



The Impact of Perceived Stress and Stress Factors on Academic Performance of Pre-Diploma Science Students: A Malaysian Study

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Abstract

This study examines the relationship between stress factors (health, social, and academic) and the level of perceived stress at three different periods of a semester (beginning, middle and end), and their impact on the academic performance of Pre-Diploma Science students at the University of Technology MARA (UiTM), Malaysia. The results indicate that on an overall the students experienced moderate level of stress and that none of the stress factors significantly affect the academic performance of students. There is a significant difference in the level of perceived stress between the beginning and middle of the semester but not significant between the middle and end of the semester. With regards to academic performance, there is no significant correlation in the level of perceived stress at both the beginning and middle of the semester. However, a significant correlation is found between the level of perceived stress at the end of the semester with academic performance. Majority of students reported that they do not get enough sleep and face nutritional problems throughout the semester. The results provide insights of how the university surveyed and other institutions of similar structure can manage stress of their students so as to achieve improved academic performance.

Keywords: health stress, social stress, academic stress, perceived stress, academic performance, Malaysia

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INTRODUCTION

Learning and memory can be affected by stress. Although an optimal level of stress can enhance learning ability (Kaplan & Sadock, 2000), too much stress can cause physical and mental health problems (Niemi & Vainiomaki, 1999; Laio et al., 2007), reduce self-esteem (Bressler & Bressler, 2007; Linn & Zeppa, 1984; Silver & Glicker, 1990) and may affect the academic achievement of students (Choi et al., 2007; Elliot et al., 2005; Hofer, 2007; Robbins et al., 2006; Trautwein et al., 2006; Was et al., 2006).

University students might experience high stress due to academic commitments, financial pressures and lack of time management skills. When stress is perceived negatively or becomes excessive, it can affect both health and academic performance (Campbell & Svenson, 1992) and can have an adverse effect on students (Amirkhan, 1998; Covington, 1997). Moreover, if the pressure is prolonged and perceived as unmanageable, these experiences have been shown to elicit helplessness, depression and stress (Carver & Scheier, 1994), thereby placing the academic futures of some students in jeopardy (Marcos & Tillema, 2006).

A considerable number of studies have been conducted to investigate the effect of stress factors on the grade point average (GPA) of university students (e.g. Calderon et al., 2001; Hammer et al., 1998; Hatcher et al., 1991; Kelly et al., 2001; Trockel et al., 2000; Quaye et al., 2005; Waring & Rijn, 2006). However, studies were conducted in isolation without incorporating a comprehensive list of stress factors. For example, while it has been acknowledged that finance and problems with roommate may affect the academic performance of students, these factors did not receive much research attention from among the undergraduate students. There also arises a question of which stress factor(s) has/have substantial influence on the academic achievement of students. To date, no decisive answer was found of whether the stress perceived by students influence their academic performance.

In addition, a review of literature indicates that not much have been prioritized on stress-related research, particularly in Malaysia. The majority of investigations has taken place in the United States and was primarily concentrated on students in the medical field (e.g. Moffat et al., 2004; Niemi & Vainiomaki, 1999; Pickard et al., 2000; Ratana, 2003; Sanders & Kurt, 2001; Shapiro et al., 2000). Furthermore, prior studies have concentrated on collecting cross-sectional rather than longitudinal data (Misra et al., 2000; Trockel et al., 2000). This paper thus attempts to address the research gaps by including a more comprehensive list of stress factors and empirically test them against the academic performance of Pre-Science students in Malaysia based on different periods of a semester. Specifically, this study is conducted to test the following hypotheses:

H₀₁: There is no significant difference in the level of perceived stress among the students at the beginning, middle, and at the end of the semester.

H₀₂: There is no significant correlation in the level of perceived stress among the students at the beginning, middle, and at the end of the semester with their academic performance.

H₀₃: There is no significant association between the level of occurrence of stress factors and academic performance of the students.

The findings from the present study would benefit various parties, such as the Education Ministry and universities in planning and conducting necessary programs for the students so that the stress factors could be reduced to an optimal level in order to help the students in attaining better academic performance. The results would also benefit the parents. By knowing and acknowledging the causes of stress, parents are in better positions to give advice, motivation and/or moral support to reduce the stress factors which could enhance the academic performance of their children.

LITERATURE REVIEW

Health-related stressors

There are three health-related factors which contribute to the academic performance of students. These factors comprise of amount of exercise, sleeping habits and nutritional routines (Hammer et al., 1998) which have been found to contribute to how a student performs academically. These factors are discussed below.

Exercise

Researchers have evaluated the effect of exercise on the academic performance of university students but arrived at different findings. Turbow (1985), in a study involving 891 upperclassmen and graduate students, found that students

who exercised seven or more hours per week obtained significantly lower grades than students who exercised six or fewer hours weekly or who do not exercise at all. The same results were reported in Trockel et al.'s (2000) study. They opine that taking time out of frequent study hours to work out pulls away the grades of students. Trockel et al. (2000) further observed that a frequent occurrence on college campuses is that students becoming almost addicted to exercise, turning a healthy behavior into one that is psychologically unhealthy.

Sleeping habits

Reports in literature indicate that sleeping habits accounted for the largest amount of variance in the GPA of students (Lack, 1986). Kelly et al. (2001) "classified sleepers into three categories: 1) Short sleepers, individuals who, when left to set their own schedule, slept six or fewer hours; 2) Average sleepers, individuals who slept seven or eight hours; and 3) long sleepers, individuals who slept nine or more hours out of twenty-four" (pp.84). The study found that people who were considered long sleepers reported higher GPAs. This is because people who sleep fewer hours at night may have psychological maladjustment and this increases their anxiety and stress, which has been associated with poorer academic performance. These factors cause problems to students such as shortened attention span and increasing the number of errors students make on tests. Similarly, Pilcher and Walter (1997) found a negative effect of sleep deprivation on the cognitive performance of college students.

Nutrition

Another aspect of health-related factor that has been shown to be related to academic performance is nutrition. One aspect of the relationship between diet and academic performance concerns the consumption of a breakfast meal. Eating breakfast appears to predict high GPAs (Trockel et al., 2000), and it seems to influence the recall ability and short-term spatial memory (Benton & Sargent, 1992). However, Trockel et al. (2000) demonstrates that eating breakfast did not significantly affect semester GPA after controlling for the effects of weekend and weekday wake-up times. Although the effects of eating breakfast (Benton & Sargent, 1992; Meyers, 1989; Pollitt, 1995) and other nutritional variables on the academic performance of elementary students (Kalman, 1997) have received much attention in the literature, little information on the effects of nutritional habits on the academic performance of college students can be found.

Social factors

A number of social factors that may contribute to stress among the college or university students have been identified. They include lack of time and/or support for and from family and friends, family commitments, financial difficulties, and problems with college roommates (Linn and Zeppa, 1984; Legault et al., 2006; Orpen, 1996; Vitaliano, et al., 1989; William, 1996).

Family and social support

A considerable number of studies have been conducted to examine the effects of parental, family members, friends, academics, and peers support on anxiety and academic performance of college students (Cutrona et al., 1994; DeBerard et al., 2004; Hackett et al., 1992; Lazarus & Folkman, 1984; Mallinckrodt, 1988; Orpen, 1996; Smith and Renk, 2007; William, 1996). However, the results on the extent of support received from a particular source are mixed and inconclusive. William (1996) found that social support ratings were significant predictors of graduate GPAs after controlling for the different ethnicities in the US. Specifically, Cutrona et al. (1994) reported that the social support of parents predicted college GPA, after controlling for the American College Test (ACT) scores. Hackett et al. (1992) discovered that encouragement from faculty members predicted the academic performance of university students but peer support and academic performance were negatively related. Orpen (1996) confirms that outside social support from friends and family members, but not from peers, moderated the negative effects on test anxiety and thus examination results of students. Interesting findings were obtained from Smith and Renk's (2007) study where parental support was not significantly related to academic-related stress; however, it is the level of social support received by the college students from significant others such as their romantic partners (boyfriends or girlfriends) who might be more likely to be an immediate influence in their daily lives. They further stressed that since many of these students are transitioning into adulthood and may be experiencing their first serious romantic relationship, they may become more entrenched with their significant others than they otherwise would, particularly as they experience and make attempts to cope with academic-related stress.

Finance

The results of prior studies suggest that financial burdens could be a potential stress factor for college students which contribute to low academic performance (Andrews & Wilding, 2004; Cheng et al., 1993; Kariv & Heiman, 2005; Misra & Castillo, 2004; Moffat et al., 2004; Mori, 2000; Omigbodun et al., 2004; Seyedfatemi et al., 2007; Smith & Renk, 2007; Tyrrell, 1992). Pfeiffer (2001) highlights that there are many students who have to work while they are attending college in order to pay for their fees. There are many times when students have to work late at night and then do not have the time to study. This can be hazardous for students as worrying about their financial issues and grades can be an immense stressor in their academic life.

Problems with roommate

The academic motivation given by a student's roommate to the student has been shown to have a positive impact on that student's academic achievement (Blai, 1972). In fact, students who are more successful academically may create less stress for their roommates and, thus, allow them to perform better (Ryan, 2004). Based on the review of literature, very little research has been conducted to ascertain whether problem with roommate is another factor contributing to stress and its effect on the academic performance among the college students. It is thus interesting to include this stressor in the study.

Academic factors

Academic problems have been reported to be the most common source of stress for students (Aldwin & Greenberger, 1987; Blumberg & Flaherty, 1985; Clark & Rieker, 1986; Evans & Fitzgibbon, 1992; Felsten & Wilcox, 1992; Kohn & Frazer, 1986; Mallinckrodt et al., 1989; Struthers et al., 2000). Schafer (1996) asked college students about their most stressful daily hassles. He observed that the most irritating daily hassles were usually school-related stressors such as constant pressure of studying, too little time, writing term papers, taking tests, plans, and boring instructors. Among the stressors, test or exam anxiety is one of the main causes of academic stress and most students seem to be more emotionally vulnerable to examination (Fisher, 1994). Another frequently reported source of stress that most college students experience is receiving a lower grade than they expected (Evans & Fitzgibbon, 1992; Kohn & Frazer, 1986; Mallinckrodt et al., 1989; Ratana, 2003). Students have a fear of failure in relation to their grades and academic work. To fall short of their own or others' expectations in school, job, athletics, or any other activity, one risks both external and internal costs: threat to academic or career prospects, disapproval, rejection, humiliation, guilt and blow to the self-esteem (Schafer, 1996).

Stress associated with academic activities has been linked to various negative outcomes such as poor health (Greenberg, 1981; Lesko & Summerfield, 1989), depression (Aldwin & Greenberger, 1987), and therefore poor academic performance (Clark & Rieker, 1986; Linn & Zeppa, 1984). For example, Lesko and Summerfield (1989) found a significant positive correlation between the incidence of illness and the number of exams and assignments. Similarly, Aldwin and Greenberger (1987) found that perceived academic stress was related to anxiety and depression in college students. Nevertheless, while too much stress can interfere with a student's preparation, concentration, and subsequently performance, but positive stress can be helpful to students by motivating them to peak performance (Pfeiffer, 2001).

In conclusion, the literature indicated that perceived stress and the presence of the stress factors might influence the academic performance of students. In addition, it is also hypothesized that perceived stress and these stress factors present in different levels during the beginning, middle and end of semester. As such, this study is conducted to test the three propositions outlined above.

METHODOLOGY

Subjects

The subjects involved in this study comprise of the Pre-Diploma Science students at the University of Technology MARA (UiTM) of the Negeri Sembilan campus. The Pre-Diploma Science is a one to two semester bridging programme with the objective to help the weak-students academically, especially in the science subjects before they are admitted into any science and technological-based Diploma courses in any of the UiTM campuses throughout the country. There are currently 3 satellite campuses, 12 branch campuses, 8 city campuses, 19 affiliated colleges of UiTM in Malaysia. Upon completion of this preparatory course, students are then able to pursue the Diploma programmes

with the condition that they obtained at least a Cumulative Grade Point Average (CGPA) of 3.00. If the students fail to achieve the required point, they have to undergo the programme for another semester.

Since the population of the Pre-Diploma Science students for the June – November 2005 intake in the campus was 242, all of the students were chosen as subjects for the survey. Out of the 242 students, 154 complete responses were returned, yielding a response rate of 63.60 percent. To avoid sample bias, a researcher is required to obtain at least 10 percent of response rate from the sample size (Roscoe, 1975) and that 30 percent of response rates are needed to make the findings eligible for generalization (Sekaran, 2004). Thus, the response rate obtained for this study indicates a non-sample bias and makes the findings eligible for generalization.

Instrumentation

A structured, self-administered questionnaire was developed as a mode of data collection. The questionnaire comprises of three sections, students' profile; Perceived Stress Scale (PSS); and Stress Factors Survey. In section A, the respondents were asked to furnish demographic information such as names, gender and previous schools enrolled (boarding or non-boarding). This information is required to allow matching of data in the three stages of data collection (beginning, middle and end of semester) with the data on academic performance. The questions in Section B were intended to measure individual's perception of stress using the PSS. This 14-item scale, developed by Cohen et al. (1983), has been acknowledged as the most widely used psychological instrument in measuring the perception of stress. It is designed to measure the degree to which respondents found their lives unpredictable, uncontrollable, and overloading (Cohen et al., 1983).

The scale also includes a number of direct queries about current levels of experienced stress. It was designed to be used in communities whose samples have at least a junior high school level of education which is equivalent to the Pre-Diploma level in this case. The items can be easily understood and very general in nature that they are free of content specific to any subpopulation groups. Therefore, it is easy to score and can be administered within a short period of time. This study adopts the constructs of PSS using a five-point Likert-type scale ranging from 1 (Never) to 5 (Very Often). The PSS scores were obtained by reversing the scores of six negative items (e.g., 1=5, 2=4, 3=3, 4=2, 5=1) and then summing across all the items. Items 4, 5, 6, 7, 9, 10, 12 and 13 are positively stated items. Individual scores on the PSS can range from 14 to 70 with lower scores indicating lower perceived stress and higher scores indicating higher perceived stress at that particular point of time.

In Section C, the Stress Factor Survey was used to determine the sources of stress that have been found to influence the academic performance of students. This section requires the participants to identify the factors of stress that they experience during the given period by answering Yes/No questions. Eleven factors of stress were listed down in the questionnaire and respondents may indicate more than one factor, which they perceive as relevant to them. The researchers developed the section and the sources of stress were gathered from the literature review. Descriptive statistics using percentage was used to explain the percentage of occurrence of each stress factor in each of the three corresponding periods of the semester. The number of occurrence of each stress factors is categorised into four, i.e. never (the stress factors never existed at all three periods); sometimes (the stress factors occurred once); often (the stress factors occurred twice); and very often (the stress factors occurred at all the three periods).

The data on the academic performance of students, i.e. the GPAs, were obtained by the researchers from the Academic Affairs Department after their final examination results were released. The GPA is a common measure of academic performance adopted by many institutions of higher learning in Malaysia. The reason of obtaining their GPAs is to find out whether the stress they experienced leaves an impact on their academic performance.

Procedures

The 4-page questionnaire were distributed to the students at three different times; one month after the semester started (beginning), one week after the semester break (middle) and the final one was given after their final exam ended (end). The purpose of doing so is to answer the first objective of the study, which is to identify the trend of stress among the students throughout that particular semester. Because of the fact that there was no control group, the issue of internal validity needed to be considered. To ensure that all plausible threats of internal validity are minimized and to reduce and control non-response error, the questionnaires were delivered and collected personally by selected lecturers during classes. The lecturers and subjects involved were thoroughly briefed on the purpose and the implementation of the data collection process. The same lecturers were asked to disseminate the questionnaires to the students throughout the three periods and were required to maintain close contact with the researchers during the study.

Questionnaires were administered during the same week to minimize the effect of varying stress levels that may occur and also under the same basic conditions. Respondents were asked to read the instructions written in the questionnaire carefully. In addition, the subjects have been kept apart so as to minimize the problems of the subjects

influencing each other's responses. They were required to complete the questionnaire during the given time. The students were not given any extra marks for participating in this survey.

Reliability

The Cronbach alpha values of the 14-item PSS for the three periods of data collection (beginning, middle and end of semester) are 0.67, 0.78, and 0.76 respectively. In general, reliability less than 0.60 are considered poor (Norzaidi et al., 2007a; Norzaidi et al., 2007b; Norzaidi et al., 2008; Sekaran, 2004). However, the values are greater than 0.60 in all the three periods, indicating that the responses from the students are considered reliable.

Respondents' Profile

Majority of students are female and the majority of them come from non-boarding schools (87 percent). This is a common scenario in tertiary institutions throughout the country whereby the percentage of female students (77.90 percent) tend to outnumber the male (22.10 percent). The high numbers of respondents who come from non-boarding schools imply that they have no prior experience of staying away from their families and thus are assumed to be dependent on their parents and families compared to those who come from boarding schools.

RESULTS

Perceived Stress Scale

Table I shows the levels of perceived stress in accordance to the three different periods of a semester. It indicates that the level of perceived stress increases as the students move from beginning to the middle of the semester, but drops as the students advance to the end of the semester. The figures are considered moderate (37.90, 39.17 and 38.40) as they are slightly more than half of the total score (70.00).

Table I: Levels of perceived stress according to three different semester periods

Semester Periods	Level of Perceived Stress (Total = 70)
Beginning	37.90
Middle	39.17
End	38.40

Stress Factor Survey

Table II shows the results in percentage of the Stress Factor Survey which consists of eleven stressors at the beginning, middle and end of semester. The majority of students claimed that they were not getting enough sleep at the three different periods of time throughout the semester, with 53.40 percent, 57.10 percent and 53.90 percent respectively. This is followed by the nutritional factor, with 53.20 percent, 53.90 percent and 51.90 percent respectively. Thus, we can conclude that most of the students are not satisfied with the food provided at the college dining hall. In addition, the students also claimed that they did not have enough exercises. This is probably due to the limited sports and recreational facilities and activities available for the students in the campus. Other factors that contribute to stress include course load, finance, problems with roommate, social activities and sleeping too much. Problems with girlfriends/boyfriends, class attendance and over exercising seem not to contribute much stress to the students.

Four trends can be observed from Table II. Stress factors associated with nutrition, sleeping too much, social activities and finance increased as the students moved towards the middle semester but dropped as the students moved towards the end of the semester. Stress factors associated with class attendance, problems with roommate, over exercising and course load reduced as the students move towards the middle of semester, but increased again towards the end of semester. Problems with girlfriend/boyfriend and not enough exercising present an increasing stress while the stress level dropped for not getting enough sleep as the students moved from beginning to middle and to the end of the semester.

Table II: Percentage of students experiencing stress during the semester

Stress Factors	Percentage of Students		
	Begin Semester	Middle Semester	End Semester
Nutrition	53.20	53.90	51.90
Sleeping too much	21.40	23.40	20.10
Not getting enough sleep	58.40	57.10	53.90
Problems with boyfriend/ girlfriend	6.50	7.80	10.40
Class Attendance	4.50	3.20	5.30
Problems with roommate	28.60	18.20	30.50
Over Exercising	1.30	0.60	1.30
Not enough exercising	44.20	50.00	55.80
Social Activities	23.40	25.30	20.10
Finances	31.80	41.60	26.60
Course load	44.80	32.50	37.00

Students' Academic Performance

Table III illustrates the GPA of the students as obtained from the Academic Affairs Department. The results comprised of five compulsory subjects namely Mathematics, Physics, Chemistry, Biology and English Language. The majority of students scored GPAs of more than 3.00 (66.20 percent). Only 7.10 percent of the students scored GPAs of less than 2.00. This implies that on an overall, the academic performance of the students is satisfactory.

Table III: Students' academic performance

CGPA	Frequency	Percent
3.50 - 4.00	37	24.00
3.00 - 3.49	65	42.20
2.50 - 2.99	31	20.10
2.00 - 2.49	10	6.50
0.00 - 1.99	11	7.10
Total	154	100.00

Level of Perceived Stress

Analysis of Variance (ANOVA) is used to determine if there is any significant difference in the level of perceived stress during the three periods of the semester. Table IV indicates that there is a significant difference in the level of perceived stress between the beginning and middle of the semester, but no significant differences were found in the level of perceived stress between the beginning and end of semester and between the middle and end of semester at 0.05 significance level. The results also suggest that the level of perceived stress faced by the students at the beginning of semester is less compared to the stress level experienced at the middle of the semester. However, the level of perceived stress experienced by the students from the middle towards the end of the semester was slightly higher than the level of stress at the beginning of the semester. As such, H_{01} is rejected for the significant difference in the level of perceived stress between the beginning and middle of the semester.

Table IV: ANOVA results on the differences of perceived level of stress between beginning, middle and end of semester

ANOVA:					
	Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	Significance
Between groups	2498.07	47	53.150	3.536	0.000
Within groups	1593.15	106	15.030		
Total	4091.23	153			

Post Hoc (LSD):				
	<i>N</i>	Mean	Mean Difference	Significance
(1) Beginning	32	2.11	(1) – (2) -1.17	.000
(2) Middle	60	3.28	(1) – (3) -0.68	.160
(3) End	62	2.79	(2) – (3) 0.49	.339
Total	154	2.73		

Table V shows the Pearson correlation coefficient results between the level of perceived stress and academic performance of the students. The results indicate that there is no significant correlation between the level of perceived stress at the beginning and at the middle of semester with academic performance. However, a significant correlation was found between the perceived level of stress at the end of semester and academic performance. The rho value (–0.206) indicates that there is a significant negative correlation between level of perceived stress at the end of semester and the academic performance of students. As such, H_{02} is accepted for the level of perceived stress at the beginning and at the middle of semester with the academic performance of students, but rejected for the level of perceived stress at the end of the semester. The results imply that although the students perceived a higher level of stress at the beginning towards the middle of the semester, it does not affect their overall academic performance. Their academic performance will only be affected when their perceived level of stress is higher at the end of the semester in which the level of perceived stress is statistically no different with the level of perceived stress at the middle of the semester.

Table V: Pearson correlation coefficient results between academic performance and levels of perceived stress at the beginning, middle and end of semester

	Perceived Stress End Semester	Perceived Stress Middle Semester	Perceived Stress Beginning Semester	Grade Point Average
Perceived Stress End Semester				
Perceived Stress Middle Semester	0.303(**)			
Perceived Stress Beginning Semester	0.207(*)	0.414(**)		
Grade Point Average	-0.206(*)	-0.113	-0.051	

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

To answer the third hypothesis, Chi-Square test of independence is used to determine whether students' GPAs depend upon the occurrence of stress factors. The results presented in Table VI indicate that at p-value of 0.05, the GPAs of students do not depend on the number of occurrence of stress factors throughout the semester. Since the p-value for all the stress factors were found to be more than 0.05, thus H_{03} is accepted. It can be concluded that none of the stress factors affect the academic performance of students.

Table VI: Chi-square results

Stress Factors	p-value
Nutrition	0.340
Sleeping too much	0.364
Not getting enough sleep	0.082
Problems with boyfriend/ girlfriend	0.232
Class Attendance	0.628
Problems with roommate	0.412
Over Exercising	0.730
Not enough exercising	0.361
Social Activities	0.194
Finances	0.437
Course load	0.455

DISCUSSION AND IMPLICATIONS

In general, we conclude that the students did experience stress but at a moderate level with the total score of 37.9 at the beginning of the semester, followed by 39.17 at the middle of the semester, and 38.4 at the end of the semester out of the total score of 70 as illustrated in Table I. This implies that the students did not experience stress as a major problem even though the one-semester Pre-Diploma Science program is considered their transition period from school to university life and the fact that the majority of them come from non-boarding schools. In fact, most of the students have performed satisfactorily based on their GPAs.

One of the possible reasons is due to the small population with only 242 students and the ratio between students and lecturers is approximately 10:1. Therefore both the lecturers and students enjoy a very close relationship. As demonstrated in Table II, this close relationship has also motivated them to attend classes throughout the semester. Another possible reason is probably due to the course workload which was slightly similar to the secondary school level. They might be nervous during the beginning of the semester, but as they go along, they started to spot similarity in terms of the course contents with that of their secondary school. The level of stress becomes lower as they get used to the system. In addition, their relationships with roommates improved as time passed. They are able to balance between their academic and sport activities as well as time spent on sleeping.

The results indicate that there is a significant difference between the level of perceived stress at the beginning and middle of the semester at 0.05 significant level. In addition, the results also indicate that there is no significant difference between the level of perceived stress at the middle and at the end of the semester (Table IV). The results imply that generally, the level of perceived stress increases as the students move to the middle and towards the end of the semester. The possible explanation to this situation is probably that the students are yet to be given any tests and assignments at the beginning of the semester. However, when more tests and assignments come into their life at the middle of the semester, this probably contribute to higher stress level among the students compared to the stress level at the beginning of the semester even though they are used to the course load. The non-significance of the level of perceived stress between middle and at the end of the semester can probably be explained by the fact that the students are already used to the system. Notwithstanding, the findings imply that stress factors which increase from beginning to the middle of the semester such as nutrition, sleeping too much, social activities and finance and to the end of the semester such as problems with boyfriends or girlfriends should be addressed since these factors continued to pose major problems to students even to the end of the semester which significantly affect their academic performance.

In addition, the findings suggest that there is no correlation between the level of perceived stress at the beginning and middle semester with the students' academic performance. The results correlate with Womble's (2003) study where students' stress does not significantly correlate with their GPAs. This finding is not surprising, given the fact that these students are normally school leavers and they are used to the school system where terms are used and only final exams are counted. As they enter tertiary education institution, they still cannot see how the quizzes, tests, assignments held in between of the semester contribute to their overall grades. They still think that final exams are the most important criteria that make up their grades.

However, there is a significant correlation between the level of perceived stress at the end of semester and the students' academic performance. The rho value was -0.206 which implied that when the level of perceived stress is higher, the academic performance is lower. However, it is important to note that the correlation was rather weak. The implication is that the stress level they experienced is not that high to the extent that they could not cope with their academic activities. Hence, it was not surprising that more than half (66.20 percent) of them scored GPA 3.00 and above and that 24 percent of them achieved Deans List with GPA 3.5 and above (Table III).

We have also attempted to determine whether the stress factors impact on the academic performance of the students. The stress factors investigated were nutrition, sleeping too much, not getting enough sleep, problems with girlfriends or boyfriends, class attendance, problems with roommate, over exercising, not enough exercising, social activities, finances and course load. While some of these factors show substantial percentage of stress and that four trends were observed, the statistical results suggest that the GPA of students do not depend on the number of occurrence of each of the stress factors.

Based on the findings, it is suggested that the current student and lecturer ratio available in the campus to be maintained. This is because results show that this is one of the possible reasons that contributed to the low level of stress experienced by the students. This is important as it would ensure good academic performance among the students so that they are able to pursue the Diploma programs of their choice upon completing the one semester of studies.

It is also important for the relevant policy makers and the university management to consistently plan suitable activities or programs for the students such as organizing talks on financial management, motivation, time management, study skills and probably topics on managing stress. These programs should be organized continuously, not only during the orientation week (Sirca and Sulcic, 2005). Such programs and activities would help to reduce the level of stress or at least they know how to control their stress, as it would directly contribute to their academic achievement. It is also timely to think of involving parents in some portion of the orientation programs. The financial problems of the students can be dealt with effectively if the parents have good understanding about financial planning. It is also important for the relevant authorities to disburse scholarships and loans on time to the university and to the students so that they do not have to worry about the financial burden shouldered by their parents. Besides enlightening the students in preparing them for university's life, parents must be involved in seminars on stress management. Many parents of these students have not attended universities and therefore, they do not understand how stressful their children are while in the university. By understanding the causes of stress encountered by their children, parents are in better positions to advise and motivate them. This indirectly leads to better academic performance.

In addition, it is also imperative to continuously monitor students food intake provided at the dining hall. This is essential because good nutrition would contribute to good health which indirectly results in producing good academic performers. In addition to that, sports and recreational facilities or activities should also be upgraded to provide more opportunities for the students to get involved in sports and recreational activities. Obviously, getting involved in those activities is one of the possible ways to help students to reduce their levels of stress.

While the problems of boyfriends or girlfriends are inevitable especially those who already found the other half before or after joining the institution, it is probably timely for the policy makers and universities to approach this issue with an open mindset. Special programs can be arranged for couples or individuals with boyfriends or girlfriends outside the institution on how they could maintain a healthy relationship and to motivate each other in achieving better grades. Program such as emotional intelligence can also play a pivotal role in ensuring that these students are not emotionally disturbed when facing problems with their other halves (Hidi, 2006).

CONCLUSION AND SUGGESTIONS FOR FUTURE RESEARCH

This study has addressed various important stress factors and their relationships with academic performance of postsecondary level students. It is hoped that the suggestions above shed some lights to the relevant authorities in planning and conducting necessary programs for the students in ensuring that they continue to produce excellent graduates in this knowledge-based economy. Notwithstanding, the results would also benefit the parents. By knowing and acknowledging the causes of stress, parents are in better positions to give advice, motivation and/or moral support to reduce the stress factors. This will ultimately lead to improved academic performance of their children.

Nevertheless, the results have to be interpreted cautiously. Although no significant effects were found between the stress factors and academic performance, we strongly believe that this is merely an absence of evidence for the effects, not evidence that there are no effects at all. Further, the correlation is rather weak, suggesting that there are other possible factors that may mask the relationship. These will have implications on the steps to be taken to mitigate all the stress factors discussed and the role of future research in addressing this.

Perhaps the most significant limitation of the study is the small sample size and that the study is confined to Malaysia. The small sample size might have contributed to the weak correlation and the absence of evidence on the effects of the stress factors on academic performance. Since culture may play a key role in adaptation to stress, a larger sample size from different institutions and geographical locations might yield different yet interesting results.

The statistical techniques used might also influence the results. It is hoped that more advanced analyses could be used in future studies in order to reach general conclusions about the perceived stress factors, stress levels and academic performance of students. For example, it is possible that some of the stress factors hang together which allows for the creation of scores for sub-areas, i.e. the social and health factors. The MLM could also be used to create growth

curves of stress over the semester and the stress factors themselves can then be used as predictors of the slopes and intercepts of the factors.

This study can be used as a basis for further exploration on the influences of stress level on academic performance of students at diploma, degree or even postgraduate levels in various year groups with varying GPAs. The level of difficulties inherent in the coursework and exams may present different stress levels to the students. Further, weak students may react differently to stress than average and good students. Since stress is a complex topic and that adaptability to stress is very much an individualistic matter, all possible mediators and moderators which contribute to stress have to be addressed. The key mediators include whether an individual perceives a stress factor as positive or negative and how the person elects to cope with stress. Moderators such as personality type and support groups may also bear major effect on stress adaptability. Therefore, environmental factors, family background, previous academic achievement, demographics and personality of the students could be further explored. Researchers however have to be careful of the threats of internal validity if the studies conducted in the future are longitudinal in nature.

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