ORIGINAL ARTICLE

The Association Between Learning Style, Social Demographic Background, and Pharmacology Assessment Result Amongst First Year Medical Students in Universiti Putra Malaysia During Covid-19 Pandemic

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ABSTRACT

Introduction: A variety of medical treatments are based on the scientific understanding gathered from pharmacology studies. Thus, pharmacology is crucial in medicine. Many universities around the world have resorted to online learning of pharmacology as a result of the unique coronavirus epidemic, which has an indirect impact on the student's academic achievement. Apart from learning styles, the socio-demographic background of a student, which includes the student's family income, parental educational level, and residential area, is another important factor that influences pharmacology academic achievement. **Methods:** This is a cross-sectional study involving first-year medical students at the Faculty of Medicine and Health Sciences Universiti Putra Malaysia which used a questionnaire regarding the socio-demographic background and learning style. In addition, the pupils were given a set of pharmacological questions to assess their academic performance. **Results:** Findings revealed that the family income had a considerable impact on medical students' academic performance with a significant value for the Chi-Square at p = 0.013. The pupils' learning styles had no discernible impact on their academic success with an insignificant Fisher's exact test value at p = 0.822. **Conclusion:** Lower-income students (those with parental income below the median) were significantly more likely to have poorer academic outcomes than their higher-income peers. Our findings imply that policymakers can prevent COVID-19 from worsening existing achievement gaps in higher education by focusing on resolving the economic and health burden imposed by COVID-19.
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INTRODUCTION

COVID-19 has wreaked havoc on the medical school system and healthcare institutions around the world (1). Because of the virus's high contagiousness, it has been impossible to continue lectures as usual, affecting the medical education process, which is mostly centered on lectures and patient-centered education (2). The COVID-19 pandemic puts patients in danger of acquiring life-threatening diseases, posing significant obstacles for medical education, as instructors must deliver lectures safely while maintaining the integrity and continuity of the educational process (3). Another issue is the risk that medical students will get the virus during their training and then spread it to the rest of the community (4). Students are also required to stay at home and follow social distancing norms. Online learning and examinations during the COVID-19 pandemic force students to adjust quickly to a new way of learning, potentially leading to different learning styles than before the epidemic (5).

The concept of "learning styles" revealed that students differ in terms of the optimal mode of study for them, resulting in a preference for certain approaches over others (6). There are two categories of learners which include verbal learners who learn better from

information offered in words, and visual learners who learn more efficiently when information is presented in the form of visuals (7). Several research studies observed the relationship between academic success and learning styles (9,10). The prevalence of identifying an individual's learning style preference and adapting instructions accordingly is growing among educators, parents, and students themselves, according to the findings of previous studies.

"Learners" can be categorically divided into several criteria (11), as listed below:
Avoidant : Learners who are not enthusiastic about learning content and attending class.
Dependent : Learners who view both teachers and peers as sources of structure and support and look to authority figures for specific guidelines on what to do.
Participant :Learners who enjoy going to class and take responsibility for getting the most out of a course.
Independent : Learners who build up their knowledge on their own.
Competitive :Learners who learn the material to perform better than others in the class.
Collaborative :Learners who are cooperative with teachers and tend to share knowledge with peers.
Learning styles may be effective in both students and educators in understanding how to enhance their learning and teaching methods. The learning styles of students can be used to learn more about their preferences. Understanding learning styles may make creating, modifying, and developing more efficient pharmacology lectures much easier (8). As a result, recognising one's learning style is crucial to achieving more effective learning (9)

Malaysia has a population of 32.5 million people and 6.35 million homes, with a wide range of socio-demographic characteristics such as ethnicity, age, income classes, gender, and geographical location (12). Household income is divided into three categories: the bottom 40 percent (B40), the middle 40 percent (M40), and the top 20 percent (T20), which represent the percentage of households in each category as a percentage of all households in Malaysia (13). According to Department of Statistics Malaysia (2019) polls, the B40 group, which included 2.91 million families, had an income threshold of RM4,849. The income criteria for the M40 group, which included 2.91 million households, ranged from RM4,850 to RM10,959. Furthermore, 1.46 million households in the T20 category had an annual income of more than RM10,960. The COVID-19 epidemic has had a huge influence on global economic activity (14) and Malaysia is one of the countries affected economically, as well.

Based on the above, socio-demographic factor involving family income was also said to be a crucial factor contributing to good academic performance in students (15). Family income in higher education is important in supporting academic needs (16), developing specific study manners, and habits (17), and is instantaneously corresponding to academic success. The achievement gap between students of high and low socio-economic backgrounds is attributed to the differences in family resources finances, academic guidance, parental involvement, and language skills (18). While underachievement among students from low-income families is undeniably a well-studied topic, less attention has been paid to the elements that influence their academic success or failure (19).

Furthermore, as the second socio-demographic factor, parental educational level has an important role, with educated parents outperforming less educated parents in numerous research (16,18). The importance of family support in enhancing knowledge of the overall medical course materials and supporting the student in explaining complicated ideas should be emphasized (20).

Finally, the student's residential regions were discovered to be a socio-demographic element that has a significant impact on the student's learning ability, physical and psychological development, and academic achievement. A study revealed that low-grade point average (GPA) students come from areas where there is social disorganization, while high GPA students were found predominantly in wealthy neighborhoods (21).

A pharmacology evaluation is used in this study to see if first-year medical students' learning styles and socio-demographic backgrounds are predictive of their overall academic performance levels. Pharmacology is one of the most important branch of medicine and has been taught since the preclinical years. Medical students' perceptions of learning pharmacology were investigated by Abdulghani and Al-Naggar. In this study, 150 medical students were chosen at random from Malaysia's Management and Sciences University. Most of the students who took part in this study had a favourable impression on teaching and learning pharmacology. When compared to the average percentage of those who disagreed, the average percentage of agreed responses was significant (22).

In the United States, medication errors are estimated to cause roughly 7000 deaths per year (23). Recently, it was estimated that adverse drug responses caused by prescription errors in the UK cause or contribute to as many as 2420 deaths every year (24). Although pharmaceutical errors can be caused by a variety of factors (25), understanding medications and prescribing training are critical (26). Indeed, it was claimed that freshly qualified doctors lacked sufficient medication understanding (27). According to research submitted to the UK General Medical Council, flaws in the pharmacological knowledge that underpins prescribing could be a major contributor to pharmaceutical errors

(28). Pharmacology has been identified by medical students and graduates as requiring more attention in their curriculum (29, 30). Thus, in this study, employing pharmacology as an assessment tool among medical students to measure academic progress will increase medical students' knowledge of pharmacology.

Previous academic achievement, personality traits, and individual differences in cognitive learning strategies are all important determinants in medical school academic success, especially during the COVID-19 pandemic, when online learning is a struggle (31). Medical students, as one might anticipate, have greater problems nowadays, as the study load has increased considerably as a result of medical advances. As a result, some students continue to fail exams, forcing them to repeat the academic year. We may be perplexed as to why students perform differently even when they are taught by the same lecturer. Every person's learning style varies significantly since they are born into different families, raised in different cultures, and exposed to different areas of life (32). Relevant to this, educational stakeholders are concerned about the causes of these achievement discrepancies and want to know how they might be narrowed. As a result, we investigated the impact of learning styles and social demographic backgrounds on academic performance among first-year medical students at Faculty of Medicine and Health Sciences (FMHS) Universiti Putra Malaysia (UPM). Family income, parental educational level, and residential area were chosen as criterion.

The purpose of this research is to identify distinguishing factors that can aid in the production of medical students that perform better academically, whether through an effective learning style or a superior socio-demographic background, particularly in terms of financial considerations.

MATERIALS AND METHODS

Study design

A cross-sectional questionnaire survey was conducted among first-year medical students at FMHS, UPM from May to June 2021. Evaluation of the academic performance was evaluated through a set of pharmacology questions which consisted of 10 multiple true false questions (MTF) and 10 single best answer (SBAQ) questions. Students were given 40 minutes to answer the questions using the online platform.

Study Setting

Respondents were recruited from 1 April 2021 until 30 June 2021 from first-year medical students in FMHS, UPM. The admission criteria comprised all first-year medical students enrolled in Semester 2 of the 2020/2021 academic year, whereas the disqualification criteria included repeaters.

Sample Size

The sample size was calculated by using a two-proportion formula based on previous research done by Musa and Haque (2017) on medical students in Universiti Sultan Zainal Abidin, which concluded that there was a significant association between family income and students' performance (33). The estimated sample size was derived using two proportion formulas and a 10% non-response rate adjustment.

This is because this study gave the most plausible number to conduct the research on the population of first-year medical students in FMHS, UPM in which the estimated sample size of n = 42 is the largest number but lesser than the total population (i.e. total first-year UPM medical students = 101).

P1 = 0.49 (Proportion of students from a high-income family with high GPA) P2 = 0.20 (Proportion of students from a low-income family with high GPA)

$$n = \frac{\{1.96\sqrt{2(0.35)(1-0.35)} + 0.84\sqrt{0.49(1-0.49)+0.20(1-0.20)}\}^2}{(0.49-0.20)^2}$$

n = 41.13 (≈ 42 participants) n = 42 participants
Considering adjustment for comparison between 2 groups
n = 42 x 2
n = 84 participants
Considering adjustment for non-response rate of 5%
n = 5 % x 84 = 4.2 (≈ 5 non-responding)
n = 84 + 5
n = 89 participants

Thus, based on the equation and previous study, a sample size of 89 participants was chosen. This was based on a confidence interval of 95%, and a power of 80%.

Sampling Method

A probability simple random sampling was used to collect the data throughout the data collection period. A number of 1-101 was assigned to the students, and by using the Excel RANDBETWEEN function, an estimated sample size calculated (i.e. 89 study samples) was chosen from the population with no repetition. Each of the respondents had the same probability of being chosen. They were invited to answer a set of questionnaires and a set of pharmacology questions during the data collection period.

Data Collection

A questionnaire entitled "The Relationship Between Learning Style, Social Demographic Background, and Pharmacology Assessment Result Amongst First Year Medical Students in Universiti Putra Malaysia" that consists of 3 sections was implemented. In phase 1 of the data collection period, 101 self-administered, validated questionnaires were distributed online among the

participants by using a pre-designated Google form link. The questionnaire consisting of a total of 73 questions was used to determine respondents' learning styles as well as their social demographic background.

i. Section 1 : Background information of first year UPM medical students were collected.
ii. Section 2 : Questions on the socio-demographic background were employed based on three factors which were family income, parental educational level, and residential area.
iii. Section 3 : A five-point Likert-type scale namely Grasha-Riechmann Student Learning Style Scales (GRSLSS) were employed to determine the respondents' learning style.

The keys of the questionnaires were based on the respondents choosing the most relatable answers. The questionnaires are based on a 5 point Likert scale.

(1) This item is never or only rarely true of me;
(2) This item is sometimes true of me;
(3) This item is true of me about half the time;
(4) This item is frequently true of me;
(5) This item is always or almost always true of me.

The scoring for each question attributes to a cumulative set of scores under 6 learning styles. The set of questions that confers these 6 types of learning styles rotates in the cyclical order of dependent, independent, participant, avoidant, collaborative, and competitive. The cumulative score of the data will provide the final score of the corresponding learning style using the formula: Learning style score = (∑ all learning style scores/ 10). The dominant learning style was determined using score ranges of Grasha-Riechmann Student Learning Style Scales (34). The questionnaire used in the current study had good and acceptable internal consistency reliability, with a range of Cronbach Alpha values between 0.623 and 0.885. In terms of test-retest, the questionnaire had excellent and good test-retest reliability, with a range of Intraclass Correlation Coefficient (ICC) values between 0.779 and 0.941.

The six learning styles were characterised as independent, avoidant, collaborative, dependent, competitive, and participant learning styles based on student attitudes toward learning, classroom activities, teachers, and peers, and students were grouped depending on their primary (highest score) style. Hence, after categorization, the variable 'Learning Style' became categorical data. The variables 'Parental Educational Level' includes illiterate, primary school, secondary school, diploma/ similar, degree/ similar, Ph.D./ similar, and 'Residential Area' includes rural or urban. For variable 'Family Income', the net family income (in Ringgit Malaysia) was further categorized into 3 categories (B40, M40, T20) based on classifications by the Department of Statistics Malaysia (2019). For variable 'Pharmacology Assessment Result', the total score received by each student (in percentage) was further categorized into 3 categories (weak, moderate, excellent) based on the quartiles of marks obtained by the students. Mean and standard deviation were presented for normally distributed data, while median and quartiles was presented for not normally distributed data. All categorical data were described in terms of frequency and percentage.

In the phase 2 of data collection period, the participants were invited to sit for a pharmacology assessment consisting of 10 MTF and 10 SBAQ regarding pharmacology topics. The participants were given one-week of preparation before sitting for the assessment. They were provided 40 minutes to complete the assessment that was conducted online via platforms Google form and Google meet. The total marks for the assessment were 100 percent, with a passing mark of 50 percent, due to the fact that each question carried a 5% weighting.

Data Analysis

The Statistical Package for the Social Science (SPSS) version 26.0 was used for data analysis, data entry, clean data, and normality testing. Kolmogorov-Smirnov test of normality was performed to analyze the collected data to determine the normality of the numerical data for variables namely 'Learning Style', 'Family Income' and 'Pharmacology Assessment Result'.

For statistical analysis, the Fisher's Exact Test and Chi-Square Test were chosen to study the associations between the independent and dependent variables. These two statistical tests were chosen because both independent and dependent variables used in this study are categorical variables. In fulfilling the assumptions in these statistical tests, the Chi-Square Test will be chosen when not more than 20% of the expected count with less than 5, while the Fisher's Exact Test will be chosen when more than 20% of the expected count with less than 5. In summary, the relationship between family income and pharmacology assessment results as well as the relationship between the residential area and pharmacology assessment results were analysed by using the Chi-Square Test. In contrast, the relationship between learning style and pharmacology assessment results as well as the relationship between parental educational level and pharmacology assessment results were analysed by using the Fisher's Exact Test.

Validity and Reliability

The validated English version of the questionnaire was adapted from The Grasha-Riechmann Learning Style Scale (34) which had gone through a translation and back-translation procedure between English and Malay language in 2007 (35). Based on a back-translated and pretested translated version of the questionnaire, validity, and reliability of the improved version of the translated questionnaire were established with the excellent internal consistency of learning styles ranging from 0.81 to 0.93.

In the current study, some questions were added to the questionnaire to further suit our study. A pilot study was conducted with 10% of the actual sample size to fulfill the face validation part of this study. It was performed among preclinical first-year medical students in Universiti Sains Islam Malaysia and the respondents who were involved in this pilot study were not included in the sampling data. The test-retest data collection was done at a 10-day interval among the same respondents. The average time taken by a person to complete the questionnaire (73 questions) was about 10 minutes. The pretest results were reviewed and necessary modifications were made to improve the clarity and comprehensibility of the questions. Then, the internal consistency (Cronbach Alpha) and inter-rater reliability were calculated by using Statistical Package for the Social Science (SPSS) version 26.0. The questionnaire had good and acceptable internal consistency reliability, with Cronbach Alpha values ranging from 0.623 to 0.885.

Ethical Consideration

This research obtained the certificate of ethical approval on 6th April 2021 from Universiti Putra Malaysia Ethics Committee for Research Involving Human Subjects (JKEUPM), with the reference number JKEUPM-2021-135. The students were notified in person, via the form, that participation was voluntary and that they had the right to refuse. Before the respondents began answering the questionnaire questions, they were asked to sign a consent form.

RESULT

Socio-demographic Characteristics, Types of Learning Style and Pharmacology Assessment

Performance

Table I showed that out of 101 students, the majority (32.67%) were dependent learners, followed by collaborative learners (31.68%) and participative learners (27.72%), respectively. The least preferred learning styles by the students were avoidant (3.96%), independent (2.97%), and competitive learning styles (0.99%). Most of the students came from the M40 family (35.64%), followed by B40 (33.46%) and T20 (30.69%). Moreover, most of the students had parents or guardians with a degree/similar (46.53%) as the highest educational level, followed by secondary education (25.74%), diploma/ similar (14.85%), and Doctor of Philosophy (12.87%). As for the residential area, the majority of the students lived in urban areas (75.25%) while some lived in rural areas (24.75%). From the pharmacology assessment results perspective, most of the students were categorized into moderate students (56.44%), followed by excellent students (22.77%) and the remaining were weak students (20.79%).

Table I: Socio-demographic Characteristics, Types of Learning Style and Pharmacology Assessment Result of Study Respondents (N=101)

Variable	Frequency (N)	%
Socio-demographic Characteristics		
Family Income		
B 40	34	33.6
M 40	36	35.64
T 20	31	30.69
Parental Educational Level		
Illiterate (No formal education)	0	0
Primary School	0	0
Secondary School	26	25.74
Diploma/Similar	15	14.85
Degree/Similar	47	46.53
Doctor of Philosophy (PhD)/Similar	13	12.87
Residential Area		
Rural	25	24.75
Urban	76	75.25
Types of Learning Style		
Dependent	33	32.67
Independent	3	2.97
Collaborative	32	31.68
Competitive	1	0.99
Participant	28	27.72
Avoidant	4	3.96
Pharmacology Assessment Result		
Weak (<25% quartile)	21	20.79
Moderate (25% to 75% quartile)	57	56.44
Excellent (>75% quartile	23	22.7

Association Between Learning Style And Pharmacology Assessment Results

Table II demonstrates the correlations between learning styles and pharmacology assessment results of the students. In this case, the Fisher's Exact Test was used because 9 cells (50%) have an expected count of less than 5. Based on the test, the findings revealed that there was no statistically significant association among these

Table II: Association between Types of Learning Style and Pharmacology Assessment Result

Types of Learning Style	Pharmacology Assessment Result			P value
	Weak	Moderate	Excellent	
Types of Learning Style				
Dependent	7	19	7	0.822[a]
Independent	1	1	1	
Collaborative	5	18	9	
Competitive	1	0	0	
Participant	6	16	6	
Avoidant	1	3	0	

[a] - Fisher's Exact Test, significant at p<0.05
Passing rate ≥ 50

two variables as the significant value was p = 0.822. The different learning styles had no immediate effect on the outcome of the pharmacology assessment result.

Association between Socio-demographic Background and Pharmacology Assessment Result

Table III presented the association between family income and the pharmacology assessment results of the students. In this case, the significant value for the Chi-Square test was used to demonstrate the association between family income and pharmacology assessment results of the students as the expected count of less than 5 was less than 20% which was 0.0%. The findings revealed that there was a significant association between family income and pharmacology assessment results of the respondents with a significant value which was p = 0.013.

In addition, Table III revealed the association between parental educational level and pharmacology assessment results of the students. We choose to implement either the Fisher's Exact Test or Chi-Square test to study the association. In this case, the significant value for the Fisher's exact test was used to demonstrate the association between parental educational level and pharmacology assessment result of the students as the expected count of less than 5 is more than 20% which was 33.3%. The findings revealed that there was no statistically significant association among these two variables as the value p = 0.515.

Table III: Association between Socio-demographic Background and Pharmacology Assessment Result

Variables	Pharmacology Assessment Result			P value
	Weak	Moderate	Excellent	
Family income				0.013[a]*
B40	7	15	12	
M40	4	28	4	
T20	10	14	7	
Parental Educational Level				0.515[b]
Secondary school	5	13	8	
Diploma/Similar	4	6	5	
Degree/Similar	9	31	7	
Doctor of Philosophy (PhD)/Similar	3	7	3	
Residential Area				
Rural	6	16	3	0.334[a]
Urban	15	41	20	

[a] – Chi Square Test, [b]- Fisher's Exact test, *significant at p<0.05
Passing rate ≥ 50

Table III also displayed the association between residential area and pharmacology assessment results of the students. We choose to implement either the Fisher's Exact Test or Chi-Square test to study the association. The significant value for the Chi-Square Test was used to demonstrate the association between residential area and pharmacology assessment results of the students as the expected count of less than 5 was less than 20% which is 0.0%. The result revealed that there was no statistically significant association among these two variables as the value p = 0.334.

DISCUSSION

This study investigates the association between learning style and socio-demographic backgrounds involving parental educational level, residential area and family income and its effects on the pharmacology assessment performances amongst the first-year medical students in the FMHS, UPM. Overall, the study showed a statistically significant relationship between family income and pharmacology assessment outcomes. However, there were no significant findings when it came to learning style, parental educational level, or a residential area with pharmacological evaluation.

There was a substantial link between family income and the pharmacology assessment result in our study. This implies that a student's family income is a means through which he or she can meet academic needs, create study habits, and develop study manners that are conducive to academic success (36). This finding is consistent with Musa and Haque's study, which found that family income has a considerable impact on students' performance (33). It's because a parent's financial situation influences the type of their children's academic accomplishment. Furthermore, families with a high income can afford the expensive expense of reliable internet service for their children's online studies, particularly during the COVID-19 epidemic season, when all studies are conducted online. Not only that, parents with a high income may equip their children with all of the necessary devices and supplies for their schooling (37). Students from low-income households, on the other hand, must rely completely on school loans that they have filed for and minimise their expenses to the point where some had to cut their meals to save money. As a result, their health suffered as a result of food insecurity and financial stress, resulting in low academic performance (38). In addition, another study by Farooq et al. found that students' financial situations have a negative impact on their academic performance since their basic needs necessitate money, and as a result, their academic performance suffers (39).

In terms of learning style, there was no statistically significant association between different learning styles and pharmacology assessment results of the first-year medical students in the FMHS, UPM. This conclusion was reinforced by Ahmad et al., who discovered no significant association between learning styles and accomplishment in their evaluation on undergraduate students at Universiti Malaysia Terengganu (40). Similarly, Razak and Azman, found no significant link between dominant learning styles and academic accomplishment in nursing students at Kolej Kejururawatan Murni, Nilai, Negeri Sembilan (41). The similarity of the most commonly chosen types of learning styles by students, which were largely dependent and collaborative learning styles, may have influenced the consistency of this conclusion with the current research.

In contrast, the findings of this study contradicted those of Asci et al., who identified a statistically significant link between all types of learning styles and pharmacology, with the exception of collaborative learning (42). In this case, collaborative learners were less likely to exceed the pharmacology passing mark. The differences in learning environments and preclinical pharmacology syllabus at medical schools in Turkey compared to medical schools in Malaysia may have influenced the heterogeneity of this finding in our current research.

In the current study, it was found that the most commonly adopted type of learning style amongst the first-year preclinical medical students in UPM was dependent and collaborative learning styles, while the least adopted learning style was the competitive learning style. All of these findings were in line with a study conducted by Lau and Ying on undergraduate students at a private higher educational institution in Sibu, Sarawak (43). Dependent learning, from the perspective of medical students, was expected to improve students' pharmacology assessment outcomes because dependent learners typically rely on their lecturers and friends, whom they will always approach if they need any explanations on a particular topic (44). However, as there was no association between learning style and students' pharmacology assessment results, it is believed other factors may play a role in enhancing students' understanding of pharmacology. Aside from learning style, factors including academic aptitude, test ability, test anxiety, and time management may all play a role in learning pharmacology (45).

This study reports no significant association between parental educational level and the pharmacology assessment result. This study contrasts with those conducted by Eshetu, who found that students with educated parents performed better in school than those with less-educated parents (46). Our research found no link between parental educational level and the pharmacology assessment result. This could be attributed to parents of all educational backgrounds being too preoccupied with their jobs to attend or pay attention to their children's studies. This will eventually expose a lack of parental interest in their children's educational performance, and the child's academic progress will be mainly reliant on their initiative to succeed in school (47).

In addition, from our study, it was found that there was no significant association seen between the residential area and the pharmacology assessment result. Due to virtually equal internet availability in rural and urban locations, this result seems expected. Students can still get materials like medical books, journals, and eBooks online without having to go to a library or a bookshop nearby in this situation. There was no obvious correlation between students' residential region or origin and their assessment outcome when they have equal access to instructional materials (48). In contrast to our findings, Shamsuddin et al. reported that students from rural areas in Malaysia had higher anxiety levels than those from semi-urban and urban areas (49). They also discovered that individuals with higher anxiety levels performed poorly in the exam. As a consequence of their research, they concluded that there might be a link between a student's residential origin and their exam scores. They linked this reason to stress because students from rural areas are more likely to be in financial difficulty, which can produce mental stress in children who are struggling financially.

LIMITATION

Because this is a cross-sectional study, causality and effect cannot be established. The timing of the study isn't guaranteed to be representative. The findings' robustness and generalisability are limited by the fact that they were limited to a small number of medical students which does not represent the Universiti Putra Malaysia medical students in its entirety.

CONCLUSION

Based on second year UPM medical students, there is a significant link between financial concerns and academic achievement. Lower-income pupils (those whose parents' income was below the median) were substantially more likely than their higher-income counterparts to have poor academic achievements. Financial management, financial stress, and financial insecurity variables should be used in future studies to examine the association between financial problems and academic performance among students in higher education institutions.

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