

THE IMPACT OF STRESS ON GRADE POINT AVERAGE (GPA) AMONG KING SAUD BIN ABDULAZIZ UNIVERSITY FOR HEALTH SCIENCES' APPLIED CLINICAL SCIENCE STUDENTS

Ayman F. Soliman^{*1,2,3}, Mohamed Al mohaini^{1,2}, Mohamed Al ghaderi^{1,2}, Talal M. Al Shammari^{1,2}, Saleh S. Aabdulkader^{1,2}, Abdulaziz Al mulhim^{1,2}, Meshaal Bujubarah^{1,2}, Wissam A. Al Suwailem^{2,3}, Nora H. Al Khatam^{2,3}, Maram R. Alsubaiee^{1,2,3}, Nemer Al mosayab^{1,2,3}, Abdulkareem AlGarni^{1,2,3} and Nawaf Al Anazi^{1,2,3}

¹King Saud Bin Abdulaziz University for Health Sciences, COAMS-A, Alahsa, MNGHA, Saudi Arabia.

²King Abdullah International Medical Research Center, Alahsa, MNGHA, Saudi Arabia.

³King Abdulaziz Hospital, Alahsa, MNGHA, Saudi Arabia.

Received date: 02 April 2022

Revised date: 22 April 2022

Accepted date: 12 May 2022

*Corresponding Author: Ayman F. Soliman

King Saud Bin Abdulaziz University for Health Sciences, COAMS-A, Alahsa, MNGHA, Saudi Arabia.

ABSTRACT

Background: Studying medicine is a demanding and stressful. Stress is an inevitable part of life, but it can have a negative impact on social, psychological, and well-being. **Aim:** In this study, we measured and monitored the stress level in students of King Saud University of Health Sciences, and it is related to the grade point average (GPA). **Subject and methods:** 159 students participated in the study, and a 72% response rate Perceived Stress Scale (PSS) instrument was used to understand the effect of stress on the overall performance of students and to determine the effect of students' characteristics on developing stress. The questionnaires were distributed to students. It includes demographic information and a student GPA and Perceived Stress Scale (PSS). **Results:** The overall mean PSS-10 score in our study was 21.67 (SD = 6.88), which is considered moderate stress. Female students had a statistically significantly higher stress score of 23.89 (SD = 7.08) than male students (20.09 (SD = 6.30), $t(152) = 3.504$, $p = 0.001$). Additionally, students with a GPA of 3.75 out of five or higher had a significantly higher stress score of 23.49 (SD = 6.27) than students with a GPA lower than 3.75 out of five 19.55 (SD = 7.01), $t(141) = 3.533$, $p = 0.001$. Furthermore, there is a statistically significant stress score difference between age groups ($F(5,148) = 3.013$, $p = .013$). The stress score was statistically significantly higher for students who were 18 years old (25.55 ± 4.16 , $p = .049$) and 19 years old (23.78 ± 5.36 , $p = .044$) than for students who were 22 years old (18.62 ± 7.58). **Conclusion:** students with higher GPAs were stressed more than others students. Strategic interventions plan is needed to reducing stress level among students.

KEYWORDS: Stress, grade point average (GPA), students.

INTRODUCTION

The body's reaction to any change that necessitates alteration or response is stress.^[1] Physical, mental, and emotional responses are produced by the body in response to these changes. Stress is an inevitable part of life, but it can have a negative impact on social, psychological, and scholastic well-being.^[2] There are three different kinds of stress. The first is physical stress, which includes things such as shock, strenuous physical labor, exhaustion, and hormone abnormalities. Second, there is psychological stress, which includes emotional stress, cognitive stress, and perceptual stress. Third, psychosocial stress: difficulty in relationships, a lack of social support, a lack of necessary resources for survival,

job loss, and isolation.^[3]

Stress results when a person's ability to cope with his or her condition is strained by a combination of internal and external demands. College and school are the best times of life for many young adults, but depression, anxiety, and stress may all negatively impact them.^[4] Stress can impact learning and memory. Although the right amount of stress can boost performance, too much stress can lead to physical and mental health issues, low self-esteem, and a drop in academic performance.^[5] Elevated stress levels among students can result in decreased academic performance and can affect both the physical and mental health of students. Therefore, studies on coping with

stress will have a significant impact on higher education.^[6]

Studying medicine is a demanding and stressful. This gives the student a small window of opportunity to feel relaxed despite the high load of information.^[7] The student's academic performance may drop as a result of this stress.^[8] The most harmful aspect of stress is how quickly it can creep up on a student. He will used to it. Even if he causes enormous harm to himself, his health, or his school life, he will not notice the degree of his influence on him.^[9] It is critical to be aware of the signs and symptoms of excessive stress. Memory issues, inability to concentrate, poor judgment, and only seeing the negative.^[10] Depression anxiety, moodiness, or anger, loneliness, and isolation are examples of emotional and behavioral symptoms.^[11,12]

The stress has three stages: the alarm, resistance and exhaustion stages.^[13] The alarm reaction stage refers to the initial symptoms the body experiences when under stress where the fight or flight reaction occurs. What is a physiological response to the stress this is a natural reaction prepares you to either flee or protect yourself in dangerous situations.^[14] If the alarm stage does not assist you with getting away from an unpleasant circumstance, your body advances to the following; stage: the Resistance Stage. In this stage, there will be the attempts to reestablish the greatest conceivable number of your body's capacities to prefill anxiety. However, because of the body's reaction to the stressor, exhaustion will be inevitable, which will lead to physical or mental breakdowns.^[15,16]

Abdulrahman et al. studied stress among medical Saudi students at the College of Medicine, King Faisal University, and they found that medical students reported high levels of stress.^[17] There is another study looking for the prevalence and correlates of a depression and anxiety among Saudi University students, and the results showed that the prevalence of symptoms of any depression or anxiety was 21.9%. Symptoms of major depression were present in 9.9%, other depression in 19.4% and any depression among 24.4%.^[18]

In this study, we measured and monitored the stress level in students of King Saud University of Health Sciences, and it is related to the grade point average (GPA).

Objectives

The aim of the study is to assess the effect of stress on the grade point average (GPA), among applied clinical science students of King Saud University of Health Sciences.

Specific Objectives

1. To determine the perceived stress among students studying in the applied medical sciences college, King Saud Bin Abdul-Aziz University for Health Sciences - Al-Ahsa. Saudi Arabia

2. To determine the stress related to different students, such as gender and age, and its correlation with GPA.
3. To provide data regarding the impact of stress on students studying in the applied medical sciences college, King Saud Bin Abdul-Aziz University for Health Sciences - Al-Ahsa. Saudi Arabia

SUBJECT AND METHODS

The study was conducted in the Medical Sciences College, King Saud Bin Abdul-Aziz University for Health Sciences - Al-Ahsa. Saudi Arabia.

Inclusion Criteria

1. Students studying in applied medical sciences college, King Saud Bin Abdul-Aziz University for Health Sciences - Al-Ahsa. Saudi Arabia.
2. Males and females

Exclusion Criteria

1. Student not related to applied medical sciences college, King Saud University.
2. Students who did not agree to participate in the study.

Study design and participants

In a descriptive cross-sectional study, 159 students participated in the study, and a 72% response rate Perceived Stress Scale (PSS) instrument was used to better understand the effect of stress on the overall performance of students and to determine the effect of students' characteristics on developing stress.

The questionnaires were distributed to students. It includes demographic information and a student GPA and Perceived Stress Scale (PSS).

Perceived Stress Scale (PSS-10)

The PSS-10 was developed in 1983 by Cohen, Kamarck and Mermelstein (19). It is a well-established and reliable scale, and is used to measure the perception of an individual's stress as a result of different situations occurring or experienced by an individual during the last month. The PSS-10 consists of 10 items in which the participants choose one of the five options on a Likert-type scale ranging from 0 to 4 (0=never, 1=almost never, 2=sometimes, 3=often, and 4=very often). Additionally, item 4, 5, 7, and 8 scores are calculated in reverse order (i.e.: 0 = 4, 1 = 3, 2 = 2, 3 = 1 & 4 = 0).

Statistical Analysis

Descriptive statistics were used, including means and standard deviations for continuous data, and frequencies for categorical data. Independent t test and one-way ANOVA tests were used to compare the means of PSS scores among different groups. Probabilities were considered statistically significant when $P < 0.05$ (2-sided). Data were analyzed using SPSS version 25.

Ethical Considerations

The study was approved by the IRB of King Abdullah

International Medical Research Center. The study number is SP20265A. Data were stored securely with adequate provisions to maintain data confidentiality. All possible measures to ensure that participant identities are not directly or indirectly disclosed for secondary data analyses, the proposal must clearly state when/how deidentification will occur. Cover page written using language that will be understandable in both Arabic and English, include an understandable explanation of the research purpose, explain the sample's inclusion criteria in such a way that the participants can understand how/why they are being asked to participate, clearly state that the participation is voluntary. All ethical issues followed the good clinical practice instructions.

RESULTS

One hundred fifty-nine students completed the PSS-10 form, for a response rate of 72%. Demographic information is shown in (Table 1). The majority of students were female (92), (57.9%), single (142), (57.9%), and fourth -year students (56), (35.2%). Age ranged from 18 to 27 with a mean of 20.66 (SD = 1.68), and GPA ranged from 2 to 5 with a mean of 3.87 (SD = 0.65).

Table 1: Personal and Professional Characteristics.

Characteristics	No. (%)
Age (mean±SD = 20.66±1.68)	
18	12 (7.5)
19	34 (21.4)
20	26 (16.4)
21	42 (26.4)
22	26 (16.4)
>=23	19 (11.9)
Gender	
Male	67 (42.1)
Female	92 (57.9)
Marital Status	
Single	142 (89.3)
Married	17 (10.7)
Students Classification	
First Year	19 (9.4)
Second Year	45 (28.3)
Third Year	29 (18.2)
Fourth Year	56 (35.2)
Intern	14 (8.8)
GPA (mean±SD = 3.87±0.65)	
A (4.51 - 5.00)	24 (20.9)
B (3.51 - 4.50)	74 (64.3)
C (2.51 - 3.50)	13 (11.3)
D (2.00 - 2.50)	4 (3.5)

The overall mean PSS-10 score in our study was 21.67 (SD = 6.88), which is considered moderate stress. The PSS-10 mean scores based on different groups are

presented in (Table 2). In addition, our study found that female students had a statistically significantly higher stress score of 23.89 (SD = 7.08) than male students (20.09 (SD = 6.30), $t(152) = 3.504$, $p = 0.001$). Additionally, students with a GPA of 3.75 out of five or higher had a significantly higher stress score of 23.49 (SD = 6.27) than students with a GPA lower than 3.75 out of five 19.55 (SD = 7.01), $t(141) = 3.533$, $p = 0.001$.

Table 2: Perceived Stress on Different Groups.

Characteristics	M (SD)	P
Age		
18	25.55 (4.16)	0.013*
19	23.78 (5.36)	
20	21.58 (6.59)	
21	22.10 (7.46)	
22	18.62 (7.58)	
>=23	19.26 (7.00)	
Gender		
Female	23.98 (7.08)	0.001*
Male	20.09 (6.30)	
Marital Status		
Single	25.55 (4.16)	0.328
Married	23.78 (5.36)	
Students Classification		
First Year	23.43 (4.74)	0.094
Second Year	23.65 (6.51)	
Third Year	19.83 (8.16)	
Fourth Year	21.07 (6.66)	
Intern	19.93 (6.67)	
GPA		
3.75 - 5.00	23.49 (6.27)	0.001*
2.00 - 3.74	19.55 (7.01)	

* Significant at $P < 0.05$

One-way ANOVA showed a statistically significant stress score difference between age groups ($F(5,148) = 3.013$, $p = .013$). A Tukey post hoc test revealed that the stress score was statistically significantly higher for students who were 18 years old (25.55 ± 4.16 , $p = .049$) and 19 years old (23.78 ± 5.36 , $p = .044$) than for students who were 22 years old (18.62 ± 7.58).

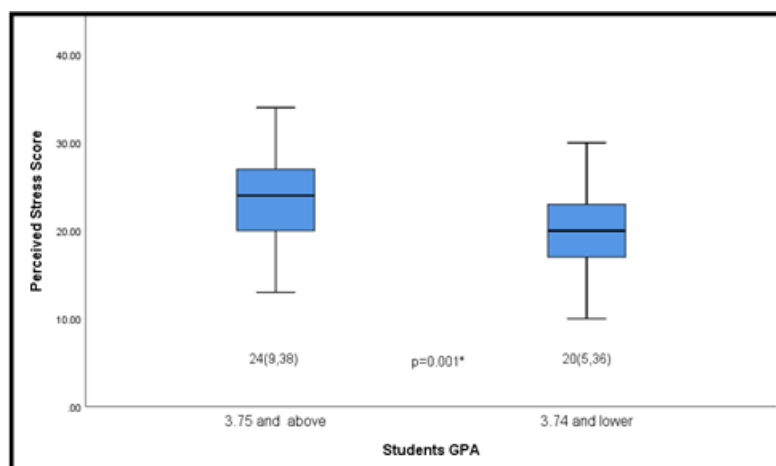


Figure 1: Boxplots of the PPS-10 scores categorized by students GPA.

DISCUSSION

Stress is a physiological human response that protects against danger. When stress occurs, stress in the human body leads to the release of specific hormones called stress hormones. These hormones lead to increased alertness and focus.^[20] However, continual exposure to stress will lead to long-term activation of the stress response system and overexposure to stress hormones. This leads to disturbances in body physiology and an increased risk of many health problems, such as anxiety, depression, and sleep problems. Furthermore, chronic stress can cause weight gain, memory and concentration impairment, gastrointestinal problems, chronic headaches, heart disease, high blood pressure and stroke.^[21]

Students' GPA is commonly used as an indicator of academic performance.^[22] Previous research on the association of stress with performance has suggested that stress level is inversely correlated with GPA.^[23,24,25] The American College Health Association National College Health Assessment report in 2010 stated that stress in students has a 27.4% negative impact on students' academic performance.^[26]

In this study, the results showed that stress has a direct relation to GPA. Students with higher GPAs have a higher stress scale. These findings are contrary to previous research results. It concludes that there is an inverse relation between academic performance and stress. However, King Saud University medical students found no relationship between stress and academic performance.^[27] However, a survey of the Active Minds and National Society of Collegiate Scholars news release, reports that students with higher GPAs have more stress and tend to seek mental health services.^[28] Which can explain the stress in our students, most likely our student stress is not social or emotional stress, but it is related to the study, such as sleep deprivation, college work, and exam stress. The students felt stressed over grades. They always worry about the grades, tests, and future.

A cross-sectional study was published in 2018 addressing the relationship between stress and academic achievement among students of the College of Medicine, and the authors concluded that the major finding of high stress among medical students points to the need for establishing counselling and preventive mental health services as an integral part of routine clinical services being provided to them.^[27]

The results of the study showed that female students have higher stress levels than male students. These results are similar to those of previous studies.^[27,29] Furthermore, we found in this study that younger students in grades 1 and 2 were more stressed than grade 3 and 4 students. This is consistent with most of the literature.^[30,31,32,33] and these results can be explained by the experience of a new academic life.

In general, in this study, the majority of the students had moderate stress. The overall prevalence of perceived stress was 51.3% compared to 3 previous studies conducted in Saudi Arabia universities, where the prevalence was 49.3%,^[27] 53%^[17] and 63%.^[30] on the other hand, the prevalence internationally was Thai (61.4%).^[34] Egypt (43.7%)^[35] Malaysia (41.9%)^[36] and Britain (31.2%).^[37]

LIMITATIONS

The limitations of this study include the Information bias since the study utilized a self-administered survey questionnaire. In addition to the validation of GPA records. The response rate of the study wherein a majority but the nonrespondents number has to be considerate. The conduction of the study at a single center can be one of the limitations.

CONCLUSION

The majority of the Abdulaziz University for Health Sciences' applied clinical science students had moderate stress; however, in this study, we found that students with higher GPAs were stressed more than others. In addition, female students and younger students had more

stress level. Further care and strategic interventions plans are needed to reduce students stress.

Conflict of interest: The authors declare no conflict of interest.

REFERENCES

- Kregel, K. C. Invited review: heat shock proteins: modifying factors in physiological stress responses and acquired thermotolerance. *Journal of applied physiology*, 2002; 92(5): 2177-2186.
- Schneiderman, N., Ironson, G., & Siegel, S. D. Stress and health: psychological, behavioral, and biological determinants. *Annu. Rev. Clin. Psychol.*, 2005; 1: 607-628.
- Types of Stress and Their Symptoms. Retrieved from <https://www.mentalhelp.net/blogs/types-of-stress-and-their-symptoms/>.
- M. Maajida Aafreen, V. Vishnu Priya, R. Gayathri. Effect of stress on academic performance of students in different streams *Drug Invention Today*, 2018; 10(9).
- Rafidah K, Azizah MA, Mohd M, Chong C. STRESS and academic performance: Empirical evidence from university students. *Acad Educ Leadersh J*, 2009; 13: 37.
- Pariat L, Rynjah A, Joplin MS, Kharjana MG. stress levels of college students: Interrelationship between stressors and coping strategies. *IOSR J Humaniti Soc Sci (IOSR-JHSS)*, 2014; 19: 40-6.
- Cooper, C. (Ed.). *Handbook of stress medicine and health*. CRC press, 2004.
- Bennett, R. Determinants of undergraduate student dropout rates in a university business studies department. *Journal of further and Higher Education*, 2003; 27(2): 123-141.8.
- Mazumdar, H., Gogoi, D., Buragohain, L., & Haloi, N. A comparative study on stress and its contributing factors among the graduate and postgraduate students. *Advances in Applied Science Research*, 2012; 3(1): 399-406.
- Fulkerson, J. A., Sherwood, N. E., Perry, C. L., Neumark-Sztainer, D., & Story, M. Depressive symptoms and adolescent eating and health behaviors: a multifaceted view in a population-based sample. *Preventive medicine*, 2004; 38(6): 865-875.
- Hershner, S. D., & Chervin, R. D. Causes and consequences of sleepiness among college students. *Nature and science of sleep*, 2014; 6: 73.
- Hearon, B. V. Stress and coping in high school students in accelerated academic curricula: Developmental trends and relationships with student success, 2015.
- Kübler-Ross, E. *Death: The Final Stage*. Simon and Schuster, 2009.
- APA PsycNet. (n.d.). Retrieved from <https://psycnet.apa.org/record/1991-97822-000>.
- Fimian, M. J. What is teacher stress?. *The Clearing House*, 1982; 56(3): 101-105.
- Albert K Stress and manger. Simon and Schuster, 2010.
- Abdel Rahman AG, Al Hashim BN, Al Hiji NK, Al-Abbad Z. Stress among medical Saudi students at College of Medicine, King Faisal University. *J Prev Med Hyg*, 2013 Dec; 54(4): 195-9. PMID: 24779279; PMCID: PMC4718324.
- M Amr, TT Amin, S Saddichha, M, Sami, S, Mohammed, A, Nasser, A, Abdulhadi, S, Abdullah. Depression and anxiety among Saudi University students: prevalence and correlates. *The Arab Journal of Psychiatry*, 2013; 24(1): 1-7.
- Cohen, S., Kamarck, T., & Mermelstein, R. A global measure of perceived stress. *Journal of Health and Social Behavior*, 1983; 24: 385-396.
- How stress affects your health. American Psychological Association. <https://www.apa.org/topics/stress/health>. Accessed March 19, 2021.
- Mariotti A. The effects of chronic stress on health: new insights into the molecular mechanisms of brain-body communication. *Future Sci OA*, 2015; 1(3): FSO23. Published 2015 Nov 1. doi:10.4155/fso.15.21
- Sansgiry SS, Bhosle M, Sail K. Factors that affect academic performance among pharmacy students. *Am J Pharm Educ*, 2006; 70(5): 104.
- Silverstein ST, Kritz-Silverstein D. A longitudinal study of stress in first-year dental students. *J Dent Educ*, 2010; 74(8): 836-48.
- Zajacova A, Lynch SM, Espenshade TJ. Self-efficacy, stress, and academic success in college. *Res High Educ*, 2005; 46(6): 677-706
- Zorah A, Hui S. Assessing Stress among Undergraduate Pharmacy Students in University of Malaya. *Indian Journal of Pharmaceutical Education and Research*, 2015; 49(2).
- Executive Summary highlights the results of the ACHA-NCHA II Spring, 2010.
- Abdullah Hamad Alsalmi, Turki Hamad Almigbal, Hisham Hamad Alsalmi, Mohammed Ali Batais. The Relationship between Stress and Academic Achievement of Medical Students in King Saud University: Cross-Sectional Study *Kuwait Medical Journal*, 2018; 50(1): 60 - 65.
- <https://www.activeminds.org/press-releases/mental-health-does-not-discriminate-by-gpa>
- Abdulghani HM, AlKanhal AA, Mahmoud ES, Ponnampereuma GG, Alfaris EA. Stress and its effects on medical students: a cross-sectional study at a college of medicine in Saudi Arabia. *J Health Popul Nutr*, 2011; 29: 516-522.
- Abdulghani HM. Stress and depression among medical students: A cross sectional study at a medical college in Saudi Arabia. *Annals of Saudi Med*, 2008; 28 (6): 442-8.
- Yusoff MSB, Fuad A, Rahim A, Yaacob MJ. Prevalence and Sources of Stress among Universiti Sains Malaysia Medical Students. *Malaysian J Med Sci.*, 2010; 17(1): 30-7.
- Shah C, Trivedi RS, Diwan J, Dixit R, Anand AK.

- Common stressors and coping of stress. *J Clin Diagnostic Res*, 2009; 3: 1621-6.
33. Dahlin M, Joneborg N, Runeson B. Stress and depression among medical students: a cross sectional study. *Med Edu*, 2005; 39(6): 594-604.
 34. Saipanish R. Stress among medical students in a Thai medical school. *Med Teach*, 2003; 25: 502–6.
 35. El-Gilany AH, Amr M, Hammad S. Perceived stress among male medical students in Egypt and Saudi Arabia: effect of sociodemographic factors. *Ann Saudi Med*, 2008; 28: 442–8.
 36. Sherina MS, Rampal L, Kaneson N. Psychological stress among undergraduate medical students. *Med J Malaysia*, 2004; 59: 207–11.
 37. Firth J. Levels and sources in medical students. *BMJ*, 1986; 292: 1177–80.