Social Science, Humanities and Sustainability Research
ISSN 2690-3628 (Print) ISSN 2690-3636 (Online)
Vol. 1, No. 1, 2020
www.scholink.org/ojs/index.php/sshsr

Original Paper

Educational Environment and Mental Health of Moroccan Medical Students: A Study in the Faculty of Medicine of Marrakech

Abdeslam Benali[1*] & Hajar Chichou[1]

[1] Department of Psychiatry, Faculty of Medicine and Pharmacy of Marrakech, University Cadi Ayyad, Marrakech, Morocco

[*] Abdeslam Benali, Department of Psychiatry, Faculty of Medicine and Pharmacy of Marrakech, University Cadi Ayyad, Marrakech, Morocco

Received: June 16, 2020 Accepted: June 21, 2020 Online Published: June 23, 2020

doi:10.22158/sshsr.v1n1p152 URL: http://dx.doi.org/10.22158/sshsr.v1n1p152

Abstract

Introduction: *Studies concur that an optimal learning environment is a vital aspect for effective learning and for enhancing students' well-being. Conversely, medical training is reported to be a suboptimal environment, thereby compromising students' learning and well-being.*

Purpose: *To evaluate the relationship between students' perceptions of the educational environment and their mental health.*

Methods: *This was a cross-sectional descriptive and analytical study, using the GHQ-12 and the DREEM questionnaires, with 380 students from the Faculty of Medicine and Pharmacy of Marrakech (3rd, 4th, 5th, 6th, 7th and 8th year), during the academic year 2017-2018.*

Results: We recruited 358 students in a period of 2 weeks, achieving a response rate of 94.2%. There was a predominance of females (66.48%). The mean age was 22.20 ± 2.149 years. The average GHQ score was 6.37 ± 3.484, with a psychological distress rate of 66.76%. The mean total score of DREEM was 86.5 ± 29.194 which indicates the existence of several significant problems. There was a statistically significant association between the poor perception of the educational environment and psychological distress.

Conclusion: *Improving the educational environment and promoting deep learning approaches for medical students will improve their psychological health during medical training.*

Keywords

educational environment, mental health, stress, medical students

1. Introduction

Access to higher education is based on several criteria and only students who have successfully completed their studies are eligible. However, the stressful university environment can have a detrimental effect on students' mental health.

Mental health is defined as a state of well-being in which every individual realizes their own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to their community. (WHO, 2017)

The most frequently used and established screening test for mental health disorders is the General Health Questionnaire (GHQ) which is available in several versions. GHQ has been widely used in studies in many countries both in the community and in general practice. It is used to detect non-psychotic psychiatric disorders, such as depression and anxiety. (Goldberg, 1972)

Research has shown that the proportion of medical students suffering from psychological distress is similar to that of the general population before undertaking medical training (less than 3%) (Smith et al., 2007; Yusoff et al., 2013); however, and according to studies conducted in the United States and Canada, the mental health of medical students in particular, worsens early in medical education and remains poor throughout training (Dyrbye et al., 2008; Givens & Tjia, 2002; Yiu, 2005), high rates of psychological distress have also been observed in Europe (Guthrie et al., 1995; Mancevska et al., 2008; Pickard et al., 2000), Asia (Bostanci et al., 2005; Khan et al., 2006; Samaranayake & Fernando, 2011) and in the Middle East (Ahmed et al., 2009; Mehanna & Richa, 2006).

These results suggest that some aspects of the medical educational environment have a negative impact on the psychological well-being of students, thus hindering the noble goal of medical education to produce healthy and competent doctors to serve society. In fact, several studies reported that the main source of the psychological pressure is related to the medical educational environment, particularly academic requirements such as examinations, overloaded content and lack of time for revision (Dyrbye et al., 2005; Yusoff, 2011; Yusoff et al., 2010).

Researchers used different methods such as qualitative approaches or questionnaires to assess the educational climate(ALCI, 2009; Chan et al., 2018; Ohtsu et al., 2014). The Dundee Ready Education Environment Measure (DREEM) is the most commonly used instrument (Belayachi et al., 2015; Chaouche, 2014). As it is intended to be a universal inventory, DREEM has been used in a multitude of studies in countries from all continents. These studies helped identify strengths and weaknesses in medical schools (Chaouche, 2014; Kim et al., 2016).

The aims of our study are to assess the mental well-being of medical students and their perceptions of the educational environment and to evaluate the relationship between the educational environment as viewed by students and their mental health.

2. Method

2.1 Instruments

The Dundee Ready Education Environment Measure (DREEM) is a questionnaire developed by Roff et al (Roff et al., 1997) to measure the educational environment in health professional education programs. The questionnaire was developed using a Delphi approach involving a range of professional health educators in different settings and countries.

The DREEM contains 50 statements. Each statement is assessed using a 5 point Likert scale ranging from "strongly agree" to "strongly disagree". Items are scored as follows: Strongly agree (4); Agree (3); Uncertain (2); Disagree (1); strongly disagree (0).

However nine of the 50 items (4, 8, 9, 17, 25, 35, 39, 48 and 50) are negative statements and are reverse scored. The 50-item DREEM has a maximum score of 200 indicating the ideal educational environment. It is also divided into five subscales:

1) Students' perceptions of learning (12 items, max score 48)
2) Students' perceptions of teachers (11 items, max score 44)
3) Students' academic self-perceptions (8 items, max score 32)
4) Students' perception of atmosphere (12 items, max score 48)
5) Students' social self-perceptions (7 items, max score 28)

The DREEM can be used to pinpoint more specific strengths and weaknesses. Items with mean scores ≥ 3.5 are considered as highly positive points. Items with mean scores between 2 and 3 indicate aspects of the environment that could be improved. While items with a mean of 2 or less should be examined more closely as they indicate problem areas.

The effect of distress and the consequences to mental health were estimated by the General Health Questionnaire (GHQ), offering four different categories of answers (graded from "better than usual", "as usual", "less than usual", to "much less than usual") for measuring the feeling of tension, depression, inability to defend, disturbed sleep based on anxiety, lack of self-confidence and self-esteem and other symptoms of mental health disturbance. The GHQ has been translated to and been validated in more than 40 languages, and exists in five versions that vary on the number of items (12, 20, 28, 30, 60). The 12-item version was chosen in the present study. From seven validation studies of the GHQ 12, Goldberg and Williams found a median sensitivity of 87% and a median specificity of 82%. (Goldberg et al., 1991)

Two different scoring systems exist: Likert system (0, 1, 2, 3) for which the scoring range for the GHQ 12 goes from 0 to 36; and the standard method of scoring (0-0-1-1), which allows a maximum score of 12.

The cut-off scores for detecting cases vary in the many studies conducted to find the best threshold. For the purpose of comparison the 4+ was chosen to be the threshold in the present study. Students marking four or more of the 12 items on the response categories of "more than usual" or "much more than usual"

in the last 2 weeks will be classified as having a clinically significant problem and belong to the case group.

2.2 Subjects and Settings

This cross-sectional study was conducted in the Faculty of Medicine and Pharmacy of Marrakech in January 2018. The questionnaire was distributed to clinical stage medical students (3rd, 4th, 5th and 6th years) in the University Hospital Mohammed VI of Marrakech, several sessions were organized within many hospital departments to explain the interest and purpose of the study. Then, the students, having accepted to participate in the survey, received the questionnaires to fill, while respecting their anonymity. These questionnaires, once completed, were given to the secretaries of each department.

The students of the 7th and the 8th year received for their part the questionnaire directly within the faculty of Medicine and Pharmacy of Marrakech.

Given the personal nature of certain questions in this survey, the questionnaire was also made available in electronic format in order to respect the privacy of students and to promote their sincerity.

2.3 Statistical Analysis

The Data were analyzed using Excel 2010 and the statistical analyzes were performed by the ANOVA test. A P-value < 0.05 served as the cut-off value for statistical significance.

3. Result

The response rate was 94.2% (total 358 out of 380 students). Among the 358 students, 120 (33.52%) were male and 238 (66.48%) were female. The mean age of participants was 22.2 (SD 2.149) years.

Considering year of study, there were 93 (25.98%) third year, 90 (25.14%) fourth year, 82 (22.91%) fifth year, 53 (14.8%) sixth year, 8 (2.23%) seventh year and 32 (8.94%) eighth year students.

3.1 Educational Environment

The mean DREEM total score was 86.5 (SD 29.194). Total DREEM scores ranged from 11 to 185.

The descriptive statistics for each of the five DREEM subscales are presented in **Table 1**. The highest score was found in the subscale of students' perceptions of teachers (21.71/44 (49.3%)), and the lowest score was found in the subscale of students' perceptions of learning (17.38/48 (36.2%)).

Table 1 shows the individual item analysis of DREEM according to the five different subscales. 35 items scored less than two. Among them, 12 items were from the students' perceptions of learning subscale, 4 items were from the students' perceptions of teachers subscale, 4 items were from the students' academic self-perceptions subscale, 11 items were from the students' perceptions of atmosphere subscale and 4 items were from the students' social self-perceptions.

The remaining 15 items scored between 2 and 3 and there was no area of excellence (Item score ≥ 3.5). The lowest score was 0.57 for Item 3 "There is a good support system for students who get stressed".

3.2 Mental Health Status

The mean score of psychological distress (GHQ) was 6.37 (SD: 3.484) ranging between 0 and 12, and 66.76% scored above the threshold (4 points) indicating notable mental problems.

In our study, 70.11% of students use stress management tools and emotional disorders, 15.64% used psychiatric help before they started their medical studies, 43.58% started using it after the beginning of the medical career and 64.53% of students reported their need for psychiatric help, 54.11% of whom wanted professional help, 43.29% prefer seeking help from their family members and friends and 29% wanted medical treatment and/or psychotherapy.

3.3 Correlation Analysis

Correlation analysis revealed significant correlation between psychological distress and the educational environment; it also showed a significant association between the educational environment and the need for psychiatric help. **Table 2 Table 3**

We also found a very significant correlation between psychological distress and 23 individual items of DREEM, since item scores were very high among students who had a GHQ score less than or equal to 4 compared to students with GHQ scores greater than 4. **Table 4**

The need for psychiatric help is also a factor associated with 23 individual items, since the average item scores were higher for students who reported that they did not require psychiatric help. **Table 5**

Table 1. Individual Item Analysis for Each Subscale of DREEM

Items		Mean	SD
Students' perception of learning (SPoL)			
1	I am encouraged to participate during teaching sessions	1,47	1,33
7	The teaching is often stimulating	1,23	1,21
13	The teaching is student-centered	1,32	1,18
16	The teaching helps to develop my competence	1,85	1,19
20	The teaching is well-focused	1,52	1,13
22	The teaching helps to develop my confidence	1,33	1,28
24	The teaching time is put to good use	1,3	1,29
25	*The teaching over-emphasizes factual learning*	1,2	1,12
38	I'm clear about the learning objectives of the course	1,57	1,23
44	The teaching encourages me to be an active learner	1,56	1,24
47	Long-term learning is emphasized over short-term learning	1,52	1,2
48	*The teaching is too teacher-centered*	1,5	1,26
Total mean score		**17.38**	**8.063**

Maximum score		**48**	
Students' perception of teachers (SPoT)			
2	The teachers are knowledgeable	2,55	1,04
6	The teachers adopt a patient-centered approach to consulting	2,22	1,18
8	*The teachers ridicule the students*	1,56	1,27
9	*The teachers are authoritarian*	1,22	1,15
18	The teachers have good communication skills with patients	2,3	1,08
29	The teachers are good at providing feedback to students	1,5	1,15
32	The teachers provide constructive criticism here	1,79	1,27
37	The teachers give clear examples	2,07	1,23
39	*The teachers get angry in teaching*	2,12	1,27
40	The teachers are well-prepared for their teaching sessions	2,03	1,21
50	*The students irritate the teachers*	2,38	1,22
Total mean score		**21.71**	**7.431**
Maximum score		**44**	
Students' academic self-perception (SASP)			
5	Learning strategies that worked for me before continue to work for me now	2,06	1,28
10	I am confident about my passing this year	2,18	1,32
21	I feel I am being well prepared for my profession	1,31	1,13
26	Last year's work has been a good preparation for this year's work	1,81	1,24
27	I am able to memorize all I need	2,16	1,3
31	I have learnt a lot about empathy in my profession	2,1	1,23
41	My problem-solving skills are being well developed here	1,26	1,13
45	Much of what I have to learn seems relevant to a career in healthcare	1,89	1,27
Total mean score		**14.76**	**5.809**
Maximum score		**32**	
Students' perception of atmosphere (SPoA)			

11	The atmosphere is relaxed during ward teaching	1,43	1,15
12	This school is well time-tabled	1,47	1,31
17	*Cheating is a problem in this school*	2,56	1,35
23	The atmosphere is relaxed during lectures	1,82	1,16
30	There are opportunities for me to develop my interpersonal skills	1,77	1,18
33	I feel comfortable in class socially	1,9	1,33
34	The atmosphere is relaxed during class/seminars/tutorials	1,84	1,18
35	*I find the experience disappointing*	1,51	1,25
36	I am able to concentrate well	1,93	1,23
42	The enjoyment outweighs the stress of the course	1,44	1,16
43	The atmosphere motivates me as a learner	1,28	1,13
49	I feel able to ask the questions I want	1,63	1,34
Total mean score		**20.58**	**8.110**
Maximum score		**48**	
Students' social self-perception (SSSP)			
3	There is a good support system for students who get stressed	0,57	0,4
4	*I am too tired to enjoy the course*	2	1,35
14	I am rarely bored in this course	1,28	1,25
15	I have good friends in this course	2,9	1,25
19	My social life is good	2,11	1,4
28	I seldom feel lonely	1,69	1,45
46	My accommodation is pleasant	1,47	1,2
Total mean score		**11.98**	**4.566**
Maximum score		**28**	

SPoL: students' perceptions of learning; SPoT: students' perceptions of teachers; SASP: students' academic self-perceptions; SPoA: students' perceptions of atmosphere; SSSP: students' social self-perceptions.

Table 2. Association between Mental Health Status and the Educational Environment

Variables		% of students with phsycological distress	Mean GHQ score±SD	p value
Global DREEM score	0-50	12,55%	8,58±3,134	<0,0001
	51-100	62,34%	6,92±3,443	
	101-150	25,10%	4,87±3,035	
	151-200	0%	2,5±0,707	
SPoL	0-12	37,24%	8,16±3,180	<0,0001
	13-24	48,12%	6,04±3,451	
	25-36	14,64%	5,34±3,173	
	37-48	0,00%	5,25±4,573	
SASP	0-8	19,67%	8,61±3,117	<0,0001
	9-16	46,44%	6,79±3,641	
	17-24	32,22%	5,18±2,877	
	25-32	1,67%	3,73±1,98	
SPoA	0-12	19,25%	8,37±2,998	<0,0001
	13-24	57,32%	6,8±3,536	
	25-36	23,01%	4,82±2,877	
	37-48	0,42%	2,66±1,632	
SSSP	0-7	25,94%	8,82±2,917	<0,0001
	8-14	51,46%	6,53±3,429	
	15-21	22,59%	4,69±2,936	
	22-28	-	-	

SPoL: students' perceptions of learning; SPoT: students' perceptions of teachers; SASP: students' academic self-perceptions; SPoA: students' perceptions of atmosphere; SSSP: students' social self-perceptions.

Table 3. Association between the Educational Environment and Mental Health

Variables			Global score of DREEM	SPoL	SPoT	SASP	SPoA	SSSP
GHQ Score	<5	n	279	279	279	279	279	279
		Mean	90,92±28,551	19,43±7,692	22,38±7,558	15,24±5,975	21,37±8,105	12,49±4,501
	≥5	n	79	79	79	79	79	79
		Mean	76,68±24,006	16,25±6,217	19,36±6,475	13,06±4,844	17,79±7,536	10,2±4,368
	p value		<0,0001	<0,0001	0,11	<0,0001	<0,0001	<0,0001
Need of psychiatric help	Yes	n	231	231	231	231	231	231
		Mean	83,13±26,635	17,69±7,15	20,93±7,338	13,93±5,735	19,48±7,691	11,08±4,434
	No	n	127	127	127	127	127	127
		Mean	96,23±29,117	20,61±7,78	23,13±7,417	16,26±5,66	22,59±8,489	13,62±4,358
	p value		0,0005	0,003	0,01	0,0006	<0,0001	<0,0001

SPoL: students' perceptions of learning; SPoT: students' perceptions of teachers; SASP: students' academic self-perceptions; SPoA: students' perceptions of atmosphere; SSSP: students' social self-perceptions.

Table 4. Association between the DREEM Items and Psychological Distress

Item		GHQ score		p value
		<5	≥5	
7	The teaching is often stimulating	1,53	1,07	0,02
10	I am confident about my passing this year	2,56	1,99	<0,0001
16	The teaching helps to develop my competence	2,05	1,74	0,008
19	My social life is good	2,7	1,81	<0,0001
20	The teaching is well-focused	1,77	1,39	0,03
22	The teaching helps to develop my confidence	1,85	1,06	<0,0001
26	Last year's work has been a good preparation for this year's work	2,07	1,67	0,03
27	I am able to memorize all I need	2,49	1,98	0,001
28	I seldom feel lonely	2,18	1,44	<0,0001
29	The teachers are good at providing feedback to students	1,74	1,35	0,004
30	There are opportunities for me to develop my interpersonal skills	2,1	1,6	0,001
33	I feel comfortable in class socially	2,16	1,76	0,008
36	I am able to concentrate well	2,19	1,79	0,04
37	The teachers give clear examples	2,36	1,92	0,0009
38	I'm clear about the learning objectives of the course	1,89	1,41	0,0006
41	My problem-solving skills are being well developed here	1,54	1,09	0,0004

42	The enjoyment outweighs the stress of the course	1,73	1,29	0,02
43	The atmosphere motivates me as a learner	1,57	1,12	0,0005
44	The teaching encourages me to be an active learner	1,89	1,39	0,001
45	Much of what I have to learn seems relevant to a career in healthcare	2,21	1,72	0,002
49	I feel able to ask the questions I want	1,91	1,48	0,003
4	*I am too tired to enjoy the course*	2,35	1,76	0,0002
35	*I find the experience disappointing*	1,93	1,3	0,0003

Table 5. Association between the DREEM Items and the Need of Psychiatric Help

Item		Need of psychiatric help		p value
		Yes	No	
10	I am confident about my passing this year	2,08	2,37	0,03
15	I have good friends in this course	2,77	3,11	0,01
16	The teaching helps to develop my competence	1,47	2,05	0,01
19	My social life is good	1,85	2,57	<0,0001
20	The teaching is well-focused	1,37	1,78	0,01
22	The teaching helps to develop my confidence	1,14	1,66	0,0005
27	I am able to memorize all I need	2,01	2,41	0,02
28	I seldom feel lonely	1,47	2,07	0,0003
29	The teachers are good at providing feedback to students	1,33	1,76	0,01
32	The teachers provide constructive criticism here	1,68	1,96	0,01
36	I am able to concentrate well	1,8	2,15	0,01
37	The teachers give clear examples	1,97	2,25	0,04
38	I'm clear about the learning objectives of the course	1,45	1,79	0,02
41	My problem-solving skills are being well developed here	1,12	1,49	0,03
43	The atmosphere motivates me as a learner	1,15	1,5	0,007
44	The teaching encourages me to be an active learner	1,43	1,8	0,01
45	Much of what I have to learn seems relevant to a career in healthcare	1,72	2,19	0,01
47	Long-term learning is emphasized over short-term learning	1,4	1,72	0,01
49	I feel able to ask the questions I want	1,49	1,86	0,04
8	*The teachers ridicule the students*	1,44	1,76	0,02
35	*I find the experience disappointing*	1,36	1,78	0,006
48	*The teaching is too teacher-centered*	1,35	1,76	0,01
50	*The students irritate the teachers*	2,28	2,55	0,007

4. Discussion

The high response rate (94.2%) obtained in our study was due to the brief introduction given to students about the aim of this study, which convinces them that the results of such a study would lead to significant changes. The students also perceived it as an ideal opportunity to express their opinions.

The response rate in other studies ranged from 44.6% to 96.9%. This showed that our response rate was among the highest, indicating that our students were keen to participate in such study to improve their school and their mental health status.

This response rate is comparable to that obtained in Canada (91%) (Till, 2004) and in Australia (90%) (Vaughan et al., 2014). On the other hand, the lowest response rate obtained in King Saud University (44.6%) was explained by students' fears of participation in their study and its impact on their exam results (Al Ayed & Sheik, 2008).

The mean age of the respondents was consistent with similar studies carried out in other medical schools (Backović et al., 2013; Bíró et al., 2011; Oku et al., 2015; Sherina et al., 2004), in which the mean age was 22.2±2.149 and the majority of the students were between the ages 19 and 31 years. Overall, two out of three respondents were female, which is quite different from what was obtained in a study conducted in Japan, with 66.3% male and 33.7% female (Ohtsu et al., 2014).

A study in Singapore reported that 79 studies showed total DREEM scores ranging from 100 to 150, and only 3 studies reported excellent scores between 150 and 200. (Chan et al., 2018)

The global DREEM score of 86.5/200 indicated the existence of many significant problems in the educational environment of our faculty. As far as we can verify, our study had the lowest score reported among published studies using the relatively recently validated DREEM inventory. The highest score was reported in Turkey and was of 156.91. (ALCI, 2009)

This cry from students is, unfortunately, only too common to medical and many other healthcare programs due in no small part to the quantity and quality of information that has to be absorbed during the time of studies.

2 local studies showed fairly similar results: 90.5/200 in the Faculty of Medicine and Pharmacy of Rabat (Belayachi et al., 2015) and 99.2/200 in the Faculty of Medicine and Pharmacy of Fes (Chaouche, 2014). Internationally, overall DREEM scores reported were 89.9/200 in Saudi Arabia (Al Ayed & Sheik, 2008), 94.65/200 in South Korea (Kim et al., 2016), 108.5/200 in Brazil (Viana-Nucci and Andrade Carvalho Pinto, 2017), 117.2/200 in Peru (Flores-Flores et al., 2017), 131.1/200 in Thailand (Hongkan et al., 2018) and 135.44/200 in Mexico (Aguilar-Barojas et al., 2017).

Among the subscale scores, students' perception of learning was lowest in our study (36.2%). This is fairly close to the score of 38.3% reported by Andalib (Andalib et al., 2015) and of 39.58% reported by Till (Till, 2004), but lower than the score of 71.7% (34.42/48) reported by Vaughan (Vaughan et al., 2014). **Table 6**

The perception of learning atmosphere, where other studies showed to have significant impact on students' behavior, academic progress and sense of well-being, scored low in the present study. The

students appear unable to concentrate, memorize or enjoy the courses while the atmosphere is not relaxed during lectures or trainings. Many studies reported generally similar findings (Al Ayed & Sheik, 2008; Al-Hazimi et al., 2004; Roff & McAleer, 2001).

Medical students around the globe seemed to share similar concerns as reported in studies that utilized the DREEM instrument (Mayya & Roff, 2004; R.M. Harden, 2000). It is interesting that most areas of concern are related to what is taught rather than how it is taught and allude to the curriculum content rather than its delivery.

There were 35 items that scored below 2, which indicated problematic areas of the learning environment. Item 3 (There is a good support system for students who get stressed) had the lowest score (0.57) in the questionnaire. This item also scored the lowest in other studies. (Aghamolaei & Fazel, 2010; Al Sheikh, 2014; Al-Hazimi et al., 2004; Al-Qahtani, 2015; Dimoliatis et al., 2010; Herrera & Oslando Padilla, 2015; Roff et al., 2001; Rotthoff et al., 2011)

A study in Greece (Dimoliatis et al., 2010) found 19 problem areas, another study in Germany (Rotthoff et al., 2011) reported 18 items with scores below 2, while a study in Iran (Aghamolaei & Fazel, 2010) objectified the existence of 22 problem areas.

In our study, no area of excellence (Score ≥ 3.5) was reported, which is in agreement with many studies. (Bennett et al., 2010; Rotthoff et al., 2011; Shehnaz & Sreedharan, 2011; Tontus, 2010; Veerapen & McAleer, 2010)

The psychological morbidity in our study was significant and a cause of concern for the faculty and administrators. Previous literature suggested consistent evidence of higher prevalence of anxiety, depression, and burnout (Dyrbye et al., 2008, 2006) and psychological distress in medical students than in the general population and age-matched peers (Dyrbye et al., 2008; Grant et al., 2004).

Assessment of psychological morbidity or mental health status of the respondents using the GHQ12 was a key finding in this study. The prevalence of psychological morbidity was 66.76%. This was found to be high compared to other studies (Dendle et al., 2018; Farahangiz et al., 2016; Ohtsu et al., 2014; Oku et al., 2015). However, studies conducted among medical students in Australia, England and Malaysia, which used the same cut off as the present study, showed similar results (Firth, 1986; Willcock et al., 2004; Yusoff, 2011). **Table 7**

Our highly stressful educational environment, the personal characteristics of our students and possible previous mental health problems may be considered as the reasons for our high levels of psychological morbidity. These variations in mental health status of medical students shows that effective supportive and mental health services still need to be instituted as a necessary part of the under graduate medical training both in developed and developing countries.

The significant findings from our study are that the educational environment has a direct effect on the students' mental health and interestingly, psychological distress also has a direct effect on the educational environment.

Several studies have demonstrated that an unfavorable medical training atmosphere leads to a high prevalence of psychological distress (Wolf, 1994; Yusoff et al., 2010) and eventually leads to unwanted consequences either at the personal level or professional level (Dyrbye et al., 2008, 2005).

A Malaysian study reported similar results, supporting that a favorable educational environment directly improves the psychological distress of medical students. (Yusoff & Arifin, 2015)

One of the important implications of this finding is that our faculty should make the effort of conducting a regular evaluation of the educational environment to detect potential areas of concern; it should also be aware of the high prevalence of psychological distress among their students, as it could be the sign of an unfavorable educational environment.

Another important message is that medical faculties should take action to improve the quality of the educational climate that is offered to the medical students and thus improve their mental health status.

Table 6. Comparison of DREEM Scores at the Faculty of Medicine of Marrakech and Other Studies

Year	Country [reference]	Overall mean score	SPoL	SPoT	SASP	SPoA	SSSP
2018	**Morocco [Our study]**	**86,5**	**17,38**	**21,71**	**14,76**	**20,58**	**11,98**
2008	Saudi Arabia (Al Ayed and Sheik, 2008)	89,9	19,5	21,2	14,8	21,3	13
2014	Morocco (Belayachi et al., 2015)	90,8	21,2	21,8	13,1	19	15,6
2016	South Korea (Kim et al., 2016)	94,65	20,2	23,03	16,16	21,7	13,57
2015	Iran (Andalib et al., 2015)	95,8	18,4	26,2	13,6	23,5	13,8
2014	Morocco (Chaouche, 2014)	99,2	22	24,31	16,84	23,36	13,71
2017	Peru (Flores-Flores et al., 2017)	117,2	26,5	27,5	21	26,6	15,6
2018	Thailand (Hongkan et al., 2018)	131,1	31,4	30,7	21,4	29,8	17,7
2016	China (Xu et al., 2016)	134,82	31,68	20,45	32,72	32,04	17,93
2017	Mexico (Aguilar-Barojas et al., 2017)	135,44	34,06	28,47	23,64	31,92	17,36

SPoL: students' perceptions of learning; SPoT: students' perceptions of teachers; SASP: students' academic self-perceptions; SPoA: students' perceptions of atmosphere; SSSP: students' social self-perceptions.

Table 7. Comparison of Mental Health Status Using GHQ-12 at the Faculty of Medicine of Marrakech and Other Studies

Country [reference]	Year	% of psychological distress	Method used
Australia (Willcock et al., 2004)	2004	70%	GHQ-28
England (Firth, 1986)	1986	68%	GHQ-12
Morocco[Our study]	**2018**	**66,76%**	**GHQ-12**
Malaysia (Yusoff, 2011)	2011	58,59%	GHQ-12
Iran (Farahangiz et al., 2016)	2016	54,4%	GHQ-28
Pakistan (Imran et al., 2016)	2016	52,3%	GHQ-12
Fes, Morocco (Chaouche, 2014)	2014	50,6%	GHQ-12
Scotland (Carson et al., 2000)	2000	46%	GHQ-60
Japan (Ohtsu et al., 2014)	2014	42,7%	GHQ-12
Nigeria (Oku et al., 2015)	2015	39,2%	GHQ-12
Australia (Dendle et al., 2018)	2018	33,1%	GHQ-28

5. Conclusion

This study extends the evidence of the important relationship between the educational environment and the students' psychological health, and thus the faculty, the medical educators and the students should work hard together to create an optimal environment.

References

Aghamolaei, T., Fazel, I., (2010). Medical students' perceptions of the educational environment at an Iranian Medical Sciences University. *BMC Medical Education*, *10*, 87. https://doi.org/10.1186/1472-6920-10-87

Aguilar-Barojas, S., Jiménez-Sastré, A., & Castillo-Orueta, M. L. (2017). *Validación de la traducción al idioma español del Dundee Ready Education Environment Measure*. Investigación en Educación Médica. https://doi.org/10.1016/j.riem.2017.03.001

Ahmed, I., Banu, H., Al-Fageer, R., & Al-Suwaidi, R. (2009). Cognitive emotions: Depression and anxiety in medical students and staff. *J Crit Care*, *24*, e1-7. https://doi.org/10.1016/j.jcrc.2009.06.003

Al Ayed, I. H., & Sheik, S. A. (2008). *Assessment of the educational environment at the College of Medicine of King Saud University, Riyadh*.

Al Sheikh, M. H. (2014). Educational environment measurement, how is it affected by educational strategy in a Saudi medical school? A multivariate analysis. *Journal of Taibah University Medical Sciences*, *9*, 115-122. https://doi.org/10.1016/j.jtumed.2013.11.005

ALCI, B. (2009). Perceptions of Students of Yeditepe University Faculty of Medicine About Educational Environment. *The New Journal of Medicine*, *26*, 205-209.

Al-Hazimi, A., Zaini, R., Al-Hyiani, A., Hassan, N., Gunaid, A., Ponnamperuma, G., … Davis, M. (2004). Educational environment in traditional and innovative medical schools: A study in four undergraduate medical schools. *Educ Health (Abingdon)*, *17*, 192-203. https://doi.org/10.1080/13576280410001711003

Al-Qahtani, M. F. (2015). Associations between approaches to study, the learning environment, and academic achievement. *Journal of Taibah University Medical Sciences, Special issue: Innovations in Medical Education*, *10*, 56-65. https://doi.org/10.1016/j.jtumed.2015.01.014

Andalib, M. M., Malekzadeh, M. M., Agharahimi, Z., Daryabeigi, M., Yaghmaei, B., Ashrafi, M.-R., … Rezaei, N., (2015). Evaluation of Educational Environment for Medical Students of a Tertiary Pediatric Hospital in Tehran, Using DREEM Questionnaire. *Iran J Pediatr*, *25*, e2362. https://doi.org/10.5812/ijp.2362

Backović, D. V., Maksimović, M., Davidović, D., Zivojinović, J. I., & Stevanović, D. (2013). [Stress and mental health among medical students]. *Srp Arh Celok Lek*, *141*, 780-784. https://doi.org/10.2298/SARH1312780B

Belayachi, J., Razine, R., Boufars, A., Saadi, A., Madani, N., Chaouir, S., & Abouqal, R. (2015). Moroccan medical students' perceptions of their educational environment. *J Educ Eval Health Prof*, *12*. https://doi.org/10.3352/jeehp.2015.12.47

Bennett, D., Kelly, M., & O'Flynn, S. (2010). Are the bigger hospitals better: DREEM on? *Ir J Med Sci*, *179*, 515-519. https://doi.org/10.1007/s11845-010-0551-x

Bíró, E., Adány, R., & Kósa, K. (2011). Mental health and behaviour of students of public health and their correlation with social support: A cross-sectional study. *BMC Public Health*, *11*, 871. https://doi.org/10.1186/1471-2458-11-871

Bostanci, M., Ozdel, O., Oguzhanoglu, N. K., Ozdel, L., Ergin, A., Ergin, N., … Karadag, F. (2005). Depressive symptomatology among university students in Denizli, Turkey: prevalence and sociodemographic correlates. *Croat. Med. J.*, *46*, 96-100.

Carson, A. J., Dias, S., Johnston, A., McLoughlin, M. A., O'Connor, M., Robinson, B. L., … Wojcik, W. (2000). Mental health in medical students. A case control study using the 60 item General Health Questionnaire. *Scott Med J*, *45*, 115-116. https://doi.org/10.1177/003693300004500406

Chan, C. Y. W., Sum, M. Y., Tan, G. M. Y., Tor, P.-C., & Sim, K. (2018). Adoption and correlates of the Dundee Ready Educational Environment Measure (DREEM) in the evaluation of undergraduate learning environments—A systematic review. *Med Teach*, 1-8. https://doi.org/10.1080/0142159X.2018.1426842

Chaouche, M. (2014). *La santé mentale et l'environnement éducatif des étudiants en médecine de Fès (Enquête par questionnaire)*. Faculté de médecine et de pharmacie de Fès, Fès, Maroc.

Dendle, C., Baulch, J., Pellicano, R., Hay, M., Lichtwark, I., Ayoub, S., … Horne, K. (2018). Medical student psychological distress and academic performance. *Med Teach*, 1-7. https://doi.org/10.1080/0142159X.2018.1427222

Dimoliatis, I. D. K., Vasilaki, E., Anastassopoulos, P., Ioannidis, J. P. A., & Roff, S. (2010). Validation of the Greek translation of the Dundee Ready Education Environment Measure (DREEM). *Educ Health (Abingdon)*, *23*, 348.

Dyrbye, L. N., Thomas, M. R., Massie, F. S., Power, D. V., Eacker, A., Harper, W., … Shanafelt, T. D. (2008). Burnout and suicidal ideation among U.S. medical students. *Ann. Intern. Med.*, *149*, 334-341. https://doi.org/10.7326/0003-4819-149-5-200809020-00008

Dyrbye, L. N., Thomas, M. R., & Shanafelt, T. D. (2006). Systematic review of depression, anxiety, and other indicators of psychological distress among U.S. and Canadian medical students. *Acad Med*, *81*, 354-373. https://doi.org/10.1097/00001888-200604000-00009

Dyrbye, L. N., Thomas, M. R., & Shanafelt, T. D. (2005). Medical student distress: causes, consequences, and proposed solutions. Mayo Clin. Proc., *80*, 1613-1622. https://doi.org/10.4065/80.12.1613

Farahangiz, S., Mohebpour, F., & Salehi, A. (2016). Assessment of Mental Health among Iranian Medical Students: A Cross-Sectional Study. *Int J Health Sci (Qassim)*, *10*, 49-55. https://doi.org/10.12816/0031216

Firth, J. (1986). Levels and sources of stress in medical students. *Br Med J (Clin Res Ed)*, *292*, 1177-1180. https://doi.org/10.1136/bmj.292.6529.1177

Flores-Flores, O., Lajo-Aurazo, Y., Zevallos-Morales, A., Rondán, P. L., Lizaraso-Soto, F., & Jorquiera, T. (2017). Psychometric analysis of a questionnaire to measure the educational environment in a sample of medical students in Peru. *Rev Peru Med Exp Salud Publica*, *34*, 255-260. https://doi.org/10.17843/rpmesp.2017.342.2642

Givens, J. L., & Tjia, J. (2002). Depressed medical students' use of mental health services and barriers to use. *Acad Med*, *77*, 918-921. https://doi.org/10.1097/00001888-200209000-00024

Goldberg, D. (1972). The General Health Questionnaire (GHQ). In *Companion to Psychiatric Studies* (pp. 172-173). London.

Goldberg, D. P., & Williams, P., & University of London, Institute of Psychiatry. (1991). *A user's guide to the General Health Questionnaire*. NFER-NELSON.

Grant, B. F., Stinson, F. S., Dawson, D. A., Chou, S. P., Dufour, M. C., Compton, W., … Kaplan, K. (2004). Prevalence and co-occurrence of substance use disorders and independent mood and anxiety disorders: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Arch. Gen. Psychiatry*, *61*, 807-816. https://doi.org/10.1001/archpsyc.61.8.807

Guthrie, E. A., Black, D., Shaw, C. M., Hamilton, J., Creed, F. H., & Tomenson, B. (1995). Embarking upon a medical career: Psychological morbidity in first year medical students. *Med Educ*, *29*, 337-341. https://doi.org/10.1111/j.1365-2923.1995.tb00022.x

Herrera, C., Oslando Padilla, P. (2015). Análisis psicométrico del cuestionario DREEM para medir el ambiente de aprendizaje en Chile. *Rev Educ Cienc Salud*, *12*(2), 134-141.

Hongkan, W., Arora, R., Muenpa, R., & Chamnan, P. (2018). Perception of educational environment among medical students in Thailand. *Int J Med Educ*, *9*, 18-23. https://doi.org/10.5116/ijme.5a4a.1eda

Imran, N., Tariq, K. F., Pervez, M. I., Jawaid, M., & Haider, I. I. (2016). Medical Students' Stress, Psychological Morbidity, and Coping Strategies: A Cross-Sectional Study from Pakistan. *Acad Psychiatry*, *40*, 92-96. https://doi.org/10.1007/s40596-015-0413-y

Khan, M. S., Mahmood, S., Badshah, A., Ali, S. U., & Jamal, Y. (2006). Prevalence of depression, anxiety and their associated factors among medical students in Karachi, Pakistan. *J Pak Med Assoc*, *56*, 583-586.

Kim, H., Jeong, H., Jeon, P., Kim, S., Park, Y.-B., Kang, Y. (2016). Perception Study of Traditional Korean Medical Students on the Medical Education Using the Dundee Ready Educational Environment Measure. *Evidence-Based Complementary and Alternative Medicine*, *2016*, 1-7. https://doi.org/10.1155/2016/6042967

Mancevska, S., Bozinovska, L., Tecce, J., Pluncevik-Gligoroska, J., & Sivevska-Smilevska, E. (2008). Depression, anxiety and substance use in medical students in the Republic of Macedonia. *Bratisl Lek Listy*, *109*, 568-572.

Mayya, S., & Roff, S. (2004). Students' perceptions of educational environment: A comparison of academic achievers and under-achievers at kasturba medical college, India. *Educ Health (Abingdon)*, *17*, 280-291. https://doi.org/10.1080/13576280400002445

Mehanna, Z., & Richa, S. (2006). Prévalence des troubles anxio-dépressifs chez les étudiants en médecine : Étude transversale chez les étudiants en médecine de l'Université Saint-Joseph de Beyrouth. *l'Encéphale*, *32*, 82. https://doi.org/10.1016/S0013-7006(06)76276-5

Ohtsu, T., Kaneita, Y., Osaki, Y., Kokaze, A., Ochiai, H., Shirasawa, T., ... Ohida, T. (2014). Mental health status among Japanese medical students: A cross-sectional survey of 20 universities. *Acta Med. Okayama*, *68*, 331-337.

Oku, A., Oku, O., Owoaje, E., & Monjok, E. (2015). An Assessment of Mental Health Status of Undergraduate Medical Trainees in the University of Calabar, Nigeria: A Cross-Sectional Study. *Open Access Maced J Med Sci*, *3*, 356-362. https://doi.org/10.3889/oamjms.2015.068

Pickard, M., Bates, L., Dorian, M., Greig, H., & Saint, D. (2000). Alcohol and drug use in second-year medical students at the University of Leeds. *Med Educ*, *34*, 148-150. https://doi.org/10.1046/j.1365-2923.2000.00491.x

R.M. Harden, J. C. (2000). AMEE Guide No 20: The good teacher is more than a lecturer-the twelve roles of the teacher. *Medical Teacher*, *22*, 334-347. https://doi.org/10.1080/014215900409429

Roff, S., & McAleer, S. (2001). What is educational climate? *Med Teach*, *23*, 333-334. https://doi.org/10.1080/01421590120063312

Roff, S., McAleer, S., Harden, R. M., Al-Qahtani, M., Ahmed, A. U., Deza, H., … Primparyon, P. (1997). Development and validation of the Dundee Ready Education Environment Measure (DREEM). *Medical Teacher*, *19*, 295-299. https://doi.org/10.3109/01421599709034208

Roff, S., McAleer, S., Ifere, O. S., & Bhattacharya, S. (2001). A global diagnostic tool for measuring educational environment: Comparing Nigeria and Nepal. *Medical Teacher*, *23*, 378-382. https://doi.org/10.1080/01421590120043080

Rotthoff, T., Ostapczuk, M. S., De Bruin, J., Decking, U., Schneider, M., & Ritz-Timme, S. (2011). Assessing the learning environment of a faculty: Psychometric validation of the German version of the Dundee Ready Education Environment Measure with students and teachers. *Med Teach*, *33*, e624-636. https://doi.org/10.3109/0142159X.2011.610841

Samaranayake, C. B., & Fernando, A. T. (2011). Satisfaction with life and depression among medical students in Auckland, New Zealand. *N. Z. Med. J.*, *124*, 12-17.

Shehnaz, S. I., & Sreedharan, J. (2011). Students' perceptions of educational environment in a medical school experiencing curricular transition in United Arab Emirates. *Med Teach*, *33*, e37-42. https://doi.org/10.3109/0142159X.2011.530312

Sherina, M. S., Rampal, L., & Kaneson, N. (2004). Psychological stress among undergraduate medical students. *Med. J. Malaysia*, *59*, 207-211.

Smith, C. K., Peterson, D. F., Degenhardt, B. F., & Johnson, J. C. (2007). Depression, anxiety, and perceived hassles among entering medical students. *Psychol Health Med*, *12*, 31-39. https://doi.org/10.1080/13548500500429387

Till, H. (2004). Identifying the perceived weaknesses of a new curriculum by means of the Dundee Ready Education Environment Measure (DREEM) Inventory. *Med Teach*, *26*, 39-45. https://doi.org/10.1080/01421590310001642948

Tontus, O. (2010). DREEM; Dreams of the Educational Environment As Its Effect on Education Result of 11 Medical Faculties of Turkey. *Clin. Med*, *27*, 104-108. https://doi.org/10.5835/jecm.omu.27.03.002

Vaughan, B., Carter, A., Macfarlane, C., & Morrison, T. (2014). The DREEM, part 1: Measurement of the educational environment in an osteopathy teaching program. *BMC Medical Education*, *14*, 99. https://doi.org/10.1186/1472-6920-14-99

Veerapen, K., & McAleer, S. (2010). Students' perception of the learning environment in a distributed medical programme. *Med Educ Online*, *15*. https://doi.org/10.3402/meo.v15i0.5168

Viana-Nucci, G. K., Andrade, C. P., & Alexandra, M. (2017). Perception of the educational environment (ee) and common mental disorders (cmd) among medical students from a brazilian institution. *International Journal of Development Research*, *7*(9), 15104-15109.

WHO. (2017). *World Mental Health Day*. Retrieved from http://www.afro.who.int/health-topics/mental-health.

Willcock, S. M., Daly, M. G., Tennant, C. C., & Allard, B. J. (2004). Burnout and psychiatric morbidity in new medical graduates. *Med. J. Aust.*, *181*, 357-360. https://doi.org/10.5694/j.1326-5377.2004.tb06325.x

Wolf, T. M. (1994). Stress, coping and health: Enhancing well-being during medical school. *Med Educ*, *28*, 8-17, discussion 55-57. https://doi.org/10.1111/j.1365-2923.1994.tb02679.x

Xu, X., Wu, D., Zhao, X., Chen, J., Xia, J., Li, M., Nie, X., & Zhong, X. (2016). Relation of perceptions of educational environment with mindfulness among Chinese medical students: A longitudinal study. *Medical Education Online*, *21*, 30664. https://doi.org/10.3402/meo.v21.30664

Yiu, V. (2005). Supporting the well-being of medical students. *CMAJ*, *172*, 889-890. https://doi.org/10.1503/cmaj.050126

Yusoff, M. S. B. (2011). Impact of Summative Assessment on First Year Medical Students' Mental Health. *International Medical Journal (1994)*, *18*, 172-175.

Yusoff, M. S. B., Abdul Rahim, A. F., Baba, A. A., Ismail, S. B., Mat Pa, M. N., & Esa, A. R. (2013a). The impact of medical education on psychological health of students: A cohort study. *Psychol Health Med*, *18*, 420-430. https://doi.org/10.1080/13548506.2012.740162

Yusoff, M. S. B., Abdul Rahim, A. F., Baba, A. A., Ismail, S. B., Mat Pa, M. N., & Esa, A. R. (2013b). Prevalence and associated factors of stress, anxiety and depression among prospective medical students. *Asian J Psychiatr*, *6*, 128-133. https://doi.org/10.1016/j.ajp.2012.09.012

Yusoff, M. S. B., Abdul Rahim, A. F., & Yaacob, M. J. (2010). Prevalence and Sources of Stress among Universiti Sains Malaysia Medical Students. *Malays J Med Sci*, *17*, 30-37.

Yusoff, M. S. B., & Arifin, W. N. (2015). Educational environment and psychological distress of medical students: The role of a deep learning approach. *Journal of Taibah University Medical Sciences*, *10*, 411-418. https://doi.org/10.1016/j.jtumed.2015.08.005

Yusoff, M. S. B., Mat Pa, M. N., Esa, A. R., & Abdul Rahim, A. F. (2013c). Mental health of medical students before and during medical education: A prospective study. *Journal of Taibah University Medical Sciences*, *8*, 86-92. https://doi.org/10.1016/j.jtumed.2013.03.004