

Medical Environment Assessment In Morocco From The Students' Perspective: A National Survey.

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ABSTRACT

Introduction: The educational medical environment designs all the factors that accompany and surround the learning process including actors, locations, interactions and the general atmosphere. It represents one of the key elements of learning and reflects the quality of implementation of the educational process. Its regular evaluation is part of the recommendations of the international academic authorities for any training institution willing to improve its services and the performance of its students. The aim of the present study was to assess the medical educational environment in Moroccan public medical schools from the students' perspective. **Methods:** We conducted a large survey to assess students' perception of their educational environment using the DREEM scale, which is made of 50 items divided into 5 categories. An online questionnaire collecting demographics, academic and psychological data, in addition to the DREEM scale, to Moroccan medical students in social networks, targeting the seven faculties of the public sector. **Results:** 2515 responses were collected from students in different levels of medical studies. The average total DREEM score was 90.5 +/- 23.6 and was significantly higher among male students ($p < 0.001$), students enrolled in lower levels of studies ($p < 0.001$), High performing students and ($p < 0.001$) and students without mental distress ($p < 0.001$). Also, there was a statistically significant raise of the total DREEM score within participants exposed to the new reform, in each of the five older medical faculties. **Conclusion:** Our results highlight the existence of many problems in the medical education system in Morocco, as reflected in the students' perception, concerning the different medical faculties with very slight variations. Hence it is both important and urgent to address these problems, particularly in the context of this new reform being implemented.

Keywords: DREEM; medical environment; medical education, medical school, Morocco

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INTRODUCTION

Medical education has witnessed a great development in recent decades. One of the major elements that have been given momentum in the educational process is the learning environment [1]. A learning environment can be defined as 'everything that is taking place in the

classroom, department, faculty or university [2]. It has received great attention and has been considered by the World Federation for Medical Education as one of the targets in the evaluation of medical education programs [3]. Moreover, a positive environment goes side by side with positive learning outcomes; it is consequently, essential for effective learning [4]. On

the other hand, students' perception of their learning environment could indirectly impact the quality of care they would provide as future practitioners [5]. In a previous study, students reported that their hostile learning environment contributed to negatively alter their conception of doctors-patients relationship and decrease their empathy levels [6].

If the environment seems to be crucial in every educational setting, it has specific requirements in the medical education field. Indeed, medical doctors are not expected to deal with mere machines or electronic devices, but they are trained to interact with suffering human beings. Therefore, their educational environment should meet a double orientation goal. On the one hand, it should be task-oriented aiming at enabling the acquisition of scientific and clinical skills, and on the other hand, it should be social-emotional orientated, aiming at fostering the development of soft skills to better deal with patients [7]. Additionally, students' perception of their educational environment seems to be as important to achieve good learning outcomes, as the quality of the environment itself [3]. This has become more obvious in the light of the current trends in medical education approaches that are mainly student centred, considering learners as the pivot of the learning process [8].

The Moroccan Kingdom counts seven public medical schools providing undergraduate medical training for around 14,000 students [9]. Since 2015, medical education in Morocco has been going through a new reform in order to improve both the curriculum and the teaching/learning methods. Prior to the reform, only one Moroccan study regarding assessment of the educational environment from the students' perspective was published [10]. It concerned one institution [the public medical school of Rabat] and included 189 students, who were asked to complete the "Dundee Ready Education Environment Measure" (D.R.E.E.M) questionnaire [11]. According to this study, students had a poor perception of their educational environment, with a mean total score of the DREEM questionnaire of 90.80/200 [10]. Three years after the implementation of the reform, and given the co-existence of the old and new systems in the same institutions, a mid-way assessment of all reform aspects, including the educational environment was required, in order to reinforce the positive aspects and take into account the potential negative features in any future adaptive strategies.

The aim of the present study was to assess the medical educational environment in Moroccan public medical schools from the students' perspective, and to

determine the associated factors influencing students' perception of their educational environment. It was conducted as a mid-way evaluation of the new reform of medical studies.

METHODS

Participants and setting

This cross-sectional online-based national survey targeted undergraduate medical students from 1st to 7th year in each of the seven Moroccan public medical schools. Data collection took place over 30 days (July 2018). The snowball sampling strategy was used to reach the maximum possible number of medical students in Morocco. The anonymous online questionnaire was first spread in medical students controlled social media groups, then participants were asked to pass it on to their colleagues from the same institution using all possible communication means (emails and social media platforms).

Main measures

The data for the current research was collected via an online questionnaire composed of two parts. The first part comprised questions about the demographic characters of the students, their medical schools, their academic performance (high performers; never or rarely retaking subjects in exams/ low performers; usually retaking subjects in exams), and their perceived psychological state. The second part consisted of the "the Dundee Ready Education Environment Measure" (D.R.E.E.M.), developed by [11] and reported to be one of the best and internationally validated tools to assess the learning environment in medical studies settings [5, 12]. The DREEM questionnaire is made of 50 items divided into 5 different categories; Students' perception of learning (12 items)/ Students' perception of teachers (11 items)/ Academic self-perceptions (8 items)/ Perceptions of atmosphere (12 items) and Social self-perceptions (7items). Each item is scored on a 5-point Likert scale, where 0: strongly disagree, 1: disagree, 2: unsure, 3: agree, 4: strongly agree. Thus, it makes a possible total score of 200. It is worth mentioning that the scoring is reversed for the nine negative items [11-12-19-20-21-23-42-43-46].

The interpretation of the total score is based on the guide of McAleer and Roff as follows; a score of 50 or less refers to "a poor system", a score of 51–100 indicates "a system with plenty of problems", a score

of 101 to 150 indicates “a system with more positive than negative aspects”, and above 150 refers to “an excellent system”.

The subscales’ scores are calculated through dividing the sum of items’ scores by the number of items in each category. Consequently, the average score of each of the five DREEM subscales ranges between 0 and 4. The subscales scoring is interpreted as follows: a mean score ≥ 3.5 implies that the category represents a strength point for the institution, a mean score ≤ 2 implies that the category represents a weakness point for the institution, and a score between 2 and 3.5 implies that the concerned category needs improvement.

Statistical analysis

The statistical analysis was conducted using SPSS 21.0 version. Descriptive analyses (numbers, means and percentages) were performed to precise the distribution of our data. The comparison of the scores was done using ANOVA test. A two-tailed $p < 0.05$ was considered statistically significant.

Ethics

The present survey was conducted in accordance of the Declaration of Helsinki Provisions regarding research on Humans. Data was gathered anonymously, using an online questionnaire that stated the purpose of the study and asked participants permission to use their survey’s answers for academic and research purposes. All Participants gave their informed consent.

RESULTS

Participants’ general characteristics

2418 medical students from seven medical schools took part of the survey. As shown in table 1, 64.8% of the participants were women, 53.8% were enrolled in the first three years of medical studies and exposed to the new reform, while 46.2% were enrolled in 4th to 7th year of medical studies, and not exposed to the medical education reform. The participants belonged to seven different public medical schools, Rabat (22.5%), Oujda (19.0%), Marrakech (17.7%), Casablanca (16.5%), Fez (15.8%), Tangier (4.3%) and Agadir (4.2%). Most participants (80.6%) were identified to be high performers, and 41.4% of them reported suffering from poor mental health (anxiety/depression symptoms).

Table 1. General characteristics of the survey participants

	Number	(%)
Sex		
Men	850	35.2
Women	1568	64.8
Study levels		
New Reform		
1 st year	421	17.4
2 nd year	487	20.1
3 rd year	393	16.3
Old System		
4 th year	328	13.6
5 th year	318	13.2
6 th year	230	9.5
7 th year	241	10.0
Medical school		
Rabat	545	22.5
Casablanca	399	16.5
Fez	383	15.8
Marrakech	427	17.7
Oujda	459	19.0
Tangier	104	4.3
Agadir	101	4.2
Academic efficiency		
High performers	1950	80.6
Low performers	19.4	19.4
Perceived mental health		
Good mental health	1417	58.6
Anxiety/depressive symptoms	1001	41.4

Analysis of DREEM questionnaire

The total DREEM score ranged from 12 to 186 for a maximum possible score of 200, with a means of 90.7 +/- 23.6, which is interpreted as a poor educational environment from the students' perception, according to the McAleer and Roff guide. The DREEM sub-scores were also below or near average with a means of 1.4 +/- 0.6 for the "Students' perception of teaching", 2.1 +/- 0.7 for the "Students' academic self-perception" and 1.9 +/- 0.6 for the three remaining subscales; "Students' perception of teachers",

"Students' perception of atmosphere" and "Students' self-social perception". For the detailed view of the mean score for each of the 50 DREEM items, see Figure 1. Four items' means scores were ≤1; "the teaching was students centred"; "the teaching is sufficiently concerned to develop my self-confidence"; "the teaching overemphasizes the actual learning", and "There is a good support system for students who get stressed" (respective mean scores were, 1, 0.97, 0.92 and 0.82 respectively). Only one item had a mean score ≥3; "I have good friends at school"

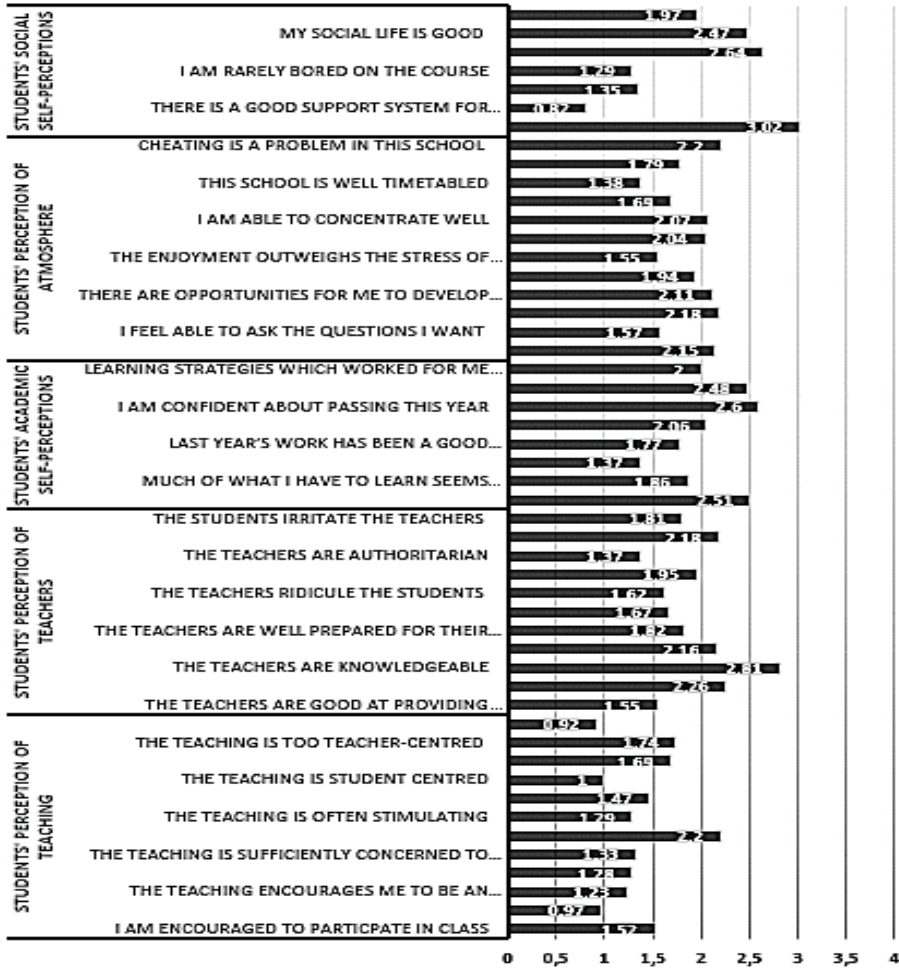


Figure 1. Mean score for each of the 50 items of the DREEM questionnaire

Factors associated to the DREEM total score

ANOVA analysis revealed that the mean DREEM score was significant lower in women (p: 0.001), lower performers (p<0.001) and students with poor mental health perception (p< 0.001). The DREEM mean score

was also found to decrease progressively with studies level ranging from 105.5 +/-22.6 in first year students to 79.9 +/- 20.9 in sixth year students (p < 0.001) (Cf. Table 2).

Table 2. Factors associated to the DREEM total score

	Total DREEM score	
	Means (SD)	P
Sex		0.001
Women	89.6 (23.9)	
Men	92.8 (23.0)	
Studies level		0.000
1 st year	105.5 (22.6)	
2 nd year	94.1 (23.6)	
3 rd year	90.8 (22.9)	
4 th year	85.7 (20.8)	
5 th year	84.5 (21.9)	
6 th year	79.9 (20.9)	
7 th year	82.9 (20.7)	
Academic performance		0.000
High performers	92.7 (23.3)	
Low performers	82.4 (23.4)	
Mental Health status		0.000
Good	97.4 (22.6)	
Poor	81.3 (21.8)	

DREEM scores changes regarding new reform exposer in each medical school

The mean DREEM score was different among the seven participating medical schools, ranging from 83.7

+/- 21.3 in the medical school of Casablanca to 106.2 +/- 23.4 in the medical school of Agadir (**Table 3**). In each medical school, the DREEM mean total score and sub-scores were compared between students exposed to the new reform and those who were thought within the old system. For the five oldest medical schools (Rabat, Casablanca, Fez, Marrakech and Oujda), there was a statistically significant raise of the total DREEM score within participants exposed to the new reform, with a p-value < 0.001 (**Table 3**). This significant improvement was also noted in each of the five medical schools, where the two systems co-existed, regarding “Students’ perception of the teaching”, “Students’ perception of the teachers” and “Students’ perception of Atmosphere”. On the other hand, students exposed to the new reform reported a significantly better “Students’ self-social perception” only in the medical schools of Marrakech and Oujda (p: 0.027 and 0.008 respectively). Also, “Students’ academic self-perception” yielded significantly higher scores in students exposed to the new reform within the medical schools of Fez, Marrakech and Oujda (p: 0.032, p<0.001 and p<0.001 respectively).

Table 3: DREEM total score and sub-scores within each of the 7 participating institutions, stratified by new & old reform exposure.

	Rabat means (SD)	Casablanca means (SD)	Fez means (SD)	Marrakech means (SD)	Oujda means (SD)	Tangier* means (SD)	Agadir* means (SD)
Total DREEM score	89.0 (21.4)	83.7 (21.3)	86.4 (23.1)	95.5 (26.2)	92.3 (23.2)	100.6 (21.8)	106.2 (23.4)
Old system	85.3 (19.4)	79.6 (19.1)	81.3 (22.5)	85.3 (23.6)	85.7 (22.3)	-	-
New reform	93.5 (22.9)	89.1 (22.9)	90.9 (22.9)	102.4 (25.6)	99.3 (22.1)	100.6 (21.8)	106.1 (23.4)
p-value	0.000	0.000	0.000	0.000	0.000	-	-
Perception of Teaching							
Old system	1.2 (0.5)	1.1 (0.4)	1.2 (0.5)	1.3 (0.5)	1.3 (0.5)	-	-
New reform	1.4 (0.6)	1.3 (0.6)	1.4 (0.5)	1.7 (0.6)	1.6 (0.6)	1.6 (0.6)	1.8 (0.6)
p-value	0.000	0.000	0.001	0.000	0.000	-	-
Perception of Teachers							
Old system	1.8 (0.5)	1.6 (0.6)	1.7 (0.6)	1.8 (0.6)	1.7 (0.6)	-	-
New reform	2.0 (0.5)	2.0 (0.5)	2.0 (0.5)	2.1 (0.6)	2.0 (0.5)	2.4 (0.6)	2.2 (0.5)
p-value	0.000	0.000	0.000	0.000	0.000	-	-
Academic self-perception							
Old system	2.0 (0.6)	2.0 (0.6)	1.9 (0.6)	2.0 (0.7)	2.0 (0.6)	-	-
New reform	2.1 (0.6)	2.0 (0.7)	2.3 (0.7)	2.2 (0.7)	2.3 (0.7)	2.1 (0.6)	2.3 (0.6)
p-value	0.075	0.832	0.032	0.000	0.000	-	-
Perception of Atmosphere							
Old system	1.8 (0.5)	1.6 (0.5)	1.6 (0.6)	1.7 (0.6)	1.8 (0.6)	-	-
New reform	2.0 (0.6)	1.8 (0.6)	1.9 (0.6)	2.8 (0.6)	2.0 (0.5)	2.0 (0.5)	2.1 (0.5)
p-value	0.000	0.000	0.000	0.000	0.000	-	-
Self-social perception							
Old system	1.9 (0.6)	1.8 (0.5)	1.9 (0.6)	1.9 (0.6)	1.9 (0.6)	-	-
New reform	1.9 (0.6)	1.8 (0.6)	1.9 (0.7)	2.0 (0.7)	2.0 (0.6)	2.0 (0.6)	2.2 (0.7)
p-value	0.189	0.958	0.831	0.027	0.008	-	-

*Recently launched medical schools with only three levels of students at the time of the survey, all of them being exposed to the new reformed system.

DISCUSSION:

The present survey yielded two main results; the educational environment was assessed as poor from the students' perspective in all investigated Moroccan public medical schools but one, and this educational environment was perceived as poorer by older students (4th year and higher) who weren't exposed to the new curricular reform.

The mean DREEM score was 90.7/200 ranging from 83.7/200 (Casablanca) to 106.2/200 (Agadir), pointing out that the educational environment in Moroccan medical schools was facing plenty of problems needing to be urgently addressed. This national DREEM score was one of the lowest when compared to previous studies including medical schools from Europe [2,7,13-16], Asia [8, 17-22] and Africa [23-26]. This could be explained by the reality of medical education settings that are broadly similar in all Moroccan public medical schools, following the same national pedagogical standards [9]. In Morocco, medical education is still largely based on a traditional curriculum, more focused on passive and factual learning than competence-based and active learning, which could be one of the possible explanations for the low DREEM scores. Indeed, according to the adult learning theories, learning is more effective and attractive when the learners are actually involved in the learning experience, which implies problem centred focus with opportunities to making mistakes and learning from them [27]. Moreover, the perception of teachers as authoritarian, with less tolerance towards the students' limitations, as reflected by the low scores in the following items ("the teachers are authoritarian", "the teachers ridicule the students", and "the teachers are good at providing feedback" see Fig. 1), could also be a source of additional stress leading to lower DREEM scores, as it was also suggested by previous studies [2, 20].

When comparing the DREEM scores of different medical schools, we found out that the results of the new-established medical schools (Tangier & Agadir) were more positive than those of the older ones (Rabat & Casablanca). This more positive perspective was expressed in newly established institutions despite the lack of equipment and human resources, highlighting that physical factors are not the major effective in the environment perception. Indeed, the young medical teachers in new schools even if less experienced, are generally more enthusiastic, dedicated and ambitious to teach and support students. Another possible explanation is that the students of the new medical

schools are still in the first stage of study (preclinical) and they have not started the practical real life in hospitals yet, so they do not have a sufficient image about the whole system, which would worsen the quality of their overall perception.

It could be argued that the overall lower DREEM scores in Moroccan medical schools might be linked to the influence of learners' factors. Our results showed that the overall DREEM score was significantly higher in high performing students, and lower in students suffering from poor mental health, which is consistent with previous findings where DREEM scores were positively correlated with students' past or current academic achievement [26, 28-29], and negatively correlated with students' psychological stress [30].

If the underperforming students represented less than 20% of our participating population, students suffering from mental distress were largely represented (41.4%) and could explain, at least partially, the low DREEM scores. It is interesting to point out that academic underperformance and psychological distress could also be a consequence of poor learning environments [31-33]. Hence, we couldn't expect any significant improvement of students' perception of their learning environment, as measured by the DREEM questionnaire, without the implementation of efficient support systems for vulnerable students. And these specific highly expected measures were unfortunately lacking in the Moroccan medical education recent reform.

There was a statistically significant increase of the total DREEM score within participants exposed to the new reform, in each of the five oldest medical schools where old and new educational systems co-existed. This could be interpreted as evidence regarding the positive aspects brought up by the new reform. However, it is worth noticing that some bias could be the cause of such apparent improvement in students' perception. Indeed, the students exposed to the new reform were the youngest (first to third year), and might have not yet acquired a good enough critical sense, as their expectations might not be as high as those of older students, enrolled in higher levels of studies and exposed to more complex learning situations.

Evaluating the medical educational environment has recently gained momentum in the entire world. This process considers the learners as the pivot of the learning process and therefore, their perceptions are given special attention. In general, the present study pinpoints the drawbacks and weaknesses in the

Moroccan medical educational system, that are still not clearly improved despite the ongoing educational reform. This requires immediate intervention from all of the stakeholders and policy makers in the field of medical education in Morocco.

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