

Effect of academic stressors on eating habits among medical students in Riyadh, Saudi Arabia

Mohammed I. AlJaber¹, Abdullah I. Alwehaibi¹, Hamad A. Algaeed¹,
Abdulrahman M. Arafah¹, Omar A. Binsebayel¹

¹College of Medicine, Al-Imam Muhammed Ibn Saud Islamic University, Saudi Arabia

ABSTRACT

Context: Stress can be defined as an integral response of the organism to pressures from the internal or external environment with the aim to maintain homeostasis. Usually, it has a negative impact on human health. Medical students can feel stress during their preclinical studies due to overload of work such as assignments, lectures, and seminars. As a result, their appetite can be affected by skipping meals eating fast food. **Aims:** The aim of this study was to assess the pattern of eating habits and to define its association with stress among medical students. **Settings and Design:** This cross-sectional study was conducted among the medical students of Al-Imam Muhammed Ibn Saud Islamic University. **Subjects and Methods:** The sample consist of 105 Arabian males (100%) with 21-year old being the average. We use questionnaires divided into three sections. **Statistical Analysis Used:** SPSS. **Results:** We have confirmed three hypotheses: freshman would have Higher Stress Levels than sophomores and junior, the spread of fast food restaurants increases the chance for students to eat Unhealthy Foods, and the students Who Have High Stress Levels Would Eat More Unhealthy Foods Than Students Who Have Low Stress Levels. **Conclusions:** Our findings have revealed the importance to develop a specific intervention program with the aim to decrease the stress in medical students. We suggest also the development of accurate university programs with resources well programmed and well established, development of the educational program with the aim to promote healthy eating habits in medical students, the longitudinal courses should be converted to Blocks to decrease the Academic stress on students.

Keywords: Academic stress, eating habits, medical students

Introduction

Stress is considered a general body response and its ability to keep homeostasis.^[1] It is considered a global problem due to the negative impact on human health. The individual response to stress is determined by different factors. The beginning of the studies in a medical school can be considered an important factor able to produce a high level of stress. The relationship between stress and how it changes eating habits in medical students has been studied in different populations.^[2-4]

One of the major life changes involved in the transition to college is the University entrance. Some symptoms of stress and depression are very common at this stage.^[5] Many researchers have stated that medical students have significant amount of stress that they experience through their years of university life.^[6-8] Several researches have shown a stress prevalence among medical students that ranges from 28.9% to 61.4% in Saudi Arabia, Egypt, United Kingdom, Malaysia, and Thailand.^[9-12]

The level of stress can be high during the undergraduate program according to different studies.^[13-17] This problem has a negative impact on cognitive functions and learning skills.^[18] The literature describes many reasons. One of them is the overload of work

Address for correspondence: Mohammed Ibrahim AlJaber,
Al-Imam Muhammed Ibn Saud Islamic University,
P.O Box 380343, Zip code: 11534, Riyadh, Saudi Arabia.
E-mail: mbjaber@sm.imamu.edu.sa

Access this article online

Quick Response Code:



Website:
www.jfmpc.com

DOI:
10.4103/jfmpc.jfmpc_455_18

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: AlJaber MI, Alwehaibi AI, Algaeed HA, Arafah AM, Binsebayel OA. Effect of academic stressors on eating habits among medical students in Riyadh, Saudi Arabia. J Family Med Prim Care 2019;8:390-400.

such as homework, assignments, lectures, and seminars, because they can take an extensive time. These situations in some students can generate stress affecting the appetite by skipping meals. They will show unhealthy behaviors of consuming, food such as fast food, sweets, and soft drink.^[19] Ahmed *et al.*, in a recent study developed in Kuwait, has shown stress is highly associated with unhealthy food selection.^[20]

Students with stress will tend to increase the consumption of high calorie and fat food according to new research.^[21,22] The intake of snack type foods, fast foods, and sweet foods has increased the intake of healthy food as well as a tendency to reduce.^[1,23] There is a scientific evidence of a relationship between stress and health,^[24,25] such as affecting eating behaviors.^[26]

As we can observe, the prevalence of this disorder is relatively high in medical students, particularly in first-year students. The disorder is part of a wide spectrum pattern with a consequent psychological, social, and physiological damage.^[27] The preclinical studies may present special challenges and expose particular vulnerability in the younger students, representing a new, exciting, and challenging environment, with quite different ways of learning, requiring adaptation to new things such as an academic model, self-discipline, and directed self-learning.^[27,28]

There are other factors related with the capability to generate stress in medical students, for example, the distance from the house to the university, the inaccurate homework's with no specific and clear ways of solution. Also, there are external factors such as the presence of a large number of restaurants of fast food close to the universities and other scholars' centers propitiating the high consume of this type of food, easy to prepare, fast in time, with high calories.^[29]

The development of new strategies in medical schools with the aim to reduce the stress is going to be positive for the health of the students.^[30] The eating habits modified by stress need to be reversed with the aim to produce a positive impact and better results for the students in their studies.^[1]

Subjects and Methods

Participants

This cross-sectional study was conducted among the medical students of Al-Imam Muhammed Ibn Saud Islamic University. Our sample consist of 105 males (100%) with an average age of 21 years. The ethnicity of the students is Arabs. The sample consists of 35 freshmen (33.3%), 35 sophomores (33.3%), and 35 juniors (33.3%). This distribution seems indicative of the current distribution of class standing among undergraduate students in preclinical phase.

Instrument

The questionnaire has been divided into three sections. First section contained the academic year. We used in the

second section some elements from The Academic Stress Scale (ASS) (Kohn and Frazer 1986) and was made into seven questions with five levels of stress Starting from the lowest No Stress "NS," Slight Stress "SS," Moderate Stress "MS," High Stress "HS," and Extreme Stress "ES," which is the highest. For the relation between stress and its effects on the appetite and eating habits, we used two scales "AP" stand for affect appetite and eating habits, "DAP" stand for not affecting appetite and eating habits. For the third section, we used compulsive eating scale (CES) (Kagan and Squires 1984) to construct our questions to serve our study objectives. This section contained nine questions related to eating habits and some factors related to it, with four patterns (never, once a month, once a week, and more than once a week).

First, the questionnaire was tested on random participants from each preclinical year. Participants were asked if they fully understood the questionnaire and its purpose. They reported a full clear understanding of the questions and their purpose.

Data collection and analysis

The self-administered questionnaire was distributed manually after the lectures randomly. Statistical analysis was done by using SPSS software.

Results

We test our hypothesis by analyzing some statements from the questionnaire. We demonstrated in the first section the result from of statements associated with the level of stress. For the second section, we discuss participation answers about statements associated with eating habits. We determined in the third section, the main objective, which was the relationship between stress and eating habits of the students in preclinical years.

First section: Level of stress

We used seven statements to measure the level of stress of students in preclinical years, which summarized results for participators opinion in those statements. The first statement was Doctors make too many extra demands on students: 34.3% answered by Moderate Stress and 23.8% answered by High Stress, but 6.7% chose Never Stress as shown in Figure 1a. Based on those answers, we found that the extra demands given by the doctors raise the stress among students.

The second statement was Lack of concentration during study hours. We found that 33.3% chose Moderate Stress and 29.5% chose High Stress as shown in Figure 1b. The result was that lack of concentration makes students have much stress during the semester.

In addition, the third statement was Worrying about examinations. We found that 32.4% answered High Stress and 27.6% answered Moderate Stress. On the other hand, just a few participants, 2.9%, chose for this statement (Never Stress) as shown in Figure 1c.

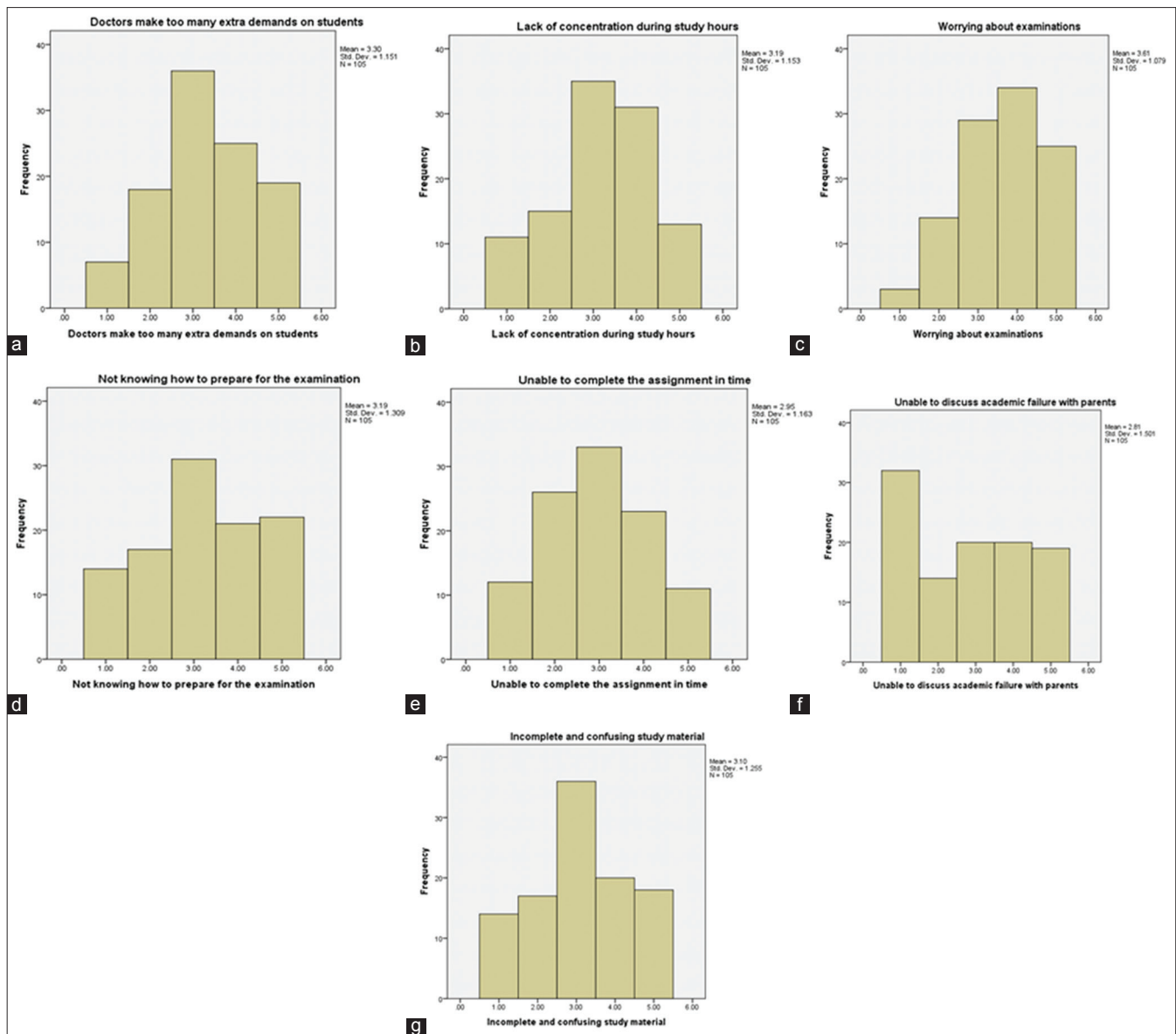


Figure 1: Level of stress of students in preclinical years. (Y axis) is the amount of times a person agreed to a level of stress. (X axis) is the stress level on which the participant choose

According to this result, we can assume that the students have high levels of stress due to examinations.

The fourth statement was Not knowing how to prepare for the examination. We found that 29.5% answered Moderate Stress, 21% answered Extreme Stress, and 20% answered High Stress. As we can see in Figure 1d, the result of Extreme Stress and High Stress is very close which means there is a large number of students who do not know the right way to prepare themselves for examinations. Based on this result, we can determine that there is a problem for how the students can prepare themselves for examination. This problem causes high levels of stress on students, especially before examinations. Also, for this reason, students worrying about examinations (third statement), which means that one of the main reasons for increasing the level of stress among students during the examination is they cannot prepare themselves for examination.

About the fifth statement, which was (Unable to complete the assignment in time, we found that 31.4% answered Moderate Stress and 24.8% answered Slight Stress as shown in Figure 1e. On the other hand, there were 11.4% chose Never Stress and 10.5% chose Extreme Stress for this statement, which means that there are some students that do not have any stress when they are not able to submit their assignments in time and there are some students that will be extremely stressed when they cannot submit their assignment in time. So, this statement can affect students by a medium level of stress during a semester.

The sixth statement was Unable to discuss academic failure with parents. We found that 30.5% answered No Stress, 20% answered Moderate Stress, 20% answered High Stress, and 19% answered Extreme Stress as we can see in Figure 1f. Based on these results, we can assume that there are many students able

to discuss their failure with their parents without any stress, which means that there is a high level of awareness between students and their families about the importance of discussing any failure and obstacles during their study. But there are some students with a degree of stress when they need to discuss their academic failure with their parents. The three answers which are Moderate Stress, High Stress, and Extreme Stress have very close results, that means there are some problems with some families about discussing with their sons about academic failure which, in turn, leads to increase levels of stress. As a conclusion from this statement, 30.5% of the students can discuss with their parents about academic failure, but 39% of the students will have some stress with this statement. Therefore, we suggest that decision makers such as sociologists must increase the awareness level among student families about the importance of this discussion to decrease the level of stress for the students as much as we can.

For the seventh statement which was Incomplete and confusing study material, we found that 34.3% answered Moderate Stress, and 19% answered High Stress. As we see in Figure 1g, for this statement, Moderate Stress achieves the largest percentage among other answers, which means that there is stress on students when it comes to confusing study materials or if its incomplete. The students cannot take good knowledge and information from some subjects if there is incomplete or confusing teaching materials. This particular problem will increase the level of stress between students.

To achieve the first hypothesis in this research (freshman would have higher stress levels than sophomores and juniors), we analyzed the results gained from each level separately with the aim to facilitate a comparison between them to prove or disprove this hypothesis. In previous analysis, we analyzed all the answers from 105 participants but all of them are from different academic levels. Based on that, we summarized in Table 1 the comparison between answers from participants in each level.

Table 1 shows the differences between answers from each academic year participants for each statement. For all three

academic years, they have agreed with the following statement “when a doctor increase the demands will increase the stress and the level of stress”. Only few students chose (Never Stress). The students in the first and second year with this selection is higher than students in the third year.

About the second statement, we discovered that the student in the higher academic level will decrease the level of stress because they can control themselves during study hours, which means they will increase level of concentration during the study. The students in the higher level can obtain information easier than students in the lower level and they have good experience in study skills than students whom in the lower level. This statement proves the first hypothesis.

According to the results for the third statement, we can notice that all three academic year students agree with the statement “there is a stress about examination and they are worrying about the examination.” As we see in the table, one student in the third level have Medium Stress but students in first and second years have High Stress, which means that students in the higher level have less level of stress than students in the lower years. This statement proves the first hypothesis.

About the fourth statement, students in the first year have a higher stress than the students in the second year, but the students in those two years have less stress than students in the third year. In our opinion, this result is because the students in the third year have a lot of references than students in two lower years, which makes preparation for examination more difficult than students in the lower year. Therefore, this statement does not prove the first hypothesis.

The results of the fifth statement have shown that there are 11 participants from first year students choosing Slightly Stress representing 31.4% and there are 9 participants from the same year who chose High Stress) representing 25.6% and the other 9 choose Moderate Stress). That means the results for those three

Table 1: Comparison between the answers from three years separately

Statement	First Year		Second Year		Third Year	
	L	H	L	H	L	H
Doctors make too many extra demands on students	NS 8.6%	MS 34%	NS 8.6%	MS 34.3%	NS 2.9%	MS 34%
Lack of concentration during study hours	NS 5.7%	HS 37%	ES 11%	MS 28%	NS/SS/ES 11.3%	MS 37.1%
Worrying about examinations	NS 2.9%	HS 31.4%	NS 2.9%	HS 34.3%	NS 2.9%	MS 34%
Not knowing how to prepare for the examination	NS 8.3%	MS 45.7%	ES 11%	HS 28%	NS 5.7%	ES 31.4%
Unable to complete the assignment in time	NS 5.7%	SS 31.4%	NS 2.9%	MS 45.7%	ES 8.6%	NS 25.7%
Unable to discuss academic failure with parents	HS 17%	MS 22.9%	HS 5.7%	NS 42.6%	SS 8.6%	HS 34%
Incomplete and confusing study material	NS 11.4%	MS 28.6%	SS/HS/ES 11.4%	MS 45.4%	NS 8.6%	MS 28.6%

L: Lowest choice; H: High choice; NS: Never Stress; SS: Slightly Stress; MS: Moderate Stress; HS: High Stress; ES: Extreme Stress

levels of stress are close to each other. In addition, large numbers of participants from second-year students have Moderate Stress and many of them from third level chose Never Stress. From these results, we can notice that students in the higher year have less level of stress than students in the lower years. Therefore, this statement proves the first hypothesis.

In the sixth statement, we notice that the participants from the first year have moderate level of stress when they discuss with their parents about academic failure by 22.9% and students in the second year does not have any stress with this statement, but students in the third year have an extreme level of stress for the same statement. Therefore, as a result, this statement does not prove the first hypothesis.

About the seventh statement, we analyzed that many students in the first year has Moderate Stress, when the study material is incomplete. That means students in the first year have a level of stress ranging from Moderate and Extreme Stress. On the other hand, many students in the second year chose Moderate Stress representing 45.4% and students in the third year chose the same choice representing 28.6%. According to these results, we can prove that students in the higher level are less likely to gain stress than the lower years. As a conclusion from the above analysis, there are four statements proved the first hypothesis and two statements do not prove it. Therefore, we can say the first hypothesis is proved.

Second section: Eating habit

In this section, we tested the second hypothesis with the aim to prove or disprove it based on the results from the questionnaire. The second hypothesis in this research was The spread of fast-food restaurants increases the chances of students to eat Unhealthy Foods.

To investigate the effect level of the academic study on the eating habits of students, we used the same statements that we studied in the previous section on the stress level. There are seven statements in the questionnaire with the objective to study this point. For each statement, there are two choices that AP (affect appetite and eating habits) and DAP (does not affect appetite and eating habits).

The first statement was Doctors make too many extra demands on students: 58.1% answered AP and 41.9% were DAP. From this statement, we can affirm that if there are too many extra demands from doctors, it will affect the eating habits of the students.

The second statement was Lack of concentration during study hours and there were 62.9% that choose the first answer AP and 37.1% chose the second answer DAP. We can say from this result that the lack of concentration during study hours will affect the eating habits of students. That is why when a student studies for an exam, he can control himself for some hours but then will need to eat unhealthy foods, such as some pieces of chocolate to take energy. This selection will affect eating habits negatively.

The third statement was Worrying about examinations. As a result, we analyzed that 66.7% of the participants select AP and 33.3% selected DAP. A lot of students chose AP for this statement, which means when a student is concerned for examination, it will lead to unhealthy food choices to allow him some free time for his examination period.

About the fourth statement which was Not knowing how to prepare for the examination, 47.6% answered AP and 52.4% were DAP. In this statement, we can discover that some students will affect their eating habits when they cannot able to prepare themselves correctly for examination and some other students do not affect their eating habits. The result for choice AP is very close to choose DAP, but this choice had larger percent than the first choice.

The fifth statement was Unable to complete the assignment in time and the 54.3% chose the first answer AP and 45.7% chose the second answer DAP. Also, in this statement, results for two choices are very close to each other, but here the choice AP had larger percent than the second choice. This refers to reason when a student cannot submit his assignment in time will feel bad and need to change his mood by eating more which is wrong way and he can do some favorite sports to feel more relaxed.

For the sixth statement, which was Unable to discuss academic failure with parents), 35.2% from participants select AP and 64.8% selected DAP. Based on this result we can say when a student cannot discuss with his parent about academic failure and some obstacles that may face during his study will not affect his eating habits negatively.

The seventh statement was Incomplete and confusing study material: 38.1% answered AP and 61.9% were DAP. The confusing and incomplete in study material will not affect eating habits for students.

To cover many features, we think it will affect students eating habits, we add four statements in the questionnaire with the aim to test the second hypothesis for to increase the level of confidence of our results. Each statement had four choices which were never, once a month, once a week, and more than once a week. To facilitate and analyze results, we will suppose one word for each choice as this: never = no effect, once a month = slightly affect, once a week = medium effect, and more than once a week = high effect. Figure two show graphs that describe results from those four statements.

First statement which was The distance of the college and my house affects my daily diet answered by 30.5% with no effect, 15.6% with slightly affect, 23.8% with medium effect, and 30.5% with high efficiency as shown in Figure 2a. Based on those results, we notice that larger number of participants agree with if a college far than their houses will affect their eating habits, but they are ranging from slightly affect medium and high efficiency and huge of them chose High Effect. In addition, there are some participants not affect their eating habits when

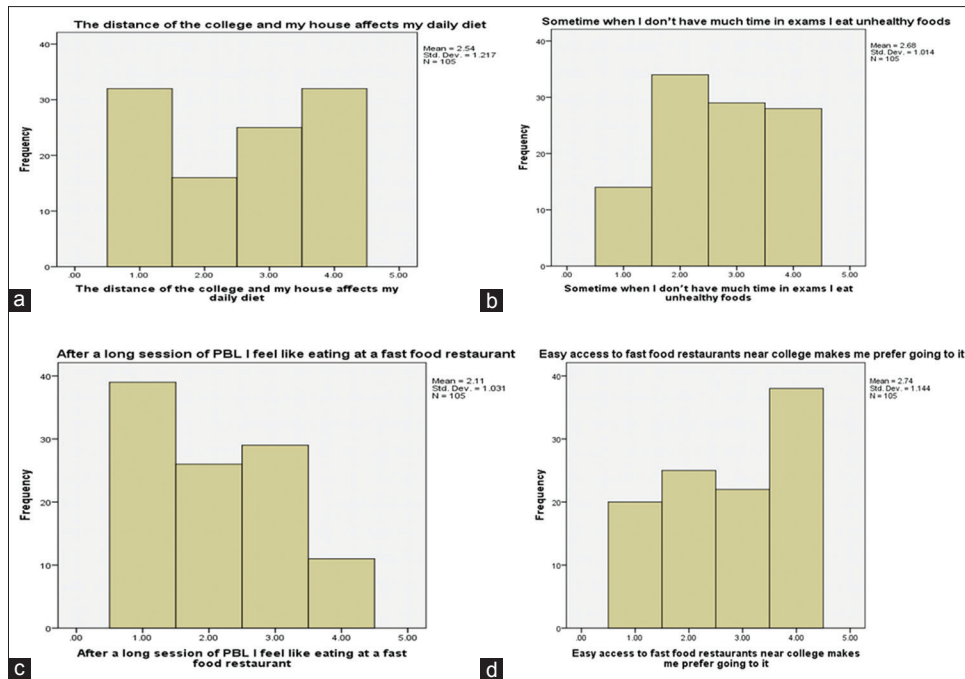


Figure 2: The affect level of the academic study on the eating habits of students. (Y axis) is the amount of times a person agreed to being affected. (X axis) is the amount of times they eat unhealthy foods when being stressed

the college is far than their house. Because of this statement, we can say if a student house is not near his college will affect the eating habits. This result refers to when a student house is not near his college will face some restaurants, coffee, donut, bagel shops, etc., along the way. Therefore, some students prefer to take a mini breakfast which is convenient, therefore affecting the students eating habits. As for lunch, the student's house is too far so he cannot go home for the break or he might risk being tardy and depending on the break, he might not even be able to go to the restaurants near him if the break is not long enough. This statement proves the second hypothesis. In addition, we found from analyzing the results for each academic year, their answers were evident that students in the lower year will have a higher chance of having their eating habits affected to eating unhealthy food, because participants from first year answered by 28% with Medium Effect) for this statement and others from second year chose Medium Effect by 34.3%, but students from third year answered by 40% with No Effect.

About the second statement, which was Sometime when I do not have much time in exams I eat unhealthy foods shown in Figure 2b, there were 32.4% from participants chose Slightly Affect), which means if the student does not have enough time he will eat unhealthy food. A large number of participants in all three academic years agree with this that there is an effect of time on their eating habits and ranging from slightly affect, medium effect, and high effect. The reason for this result, in the examination days, students need each minute to study hard, it is hard to comply to a healthy schedule which would lead to either inadequate intake of healthy food or choosing unhealthy food for convenience. Another reason, students during examination days may want to change the place to study such as cafes for

access to food and internet which is convenient. This statement proves the second hypothesis.

For the third statement, which was After a long session of PBL I feel like eating at a fast food restaurant shown in Figure 2c, many the participant does not have any effect after PBL sessions of their eating habits. There were 37.1% of them answered by No Effect. From analyzing the results gained from each academic year separately, we discover there is a relationship between year and effect of PBL sessions on students eating habits. Students in the higher academic year will show that they are less influenced, because there were 40% from participants from the first level chose Slightly Affect, 48.6% from second year chose No Effect, and 40% from third level chose (no effect) too. This result refers to students in the higher level are familiar with those sessions, but students in the lower years do not have an experience with those sessions and need to change their mood after the session. Therefore, this statement does not prove the second hypothesis.

For the fourth statement, which was Easy access to fast food restaurants near college makes me prefer going to it shown in Figure 2d, there were 36.2% answered High Effect. Because at the present time, as there are many tools that allow us to order from restaurants easily such as calling or using an application or simply go there with friends, etc. This statement proves the second hypothesis.

We can conclude after analyzing the results for this section, students eating habits will be affected by the distance from their home to college and if there are some restaurants nearby on their way to college and their home. We examine 11 statements to study the effect level of the academic study on the eating

habits of students. We found eight statements prove the second hypothesis and three other statements do not prove it. So, the second hypothesis is proved.

Third section: Relationship between the levels of stress on students' eating habit.

Previous two sections discussed the effects of stress on students and the second section discussed the effect level of academic studies on students eating habits. Now in this section, we would like to discover if there is any relationship between stress levels and the change on eating habits of the students to prove or disprove the third hypothesis in this research, which is Students who have a high-stress level would eat more unhealthy foods than students who have a low-stress level. We used 12 statements to achieve this purpose.

There were seven statements that we used previously in the first and second sections to examine the third hypothesis. We summarize results in Table 2 that describes the level of stress and level of affected eating habits for each statement.

In Table 2, there is a strong relationship between stress level and its effects on eating habits of the different academic years. Usually, when the level of stress is moderate or high, then eating habits will lead to eating unhealthy foods, and when there is no stress, then the eating habits are not affected. Meaning those seven statements prove the third hypothesis.

To prove this hypothesis clearly, we used five extra statements that facilitate understanding the relationship between stress level and effect level of eating habits which lead to eating or drinking unhealthily. Figure 3 shows charts describing each statement with its answers.

The first statement was I feel completely out of control when it comes to food while being stressed by college obligations,

shown in Figure 3a. There were 32.4% answered by Slightly Affect. Students in all three years agree with the following: if there is stress caused by college obligations, the student would be more likely to eat unhealthy products, but the effect level is differentiated between students in a specific year to another. Students in the first year and students in the second year answered by 37.1% with Slightly Affect, but students in the third year chose Medium and High Effects by the same percent that equal to 28.6%. Therefore, from those results, we can discover if the stress level increase in students, it will affect their eating habits negatively. This statement proves the third hypothesis.

On the second statement, which was I tend to eat unhealthy foods because I'm stressed, that is shown in Figure 3b, there were a large number of participants agreeing with, if students have stress, they will tend to eat unhealthy foods by 65.7%, and 34.3% chose not affected. After we saw the results for this statement for each academic year separately, we found there is a relationship between stress level and students tend to eat unhealthy food. About 40% students in the first year chose Never Affect, 45% of the students in the second year picked the same choice, but 37.1% of the students in the third year chose High Effect. That means when the student level increase, the negative effect on their eating habits will increase, because they have more stress and more demands comparing with students in the lower years. Therefore, from this statement, we can prove the third hypothesis.

For the third statement, which was I like to drink soft drinks and eat sweets when I'm stressed while studying as shown in Figure 3c, there were a lot of participants agreeing, if a student is stressed while studying, he will more likely to eat sweets and drink soda which means it will affect his eating habits negatively. There were 70 participants; 66.7% of them answered that there is a negative effect on their eating habits when they are feeling stressed ranging from Slightly, Medium, and High Effect by 18.1%, 22.5%, and 25.7% respectively. From this result, we discover when a student felt stress during studying, he will likely to eat unhealthy food, which means that this statement proves the third hypothesis.

The fourth statement, which was I eat unhealthy food to relieve myself from stress that shown in Figure 3d, many participants concur that when student want to relieve himself from stress, he will eat unhealthy food by 66.8%, which means if stress level increase, students will be affecting their eating habits negatively. However, this level of effect on eating habits ranging from Slightly, Medium, and High Level of Negatively Affect by 24.8%, 21%, and 21%, respectively. According to those results in analyzing this statement, it proves the third hypothesis.

About the fifth statement, which was Familial obligations cause me to relieve my stress through unhealthy foods as shown in Figure 3e, answered by 39% Slightly Affect, which means when students are stressed, their families will give them unhealthy foods to decrease the level of stress either by cooking sweets, inviting them for dinner in a restaurant, suggesting them to go to party,

Table 2: Summarize results for effect of academic study on level of stress and on effect level of eating habits for students

Statement	Level of stress	Affect level on eating habits
Doctors make too many extra demands on students	Moderate stress	Affect appetite and eating habits
Lack of concentration during study hours	Moderate stress	Affect appetite and eating habits
Worrying about examinations	High stress	Affect appetite and eating habits
Not knowing how to prepare for the examination	Moderate stress	Do not affect appetite and eating habits
Unable to complete the assignment in time	Moderate stress	Affect appetite and eating habits
Unable to discuss academic failure with parents	Never stress	Do not affect appetite and eating habits
Incomplete and confusing study material	Moderate stress	Do not affect appetite and eating habits

and so on. For that reason, each member in a family love each other and they do not want to see one of them having a high level of stress; so, they may give the wrong solution, to relieve the student from stress such as by using unhealthy foods to relive from his stress. Therefore, this statement proves the third hypothesis.

As a conclusion from this section, we can assume that there is a strong relationship between the level of stress and poor eating habits. When a student is stressed, he will be more likely to choose a more convenient food such as fast foods, therefore leading to an unhealthy routine. As a result, the third hypothesis is proved because there are 11 statements prove the third hypothesis and only one statement does not prove it.

Discussion

Hypothesis testing

We have three hypotheses in this study, and we discussed each one in a separate section previously. Now, we will decide which hypothesis to be accepted or rejected. To accept any

hypothesis, we will see the number of statements that was achieved to examine the correctness and incorrectness of the three hypotheses. Table 3 will describe the accepted and rejected hypotheses after testing.

The definition of stress is the response of the organism to any change from the internal or external environment. University medical students can experience a high level of stress during their undergraduate program according to different studies.^[4,5,31] The new environment, a large number of documents to study, seminars, practical classes, overload of homework, and time management are some of the causes of stress among the preclinical studies.^[31] In coincidence with Fabian *et al.*, students of health sciences have more stress than other students. Science students tend to that concurrently with the necessity of managing challenging course loads.^[3]

Our study has suggested that a freshman would have higher stress levels than sophomores and juniors. According to our study, 34.3% of the students in preclinical studies recognize high level

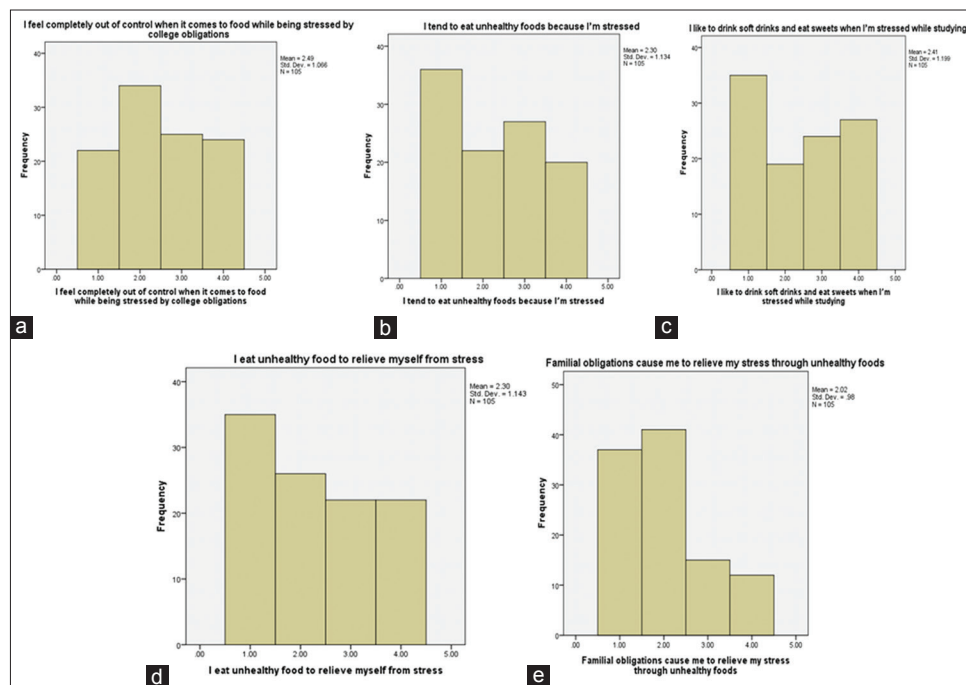


Figure 3: Investigate the relationship between stress levels and affect level of eating habits. (Y axis) is the amount of times a person agreed to being stressed. (X axis) is the tendency to eat unhealthy food when stressed

Table 3: Hypothesis testing				
Hypothesis	Number of statements used to examine each hypothesis	Number of statements that prove each hypothesis	Number of statements that disapprove each hypothesis	Accept or reject
H1: Freshman would have higher stress levels than sophomores and juniors	7	4	3	Accept
H2: The spread of fast-food restaurants increases the chances of students to eat Unhealthy Foods	11	8	3	Accept
H3: Students who have a high stress levels would eat more unhealthy foods than students who have a low stress levels	12	11	1	Accept

of stress when the doctor increases the demands and the level of stress will be moderate, 29.5% of the student in the higher level will decrease the level of stress because they can control themselves during study hours, increasing level of concentration during study, obtaining information easier than students in lower level, and they will have more stress in case of exams due to a lot of references which make preparing for examination more difficult than students in the lower year.

Our result is showing a different result if we compare with the results of Fabian *et al.*, a study developed in Puerto Rico. They have been found that 60.7% of the participants perceived their stress levels to be moderate, and 68.3% felt that they were carrying a heavy course load^[5] But even with this difference, we need to recognize that the presence of high level of stress is evident in medical students. This stress will be more evident in the students from the first years of the medical school.

Abdulghani *et al.* showed that the level of stress of the students diminishes in close relation with the year of study already progressed.^[25] This result is in correspondence with our first hypothesis. We have proved that the students of the first years will suffer more stress than students of the last years. There are many reasons involved in these results, such as better study control and development of study skills. But sometimes the major knowledge of the students of the last year can result in more stress in case of exams. Other studies have been suggested that mental health worsens after students join a medical school,^[5] and the problem becoming worse especially in the transition from basic science to clinical training.^[5] As we can see, the stress is common with the students during the preclinical years. A study of Assadi *et al.* showed that the prevalence of highly stressed students is 36.2% and that of very highly stressed students is 39.1%.^[20]

Our second section showed that the spread of fast-food restaurants increases the chances for students to eat unhealthy foods. We probed our hypothesis based on different elements such as the extra demand from doctors on students will affect the eating habits of them according to 58.1%, the lack of concentration during study hours will affect the eating habits for students represents 62.9%, when students concern for examination, it will lead to eating unhealthy food to make him free from examination constraints, which represents 66.7%, some students 47.6% will affect their eating habits when they are not able to prepare themselves correctly for the examination and some other students are not affected, when a student cannot submit his assignment in time, he will feel negatively and need to change his mood by eating more, this group is represented by the 54.3%, when a student cannot discuss with his parent about academic failure and some obstacles that may face during his study, it will not affect his eating habits negatively (64.8%) and the confusing and incomplete in study material does not affect eating habits for students (61.9%).

Based on those results, we notice that a larger number of participants (30.5%) agree with, if a college a far from home, it

will affect their eating habits, but they are ranging from slightly, medium and highly affected and a large amount chose High Effect). So, as a result, from this statement, we can say if student house is not close to the college, it will affect his eating habits. In addition, we found from analyzing results for each year answers separately when students in the lower year will increase the chance of being affected by eating unhealthy food, because participant from first year answered by 28% with Medium Effect for this statement and others from second year chose Medium Effect by 34.3%, but students from third year answered by 40% with No Effect.

There is an effect of time on their eating habits and ranging from Slightly Affect, Medium Effect and High Effect according to the 32% of the students. A large number of participants 37.1% do not have any effect after PBL sessions of their eating habits. We discover there is a relationship between the academic year and the difficulty of PBL sessions on students eating habits. As seen in the statements above on eating habits, the higher academic level chose no effect, for the second year 48% and the third year 40% while the first year on the other hand were slightly affected 40%.

In relation with the easy access to fast food restaurants near college makes it preferable due to convenient going to it, there were 36.2% answered High Effect We can conclude students eating habits will affect by the distance from the house to college and if there are some restaurants near their college and their home. As we can observe if the student is very busy and stressed with their studies, they are more likely to buy fast food because it is easier and cheaper than cooking^[32] Recent study developed in Chicago showed that fast-food restaurants are concentrated within a short distance from schools, with the consequent exposure to fast food with low quality^[29] Recently, the spread of fast-food restaurants close to the schools have a marked influence in the development of unhealthy eating habits. There are many reasons for that. The medical students often do not have time to cook, due to the overload of work, overload of study materials. For them, time is limited; therefore, they will prefer to buy fast food ready to eat with a high dose of energy.

Individuals face stress in different ways. Several studies have shown that stress may contribute to triggering patterns of disordered eating^[31] The students may present signs of disorder in the eating habits which can be produced by the stress.^[24] This result is different from our result because we have been found that students from the higher year are having less stress than students from the first year.

Our third hypothesis study revealed that there is a relationship between stress levels and changing the eating habits of students. For our first statement, I feel completely out of control when it comes to food while being stressed by college obligations, 32.4% of the students answered by Slightly Affect. Students in the first year and students in the second year answered by 37.1% with Slightly Affect, but students in the third year chose Medium and High Effect by the same percent that equal to 28.6%. Therefore,

from those results, we can discover if the stress level increase will affect their eating habits negatively.

About the second statement I tend to eat unhealthy foods because I'm stressed, there were a large number of participants agreeing with, if students are stressed causing consumption of unhealthy foods by percent 65.7%. There is a relationship between stress level and the change in the eating habits with a high prevalence of unhealthy food. According to new researches, the typical university student diet is usually high in fat. This type of food is selected by the students due to the availability and convenience of fast-food restaurants.^[29] Some results revealed that most of the students (73.5%) consumed fried food twice a week or more.^[31]

There were 70 participants (I like to drink soft drinks and eat sweets when I'm stressed while studying). About 66.7% answered there is a negative effect on their eating habits when they feel stressed, ranging from Slightly, Medium, and High Effect by 18.1%, 22.5%, and 25.7% respectively. By this result, we discover when a student felt stressed during studying, he will eat unhealthy foods. This result is compared with global results.

As a rule, in presence of stress, the food choices are redirected to foods with a significantly high concentration in sugar and fat with a reduction in the consumption of fruits and vegetables.^[16,31] Some studies revealed the relationship between the consumption of foods rich in carbohydrates and fats and stress levels are common. Increased consumption of foods high in sugar is an attempt to relieve stress, which may be related to a strong feeling of pleasure. The physiological explanation is based on the increased serum levels of serotonin, the neurotransmitter responsible for feelings of pleasure.^[30]

The fourth statement (I eat unhealthy food to relieve myself from stress) showed many participants concur, when a student wants to release himself from stress, he will eat unhealthy food by 66.8% which means if stress level increase students eating habits being affected negatively. However, this level of effect on eating habits ranging from Slightly, Medium, and High Level of Negatively Affect by 24.8%, 21%, and 21%, respectively. "Familial obligations cause me to relieve my stress through unhealthy foods" was answered Slightly Affect by 39% of the students.

There is a strong relationship between the level of stress and the affection of the eating habits negatively.^[2,3] When stress increase, many students will worsen the wrong habits in their eating routine such as eating junk food or ruining their daily schedule of food intake. There is evidence of higher frequency of consumption on fast-food type for students with higher stress.^[30] Recent findings suggest that high levels of stress can be associated with both increased (saturated fat consumption) and decreased (overall calories) food intake. Other study revealed that stress is associated with an increase in fast-food consumed in adults.

Fabian *et al.* have been found the high consumption of soft drinks and nonhealthy snacks by students may be caused by stress

and/or lack of time. This result is very similar to the results of our study.^[3]

The stress can produce changes in the organism in different ways.^[4,30] The eating habits can be affected secondary to this problem.^[2,31] Medical students due to the characteristics of the study program can develop stress and one of the consequences is the change in the eating pattern.^[1,2,3,16,31] The high level of stress, common in the freshman, may produce changes in the way the students perceive the necessity to take food. Under this situation, fast food and the food with high calories are selected for most of the students as a common way to generate more energy in less period. This situation is becoming worse for the presence of a high number of fast-food restaurant close to the schools making easy access to this food.^[28,29] Some studies are necessary to develop university programs with the objective of students with the consequent reduction of the stress impact on health.^[1]

Conclusion

We proved in our first section that students in the higher academic level have lower stress compared to the lower years which is probably related to Academic experiences and the longitudinal courses in the first year with other subjects

In the second section, we proved that students eating habits will be affected by the distance from home to college and if there are some restaurants near their college and home.

In addition, in the last section, there was a strong relationship between the level of stress and negative eating habits. When stress increase, many students will increase the wrong habits in their eating routine such as eating unhealthy foods.

Our findings have revealed the importance to develop a specific intervention program with the aim to decrease the stress in medical students. We suggest also the development of accurate university programs with resources well programmed and well established, development of the educational program with the aim to promote healthy eating habits in medical students, the longitudinal courses should be converted to blocks to decrease the academic stress on students. Also, we recommend that a healthy restaurant should spread around busy places like colleges which are required for both a healthy life style and convenience for all types of students.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Elshurbjy AJ, Ellulu MS. Association between stress and dietary behaviors among university students: Mini-review.

- Med Clin Arch 1. doi: 10.15761/MCA.1000108.
2. Al-Qahtani MH. Dietary habits of Saudi Medical Students at University of Dammam. *Int J Health Sci* 2016;10:353-62.
 3. Fabián C, Pagán I, Ríos JL, Betancourt J, Cruz SY, González AM, *et al.* Dietary patterns and their association with sociodemographic characteristics and perceived academic stress of college students in Puerto Rico. *P R Health Sci J* 2013;32:36-43.
 4. Jorhat Goswami B. Prevalence of stress and its association with body weight among the Medical Students of Jorhat Medical College and Hospital, Jorhat. *Int J Sci Stud* 2017;4:1-3.
 5. Cvetovac M, Hamar S. Stress and Unhealthy Eating in a College Sample. In Proceedings of The National Conference on Undergraduate Research (NCUR) Weber State University, Ogden Utah. Seattle University, Seattle, U.S.A.
 6. Qureshi SR, Abdelaal AM, Janjua ZA, Alasmari HA, Obad AS, Alamodi A, *et al.* Irritable Bowel Syndrome: A Global Challenge Among Medical Students. *Cureus* 2016;8:e721. doi:10.7759/cureus.721.
 7. Saeed AA, Bahnassy AA, Al-Hamdan NA, Almudhaibery FS, Alyahya AZ. Perceived stress and associated factors among medical students. *J Family Community Med* 2016;23:166-71.
 8. Qamar K, Khan NS, Bashir Kiani MR. Factors associated with stress among medical students. *J Pak Med Assoc* 2015;65:753-5.
 9. 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.
 10. Firth J. Levels and sources in medical students. *BMJ* 1986;292:1177-80.
 11. Sherina MS, Rampal L, Kaneson N. Psychological stress among undergraduate medical students. *Med J Malaysia* 2004;59:207-11.
 12. Saipanish R. Stress among medical students in a Thai medical school. *Med Teach* 2003;25:502-6.
 13. Rosal MC, Ockene IS, Ockene JK, Barrett SV, Ma Y, Hebert JR. A longitudinal study of students' depression at one medical college. *Acad Med* 1997;72:542-6.
 14. Stewart SM, Lam TH, Betson CL, Wong CM, Wong AM. A prospective analysis of stress and academic performance in the first two years of medical school. *Med Educ* 1999;33:243-50.
 15. Singh G, Hankins M, Weinman JA. Does medical school cause health anxiety and worry in medical students? *Med Educ* 2004;38:479-81.
 16. AlQahtani AA, Nahar S, AlAhmari SM, AlQahtani KA. Association between obesity and mental disorders among male students of King Khalid University, Abha, Saudi Arabia. *Saudi J Obesity* 2015;3:48-54.
 17. Wilkinsos TJ, Gill DJ, Fitzjohn J, Palmer CL, Mulder RT. The impact on students of adverse experiences during medical school. *Med Teach* 2006;28:129-35
 18. Styles WM. Stress in undergraduate medical education: 'The mask of relaxed brilliance'. *Br J Gen Pract* 1993;43:46-7.
 19. Dahlin M, Joneborg N, Runeson B. Stress and depression among medical students: A cross-sectional study. *Med Educ* 2005;39:594-604.
 20. Yau YHC, Potenza MN. Stress and eating behaviors. *Minerva Endocrinol* 2013;38:255-67.
 21. Ahmed F, Al-Radhwan L, Al-Azmi GZS, and Al-Beajan M. Association between stress and dietary behaviours among undergraduate students in Kuwait: Gender differences. Research article. *J Nutr Health Sci*. doi: 10.15744/2393-9060.1.104.
 22. Unusan N. Linkage between stress and fruit and vegetable intake among university students: An empirical analysis on Turkish students. *Nutr Res* 2006;26:385-90.
 23. Zellner DA, Loaiza S, Gonzalez Z, Pita J, Morales J, Pecora D, *et al.* Food selection changes under stress. *Physiol Behav* 2006;87:789-93.
 24. El Ansari W, Berg-Beckhoff G. Nutritional correlates of perceived stress among university students in Egypt. *Int J Environ Res Public Health* 2015;12:14164-76.
 25. DeLongis A, Folkman S, Lazarus RS. The impact of daily stress on health and mood: Psychological and social resources as mediators. *J Pers Soc Psychol* 1988;54:486-95.
 26. Wilkinson R, Marmot M. *Social Determinants of Health: The Solid Facts*. 2nd ed. WHO Europe; 2003.
 27. Oliver G, Wardle J. Perceived effects of stress on food choice. *Physiol Behav* 1999;66:511-5.
 28. Power JJ. Disordered eating patterns in university students and links with stress coping; a literature review and discussion. *Adv Practice Nurs* 2016;1:108.
 29. Ganasegeran K, Al-Dubail S, Qureshi AM, Al-abed AA, Rizal AM, Aljunid SM. Social and psychological factors affecting eating habits among university students in a Malaysian medical school: A cross-sectional study. *Nutri J* 2012;11:48.
 30. Austin SB, Melly SJ, Sanchez BN, Patel A, Buka S, Gortmaker SL. Clustering of fast-food restaurants around schools: A novel application of spatial statistics to the study of food environments. *Am J Public Health* 2005;95:1575-81.
 31. Abdulghani HM, AlKanhah 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;29:516-22.
 32. Penaforte FRO, Matta NC, Japur CC. Association between stress and eating behavior in college students. *Demetra* 2016;11:225-37.