

EVALUATION OF THE TRAINING ENVIRONMENT AMONG RESIDENTS IN MOROCCO: A MULTICENTRIC STUDY

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Abstract

Background: The learning environment is one of the most influential factors in training of medical residents. The Postgraduate Hospital Educational Environment (PHEEM) is one of the strongest instruments for measuring the learning environment. The objective of this study is to evaluate the educational environment of resident doctors in Morocco using the PHEEM instrument and identify risk factors for poor educational environment. **Materials and methods:** This study was cross-sectional conducted over a 2-month period from July 12, 2018, to September 22, 2018, in Morocco. Residents from five Moroccan public university hospitals were invited to complete the French validated version of the PHEEM. Descriptive statistics for the PHEEM were analyzed. In addition, a multivariate logistic regression was used to identify risk factors for poor educational environment. **Results:** A total of 211 residents responded. The average PHEEM score was 78.68/160, suggesting that there are several problems in our training programs. The subscale scores were 27/56 for the perception of autonomy, 31/60 for the perception of teaching and 19/44 for the perception of social support. Multivariate analysis showed that the surgical specialties and location of training in older university hospitals were independent risk factors for poor training environments. **Conclusion:** Moroccan residents identified various challenges in their learning environments, specifically in the autonomy and social support domains. Surgical training and older universities hospitals were associated with poor educational environment. Addressing these issues can enhance the quality of postgraduate medical training and benefit both residents and patients.

Keywords: Educational environment, Postgraduate medical education, Residency, Morocco

Introduction

In the field of medical education, the educational environment plays a crucial role in shaping the learning experiences of healthcare professionals. It encompasses the physical, psychological, and social factors that influence teaching and learning processes within hospitals and other healthcare institutions [1]. A positive educational environment promotes effective learning, enhances professional development, and

fosters the acquisition of the necessary skills and competencies. Conversely, a negative environment can hinder learning, create psychological distress, and lead to suboptimal educational outcomes [1-2].

In a literature review, Soemantri et al. recognized a range of tools specifically designed for medical education assessment. Notably, they emphasized a restricted selection, identifying only seven instruments exclusively crafted for residency training [3]. Several established measurement tools, such as ATEEM (Anesthetic Trainee Theatre

[5], and PHEEM (Postgraduate Hospital Educational Environment Measure) [6], are available to assess the educational environment. These tools gauge the perception of anesthesia residents, medical students, and postgraduate trainees, respectively, regarding various aspects such as the atmosphere, organization, and teaching quality of the educational climate. In order to evaluate the teaching and learning settings of medical residents in the United Kingdom, Roff et al. created the PHEEM [6]. There are forty questions total, broken down into three categories: perceptions of social support, autonomy, and education. Because of PHEEM's excellent reliability, adaptability to various postgraduate contexts, and content validity, it was deemed appropriate for use in assessing postgraduate medical education [7]. This questionnaire has gained popularity in assessing the learning environment for postgraduate trainees worldwide in various medical fields. With this tool, we seek to evaluate comprehensively the educational environment in Moroccan postgraduate hospital settings.

In Morocco, post-graduate medical education is undergoing a new reform in order to improve its quality and adaptability to the local needs. These reforming efforts aim to achieve the training of high-quality specialized doctors which will provide up-to-date care services to the Moroccan population. However, the educational environment, despite its crucial importance in the educational process, has not been assessed among the pre-reform evaluation studies. Through this research, we aimed to measure the educational environment in Moroccan public university hospitals and identify the factor associated with poor perceived educational environment. The findings of this study will serve as a foundation for targeted interventions to enhance the educational climate, promote effective learning, and ultimately improve the quality of postgraduate medical education in Morocco.

Methods

Context and participants

Between July and September 2018, a multicentric study was conducted using a cross-sectional research design to evaluate the educational environment of postgraduate medical training, in five public university hospitals in Morocco. The research did not require an ethics committee approval since it is not biomedical research, according to the Moroccan law 28/13. Explicit informed consent was secured from each participant. Anonymity and confidentiality were ensured throughout data acquisition and analysis. The research encompassed participants from five academic medical centers located in Rabat,

Casablanca, Oujda, Fez, and Marrakech.

Description of the questionnaire

We used the French validated version of the PHEEM. It is a validated questionnaire that assesses three aspects of education, including role autonomy perception, teaching perception, and social support perception. It consists of 40 questions, each rated on a 5-point Likert scale ranging from 0 (disagree completely) to 4 (agree strongly). While four questions (questions 7, 8, 11, 13) are negatively worded and scored in reverse, with a minimum score of 0 for each sub-scale, the maximum scores are 56, 60, and 44 for the perception of role autonomy, perception of teaching, and perception of social support respectively. The highest possible score is 160.

We also collected demographic and professional characteristics of the participants (age, sex, city, year of residency, specialty, and type of residency contract) through an additional questionnaire in French.

Questionnaire distribution

A digital survey instrument was developed via the Google Form platform and distributed to Moroccan residents from July 1 to September 30, 2018. Due to the lack of readily available email databases specific to residents within medical schools, a uniform and direct targeting approach to residents was unattainable. To overcome this difficulty, a residents' representative was assigned at each university hospital. These representatives were responsible for distributing the online anonymous survey questionnaire to the other residents in the same institution. All respondents provided their consent through the Google Form platform.

Statistical analysis

The collected data was examined with descriptive statistics. Each sub-scale (perception of role autonomy, perception of teaching, and perception of social support) was analyzed individually by calculating mean scores and standard deviations. The overall study rating was determined by summing up the average sub-scale scores. The result scores were interpreted as follows: 0-40 (a very low-quality educational atmosphere), 41-80 (suggestive of significant problems), 81-120 (positive overall but with opportunities for improvement), and 121-160 (an outstanding educational environment). Factors independently correlated with an unfavorable training environment were discerned through both univariate and multivariate analyses. The univariate analysis involved the application of chi-square or Fisher tests

for qualitative variables and the Student's t-test for quantitative variables. Variables exhibiting a p-value less than 0.05 in the univariate analysis were subsequently incorporated into the multivariate analysis, which employed binary logistic regression. Data coding was executed using Excel (Microsoft Office), and statistical analyses were conducted utilizing Jamovi Version 2.2. $P < 0.05$ values were accepted as statistically significant.

Results

Participants

Among 795 residents contacted, 211 responded to the questionnaire (26.5%). The mean age of the participants was (29.12 ± 4.2) years, with an age range from 23 to 40 years. The majority of participating residents were being trained in the university hospital of Rabat (44.5%) and Fes (40.2%). The first-year residents (25.6%), the third-year residents (25.4%), and fourth-year residents (24.4%) were the most represented in terms of training level. Regarding the residents' contract types, 49.8% were on a benevolent contract (limited contract for the training period). In terms of specialty type, there were more residents in medical specialties (57.9%) compared to surgical ones (42.1%). Details are represented in table 1.

Table 1: Characteristics of participating residents

Variables	Results
Age	29.12
Sex	
Male	97 (43.7%)
Female	114 (56.3%)
City	
Fes	85 (40.2%)
Rabat	94 (44.5%)
Marrakech	8 (3.8%)
Casablanca	13 (6.1%)
Oujda	11 (5.2%)
Residency year	
1 st year	54 (26.9%)
2 nd year	34 (14.2%)
3 rd year	52 (25.4%)
4 th year	50 (24.4%)
5 th year	21 (9.1%)
Contract type*	
Unlimited time contract	95 (42.6%)
Limited time contract	102 (49.8%)
Foreign residents	14 (7.6%)
Specialty type	
Medical	115 (57.9%)
Surgical	96 (42.1%)

* Unlimited time contract: with the ministry of health / Limited time contract: finished by the end of the residency training.

PHEEM score results

Out of the 211 responses, one form had 2 missing answers, and 6 forms had only one missing answer. The average PHEEM score was (78.68 ± 26.65) , indicating that Moroccan residents perceived several issues in their learning environments.

The mean scores for each question in the survey ranged from (0.72 ± 1) (the availability of support services for struggling residents) to (2.84 ± 1.01) (the level of collaboration among residents). In terms of subscales, the survey respondents rated teaching perception the highest at 31.43/60, followed by autonomy perception at 27.82/56 and social support at 19.43/44. These findings are displayed in **Table 2**.

Table 2: PHEEM questions and subscales results

Questions	N	Min.	Max.	Mean +- SD
1- I have a contract providing work hours information	211	0	4	1.16 \pm 1.09
4- I had an informative induction program	211	0	4	1.3 \pm 1.24
5- I have the appropriate level of responsibility in this post	211	0	4	1.91 \pm 1.24
8- I have to perform inappropriate tasks	211	0	4	1.64 \pm 1.22
9- There is an informative Junior Doctors' Handbook	211	0	4	1.72 \pm 1.35
11- I am bleeped inappropriately	210	0	4	2.26 \pm 1.02

	14- There are clear clinical protocols in this post	211	0	4	1.97+/-1.21
	17- My hours conform to the directives	211	0	4	2.05+/-1.18
	18- I have the opportunity to provide continuity of care	210	0	4	2.5+/-0.98
	29- I feel part of a team working here	211	0	4	2.6+/-1.08
	30- I have the opportunity to acquire the appropriate practical procedures for my grade	210	0	4	2.32+/-1.13
	32- My workload in this job is fine	211	0	4	1.69+/-1.27
	34- Training makes me feel ready to become a specialist	211	0	4	2.23+/-1.23
	40- My clinical teachers promote mutual respect	211	0	4	2.51+/-1.18
	Total subscale score	211	0	56	27.82
	2- My clinical teachers set clear expectations	211	0	4	2.01+/-1.13
	3- I have protected educational time in this post	210	0	4	1.61+/-1.21
	6- I have good clinical supervision at all times	211	0	4	1.89+/-1.15
	10- My clinical teachers have good communication skills	211	0	4	2.25+/-1.14
	12- I am able to participate actively in educational events	211	0	4	2.17+/-1.19
	15- My clinical teachers are enthusiastic	211	0	4	2.17+/-1.13
	21- I have access to an educational program relevant to my needs	210	0	4	1.64+/-1.2
Perception of Teaching	22- I get regular feedback form seniors	211	0	4	1.84+/-1.17
	23- My clinical teachers are well organized	211	0	4	2.04+/-1.21
	27- I have enough learning opportunities for my needs	211	0	4	1.96+/-1.2
	28- My clinical teachers have good teaching skills	211	0	4	2.55+/-1.19
	31- My clinical teachers are accessible	211	0	4	2.59+/-1.11
	33- Senior staff utilize learning opportunities effectively	211	0	4	2.13+/-1.22
	37- My teachers encourage me being independent learner	211	0	4	2.73+/-1.12
	39- My clinical teachers provide me with good feedback on my strengths and weaknesses	211	0	4	1.87+/-1.17
	Total subscale score	211	0	60	31.43
		7- There is racism in this post	211	0	4
	13- There is sex discrimination in this post	211	0	4	2.78+/-1.23
	16- I have good collaboration with doctors in my grade	211	0	4	2.84+/-1.01
Perception of social support	19- I have a suitable access to careers advice	211	0	4	1.69+/-1.16
	20- The hospital has good accommodation when on call	211	0	4	1.13+/-1.17
	24- I feel physically safe within hospital environment	210	0	4	1.3+/-1.25
	25- There is a no-blame culture in this post	211	0	4	1.48+/-1.11
	26- There are adequate catering facilities when on call	211	0	4	0.77+/-1.01

35- My clinical teachers have good mentoring skills	209	0	4	2.08+/-1.17
36- I get a lot of enjoyment out of my present job	211	0	4	1.93+/-1.2
38- There is good counseling for failing doctors	211	0	4	0.72+/-1
Total Subscale score	211	0	44	19.43
Total score	211	0	160	78.68+/- 26.65

SD : Standard deviation; Minimum: Min. ; Maximum : Max.

Factors Associated with Poor Training Environment

We analyzed the factors associated with a poor training environment, defined as a PHEEM score equal to or less than 40. The rate of poor training environment was 9% (19/211). To ease data interpretation, the data underwent the following adjustments: residency year was divided into two categories: Junior (first to third year) and Senior (fourth and fifth year); training

location was divided into: Old (Rabat and Casablanca) and Young (Fes, Marrakech, and Oujda) university hospitals.

The independent risk factors associated with a poor training environment were surgical specialty (Odds ratio: 3.83; p = 0.015) and training locations in Rabat and Casablanca (Odds ratio: 6.02; p = 0.006). These results are shown in table 3.

Table 3: Univariate and multivariate analysis of factors associated with poor educational environment.

Variable	Univariate analysis		Multivariate analysis			
	n (%)	p value	OR	Lower CI	Higher CI	p value
Age*Mean +/- SD (years)	29,1 +/- 4,2	0.7				
Sex						
Female	9/114 (7.9%)	0.31				
Male	10/97 (10.3%)					
Year of training						
1 to 3	14/140 (10%)	0.480				
4 to 5	5/71 (7%)					
Training location			6.02	1.68	21.60	
Rabat – Casablanca	16/107 (14.6%)	0.006				0.006
Fes - Marrakech - Oujda	3/104 (2.9%)					
Contract type						
Unlimited time contract	8/95 (8.4%)	0.730				
Limited time contract	10/102 (9.8%)					
Foreign	1/14 (7.1%)					
Type of specialty			3.83	1.30	11.29	
Surgical	14/96 (14.6%)	0,014				0.015
Medical	5/115 (4.3%)					

* Student test

Discussion

In the present study, Moroccan residents reported a variety of concerns about their educational environment. Specifically, residents had a negative perception of their autonomy and perceived social support as unfavorable. However, they had a more positive perception of the teaching aspect and believed that it was heading in the right direction. Multivariate analysis made it possible to identify surgical specialties and training location in Rabat and Casablanca (the old universities) as independent risk factors for poor training environment. Twenty questions (in the domains of social support and education) obtained a notably low score. This result is quite alarming, for the administration of the five included university hospitals, the professors and educators working in these hospitals, the faculties of medicine and in particular the Ministry of Health and Higher Education.

The PHEEM questionnaire was widely used in literature to evaluate the educational environment of residents, in its original and translated versions [24-25-6]. The data showed that there were more female participants (54%), which is comparable to a previous study conducted in Pakistan by Bari et al., where women accounted for 60% of the participants. The increased representation of female medical students may explain this trend. Conversely, a study conducted in the Eastern region of Saudi Arabia found a higher proportion of male-to-female participants. [26]

The respondents' overall score was 78.68 out of 160, indicating an environment with many problems. Comparable scores were found in 3 studies: in Saudi Arabia (77.7) [27], in Pakistan (67.1) [28], and in Sudan (74) [29]. In contrast, several studies have found higher average scores ranging from 85 to 106 in Niger, Pakistan, Singapore, Argentina, and Japan [12, 17, 22, 26, 31]. We found that half the questions (mostly from the social support and teaching domains) received scores of 2 or less, and no item scored 3 or above. Interestingly, studies conducted in Saudi Arabia, Niger, and Pakistan also had similar findings, while studies in New Zealand and the United Kingdom had only 3 and 4 items with scores of 2 or less. These data suggest a tendency for better educational environment in higher income countries.

The subscale of perception of social support often received the lowest rating in numerous studies compared to the 2 other subscales. These studies have identified three main weaknesses, including the lack of proper counseling opportunities, inadequate residential arrangements for residents on duty, and the lack of proper dining facilities [32]. Catering facilities during on-call duties was the least-rated item in Niger and Saudi Arabia [12, 27], according to two studies. It

was the second least-rated item, following suitable counseling opportunities for junior doctors who are unable to complete their training, in this study. On the other hand, the most cited strengths in our study and in the literature were having effective collaboration with doctors at the same professional level, and the absence of gender discrimination [32].

The subscale perception of teaching has some areas that require improvement as well as areas of strength. It was reported that the lack of a specific study time, and the lack of feedback from clinical teach negatively impacted the perception of teaching [32], and this was the case in our study. However, notable strengths were also reported in the perception of teaching subscale, such as clinical teachers who provide good teaching, teachers with good communication skills, and the opportunity to actively participate in educational sessions [32]. Moroccan residents considered teachers encouraging independent learning and teachers' accessibility as the main strengths of their programs.

Concerning the perception of autonomy in roles, common weaknesses included the absence of a helpful handbook for junior residents, the lack of a balanced workload, and the lack of detailed employment agreements outlining working hours in many studies [33]. Within the subscale assessing Role Autonomy Perception, prevalent shortcomings, as identified, encompassed the absence of an informative manual for young doctors, a lack of balanced workload and the absence of an employment contract specifying working. Conversely, strengths in this domain were characterized by an adequate level of responsibility, and a sense of belonging to a team [33]. This last item was regarded more as a weakness in our study.

In the literature, factors associated with a poor training environment are gender [8-12], year of residency [13-16], specialty [17-20] and place of training [21-23]. We identified two factors as associated with poor educational environment: surgical training and location of training. Surgical training may have specific features related to the operating room, the short-term high stake of surgical procedures and the long learning curve required to master surgical techniques. However, most studies in the literature did not report differences between medical and surgical specialties. This specific point may require additional local investigations to be explained. As for training location, we hypothesized a difference between older universities (created before 1980) and recent ones (created after 1995). Older universities had significantly lower scores. Younger faculty members, who may have better understanding of younger generations, and a higher ability for change and adaptation may explain this difference.

This study had some limitations that need to be acknowledged. The limited number of participants and

their voluntary participation may have resulted in some selection bias, which may limit the generalizability of the results to other settings. The study only included public hospitals, which may restrict its applicability to private ones. While self-reported questionnaires were employed, this methodology may also introduce the possibility of response bias. Finally, the lack of a control group prevents the establishment of causality. The most interesting perspective is certainly the use of the instrument in the framework for quality improvement initiatives, we propose that the evaluation of educational climate should be included in the curriculum of medical schools in Morocco as a tool for evaluation and continuous improvement. The PHEEM can also be modified to adapt to the local context in accordance with our own requirements and guidelines, and it can subsequently be used to evaluate the educational environment in hospitals in Morocco on a regular basis. Finally, the PHEEM instrument can be used in climate effect research, learning about patient outcomes and health care system cost-effectiveness.

Conclusion

In summary, Moroccan residents identified various challenges in their learning environments, specifically in the autonomy and social support domains. Surgical training and older universities hospitals were associated with poor educational environment. The findings will contribute to a better understanding of the strengths and areas for improvement in the educational environment. Addressing these issues can enhance the quality of postgraduate medical training and benefit both residents and patients.

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