Prevalence and Severity of Stress among Under Graduate Medical Students after Application of Integrated Curriculum in University of Kufa. A Comparative Cross Sectional Study

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ABSTRACT:

BACKGROUND:

Stress is a process by which the environmental demands are more than the adaptive capability of a human leading to biological and psychological changes that make the individuals at risk for disorders. Medical students experience elevated stress level throughout their medical school life, and more liable to psychological distress and mental health problems than non-medical students, so that, stressors that confront medical students should be identified early for enabling interventions before development of more serious complications like burnout and depression**.**

OBJECTIVE:

Measure stress level among medical students of Kufa and Jabir ibn Hayyan medical colleges by using Kessler10 Psychological Distress scale (K10) questionnaire, Compare the levels of stress with different sociodemographic characters and Compare the level of stress among different college stages.

SUBJECTS AND METHOD:

Across sectional study was conducted on under graduate medical students in Kufa and Jabir ibn Hayyan medical colleges at Al Najaf city/Iraq. Medical students from all stages had been recruited for the study and selected by a systematic random sampling technique. We used a self-administered, pre-tested questionnaire form.

RESULTS:

A total of 842 students included in the study, the prevalence of stress is 84.56% expressed some degree of stress ranging between mild stress 21.5%, moderate 28.5% and severe 34.56%.

CONCLUSION:

High stress level among medical students in Kufa Medical College and Jabir ibn Hayyan Medical College. Female gender, living at home, delay or missing academic years were factors associated with stress.

KEYWORDS: stress, medical students, curriculum.

INTRODUCTION:

Stress is a process by which the environmental demands more than the adaptive capability of a human leading to biological and psychological changes that make individuals at risk for disorders. Stress is anything which poses a challenge or threat to human well-beings [1].

Stress has two forms: eustress and distress. Eustress is a positive or good stress which alarming the body and enhances attention, performance and creation while distress is a negative or bad stress which has negative influences on the body [2].

Stress reaction is classified in to 3 types:

1. Acute reaction: after initial alarm.
2. Subacute reaction: a state of resignation.
3. Chronic reaction: a state of mental and somatic exhaustion [3].

Stress in medical students has been a global issue [4]. There is extensive literature explaining that medical students begin medical school with mental health profiles similar to their non-medical peers. Since the healing professional is distinctively motivated to counteract the issues of suffering, death and care, issues that most of their fellows anxiously avoid, through the course of medical school, they experience substantial collapsing in their mental life, due to stress and anxiety [5]. Medical students have to deal with stressors specific to medical college as well as normal stressors of everyday life that demonstrates this high prevalence of anxiety [5].

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Studies tried to explain the sources of stress among medical students which generally concern three main divisions:

- Academic stress: massive syllabus to be completed in a short time, sudden life style change of studying, enormous medical science with new concepts, lack of suitable guidance, thought of not passing in exams, insufficient bed side teaching.
- Social stress: relationship with peers, dormitory friends, senior teachers, being away from home, parents' expectations.
- Physical stress: inadequate dormitory facilities, food, etc. [4].

Some students may perceive factors such as exercise routines, sleep patterns, social activities, having a baby to care for, work responsibilities and finances as stressors that they need to counteract in order to achieve a higher academic standing [5]. Recent studies have express that students living displaced from their families to get higher dealing with a different alienated environment than their hometown are placed to a lot of psychological stress [6]. Many studies have suggested that stress differs from time to time and have reported various levels of distress in medical students at different stages of their medical journey. Never mind about some stress, it is normal and regard as unavoidable component for physician during medical education and working. Anyhow, elevated, continuous levels of distress can cause fear feeling, uselessness, incompetence or feeling guilty. Also this bad stress can effect on cognitive processes negatively, by chronic stress, attention and concentration reduced and may precipitate struggles in interpersonal relationships, encourage alcohol and drug abuse and lead to symptoms of anxiety, depression and burnout [7]. So that, earlier identification of such susceptible students i.e. first academic year of medical school and giving them essential support might be a useful intervention to decrease the negative sequels of stress in future [8].

The students aim to combat the effects of stressful situations with various coping skills. The coping includes both cognitive and behavioral efforts against the problem of stress encountered during examinations [9]. Medical students who fail to manage their stress levels have a tendency to be less proficient in their work. Students who do not control their time limits of examinations well lack time of exercise and social interactions as those two factors are more stressful than the perceived discrimination on the course or the death of patients [10].

There is high level of stress among medical students in several studies done in many Arab countries, like Egypt (60%), Sudan (50%), Lebanon (62%), Saudi Arabia (53%) [11], in addition to our country (77.5%) [12].

To our knowledge, there is no study about the level of stress among medical students of Kufa and Jabir ibn Hayyan universities. So it is important to catch the prevalence of stress among students, that not affecting health only, but also their academic performance at different times of their study period.

SUBJECT AND METHODS:

Study design, target population and setting: a comparative cross sectional study was conducted on under graduate medical students in Kufa and Jabir ibn Hayyan medical colleges at Al Najaf city/Iraq.

Study time: the study started at March, throughout November 2019.

Sample size calculation: sample size was calculated by using the following formula:

Estimated sample size(n)= $z^2*(p)*(1-p)/d^2$

Z is equal to 1.96 (confidence interval corresponded to 95%)

P [12] percentage of estimated prevalence that obtained from a previous study which is equal to (0.775)

d (border of error which was chose to be 0.05)

n= $(1.96)^2*0.775*(1-0.775)/ (0.05)^2$

So the minimal estimated sample size 268.

Sampling technique: medical students from all stages had been recruited for the study and selected by a systematic random sampling technique.

Number of participants and distribution of study sample as in the table below:

Table 1: Distribution of students according to their colleges and stages.

Kufa medical college		Jabir ibn Hayyan medical college	
Number of stages	Number of participants	Number of stages	Number of participants
First	67	First	67
Second	67	Second	67
Third	68	Third	67
Forth	67	Forth	67
Fifth	67	Fifth	90
Sixth	67	Sixth	81
Total	403	Total	439

Data collection: The data were collected on average four to five times per week during a period from first of March to 31st of May 2019, about 1 month before final year examination period to avoid actual stress of examination that may affect the responses of the students. We use a self-administered, pre-tested questionnaire form, it was filled by the under graduate medical students after a brief interview about the purpose and objectives of the study. The questionnaire sheets after completion were collected on the same day.

The questionnaire sheet consists of two parts:

Part 1: Sociodemographic information, consisting of age, gender, year of study, regularity of attendance, living accommodation, delay in academic years, presence of chronic disease, working, marital status, father's and mother's education and father's occupation.

Part 2: The Kessler10 Psychological Distress scale (K10) taken from Kessler R. professor of Health Care Policy, Harvard Medical School, Boston, USA [13]. This scale has been widely used in population-based epidemiological studies to measure the current (1- month) stress [12]. This is a questionnaire of 10 items designed to produce a global measure of stress based on questions about anxiety and depressive symptoms that a person was experienced in the past recent 4-week period.

Ethical issue: before data collection, official agreement had been taken from Iraqi council of medical specialty. Also official agreement from Kufa and Jabir ibn Hayyan medical colleges had been obtained. Verbal consent was obtained from every participant after explaining the aim and objectives of study and ensuring privacy of data and questionnaire filled without names.

Statistical analysis: data were entered and statistical analysis conducted by using SPSS program version 20. Data were presented in form of tables, numbers and percentages. Descriptive statistics (mean, standard deviation, and percentages) used for summarizing the study and outcome variables. Chi-square test (x^2-test) and p value (equal or less than 0.05 was considered statistically significant) would be used for measuring association between level of stress and sociodemographic characteristics

RESULTS:

A total of 842 medical students had been included in this study. Their mean age was 21.3±1.9 years (minimum 17- maximum 26). Participants sociodemographic characteristics as shown in table 1.

Table 2 :Sociodemographic characteristics of participants for both colleges.

		Frequency	Percent
Gender	Male	322	38.2
	Female	520	61.8
Stage	First	134	15.7
	Second	134	16.2
	Third	135	16.0
	Forth	134	15.9
	Fifth	157	18.6
	Sixth	148	17.6
Attendance	Yes	738	87.6
	No	104	12.4
Accommodation	Home	749	89.0
	Dormitory	93	11.0
Delay	Yes	121	14.4
	No	721	85.6
Medical problem	Yes	108	12.8
	No	734	87.2
Working	Yes	51	6.1
	No	791	93.9
Marital status	Single	795	94.4
	Married	47	5.6
Father occupation	Employee	447	53.1
	Worker	213	25.3
	Retired	100	11.9
	Unemployed	82	9.7
Father education	Higher	160	19.0
	College	519	61.6
	Secondary	127	15.1
	Primary	36	4.3
Mother education	Higher	97	11.5
	College	403	47.9
	Secondary	241	28.6
	Primary	101	12.0
	Total	842	100.0

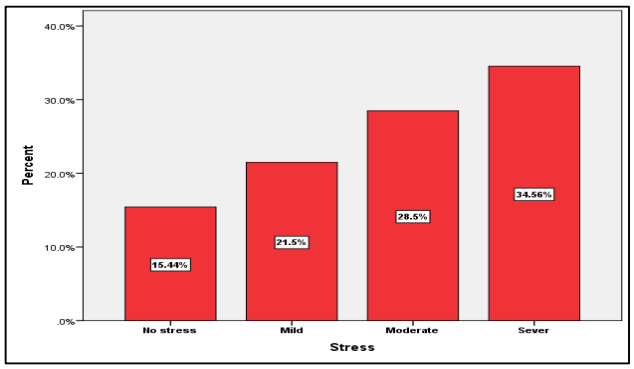

Figure 1: Distribution of severity of stress among medical students.

There is 34.56% of students had severe stress which is the higher percentage while only 15.44% of students did not have stress as shown in figure 1

Table 3: Association between gender and stress among medical students.

Stress	Gender		Total	Chi square	P value
	Male	Female			
No stress	76	54	130	57.703	<0.001
	58.5%	41.5%	100.0%		
Mild	93	88	181		
	51.4%	48.6%	100.0%		
Moderate	77	163	240		
	32.1%	67.9%	100.0%		
Severe	76	215	291		
	26.1%	73.9%	100.0%		
Total	322	520	842		
	38.2%	61.8%	100.0%		

Table 3 shows significant association between gender and stress in which we notice that females had higher level of stress compared to males.

Table 4 :Association between stage and level of stress of medical students.

Stress	Stage						Total	Chi square	P value
	First	Second	Third	Forth	Fifth	Sixth			
No stress	18	19	19	17	24	33	130	19.99	0.17
	13.8%	14.6%	14.6%	13.1%	18.5%	25.4%	100%		
Mild	30	31	31	23	33	33	181		
	16.6%	17.1%	17.1%	12.7%	18.2%	18.2%	100%		
Moderate	46	27	40	44	47	36	240		
	19.2%	11.2%	16.7%	18.3%	19.6%	15.0%	100%		
Severe	38	59	45	50	53	46	291		
	13.1%	20.3%	15.5%	17.2%	18.2%	15.8%	100%		
Total	132	136	135	134	157	148	842		
	15.7%	16.2%	16.0%	15.9%	18.6%	17.6%	100%		

No association between stage of students and stress as shown in table 4.

Table 5 :Association between regularity of attendance and level of stress.

Stress	Attendance		Total	Chi square	P value
	Yes	No			
No stress	120	10	130	6.791	0.079
	16.3%	9.6%	15.4%		
Mild	163	18	181		
	22.1%	17.3%	21.5%		
Moderate	210	30	240		
	28.5%	28.8%	28.5%		
Severe	245	46	291		
	33.2%	44.2%	34.6%		
Total	738	104	842		
	100.0%	100.0%	100.0%		

The table above shows no significant association between attendance of medical students and level of stress.

Table 6: Association between living accommodation of medical students and level of stress.

Stress	Accommodation		Total	Chi square	P value
	Home	Dormitory			
No stress	114	16	130	14.096	0.003
	15.2%	17.2%	15.4%		
Mild	149	32	181		
	19.9%	34.4%	21.5%		
Moderate	225	15	240		
	30.0%	16.1%	28.5%		
Severe	261	30	291		
	34.8%	32.3%	34.6%		
Total	749	93	842		
	100.0%	100.0%	100.0%		

Table above shows significant association between living accommodation and level of stress among medical students, in which most of those living in home show moderate and sever stress (64.8 %).

Table 7: Association between delay in academic years of medical students with their level of stress.

Stress	Delay		Total	Chi square	P value
	Yes	No			
No stress	9	121	130	19.382	<0.001
	7.4%	16.8%	15.4%		
Mild	22	159	181		
	18.2%	22.1%	21.5%		
Moderate	28	212	240		
	23.1%	29.4%	28.5%		
Severe	62	229	291		
	51.2%	31.8%	34.6%		
Total	121	721	842		
	100.0%	100.0%	100.0%		

The table above show significant association between delay in academic years and level of stress, those with delay or had previous failure in academic years explained higher levels of stress.

Table 8: Association between medical problem and stress of medical students.

Stress	Medical problem		Total	Chi square	P value
	Yes	No			
No stress	16	114	130	6.596	0.086
	14.8%	15.5%	15.4%		
Mild	14	167	181		
	13.0%	22.8%	21.5%		
Moderate	32	208	240		
	29.6%	28.3%	28.5%		
Severe	46	245	291		
	42.6%	33.4%	34.6%		
Total	108	734	842		
	100.0%	100.0%	100.0%		

As shown in table (8), there is no significant difference between evidence of medical problem and stress enhancing in medical students.

Table 9 :Association between medical students working and level of stress.

Stress	Working		Total	Chi square	P value
	Yes	No			
No stress	8	122	130	3.100	0.376
	15.7%	15.4%	15.4%		
Mild	15	166	181		
	29.4%	21.0%	21.5%		
Moderate	10	230	240		
	19.6%	29.1%	28.5%		
Severe	18	273	291		
	35.3%	34.5%	34.6%		
Total	51	791	842		
	100.0%	100.0%	100.0%		

Table (9) explained no association between current students working and level of stress.

Table 10: Association between marital status and level of stress among medical students.

Stress	Marital status		Total	Chi square	P value
	Single	Married			
No stress	123	7	130	2.294	0.514
	15.5%	14.9%	15.4%		
Mild	170	11	181		
	21.4%	23.4%	21.5%		
Moderate	223	17	240		
	28.1%	36.2%	28.5%		
Severe	279	12	291		
	35.1%	25.5%	34.6%		
Total	795	47	842		
	100.0%	100.0%	100.0%		

Table above shown married students have lower levels of stress (no association) compared with single students.

Table 11: Association between father's occupation of medical students and their level of stress.

Stress	Father occupation				Total	Chi square	P value
	Employee	Worker	Retired	Unemployed			
No stress	67	38	16	9	130	9.297	0.41
	15.0%	17.8%	16.0%	11.0%	15.4%		
Mild	105	38	18	20	181		
	23.5%	17.8%	18.0%	24.4%	21.5%		
Moderate	134	60	24	22	240		
	30.0%	28.2%	24.0%	26.8%	28.5%		
Severe	141	77	42	31	291		
	31.5%	36.2%	42.0%	37.8%	34.6%		
Total	447	213	100	82	842		
	100.0%	100.0%	100.0%	100.0%	100.0%		

Table above explained no significant association between father's occupation and stress level of students.

Table 12: Association between father's education of medical students and level of stress.

Stress	Father education				Total	Chi square	P value
	Higher	College	Secondary	Primary			
No stress	31	76	17	6	130	7.542	0.581
	19.4%	14.6%	13.4%	16.7%	15.4%		
Mild	35	116	25	5	181		
	21.9%	22.4%	19.7%	13.9%	21.5%		
Moderate	44	154	33	9	240		
	27.5%	29.7%	26.0%	25.0%	28.5%		
Severe	50	173	52	16	291		
	31.2%	33.3%	40.9%	44.4%	34.6%		
Total	160	519	127	36	842		
	100.0%	100.0%	100.0%	100.0%	100.0%		

As shown above, there is no association between father's education and medical students stressing.

Table 13:Association between mother's education of medical students and level of stress.

Stress	Mother education				Total	Chi square	P value
	Higher	College	Secondary	Primary			
No stress	16	65	30	19	130	8.931	0.444
	16.5%	16.1%	12.4%	18.8%	15.4%		
Mild	24	87	47	23	181		
	24.7%	21.6%	19.5%	22.8%	21.5%		
Moderate	26	124	66	24	240		
	26.8%	30.8%	27.4%	23.8%	28.5%		
Severe	31	127	98	35	291		
	32.0%	31.5%	40.7%	34.7%	34.6%		
Total	97	403	241	101	842		
	100.0%	100.0%	100.0%	100.0%	100.0%		

Table above explained no significant association between mother's educational level and stress of medical students.

Table 14 :Comparison for level of stress between Kufa and Jabir ibn Hayyan medical students.

stress	College		Total	Chi square	P value
	Kufa	Jabir ibn Hayyan			
No stress	62	68	130	0.681	0.878
	47.7%	52.3%	100.0%		
Mild	82	99	181		
	45.3%	54.7%	100.0%		
Moderate	118	122	240		
	49.2%	50.8%	100.0%		
Severe	141	150	291		
	48.5%	51.5%	100.0%		
Total	403	439	842		
	47.9%	52.1%	100.0%		

There is no significant difference in stress level among medical students of both colleges as seen table above.

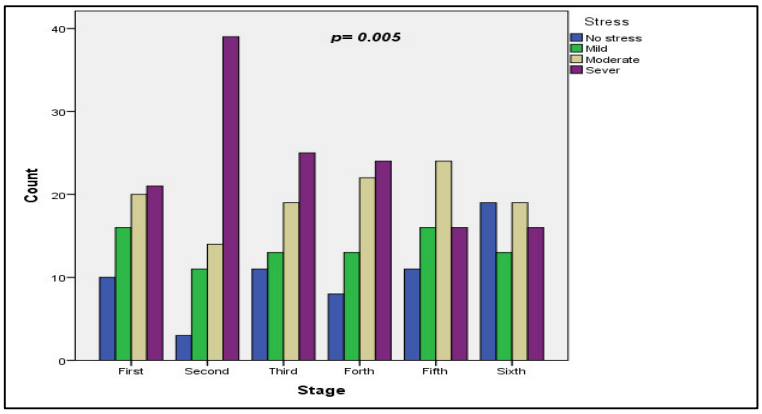

Figure 2: Distribution of students' stress among all academic years of Kufa medical college.

As shown in figure 3 there is significant difference in level of stress in different stages where it is higher in the second stage and declines with progressing in stages.

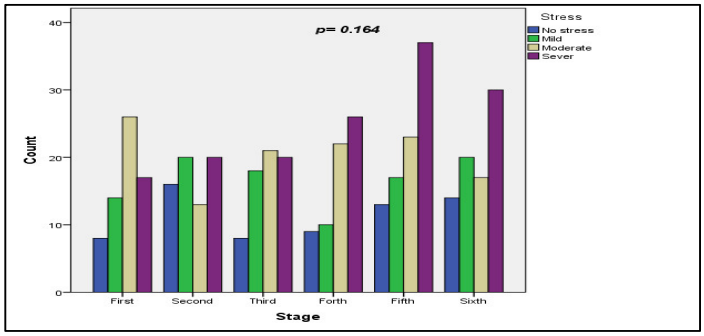

Figure 3: Distribution of students' stress among all academic years of Jabir ibn Hayyan medical students.

In spite of high level of stress among fifth and sixth stages compared to other stages, there is no significant difference statistically as shown in figure 4.

DISCUSSION:

Medical journey aims to prepare graduate students for a personality rewarding career. Students also have high academic expectations and are expected to master on a wide range of knowledge and skills in a competitive environment. So, it is clear for thinking that medical students are the most distressed group of students among all graduates [14]. The prevalence of stress in the current study is 84.56%, it is very high; this finding is more elevated as compared with other studies in the same country like Tikrit University 57.2% [15] and in medical students of Anbar governorate 77.5% [12], while in Babylon Medical College express higher level of stress 98.9% [16]. Outside our country, 63.7% at College of Medicine in Saudi Arabia [17], these differences could be due to another tools using in assessing the severity status of stress or might be a real difference, some studies like certain one in Babylon Medical College implemented it at mid-year examination period when students facing a lot of stress that might be effect on self-reported questionnaire [16]. The highly competition and individualization of medical schools' environment forms stress that may continue even after graduation. The learning and recreational environment of education have to be more accessible to undergraduate students to decrease their current stress level [18]. In our study perceived stress is significantly higher among female medical students as compared with male students.

A lot of studies also found that female medical students reported higher level of stress than male students' counterparts [19] [7]; generally, higher stress in women could be due to sensitive nature and the method of reacting to stressful situation; specifically, elevated level of stress among female students might be explained the struggling of females in a male-dominant environment [20].. Few studies showed no significant association among both genders [21]. This inconsistent association between gender and levels of stress among medical students in different studies may be attributed to differences in social and educational surrounding in addition to subjectivity in measuring self-reported stress, male and female students may have separate universities with different recreational and educational facilities [18]. The prevalence of stress, according to students' stage, was different in both colleges. Kufa medical students demonstrate higher level of stress in early stages of study specially the second stage. In contrast to Kufa medical students, Jabir ibn Hayyan medical students showing elevated level of stress when proceed up by stages, to find fifth stage is the most one had stress level. This variation might be due to different curriculum that adapted in Kufa medical college and introducing small group teaching, sometimes these groups can reduce stress in medical students [9]. A qualitative study in Hawler College of Medicine is situated in Kurdistan region had been done in 2015 demonstrate the importance of small group teaching and its role in education of students, expressing themselves and enhancing more contact with academic staff. Group discussion may perform the instrumental skills of listening, explaining thoughts, and counterpart as member of team. Also it increases information retention, establish capability to solve problems, increasing interest of medical students, developing communication skills and offer the ability to clarify points of confusion [22]. Nevertheless, statistically, there was no significant association between stage of study and stress severity; also there were association statistically insignificant between regularity of attendance and stress level, this result is similar to study at a College of Medicine in Saudi Arabia [17]. There is a high K10 stress score among medical students living at home compared to those living at dormitory, as research was done on students from 3 medical colleges of Pakistan that had been showing same result[6], the original hypothesis explained students living at dormitory expresses more stress than students living at home, for many reasons: being away from their home for the first time, home sickness, financial stressor [6],our result may be due to medical students living in dormitory feel that they can better concentrate on study when living in solitary place made for study, in addition to specially arranging study period and other activities which give them chance to polish their educational capabilities, by this way, all those actions can improve the academic performance[23]which is one of the main stressors for medical students [5], living a way from family makes students more independent, confident and social, they learn how to solve their own problems by themselves without parents guiding, students living at home have less opportunity to learn about external world, during the extended staying period of dormitory life, students learn to tolerate, modify, and compromise with other students, also dormitory students learn how to handle and manage their finances, and becoming aware to deposit money, this ability make them more mentally mature and capable to confront practical life without family support[23]. Regarding to students' academic achievement, highly significant association with direct proportion between stress level and delay in academic years; referring to increase stress, causing decrease in academic achievement like study at Jimma University in Ethiopia [24]. Furthermore, there is no detected significant statistical difference between stress level and students with medical problems, this may attributed to medical students are aware about their capability to cope with stress, inhibits the development of many diseases in effective manner, like mental health problems, allergies and another clinical problems[25]; the result similar to study done in Saudi Arabia [18] , and inconsistently with another studies which demonstrated significant association of stress with students' self-reported physical problems[26]. About students paid working, there was no significant association with higher stress scores, theoretically, student's job may be pointing to poor financial state and the time lost during working could increase distress level, the possible illustrations here: some medical students may not work regularly (on holidays only); the getting money from their job may decrease distress; or that paid working has a relaxing effect and fights distress feeling[27], similar result had been shown in the Egyptian Journal of

Hospital Medicine about study in the Kingdom of Saudi Arabia[28].

There was no significant association between stress level and marital status which similar to study done in India, lesser stress level among married students means marriage could be protective factor against stress [29]. Regarding to parents' education and father's occupation, there were statistically insignificant, resembling another study in Saudi Arabia[30], may be attributed to exposure of whole population to different types of traumatic events and unstable environment particularly the last 20 years[12], this result disagrees with study at University Hospital Tubingen in Germany which demonstrated the single stressing conflict with parents was highly associated with financial problems, problems with jobbing and with the living status. Conflicts about financials might not be recognized as specific stressors, even though it is possible that were hidden within the stressor of conflicts with parents [7].

Stress during medical journey can have multiple professional bifurcations, consists of destroying effects on empathy, ethical conduction and professionalism, also personal sequels like burnouts, broken relationships, substance abuse and suicidal ideation. So that, it is the responsibility of the society generally and it is the responsibility of medical schools particularly, to recognize stress among future doctors, to identify stressor sources, ability of the student to coping and perform mitigating measures [31]. Some of the possible suggested stress reducing measures could be developing infrastructural facilities available to medical students; giving more importance to continuous academic performance; and providing a well-trained students counselors[31], and providing special programs such as health promoting measures like psychological support in Jabir ibn Hayyan Medical College, although psychological counselling in Kufa Medical College already exists, it is surprising that they need further counselling service; also provide counselling about healthy diet, encourages exercise and healthy life style[32].

CONCLUSION:

The study showed that students' stress was greater among second stage medical students of Kufa Medical College and fifth stage in Jabir ibn Hayyan Medical College. The study shows high stress level 84.56%.

Also, it revealed a gender-related disparity; there is significant association between female gender and stress level. There is significant association between stress and students living at home compared with those living at dormitory. Furthermore, there is significant stress level between stress and delay or missing in academic year while there is no significant association about stress and medical problem. Also the study did not find a significant association between regularity of attendance, academic grading with stress level and parents education.

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