

Stress and Burnout among Egyptian Undergraduate Medical Students

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Abstract

Background: Medical study often carries a great load on the medical students that may result in different affections on their life. **Objectives:** To assess the prevalence of stress and burnout and the influencing factors that may contribute to them among the Egyptian medical undergraduate students and to determine the most influencing stressors in the pre-clinical and clinical stages of education. **Method:** A cross-sectional study was conducted on 320 undergraduate Egyptian medical students in the Zagazig and Menoufia faculties of medicine. The participants were interviewed through a questionnaire of four parts. The first part was about their sociodemographic characteristics, the second part was to assess their perceived level of stress by the 12-item General Questionnaire (GHQ-12), The level of burnout was assessed through the Maslach Burnout Inventory (MBI) in the third part, and stress and burnout influencing factors were assessed through a predesigned questionnaire in the fourth part. **Results:** This study showed a worrisome prevalence of stress (84.7%) and burnout (45.6%) among undergraduate medical students. On studying stress, the students in the clinical stage of education were exposed more to stress and burnout (P-value 0.007, <0.001). The most stressing factors were being in clinical education, having a personal illness or disability that may affect their academic performances, and worry about the future career. **Conclusion:** High prevalence of stress and burnout is disconcerting. There were many triggering factors found that should be reconsidered.

Keywords: *burnout factors, medical stress, students.*

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Introduction

Medical education is a lifelong exhausting journey. Medical students have a unique stressful life during their academic years. Their exposure to stressful events harms their physical and psychological well-being.¹ Many studies have stated that medical students are more exposed to stress and burnout rather than other university students due to the academic pressure they pass through, the learning environment, the long duration of the study, and their educational program design that gives no adequate time for

personal life events.² They try to cope with their unhealthy learning environment by smoking, unhealthy diet, and reduced physical activity.³

Stress is defined as the perception of strain or pressure that adults experience from different conditions, such as social life events, education, occupation, or economic problems.⁴ It may arise as a downstream result of stressful events.^{5,6}

Stress is a leading cause of burnout. While stress is experienced in every life aspect, burnout is mainly related to work

Table (1a): Socio-demographic and relationship problems influencing factors of stress and burnout (BO) among medical students

Item	Stress (271)	No stress (49)	X ²	P	OR ** (95% CI)	BO (146)	No BO (174)	X ²	P	OR ** (95% CI)
Socio-demographic factors										
Gender:										
Male	136 (87.7)	19 (12.3)	2.2	0.09	0.63 (0.34-1.17)	69 (44.5)	86 (55.5)	0.1	0.4	1.09 (0.7-1.7)
Female*	135 (81.8)	30 (18.2)				77 (46.7)	88 (53.3)			
SE standard:										
Low and Moderate										
High*	213 (83.5)	42 (16.5)	1.3	0.3	1.6 (0.7-3.8)	114 (44.7)	141 (55.3)	0.4	0.6	1.2 (0.7-2.1)
High*	58 (89.2)	7 (10.8)				32 (49.2)	33 (50.8)			
Education:										
Pre-clinical*	154 (80.2)	38 (19.8)	7.4	0.007	2.63 (1.29-5.35)	49 (25.5)	143 (74.5)	87.2	<0.01	9.1 (5.4-15.3)
Clinical	117 (91.4)	11 (8.6)				97 (75.8)	31 (24.2)			
Relationship problems										
Problems with the opposite gender										
Living away from family	127 (87.0)	19 (13.0)	1.1	0.35	1.39 (0.75-2.59)	64 (43.8)	82 (56.2)	0.3	0.3	1.0 (0.56-1.4)
Competition with colleagues	119 (81.0)	28 (19.0)	2.9	0.12	1.03 (0.32-1.09)	70 (47.6)	77 (52.4)	0.4	0.4	1.16 (0.74-1.8)
Problems with faculty staff	129 (79.6)	33 (20.4)	6.5	0.01	1.44 (1.23-2.84)	79 (48.8)	83 (51.2)	1.3	0.15	1.29 (0.8-2.1)
High parental expectation	150 (92.0)	13 (8.0)	13.7	<0.01	3.43 (1.7-6.76)	82 (50.3)	81 (49.7)	2.9	0.06	1.47 (0.94-2.29)
High parental expectation	173 (86.1)	28 (13.9)	0.7	0.43	1.3 (0.7-2.46)	98 (48.8)	103 (51.2)	2.1	0.09	1.4 (0.89-2.23)

overstress. Burnout is defined as the chronic feeling of extreme physical and emotional exhaustion at the workplace that has not been successfully managed. It has been called stress syndrome.⁷ It is characterized by exhaustion and depersonalization in the form of negativism or cynicism and is perceived mainly in professions that deal with people in need such as medical staff, teachers, and social workers.⁸ It is also identified by Maslach et al. through the dimensions of exhaustion, cynicism, and professional inefficacy. Exhaustion is to feel emotionally unable to offer any effort. Cynicism is perceived as a negative attitude toward work. Inefficacy is an unsatisfactory feeling about accomplishing the required tasks.⁹

Factors causing stress and burnout to medical students are variable. The transition from secondary school life to the higher education environment is a strong trigger for their perceived stress. A high

load of new knowledge, experience, and practice related to the education process and the high stressful influence of exams contribute to medical students' stress. The lack of free time, weakness of their social relations with friends, and being away from their families precipitate suffering from stress and make them more prone to reach up to the level of burnout.¹⁰

On the psychological assessment of medical students presented to our family health clinics as a part of their anticipatory care services, we observe that they complain of a decline in their academic performance with a sense of easy development of exhaustion with the loss of the power to overcome their feeling of loss of desire to achieve the due assignments that make them stressed most of the time. So, we have these research questions to guide our study: what the prevalence of stress and burnout is among undergraduate Egyptian medical students? What are the most influential

Table (1b): Hospital problems influencing factors of stress and burnout (BO) among medical students:

Item	Stress (271)	No stress (49)	X ²	P	OR ** (95% CI)	BO (146)	No BO (174)	X ²	P	OR ** (95% CI)
Hospital problems:										
Shortage and unstable hospital time	178 (89.9)	20 (10.1)	10.9	0.001	2.78 (1.49-5.17)	92 (46.5)	106 (53.5)	0.1	0.39	1.09 (0.7-1.7)
Incompatible hospital capacity with students' number	167 (83.5)	33 (16.5)	0.6	0.28	1.2 (0.4-1.5)	98 (49.0)	102 (51.0)	2.4	0.07	1.44 (0.9-2.3)
Inability to socialize with the hospital environment	173 (80.8)	41 (19.2)	7.4	0.008	1.34 (1.16-1.76)	107 (50.0)	107 (50.0)	4.9	0.02	1.72 (1.1-2.8)
Fear of becoming infected	167 (48.8)	30 (15.2)	0.003	0.5	1.02 (0.55-1.89)	105 (53.3)	92 (46.7)	12.2	0.001	2.28 (1.4-3.6)
Transportation problems to and from the hospital	192 (85.7)	32 (14.3)	0.6	0.49	1.29 (0.67-2.46)	113 (50.4)	111 (49.6)	6.9	0.01	1.9 (1.2-3.2)

factors that cause stress and burnout in the medical student life? Also, is there a difference between students in the preclinical and clinical stages of education regarding the stressors they face?

So, we aim in this study that is conducted among undergraduate Egyptian medical students in Menoufia and Zagazig faculties of medicine during the academic year 2019 – 2020 to assess the prevalence of stress and burnout and determine their influencing factors and assess the difference between the students in the preclinical and clinical stages of education regarding the stressors they face.

Methods

A cross-sectional study was conducted among Egyptian undergraduate medical students in all grades in Menoufia and Zagazig faculties of medicine, Egypt as representatives of medical faculties. The sample was calculated to be about 307 students based on the prevalence of burnout is 71.1%,¹ the total study population was 10000 students, and the confidence level 95%. A ten percent was added to the total sample to avoid the dropout to be 338. The expatriate students

and the students who have or receiving medication for psychological problems were excluded from the study. The students were allocated proportionally between the two faculties. They were divided according to their grades (from 1st to 6th grades) into strata by a stratified sampling technique then they were chosen within every grade by a simple random sampling method. The first three years were considered as a preclinical stage and the last three years were the clinical stage. A total of eight students refused to participate in the study and ten questionnaires were not complete and were excluded. So, the total number of students interviewed was 320 students. The participants were interviewed through a questionnaire of four parts. The first part was about their sociodemographic characteristics.¹¹

The second part was to assess their perceived level of stress by the 12-item General Health Questionnaire (GHQ-12).¹² each item assesses the manifestation of stress over the past few weeks preceding the study using a 4-point Likert scale graded

Table (1c): Professional problems influencing factors of stress and burnout (BO) among medical students:

Item	Stress (271)	No stress (49)	X ²	P	OR** (95% CI)	BO (146)	No BO (174)	X ²	P	OR** (95% CI)
Professional problems:										
having a personal illness or disability that may affect the academic performance	177 (81.6)	40 (18.4)	5.1	0.03	2.1 (1.19-2.9)	124 (57.1)	93 (42.9)	36.1	<0.01	4.9 (2.85-8.44)
Time limitation for training	162 (85.7)	27 (14.3)	0.4	0.6	1.2 (0.66-2.2)	94 (49.7)	95 (50.3)	3.1	0.09	1.5 (0.96-2.36)
Fear of hurting a patient	171 (83.0)	35 (17.0)	1.3	0.33	1.86 (1.35-2.33)	106 (51.5)	100 (48.5)	7.9	0.003	1.96 (1.22-3.14)
Clinical skills practice is not enough	148 (90.8)	15 (9.2)	9.6	0.003	2.72 (1.4-5.2)	82 (50.3)	81 (49.7)	2.9	0.06	1.47 (0.94-2.29)
Difficulties of case taking and presentation	142 (90.4)	15 (9.6)	7.9	0.005	2.4 (1.29-4.79)	81 (51.6)	76 (48.4)	4.4	0.04	1.61 (1.03-2.5)
Lack of feedback	136 (88.3)	18 (11.7)	3.1	0.09	1.7 (0.93-3.25)	76 (49.4)	78 (50.6)	1.7	0.2	1.3 (0.68-2.08)
Inability to answer patients' questions	169 (82.8)	35 (17.2)	1.5	0.3	1.66 (0.3-2.3)	100 (49.0)	104 (51.0)	2.6	0.13	1.46 (0.92-2.32)
Verbal or physical abuse by hospital staff	151 (83.4)	30 (16.6)	0.5	0.5	1.79 (0.4-3.49)	98 (54.1)	83 (45.9)	12.2	<0.01	2.24 (1.42-3.53)
Worry about the future career	186 (89.9)	21 (10.1)	12.1	0.001	2.9 (1.6-5.4)	85 (41.1)	122 (58.9)	4.9	0.02	1.32 (1.04-1.66)

*reference **Odds Ratio, Confidence Interval P-value is significant if < 0.05.

Table (2): logistic regression analysis of significant independent influencing factors of stress and burnout among the medical students:

Stress	B**	Exp. (B)	95% CI [#]	P-value
Clinical education*	1.48	4.5	1.8-10.7	0.001
Competition with colleagues	0.96	1.3	1.17-2.9	0.02
Problems with faculty staff	0.68	1.9	0.9-4.4	0.11
Shortage and unstable hospital time	1.04	2.8	1.3-6.3	0.01
Inability to socialize with the hospital environment	0.96	1.4	1.1-1.9	0.04
Having a personal illness or disability that may affect their academic performance	1.77	3.2	1.06-4.5	<0.001
Clinical skills practice is not enough	1.13	3.1	1.3-7.2	0.009
Difficulties of case taking and presentation	0.52	1.7	0.8-3.7	0.2
Worry about the future career	1.35	3.9	1.8-8.3	0.001
Burnout				
Clinical Education*	2.1	3.1	1.3-8.2	<0.001
Inability to socialize with the hospital environment	0.45	1.06	0.4-1.1	0.12
Fear of becoming infected	0.45	1.06	0.4-1.5	0.14
Transportation problems to and from the hospital	0.25	1.08	0.3-1.5	0.43
Having a personal illness or disability that may affect the academic performance	0.86	2.4	1.2-7.8	0.009
Fear of hurting a patient	0.8	2.4	1.2-4.9	0.01
Difficulties of case taking and presentation	0.38	1.07	0.4-1.5	0.17
Verbal or physical abuse by hospital staff	0.18	1.3	0.5-1.5	0.52
Worry about the future career	1.02	2.8	1.5-5.2	0.001

* Preclinical is the reference, #confidence interval, P-value is significant if < 0.05. For stress: Hosmer - Lemeshow test= 3.9, p-value=0.4, **Beta coefficient, For burnout: Hosmer - Lemeshow test= 4.2, p-value=0.13

from better than usual (4), as usual (3), less than usual (2), too much less than usual (1)}for measuring social dysfunction (items 1,3,4,7,8,12), anxiety and depression (items 2,5,6,9), and loss of confidence (items 10,11). The binary

scoring method was used to evaluate where replies are coded 0-0-1-1. This method assigns a score of zero to the two least symptomatic answers and a score of one to the two most symptomatic answers; thus, responses can only be scored as zero or one. As demonstrated in previous studies, a mean score of 0.66 on the GHQ-12 provided the best conservative estimate of psychiatric stress.¹³

The level of burnout was assessed through the Maslach Burnout Inventory (MBI)¹⁴ in the third part. MBI is a 16-item self-report questionnaire. Possible answers were categorized into seven categories {never (0), several times a year or less (1), once a month or less (2), several times a month (3), once a week (4), several times a week (5), every day (6)}. The MBI measures three subscales: emotional exhaustion (5 items), cynicism (5 items), and professional inefficacy (6 items). A cutoff value of burnout differs according to the perception of questions that vary from one culture to another.¹⁵ The high degree of burnout is presented by high scores for exhaustion and cynicism and a low score of professional efficacy.

Table (3): Burnout dimensions among the studied group

	Mean subscale score	No (%)
Emotional exhaustion:		
≤ 14 (low level)		175 (54.7)
15-24 (moderate level)	17.4±8.1	123 (38.4)
≥ 25 (high level)		22 (6.9)
Cynicism:		
≤ 3 (low level)		13 (4.1)
4-9 (moderate level)	13.1±5.9	123 (38.4)
≥ 10 (high level)		184 (57.5)
Professional efficacy		
≤ 32 (low level)		152 (47.5)
33-39 (moderate level)	31.9±8.7	164 (51.2)
≥ 40 (high level)		4 (1.3)

In this study, Burnout was identified at a high level based on the following scores: emotional exhaustion ≥ 27 , cynicism ≥ 20 , and professional efficacy ≤ 16 . These scores correspond to the 66th percentile of

exhaustion and cynicism and the 33rd percentile of efficacy.¹⁶

Stress and burnout influencing factors were assessed through a questionnaire composed of open-ended questions guided by general themes predesigned from the review of the literature in the fourth part.

The students received a written questionnaire in a closed room without any interference by any data collectors and before their answers, they got an illustration for all questions. To keep privacy, the names were replaced by self-generated codes representing every participant. The study was held in two weeks during the first term of the academic year 2019/2020.

Ethical and Administrative Approval

The study was approved by the Zagazig Internal Review Board (IRB) (ZU-IRB#:6514) and the administrative permission letter was obtained from Menoufia and Zagazig Faculties of Medicine to conduct the study on their students. Informed written consent was obtained from the participating students after simple clarification of the study objectives and methodology.

Statistical analysis

All data were collected, tabulated, and statistically analyzed using Statistical Package of Social Science (SPSS) version 20.0 for windows (SPSS Inc., Chicago, IL, USA), where the following statistics were applied: quantitative variables with independent parametric data were expressed as mean and standard deviation. A Chi-square test was applied for qualitative variables expressed as a percentage. Binary multivariable logistic regression analysis for binary outcome was used to detect the most evident influencing factors which cause stress and burnout facing the participants. Hosmer-Lemeshow test was used to assess the model fitness. Statistical significance was determined to be less than 0.05.

Results

Stress and burnout are evident among medical students that affect their engagement. A total of 320 students were included in the study with a mean age of 20.56 and 1.7 standard deviation, about half of the students were females (51.6%), and 62.5% were of medium socioeconomic level, 20.3% of high socioeconomic level. This study showed a worrisome prevalence of stress (84.7%) and burnout (45.6%) among undergraduate medical students. These findings were statistically significant among the students of clinical education rather than those in their

preclinical stage (p-value <0.001) (figure 1). On studying stress, the students in the clinical stage of education were exposed more to stress (P-value 0.007). The stress-causing factors among medical students were competing with their colleagues, problems with faculty staff, shortage and unstable hospital time, inability to socialize with the hospital environment, having a personal illness or disability that may affect their academic performances, not enough clinical skills practice is not enough, difficulties of case taking and presentation and worry about the future career (P-value 0.01, <0.001, 0.001, <0.001, 0.001, 0.008,

Table (4): Difference in stressors facing the students during the preclinical and clinical stages of medical education:

	Preclinical (192)	Clinical (128)	X2	P-value
Social relationship problems:				
Problems with the opposite gender	83 (56.8)	63 (43.2)	1.1	0.17
Live away from family	71 (48.3)	76 (51.7)	15.5	<0.001
Competition with colleagues	78 (48.1)	84 (51.9)	19.2	<0.001
Problems with faculty staff	84 (51.5)	79 (48.5)	9.9	0.002
High parental expectation	95 (47.3)	106 (52.7)	36.5	<0.001
Shortage and unstable hospital time	99 (50.0)	99 (50.0)	21.64	<0.001
Incompatible hospital capacity with students' number	101 (50.5)	99 (49.5)	20.05	<0.001
Inability to socialize with the hospital environment	123 (57.5)	91 (42.5)	1.7	0.12
Fear of becoming infected	98 (49.7)	99 (50.3)	22.45	<0.001
Transportation problems to and from the hospital	117 (52.2)	107 (47.8)	18.77	<0.001
Having a personal illness or disability that may affect the academic performance	107 (49.3)	110 (50.7)	32.1	<0.001
Time limitation for training	92 (48.7)	97 (51.3)	24.66	<0.001
Fear of hurting a patient	121 (58.7)	85 (41.3)	0.38	0.31
Clinical skills practice is not enough	97 (59.5)	66 (40.5)	0.03	0.47
Difficulties of case taking and presentation	88 (56.1)	69 (43.9)	2.01	0.09
Lack of feedback	71 (46.1)	83 (53.9)	22.89	<0.001
Inability to answer patients' questions	116 (56.9)	88 (43.1)	2.3	0.08
Verbal or physical abuse by hospital staff	86 (47.5)	95 (52.5)	27.1	<0.001
Worry about the future career	118 (57.0)	89 (43.0)	2.19	0.09

*odds ratio, confidence interval, P-value is significant if < 0.05.

0.03, 0.003, 0.005 and 0.001 respectively) (Table 1).

On analyzing the influencing factors of stress facing the students by binary

multivariable logistic regression, the most stressing factors were having a personal illness or disability that may affect their academic performances then the clinical

education followed by worry about the future career then not enough clinical skill practice then short and unstable hospital time, competition with colleagues and finally inability to socialize with hospital environment (OR 3.2, 4.5, 3.9, 3.1, 2.8, 1.3, 1.4 respectively). Hosmer- Lemeshow test was used to standardize the model. (Table 2).

On analyzing the influencing factors of burnout among the medical students, the students of the clinical education stage (P-value <0.001) were more prone to burnout. the most significant factors causing burnout were inability to socialize with the hospital environment, fear of becoming infected, transportation problems to and from the hospital, having a personal illness or disability that may affect their academic performances, Fear of hurting patient, Difficulties of case taking and presentation, Verbal or physical abuse by hospital staff and worry about the future career (P-value 0.02, 0.01, 0.01, <0.001, 0.003, 0.04, <0.001 and 0.03 respectively) (Table 1).

On performing binary multivariable logistic regression to evaluate the most evident factor for burnout, clinical education was the most significant factor followed by worry about the future career then fearing of having a personal illness or disability that may affect their academic performances,

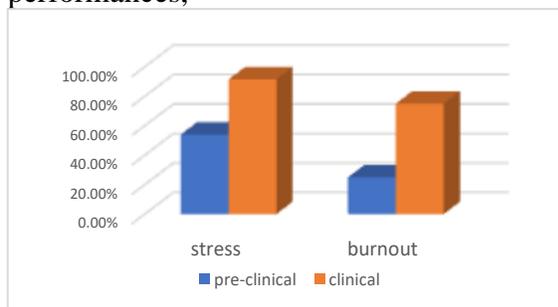


Figure (1): difference in the distribution of stress and burnout prevalence between the students in the pre-clinical and clinical stages of medical education.

and finally, the fear of hurting patient (OR 3.1, 2.8, 2.4, 2.4 respectively). Hosmer-Lemeshow test was used to standardize the model. (Table 2).

On studying the burnout subscales, about half of the students (54.7%) had a low level of emotional exhaustion but they had a high level of cynicism (57.5%) and a moderate level of professional inefficacy (51.2%) (Table 3).

On comparing the stressors facing the participants in both preclinical and clinical stages of education, there was a statistically significant difference between both stages as regards social problems including living away from their families, competition with their colleagues, problems with faculties, and the challenge of high parental expectation which was more significant among the clinical-stage students (P-value <0001, <0.001, 0.002 and <0.001 respectively). There was also a statistically significant difference in the side of clinical-stage students as regards hospital-related problems in terms of shortage and unstable hospital time, Incompatible hospital capacity with students' number, fear of becoming infected, and transportation problems to and from the hospital (P-value <0.001 for all stressors). There were more evident professional problems among the clinical-stage students in terms of having a personal illness or disability that may affect their academic performances, the time limitation for training, lack of feedback, and verbal or physical abuse by hospital staff (P-value <0.001 for all stressors) (table 4).

Discussion

Medical education is identified as stress-filled, and vast loaded curricula with long studying years. Chronic stress among medical students with short sleep and leisure time affects students' academic performance and results in depression,

substance use, and suicide.¹⁷ However, there is a shortage of such research evidence in Egypt. The prevalence of stress and burnout were (about 80% and 40%, respectively) among the studied sample, and students in the clinical stage were more affected than students in the preclinical one. It considered remarkable results. These results were concomitant with a study conducted on undergraduate medical students in The Kingdom of Saudi Arabia, 2017¹⁸, which found the prevalence of stress was 82% among them with high affection in the clinical stage. A study was done at Jimma University; Ethiopia¹⁷ found that the prevalence of stress was 52% and referred to vast medical courses and increasing responsibilities during the final years with insufficient knowledge and skills.

On the same line, a study conducted in the faculty of medicine, Ain Shams University, Cairo, Egypt – having merely the same teaching courses as the faculties of the current study- on 390 medical students during the academic year 2017-2018 revealed a high prevalence of stress and burnout cynicism subscale among the studied sample (66% and 75%, respectively). The three main reasons for stress among medical students were fear of hurting patients, students' perception that their clinical practice is not enough, limited time for training, with a highly statistically significant relationship between high-stress levels, high burnout subscales, and using hypnotics and smoking among these students.¹⁹ A study implemented among medical students at King Faisal University, Saudi Arabia, during the academic year 2011- 2012¹ revealed a high frequency of emotional exhaustion and perceived stress among medical students in the final years of clinical medical education with multiple concerns cited by the six-year students as fear of the future, defective clinical

practice skills, and fear of harming patients.

Many factors contributed to stress and burnout occurrence in the current study. Logistic regression analysis revealed that the clinical stage of medical education, colleagues' competition, shortage and unstable hospital time, inability to socialize with the hospital environment, having a personal illness that may affect the academic performance, shortage of clinical training, and worry about the future career were significant independent factors regarding stress occurrence.

Whereas the clinical stage, having a personal illness or disability, fears of hurting patients, and worrying about their future career were significant independent factors regarding burnout occurrence.

A study was done among medical students in Cairo university in the academic year 2016- 2017 revealed multiple significant independent variables sharing in stress and burnout occurrence among the studied sample as female gender, inadequate sleep, being affected by chronic personal illness, having little or no leisure time, and worrying about choosing a specialty and future income.¹⁶

Another study was conducted on 600 Medical Students of Karachi, Pakistan²⁰ showed various significant influencing factors like lack of enough time to sleep, practicing physical activities, and participating in social activities due to the loaded medical curriculum.

A study was conducted in Riyadh, Saudi Arabia²¹ on 276 medical students from Al Faisal University revealed that the female gender was a significant influencing factor by multivariable analysis for demographic characteristics. Regarding the total level of burnout with higher levels of burnout compared to males (P -value <0.001). Unlike the current study, the highest percentages of students who reported higher levels of burnout, especially the

cynicism and emotional exhaustion domains were in the preclinical years compared to the students who were in the clinical years and referred this to the adaptation of the students on medical studies in the higher academic years.

Regarding the current study, there was a statistical significance difference between preclinical and clinical stages of education regarding many social, professional, and hospital-related problems, which were more evident in the clinical stage. These results can be explained by the long crowded academic year, starting contact with the patients and hospital environment with increasing the student responsibilities. A study was conducted at the University Hospital of Tuebingen, Germany on 1,425 participants, 2018 showed various stressors challenging the medical students through their academic study as private related stressors (financial worries, side job, living situation, and conflicts with parents) and training related stressors (missing consultation and support, bad time management, and lack of enough training time).²²

On contrary a study done in Bangladesh²³ on undergraduate medical students showed that the Intensity of stressors was significantly higher in preclinical students than clinical ones ($p=0.000$), and revealed many stressors affect them as getting low marks and facing parental expectations, facing a personal illness or death of patients, too much restriction in campus, high workload and crowded curriculum, and inadequate medical skill practice.

Another study conducted on 68 medical students in Germany to assess Medical students' perceptions of stress due to academic studies and its interrelationships with other domains of life showed that starting medical studies are linked with significant personal challenges that may develop over stress and burnout syndrome and affect the scholar achievement, such as

living alone for the first time, a little time for rest and physical activities and a healthy lifestyle, Feelings of social isolation especially during exam stages, Side jobs were perceived to increase stress by time and effort consumption, and high surrounding expectations.²⁴

Conclusion

Prevalence of stress and burnout is evident among medical students. Many stressors related to their social relationship, professional and hospital-based problems face them throughout their academic trips. This may cause a great impact on the students' personal lives and affect their academic achievements and, may reflect on their psychological health.

Recommendations

A considerable concern should be given to these students through the anticipatory care services provided by family health clinics, finding different ways to relieve the total stress. Further studies should be done to discuss different ways to criticize the overcrowded medical curricula and to mitigate the academic stress as adding an extra entertainment curriculum e.g., sports, arts, and handicrafts are simple examples.

Study limitation

Preoccupation of the medical students and their limited time during the academic day made it difficult to participate. The study was conducted on two Egyptian faculties only, so this may interfere with the extrapolation of the results.

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References

1. El-Masry R, Ghreiz S, Helal R, Audeh A, Shams T. Perceived Stress and Burnout among Medical Students during the Clinical Period of Their Education, *Ibnosina J Med BS* 2013,5(4):179-188
2. Liu C, Xie B, Chou C-P, Koprowski C, Zhou D, Palmer P, et al. Perceived stress,

- depression, and food consumption frequency in the faculty students of China seven cities. *Physiol Behav.* 2007; 92: 748–54.
3. Mikolajczyk RT, El Ansari W, Maxwell AE. Food consumption frequency and perceived stress and depressive symptoms among students in three European countries. *Nutr J.* 2009; 8: 31.
 4. Kuo WC, Bratzke LC, Oakley LD, Kuo F, Wang H, Brown RL. The association between psychological stress and metabolic syndrome: a systematic review and meta-analysis. *Obes Rev.* 2019; 20(11): 1651- 1664.
 5. Cohen S, Janicki-Deverts D, Miller GE. Psychological Stress and Disease. *JAMA.* 2007;298(14):1685–1687.
 6. Dewe P.J., O’Driscoll M.P., Cooper C.L. Theories of Psychological Stress at Work. In: Gatchel R., Schultz I. (eds) *Handbook of Occupational Health and Wellness.* 2012 *Handbooks in Health, Work, and Disability.* Springer, Boston, MA.
 7. Montero-Marín, J., García-Campayo, J., Mera, D.M. A new definition of burnout syndrome based on Farber's proposal. *J Occup Med Toxicol* 2009;4, 31.
 8. Weber A and Jaekel-Reinhard A. Burnout syndrome: a disease of modern societies? *Occup. Med.* 2000; 50 (7) :512-517
 9. Maslach C, Jackson SE, Leiter MP: *Maslach Burnout Inventory.* Palo Alto, CA: Consulting Psychologist Press; 1996.
 10. Fares J, Saadeddin Z, Al Tabosh H, Aridi H, Mouhayyar C, Koleilat M, Chaaya M, El Asmar K. Extracurricular activities associated with stress and burnout in preclinical medical students. *Journal of Epidemiology and Global Health* 2016 (6): 177– 185.
 11. Fahmy SI, Nofal LM, Shehata SF, El-Kady HM, Ibrahim HK. Updating indicators for scaling the socioeconomic level of families for health research. *J Egypt Public Health Assoc.* 2015 Mar 1;90(1):1-7.
 12. Hankin M. The reliability of the twelve-item general health questionnaire (GHQ-12) under realistic assumptions. *BMC Public Health* 2008, 8:355
 13. Yusoff M, Rahim A, Yaacob M. Prevalence, and sources of stress among Universiti Sains Malaysia medical students. *Malays J Med Sci,* 17 (2010), p. 30
 14. Bakker, A.B., Demerouti, E., & Schaufeli, W.B. (2002). Validation of the Maslach Burnout Inventory – General Survey: An Internet study. *Anxiety, Stress, and Coping,* 15, 245-260.
 15. Lee HF, Kuo HT, Chang CL, Hsu CC, Chien TW. Determining cutting points of the Maslach Burnout Inventory for nurses to measure their level of burnout online. *History Research.* 2017 Feb 24;5(1):1-8.
 16. ElKholi MM, El-Sayed ET, Sedrak AS, Raouf NA. Prevalence and Predictors of Burnout Syndrome among Medical Students of Cairo University. *Egyptian Journal of Community Medicine.* 2019 Jul;37(3).
 17. Melaku L, Mossie A, Negash A. Stress among medical students and its association with substance use and academic performance. *J Biomed Educ.* 2015;2015.
 18. Mahyuddin RA, Haneef ZM, Alalwani BM, Al Juhani A, Fallatah SM, Abdulmajeid SA, Alsaïdi DA. The Prevalence of Stress among Medical Students and Its Effects on Academic Performance in The Kingdom of Saudi Arabia. *Egypt J Hosp Med* 2018 Apr 1;71(5):3200-5.
 19. Wassif GO, Gamal-Eldin DA, Boulos DN. Stress and burnout among medical students. *JHIPH.* 2019;49(3):190- 198.
 20. Asghar AA, Faiq A, Shafique S, Siddiqui F, Asghar N, Malik S, Kamal SD, Hanif A, Qasmani MF, Ali SU, Munim S. Prevalence and Predictors of the Burnout Syndrome in Medical Students of Karachi, Pakistan. *Cureus.* 2019 Jun;11(6).
 21. Altannir Y, Alnajjar W, Ahmad SO, Altannir M, Yousuf F, Obeidat A, Al-Tannir M. Assessment of burnout in medical undergraduate students in Riyadh, Saudi Arabia. *BMC medical education.* 2019 Dec;19(1):34.
 22. Erschens R, Herrmann–Werner A, Keifenheim KE, Loda T, Bugaj TJ, Nikendei C, Lammerding–Köppel M, Zipfel S, Junne F. Differential determination of perceived stress in medical students and high-school graduates due to private and training-related stressors. *PLoS One.* 2018;13(1).
 23. Habib MA, Rahman MA, Manara A, Ayub M, Begum N, Hossain S. Stressors perceived by the para-clinical undergraduate medical

students. Bangladesh Journal of Medical Education. 2018 Nov 28;9(2):3-10.
24. Bergmann C, Muth T, Loerbroks A. Medical students' perceptions of stress due to

academic studies and its interrelationships with other domains of life: a qualitative study. Medical education online. 2019 Jan 1;24(1):1603526