Internal factors Affecting Academic Performance among Pharmacy Students in Malaysian Public Institutions of Higher Learning

Norazrina Azmi, Adliah Mhd Ali*, Xiao-Lian Wong, Endang Kumolosasi, Jamia Azdina Jamal and Thomas Paraidathatu

Faculty of Pharmacy, Universiti Kebangsaan Malaysia, Jalan Raja Muda Abdul Aziz, 50300 Kuala Lumpur

ABSTRACT

Introduction: Several factors have been found to affect university students from achieving and maintaining good academic performance. Therefore, the objective of this study was to evaluate the internal factors that affect pharmacy students' academic performance and to determine whether these factors have significant effect on their Cumulative Grade Point Average (CGPA) and year of study. **Method:** A questionnaire consisted of 47 items was used as the survey instrument in this study. A total of 1,018 pharmacy students from five Malaysian public institutions of higher learning participated in this study. **Result:** The result of the study showed that students' academic performance (CGPA) was significantly associated ($p<0.05$) with academic competency, test competency, time management skills, neuroticism and test anxiety. Academic competence, test competence, time management skills and test anxiety significantly ($p<0.05$) affect students with different ranks of CGPA. There was a significant difference ($p<0.05$) in conscientiousness level among second, third and fourth years' pharmacy students. *Post hoc* analysis indicated that significant difference was noted in the conscientiousness level between the second year students compared to fourth year students. In conclusion, academic competence, test competence, time management skills and test anxiety were important factors that were associated with students' academic performance.

Keywords: Pharmacy education, academic performance, pharmacy students, internal factors.

INTRODUCTION

In order to become a successful future pharmacist, a pharmacy student should acquire important qualities such as empathy and social skills which includes communication skills and teamwork.[1] Students who acquired these qualities were more likely able to work effectively with the other health care providers in managing patient care.[2] Academic performance has also been demonstrated to be one of the important factors associated with career success in the future.[3] Academic competence, test competence, time management skills, study strategies and test anxiety have been identified as important factors that may affect students' academic performance.[1] Students' personality traits such as conscientiousness, extraversion and neuroticism have also been found to affect students' academic performance.[4] These factors could be used by the academic administrators of the faculty to develop strategies in improving students' academic performance.[1]

Limited studies have been published regarding this issue in the Malaysian settings that involved institutions of higher learning. Therefore, this study investigate the factors that affect pharmacy students' academic performance such as academic competence, test competence, time management skills, study strategies, conscientiousness, extraversion, neuroticism and test anxiety among Malaysian pharmacy students at public insti-

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Address for correspondence:
Dr. Adliah Mhd Ali
Faculty of Pharmacy, Universiti Kebangsaan Malaysia, Jalan Raja Muda Abdul Aziz, 50300 Kuala Lumpur, Malaysia
Phone: +603 92897964
Fax: +603 26983271
E-mail: adliah@pharmacy.ukm.my

www.ijper.org

tutions of higher learning. We hypothesized that students with different ranks of cumulative Grade Point Average (CGPA) and in different years of study have different analytical and thinking skills as well as different levels of stress and confidence. Therefore, the differences in these factors with different ranks of CGPA and among second, third and fourth year students were measured.

MATERIALS AND METHODS

Subject

This cross-sectional survey was conducted by distributing the questionnaires to the pharmacy students at five Malaysian Public Institutions of Higher Learning which offer Bachelor of Pharmacy (B. Pharm.) degree; University Kebangsaan Malaysia (UKM), International Islamic University Malaysia (IIUM), University Teknologi MARA (Ui TM), University of Malaya (UM) and University of Science Malaysia (USM).Convenience sampling was used and all the students from the study population were enrolled as the study subjects. First year students were excluded due to unavailability of CGPA during the study period. The participation in this study was voluntary. This study was approved by the UKM Research Ethics Committee with the approval code of NF-035-2012.

Survey instrument

The survey instrument consisted of 47 items and were divided into Section A and B. Section A consisted of 7 questions consisting of demographic data while Section B consisted of 40 selected items adapted from previous studies to measure the factors that would affect pharmacy students' academic performance.[1,4] Section B consisted of 35 items which were used to measure academic competence, test competence, time management skills, study strategies, conscientiousness, extraversion and neuroticism. Academic competence, test competence, time management skills and study strategies were measured using a validated scale from the Study Management and Academic Results Test (SMART) by Kleijn and colleagues.[5] The inventory used to assess conscientiousness, extraversion and neuroticism was adapted from the Revised NEO Personality Inventory (NEO-PI-R) by Costa and McCrae.[6] All of the items were measured using 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strong agree). Section B consisted of 5 items which were used to measure test anxiety. The scale used to measure test anxiety was adapted from the Test Anxiety Scale (TAS)by Sarason.[7] All of the items were measured using a 5-point Likert scale ranging from 1 (not at all typical of me) to 5 (very much typical of me).

A pilot study was conducted by distributing the questionnaires to 30 pharmacy students from UKM which comprised of 10 pharmacy students from second, third and fourth year respectively for face validity. Minor modifications were made and these 30 pharmacy students were not included into the study.

The data obtained were coded and analysed using Statistical Package for Social Sciences (SPSS) version 20.0. The alpha level (p value) was set as 0.05which indicates significant relationship when $p<0.05$. The questionnaire was self-administered by subjects and analysed anonymously. The self-reported CGPA was used as an academic performance indicator. According to the current system, students must maintain their CGPA above 2.00 for continuation of enrolment in the programme. CGPA less than 2.50 was considered as poor, intermediate when the value falls between 2.50 to 2.99, good: 3.00 to 3.66 and excellent: 3.67 to 4.00.The statistical analysis used to analyse the data included descriptive statistics, Spearman's correlation analysis, Kruskal-Wallis H and Mann-Whitney U tests. Items 9, 10, 11, 12, 23, 28, 29, 30, 31, 32 and 35 in section B were reverse-coded during statistical analysis to indicate better outcomes with higher scores.

RESULTS

Reliability

Data obtained from the pilot study was analysed for reliability by calculating Cronbach's alpha. The Cronbach's alpha obtained from the pilot study was 0.709. A score of 0.7 and above indicates acceptable reliability.[8]

Demographic data

A total of 1,650 questionnaires were distributed and only 1,220 questionnaires (73.9%) were returned to the researcher. From the total of 1,220 returned questionnaires, only 1,018 were included in the final analysis. Two hundred and two questionnaires were excluded due to incomplete data. It has been found that 398 of the subjects were second year students, 290 subjects' were third year students and 330 subjects were fourth year students (Table 1). The overall mean age of the respondents was 21.19 ± 1.04. Majority of the respondents were Malays (70.5%) and females (75.6%). The mean CGPA was 3.06 ± 0.36. Statistical analyses showed that age and gender were not significantly associated with CGPA ($p>0.05$) but race and the year of study was significantly associated with CGPA of the respondents ($p<0.05$).

Table 1: Respondents' demographic characteristic

Variables	Second Year N = 398	Third Year N = 290	Fourth Year N = 330	Overall N = 1,018
Age, year				
Mean (SD)	20.29 (0.59)	21.22 (0.57)	22.23 (0.75)	21.19 (1.04)
Min	19	18	20	18
Max	24	23	27	27
Gender, %				
Male	27.1	21.0	23.9	24.4
Female	72.9	79.0	76.1	75.6
Race, %				
Malay	71.6	66.6	72.8	70.5
Chinese	25.1	31.7	24.2	26.7
Indian	1.0	1.4	1.2	1.2
Others	2.3	0.3	1.8	1.6
CGPA, mean (SD)	3.08 (0.33)	3.09 (0.38)	3.01 (0.37)	3.06 (0.36)
CGPA, mean (SD)	3.08 (0.33)	3.09 (0.38)	3.01 (0.37)	3.06 (0.36)

CGPA = Cumulative Grade Point Average

Internal factors affecting academic performance:

The mean score of academic competence was 3.58 ± 0.49. Table 2 showed that 58.2% of the students were able to manage their course loads (agree and strongly agree). Majority of the students (70.7%) found that their course materials were interesting (agree and strongly agree) while 74.7% of the students indicated that they need to put effort to understand the course materials being taught (agree and strongly agree).

The results showed that the mean score of test competence was 2.95 ± 0.53 (Table 2). Half of the students (51.7%) indicated that they had difficulty to prepare for examinations (disagree and strongly disagree).One third of the students (36.7%) were not able to cope with the examination tension (disagree and strongly disagree) while 32.9% of the students had difficulty in managing the amount of study material for examination (disagree and strongly disagree).

The mean score of time management skills was 2.82 ± 0.71. Only a small proportion of the students (28.6%) indicated that they could organise their study and leisure time easily (agree and strongly agree) while 55.6% of the students were having difficulty to study regularly (disagree and strongly disagree). Some of the students (29.4%) reported that they always started to prepare for an examination well in advance (agree and strongly agree).

The mean score of study strategies was 3.33 ± 0.57. Less than half of the students (48.4%) would review their course materials with their classmates while studying for examinations (agree and strongly agree) while56.8% of the students indicated that they summarised the course materials in their own words (agree and strongly agree).

The results showed that the mean score of conscientiousness was 3.54 ± 0.54. Majority of the students (74.8%) would try to attend lecture even when they were not feeling well (agree and strongly agree). Less than half of the students (49.0%) indicated that they paid attention to details (agree and strongly agree) and 46.3% of the students followed schedule (agree and strongly agree). Most of the students (68.4%) were ambitious (agree and strongly agree).

The mean score of extraversion was 3.13 ± 0.59. More than half of the students (56.3%) reported that they felt comfortable around people (agree and strongly agree) while 53.5% of the students acted forcefully and energetically (agree and strongly agree). The results indicated that 55.1% of the students were quiet around strangers (disagree and strongly disagree).

Statistical analysis showed that the mean score of neuroticism was 3.13 ± 0.52. Over half of the students (57.6%) reported that they were worried about things (agree and strongly agree) while 59.1% of the students were always in control of themselves (disagree and strongly disagree. The results revealed that 30.5% of the students were relaxed most of the time (disagree and strongly disagree).

Test anxiety

The mean score of test anxiety was 3.08 ± 0.70. One third of the students (31.6%) were nervous during

Table 2: Pharmacy students' responses to survey

Variables	Strongly Disagree (%)	Disagree (%)	Not Sure (%)	Agree (%)	Strongly Agree (%)	Mean Score (SD)
Academic Competence						
Managing course load	0.8	8.5	32.5	53.8	4.4	3.52 (0.75)
Comprehension	0.7	19.5	46.2	31.8	1.8	3.14(0.77)
Interest	0.2	5.5	23.6	60.2	10.5	3.75(0.72)
Enjoyment	0.2	7.0	29.9	54.6	8.3	3.64(0.74)
Efforts	0.4	4.3	20.6	60.6	14.1	3.84(0.73)
Test Competence						
Easily manage study material	2.4	25.6	45.4	24.4	2.2	2.98(0.83)
Test preparation	8.5	43.2	31.8	15.1	1.4	2.57(0.89)
Coping with examination tension	4.3	32.4	35.3	25.3	2.7	2.90(0.92)
Difficulty in managing study material	3.8	29.1	35.9	28.2	3.0	2.98(0.92)
Expecting complex questions in exam	5.9	18.5	23.5	41.6	10.5	3.33(1.08)
Time management skills						
Difficulty in combining study and leisure time	6.8	34.8	29.8	24.8	3.8	2.84(1.00)
Studying regularly	13.9	41.7	18.8	22.2	3.4	2.60(1.08)
Organisation	4.1	27.7	42.2	23.4	2.6	2.93(0.88)
Test preparation	5.4	31.5	33.7	26.3	3.1	2.90(0.95)
Study Strategies						
Judgement of test questions	3.2	19.0	24.4	44.8	8.6	3.37(0.99)
Advance planning	1.2	14.0	35.9	44.1	4.8	3.37(0.83)
Review with classmates	4.4	23.1	24.1	40.8	7.6	3.24(1.03)
Knowledge assessment	2.8	25.2	28.8	37.5	5.7	3.18(0.97)
Summarize	0.8	15.9	26.5	48.5	8.3	3.48(0.89)
Conscientiousness						
Details	0.9	14.0	36.1	43.0	6.0	3.39 (0.83)
Follow schedule	2.2	22.4	29.1	41.2	5.1	3.25 (0.93)
Attendance	2.0	8.0	15.2	56.7	18.1	3.81 (0.89)
Ambitious	2.3	11.1	18.2	38.6	29.8	3.83 (1.05)
Efficient	2.0	11.9	34.8	46.0	5.3	3.41 (0.84)
Extraversion						
Comfortable around people	2.6	13.4	27.7	48.5	7.8	3.46(0.91)
Centre of attention	5.4	25.3	36.9	28.4	4.0	3.00(0.96)
Forcefully and energetically	0.5	8.2	37.8	47.8	5.7	3.50(0.75)
Quiet around strangers	11.4	43.7	23.8	17.1	4.0	2.59(1.03)
Talk a lot	3.1	31.3	27.6	28.9	9.1	3.09(1.04)

Continue ....

Table 2: Pharmacy students' responses to survey *(Continue ....)*

Variables	Strongly Disagree (%)	Disagree (%)	Not Sure (%)	Agree (%)	Strongly Agree (%)	Mean Score (SD)
Extraversion						
Comfortable around people	2.6	13.4	27.7	48.5	7.8	3.46(0.91)
Centre of attention	5.4	25.3	36.9	28.4	4.0	3.00(0.96)
Forcefully and energetically	0.5	8.2	37.8	47.8	5.7	3.50(0.75)
Quiet around strangers	11.4	43.7	23.8	17.1	4.0	2.59(1.03)
Talk a lot	3.1	31.3	27.6	28.9	9.1	3.09(1.04)
Neuroticism						
Nervous	1.6	14.1	35.1	39.8	9.4	3.41 (0.90)
Bother	3.0	25.7	27.5	33.9	9.9	3.22 (1.03)
In control	5.5	53.6	31.1	8.4	1.4	2.46 (0.78)
Irritated	4.0	27.6	29.6	33.6	5.2	3.08 (0.99)
Worry	2.3	15.5	24.6	46.5	11.1	3.49 (0.96)
Relaxed	4.2	26.3	31.6	30.6	7.3	3.10 (1.01)

Table 3: Pharmacy students' responses to survey questions to measure test anxiety

Variables	Not at all typical of me (%)	Not very typical of me (%)	Somewhat typical of me (%)	Fairly typical of me (%)	Very much typical of me (%)	Mean Score (SD)
Failure to perform better	5.4	15.1	35.5	33.4	10.6	3.29 (1.02)
Nervousness	5.7	27.8	34.9	26.4	5.2	2.98 (0.99)
Task-irrelevant cognitions	13.8	34.6	31.8	16.8	3.0	2.61 (1.02)
Panicky	9.1	25.9	34.4	24.2	6.4	2.93 (1.06)
Anxious even when well-prepared	2.9	10.2	26.5	42.9	17.4	3.62 (0.98)

Test anxiety = 3.08 (0.70)

examinations until they forgot the facts that they knew (fairly typical of me and very much typical of me) (Table 3). Most of the students (60.3%) found that they were very anxious even when they were well prepared for a test (fairly typical of me and very much typical of me).

Relationship between the factors measured and academic performance

The results showed that the pharmacy students' academic performance (CGPA) was significantly ($p<0.05$) associated with academic competence, test competence, time management skills, neuroticism and test anxiety although the correlation coefficients were fairly weak (Table 4). Academic competence, test competence and time management skills were found to be positively associated with academic performance while neuroticism and test anxiety were negatively associated with academic performance. However, academic performance (CGPA) was not significantly associated with study strategies, conscientiousness and extraversion.

Differences in the factors measured among students with different ranks of CGPA

Among the 1,018 respondents, 51 students were in the rank of poor academic performance while 350 students, 580 students and 37 students were in the ranks of intermediate, good and excellent academic performance, respectively. Academic competence ($p=0.016$),

Table 4: Spearman's correlation analysis to predict the association between the factors measured with students' academic performance (CGPA)

	Spearman's Correlation Coefficients (*p* value)							
	AC	**TC**	**TMS**	**SS**	**C**	**E**	**N**	**TA**
CGPA	0.112*	0.092*	0.128*	0.010	-0.061	0.058	-0.076*	-0.200*
(*p* value)	(< 0.0001)	(0.003)	(< 0.0001)	(0.744)	(0.050)	(0.066)	(0.015)	(< 0.0001)

*Significant at $p<0.05$

CGPA = Cumulative Grade Point Average; AC = Academic Competence; TC = Test Competence; TMS = Time Management Skills; SS = Study Strategies; C = Conscientiousness; E = Extraversion; N = Neuroticism; TA = Test Anxiety

Table 5: Differences in factors among students with different ranks of CGPA

	Kruskal-Wallis H Test(mean rank)			
CGPA Ranks	**AC**	**TC**	**TMS**	**TA**
Poor	449.75	379.04	524.10	630.28
Intermediate	477.46	502.21	470.23	557.25
Good	532.24	522.56	522.53	480.28
Excellent	538.42	553.61	656.59	349.43

CGPA = Cumulative Grade Point Average; AC = Academic Competence; TC = Test Competence; TMS = Time Management Skills; TA = Test Anxiety

test competence (p=0.006), time management skills (p=0.001) and test anxiety (p< 0.0001) were found to have significant difference ($p<0.05$) among students with different ranks of CGPA. Study strategies, conscientiousness, extraversion and neuroticism showed no significant difference (p>0.05) among students with different ranks of CGPA.

Table 5 showed that students with excellent academic performance had the highest academic competence (mean rank=538.42) while students with poor academic performance had the lowest academic competence (mean rank=449.75). The results of post hoc analysis indicated that students with intermediate and good academic performance were significantly different (p=0.005).

The test competence of students with poor academic performance was the lowest (mean rank=379.04) among all the ranks of CGPA while students with excellent academic performance had the highest test competence (mean rank=553.61). Students with poor and intermediate academic performance (p=0.004), poor and good academic performance (p=0.001) and poor and excellent academic performance (p=0.007) were significantly different as shown by post hoc analysis.

Students with excellent academic performance demonstrated the best time management skills (mean rank=656.59). The poorest time management skills were shown by students with intermediate academic performance (mean rank = 470.23). Post hoc analysis reported that students with poor and excellent academic performance (p=0.024), intermediate and good academic performance (p=0.009), intermediate and excellent academic performance (p<0.0001) and good and excellent academic performance (p=0.008) differed significantly.

Statistical analysis showed that students with poor academic performance had the highest test anxiety (mean rank=630.28) while students with excellent academic performance had the lowest test anxiety (mean rank=349.43). Students with poor and good academic performance (p<0.0001), poor and excellent academic performance (p<0.0001), intermediate and good academic performance (p<0.0001), intermediate and excellent academic performance (p<0.0001) and good and excellent academic performance (p=0.005) were significantly different as revealed by post hoc analysis.

Differences in the factors measured among second, third and fourth years' students

There was a significant difference ($p<0.05$) in conscientiousness ($p=0.002$) among second, third and fourth years' pharmacy students. Second year students were shown to have the highest conscientiousness level (mean rank = 544.80), followed by third year students (mean rank = 507.18) while fourth year students had the lowest level of conscientiousness (mean rank = 468.97). The results of post hoc analysis indicated that second year and fourth year students differed significantly ($p<0.0001$). However, academic competence, test competence, time management skills, study strategies, extraversion, neuroticism and test anxiety were found to have no significant difference ($p>0.05$) among second, third and fourth years' pharmacy students.

DISCUSSION

Academic competence, test competence, good time management skills were found to be associated with academic performance. The positive association of academic competence with academic performance indicates that the students think it is important to manage their course material effectively to ensure improvement in their academic performance. Studies from Sansgiry et al.[1] and Kleijn et al.[5] have also reported similar findings.

Time management skills significantly associated with academic performance, which was similar to the previous studies.[5, 9-13] Many students reported that they had difficulty organising their study and leisure time. This may be attributed to the extensive course load and stress associated with examinations or tests.[1] it's believed that students may achieve academic success with better time management skills.[14]

Study strategies were not associated with their academic performance which was consistent with the study by Sansgiry and colleagues.[1] Although extraversion was found not to affect students' academic performance, however the finding was inconsistent with the previous studies.[4,15]

Extraversion was negatively associated with academic performance and found similar to the previous studies.[4,16,17] This finding can be due to the neurotic characteristic of the students which is anxiety, especially under stressful conditions such as examinations or tests.[18,19]

Based on the result obtained, test anxiety was shown to be negatively associated with academic performance. The finding is consistent with some of the previous studies.[7,18,20-22] Therefore, the academic administrators of the faculty could organise stress management programs to reduce the stress levels of students and assist them to overcome anxiety in order to help them to improve their academic performance.[22]

Academic competence, test competence, time management skills and test anxiety were found to be the important factors which might help to distinguish students with different ranks of CGPA (academic performance). This indicates that students with good academic competence,[5] high test competence,[1] good time management skills[12] and low test anxiety[20] will achieve higher CGPA. This is supported by the results of this study which showed that students with excellent academic performance had the highest academic and test competence, best time management skills and lowest test anxiety among students with all ranks of CGPA. Students with poor academic performance were shown to have the lowest academic and test competence and highest test anxiety. This may be due to the poor ability of these students to manage their academic course load and they may have difficulty in coping with the study materials for examinations or tests.[1] However, in this study, students with poor academic performance demonstrated better time management skills than students with intermediate and good academic performance. It is possible that students with poor academic performance have the wrong perception about good time management. Our study found that the year of study would not affect academic performance based on the factors measured except for conscientiousness.

It is evident that academic competence, test competence, time management skills, neuroticism and test anxiety would affect students' academic performance. Similarly, students with good academic performance have better control of academic competence, test competence, time management skills and test anxiety.

CONCLUSION

It is evident that academic competence, test competence, time management skills, neuroticism and test anxiety would affect students' academic performance. Similarly, students with good academic performance have better control of academic competence, test competence, time management skills and test anxiety.

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ABBREVIATION

CGPA	Cumulative Grade Point Average
BPharm	Bachelor of Pharmacy
UKM	Universiti Kebangsaan Malaysia
IIUM	International Islamic University Malaysia
UiTM	Universiti Teknologi MARA
UM	University of Malaya
USM	University of Science Malaysia
SMART	Study Management and Academic Results Test
NEO-PI-R	Revised NEO Personality Inventory
TAS	Test Anxiety Scale

CONFLICT OF INTEREST

There is no conflict of interest to declare for this study.

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