets (such as a handphone, computer etc.) for your learning no matter online or face to face?		
5.	Do you have sufficient water and electric supply at home?		
6.	Do you receive any sponsorship for your degree from any agencies?		

SECTION C: LEARNING ENVIRONMENT

LEARNING STYLE

Choose the answer which best explains your preference and click the box next to it. Please click more than one if a single answer does not match your perception. Leave blank any question that does not apply.

1. You are helping someone who wants to go to your airport, town centre or railway station. You would:
 - a. Go with her
 - b. Tell her the directions
 - c. Write down the directions
 - d. Draw or give her a map
2. You are not sure whether a word should be spelled 'dependent' or dependant'. You would:
 - a. See the word in your mind and choose by the way they look
 - b. Think about how each word sounds and choose one
 - c. Find it in a dictionary
 - d. Write both words on paper and choose one
3. You are planning a holiday for a group. You want some feedback from them about the plan. You would:
 - a. Describe some of the highlight
 - b. Use a map or website to show them the places
 - c. Give them a copy of the printed itinerary
 - d. Phone, text, or email them
4. You are going to cook something as a special treat for your family. You would:
 - a. Cook something you know without the need for instructions.
 - b. Ask friends for suggestions
 - c. Look through the cookbook for ideas from the pictures
 - d. Use a cookbook where you know there is a good recipe —
5. A group of tourists want to learn about the parks or wildlife reserves in your areas. You would:
 - a. Talk about or arrange a talk for them about parks or wildlife reserves.
 - b. Show them internet pictures, photographs or picture books.
 - c. Take them to the park or wildlife reserve and walk with them
 - d. Give them a book or pamphlet about the parks or wildlife reserves
6. You are about to purchase a digital camera or mobile phone. Other than price, what would most influence your decision?
 - a. Trying or testing it
 - b. Reading the details about its features
 - c. It is a modern design and looks good
 - d. The salespersons telling me about the features

7. Remember a time when you learned how to do something new. Try to avoid choosing a physical skill. Eg. riding a bike. You learned best by:
 - a. Watching a demonstration
 - b. Listening to somebody explaining it and asking questions
 - c. Diagram and charts
 - d. Written instruction eg. manual or textbook
8. You have a problem with your knee. You would prefer that doctor:
 - a. Gave you a web address or something to read about it
 - b. Use a plastic model of a knee to show what was wrong
 - c. Described what was wrong
 - d. Showed you a diagram of what was wrong
9. You want to learn a new program, skill or game on the computer. You would:
 - a. Read the written instruction that came with the program
 - b. Talk with people who know about the program
 - c. Use the controls or keyboard
 - d. Follow the diagrams in the book that came with it
10. I like website that have :
 - a. Things that I can click on, shift or try.
 - b. Interesting design and visual features
 - c. Interesting written descriptions, list and explanation
 - d. Audio channel where i can hear music, radio programs or interviews.
11. Other than price, what would most influence your decision to buy a new non fiction book?
 - a. The way it looks is appealing
 - b. Quickly read parts of it
 - c. A friends talks about it and recommends it
 - d. It has real life stories, experiences and examples
12. You are using a book, CD or website to learn how to take photos with your new digital camera. You would like to have:
 - a. A chance to ask questions and talk about the camera and its features
 - b. Clear written instructions with lists and bullet points about what to do
 - c. Diagram showing the camera and what each part does
 - d. Many examples of good and poor photos and how to improve them
13. Do you prefer a teacher or a presenter who uses:
 - a. Demonstration, models or practical sessions
 - b. Questions and answer, talk, group discussion, or guest speaker
 - c. Handouts, books or readings
 - d. Diagrams, chart, or graph
14. You have finished a competition or test and would like some feedback. You would like to have feedback:
 - a. Using examples from what you have done
 - b. Using a written descriptions of your results
 - c. From somebody who talks it through with you
 - d. Using graph showing what you had achieved

15. You are going to choose food at a restaurant or cafe. You would:
- Choose something that you have had there before
 - Listen to the waiter or ask friends to recommend choices
 - Choose from the descriptions in the menu
 - Look at what others are eating or look at pictures of each dish
16. You have to make an important speech at a conference or special occasion. You would:
- Make diagram or get graph to help explain things
 - Write a few key words and practice saying your speech over and over
 - Write out your speech and learn from reading it over several times
 - Gather many examples and stories to make the talk real and practice

STUDY HABITS

Please click and type at the statements which best explains you.

How many hours do you usually study in a day ? _____

No.	Questions	Yes	No
1.	Do you prefer to study at the last minute for your examination?		
2.	Do you prefer to study consistently to prepare for your examination?		
3.	Do you hand in your assignment on time mostly?		

Which study habit do you prefer while doing study or assignment?

[☐] Alone [☐] Study Group

Choose the best teaching method you prefer.

- [☐] Live Class [Online lecture] _____
- [☐] Youtube Videos
- [☐] Kahoot/ Quiz
- [☐] Pre Recorded Lecture
- [☐] Face to face Teaching
- [☐] Others: _____

SECTION D: HEALTH CONDITION

PHYSICAL HEALTH

Please click if you currently have or ever had any of the following health conditions. You can choose more than one health condition.

Do you have any history of the following?	Tick (✓) if you have it
Diabetes	
High Blood Pressure	
Heart disease	
Asthma	
Cancer	
TB/ Tuberculosis	
Kidney disease	
High Cholesterol level	
Obesity	
Eating disorder	
No	
Others (Please State): _____	

MENTAL HEALTH

Please read each statement and select one number, 0, 1, 2 or 3 which indicates your experience over the **PAST ONE WEEK**. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

0 Did not apply to me at all

1 Applied to me to some degree, or some of the time

2 Applied to me to a considerable degree or a good part of time

3 Applied to me very much or most of the time

1(s)	I found it hard to wind down	0	1	2	3
2(a)	I was aware of dryness of my mouth	0	1	2	3

3(d)	I couldn't seem to experience any positive feeling at all	0	1	2	3
4(a)	I experienced breathing difficulty (e.g. excessively rapid breathing breathlessness in the absence of physical exertion)	0	1	2	3
5(d)	I found it difficult to work up the initiative to do things	0	1	2	3
6(s)	I tended to over-react to situations	0	1	2	3
7(a)	I experienced trembling (e.g. in the hands)	0	1	2	3
8(s)	I felt that I was using a lot of nervous energy	0	1	2	3
9(a)	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10(d)	I felt that I had nothing to look forward to	0	1	2	3
11(s)	I found myself getting agitated	0	1	2	3
12(s)	I found it difficult to relax	0	1	2	3
13(d)	I felt down-hearted and blue	0	1	2	3
14(s)	I was intolerant of anything that kept me from getting on with what was doing	0	1	2	3
15(a)	I felt I was close to panic	0	1	2	3
16(d)	I was unable to become enthusiastic about anything	0	1	2	3
17(d)	I felt I wasn't worth much as a person	0	1	2	3
18(s)	I felt that I was rather touchy	0	1	2	3
19(a)	I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat)	0	1	2	3
20(a)	I felt scared without any good reason	0	1	2	3
21(d)	I felt that life was meaningless	0	1	2	3

THANK YOU FOR YOUR TIME

APPENDIX 5

Questionnaire for year 2

RESEARCH TITLE: Academic Performance and its Associated Factors among Medical Undergraduates in Universiti Putra Malaysia

SECTION A: INDIVIDUAL FACTOR

Please click at the answers which relate to you and fill in the blanks provided.

Year of birth: _____

Gender:

[] Male [] Female

Ethnicity:

[] Malay [] Chinese [] Indian Others: _____

Year One Final Exam Result in 2019/2020 session

[] Pass [] Fail and Resit

History of previous academic performance:

[] Repeat year One [] Did not repeat year One

LIFESTYLE:

No.	Questions	Yes	No
1.	Do you sleep for 7 hours and above at night in your routine?		
2.	Do you have regular sleeping time at night?		
3.	Do you take your meals regularly?		
4.	Do you consume caffeine drinks (e.g. coffee, tea) often?		
5.	Do you consume fast food or processed food often?		

How do you spend your free time?

[] Do Online gaming [] Do Social Media

[] Do Physical activity. [] Do Reading novel
 [] I don't have any free time [] Others: _____

How many hours do you spent on social media per day? _____

SECTION B: SOCIOECONOMIC FACTORS

Please click at the answers which relate to your parents, or any one of your father or mother if your parent is a single parent.

PARENTAL FACTORS:

Parents' marital status:

[] Married
 [] Divorced
 [] Separated
 [] Widow/Widower

Parents' highest education level

Parent	UPSR	PMR	SPM	Pre-University (STPM/ Foundation/ A-level/ Diploma/ Politeknik/ Matriculation)	Bachelor	Master	PhD	No formal education
Father								
Mother								

Parents' occupation

Parent	1	2	3	4	5	6	7	8	9	10	11	12
Father												

Mother												
--------	--	--	--	--	--	--	--	--	--	--	--	--

- | | |
|--|---|
| 1 = Agriculture, Food and Natural Resources | 5 = Medical, Health, Science & Technology |
| 2 = Business, Management and Administration | 6 = Education and Training |
| 3 = Communication and Information System | 7 = Government and Public Administration |
| 4 = Engineering, Manufacturing and Technology | 8 = Human Services |
| 9 = Law, Public Safety, Corrections and Security | 10 = Jobless |
| 11 = Retired | 12 = Housewife/ Househusband |

Household Income:

- [] Above RM10,961
 [] Between RM4851 to RM10960
 [] RM4850 and below

HOUSING FACILITIES AND EDUCATIONAL SPONSORSHIP

Where do you stay?

- [] Rural [] Urban

No.	Questions	Yes	No
1.	Do you have a conducive study environment without disturbance?		
2.	Do you have enough space to study?		
3.	Do you have a stable internet connection?		
4.	Do you have sufficient gadgets (such as handphone, computer etc.) for your learning no matter online or face to face?		
5.	Do you have sufficient water and electric supply at home?		
6.	Do you receive any sponsorship for your degree from any agencies?		

SECTION C: LEARNING ENVIRONMENT

LEARNING STYLE

Choose the answer which best explains your preference and click the box next to it. Please click more than one if a single answer does not match your perception. Leave blank any question that does not apply.

1. You are helping someone who wants to go to your airport, town centre or railway station. You would:
 - a. Go with her
 - b. Tell her the directions
 - c. Write down the directions
 - d. Draw or give her a map
2. You are not sure whether a word should be spelled 'dependent' or dependant'. You would:
 - a. See the word in your mind and choose by the way they look
 - b. Think about how each word sounds and choose one
 - c. Find it in a dictionary
 - d. Write both words on paper and choose one
3. You are planning a holiday for a group. You want some feedback from them about the plan. You would:
 - a. Describe some of the highlight
 - b. Use a map or website to show them the places
 - c. Give them a copy of the printed itinerary
 - d. Phone, text, or email them
4. You are going to cook something as a special treat for your family. You would:
 - a. Cook something you know without the read for instructions.
 - b. Ask friends for suggestions
 - c. Look through the cookbook for ideas from the pictures
 - d. Use a cookbook where you know there is a good recipe
5. A group of tourists want to learn about the parks or wildlife reserves in your areas. You would:
 - a. Talk about or arrange a talk for them about parks or wildlife reserves.
 - b. Show them internet pictures, photographs or picture books.
 - c. Take them to the park or wildlife reserve and walk with them
 - d. Give them a book or pamphlet about the parks or wildlife reserves
6. You are about to purchase a digital camera or mobile phone. Other than price, what would most influence your decision?
 - a. Trying or testing it
 - b. Reading the details about its features
 - c. It is a modern design and looks good
 - d. The salespersons telling me about the features
7. Remember a time when you learned how to do something new. Try to avoid choosing a physical skill. Eg. riding a bike. You learned best by:
 - a. Watching a demonstration
 - b. Listening to somebody explaining it and asking questions
 - c. Diagram and charts
 - d. Written instruction eg. manual or textbook
8. You have a problem with your knee. You would prefer that doctor:
 - a. Gave you a web address or something to read about it

- b. Use a plastic model of a knee to show what was wrong
 - c. Described what was wrong
 - d. Showed you a diagram of what was wrong
9. You want to learn a new program, skill or game on the computer. You would:
- a. Read the written instruction that came with the program
 - b. Talk with people who know about the program
 - c. Use the controls or keyboard
 - d. Follow the diagrams in the book that came with it
10. I like website that have :
- a. Things that I can click on, shift or try.
 - b. Interesting design and visual features
 - c. Interesting written descriptions, list and explanation
 - d. Audio channel where i can hear music, radio programs or interviews.
11. Other than price, what would most influence your decision to buy a new non fiction book?
- a. The way it looks is appealing
 - b. Quickly read parts of it
 - c. A friends talks about it and recommends it
 - d. It has real life stories, experiences and examples
12. You are using a book, CD or website to learn how to take photos with your new digital camera. You would like to have:
- a. A chance to ask questions and talk about the camera and its features
 - b. Clear written instructions with lists and bullet points about what to do
 - c. Diagram showing the camera and what each part does
 - d. Many examples of good and poor photos and how to improve them
13. Do you prefer a teacher or a presenter who uses:
- a. Demonstration, models or practical sessions
 - b. Questions and answer, talk, group discussion, or guest speaker
 - c. Handouts, books or readings
 - d. Diagrams, chart, or graph
14. You have finished a competition or test and would like some feedback. You would like to have feedback:
- a. Using examples from what you have done
 - b. Using a written descriptions of your results
 - c. From somebody who talks it through with you
 - d. Using graph showing what you had achieved
15. You are going to choose food at a restaurant or cafe. You would:
- a. Choose something that you have had there before
 - b. Listen to the water or ask friends to recommend choices
 - c. Choose from the descriptions in th menu
 - d. Look at what other are eating or look at pictures of each dish
16. You have to make an important speech at a conference or special occasion. You would:
- a. Make diagram or get graph to help explain things
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Kidney disease	
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Eating disorder	
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21(d)	I felt that life was meaningless	0	1	2	3

THANK YOU FOR YOUR TIME

APPENDIX 6

Ref. no: UPM/TNCPI/RMC/JKEUPM/1.4.18.2 (JKEUPM)

Date: 30 March 2021

Dear Prof./Dr./Mr./Ms.,

APPLICATION FOR JKEUPM ETHICAL CLEARANCE: APPROVED

With reference to the above, I am pleased to inform you that your application for ethical clearance for the research project entitled '**Academic Performance and its Associated Factors among Medical Undergraduates in Universiti Putra Malaysia**' has been approved.

Please note that the official letter of approval will be issued as soon as possible. However, the ethical clearance is considered effective from the date of this email, and you may now proceed with your research.

Kindly remind the ethical approval required in the case of amendments/ changes to the study documents/ study sites/ study team.

Researchers should also complete a Study Final Report upon study completion. The form can be obtained from the Ethics Committee for Research Involving Human Subjects (JKEUPM) website (<http://www.tncpi.upm.edu.my/faildokumen>).

If you have any enquiries, please contact Ms. Nurulhasanah Ishak (03-97691605) or Ms. Nor Ellia Abd Ajis (03-97691244).

Note: Please use this reference number for any transaction:- **JKEUPM-2021-101**

Thank you.

Yours faithfully,

Prof. Dr. Zamberi Sekawi
Chair
Ethics Committee for Research Involving Human Subjects
Universiti Putra Malaysia



APPENDIX 7

**JAWATANKUASA ETIKA UNIVERSITI UNTUK
PENYELIDIKAN MELIBATKAN MANUSIA (JKEUPM)
UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG,
SELANGOR, MALAYSIA**

FORM 3.2 STUDY FINAL REPORT

1.	JKEUPM Ref. No.	JKEUPM-2021-101
2.	Study Title	Academic Performance and Its Associated Factors among Medical Undergraduates in Universiti Putra Malaysia.
3.	i. Principal investigator a. Name b. Address c. Tel.No d. Email ii. List of co-investigators	ia. Dr Anisah Binti Baharom b. Department of Community Health, Faculty of Medicine and Health Science, Universiti Putra Malaysia. c. 019-2811948 d. b_anisah@upm.edu.my ii. Co-investigator a. Ho Sze Qi b. Nur Nabilah binti Japri c. Nik Syahmi bin Nik Yusaimi
4.	Name Of Funding Agency	-
5.	Study Site	Faculty of Medicine and Health Sciences, Universiti Putra Malaysia
6.	Total number of eligible subjects in study site	216
7.	Recruitment of subjects in study site i. Number of participants recruited: ii. Number of participants completing trial/ study: iii. Proposed in original application: iv. Number of withdrawals from trial to date due to: a) withdrawal of consent b) no response from participants c) loss to follow-up	216 181 178 Not applicable.

	d) death (not the primary outcome) Total study withdrawals: v. Number of treatment failures to date (Prior to reaching primary outcome) due to: a) adverse events b) lack of efficacy Total treatment failures:	Not applicable.
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JKEUPM/ FORM 3.2/ VERSION: 2 OCTOBER 2018 1

