

Evaluating the Quality of the Educational Environment for Medical Interns in an Emergency Department Using the DREEM Inventory

Shervin Farahmand¹, Shahram Bagheri-Hariri¹, Samaneh Moghanloo²,
Hamed Basir Ghafouri³, Morteza Saeedi¹, Mohammad Afzalimoghadam¹, and Yun Gao⁴

¹ Department of Emergency Medicine, Faculty of Medicine, Tehran University of Medical Sciences, Tehran, Iran

² Department of Medicine, Faculty of Medicine, Tehran University of Medical Sciences, Tehran, Iran

³ Department of Emergency Medicine, Faculty of Medicine, Iran University of Medical Sciences, Tehran, Iran

⁴ M.P.H., Medical Student, McGill University, Montreal, Canada

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Abstract- Moving toward establishing more student center educational environment to meet the ever-changing learning expectations in a challenging climate like emergency department for under graduates is an intimidating task. In our newly founded academic emergency department, every step toward scoring as a dynamic and modern educational environment for both undergraduates and postgraduates would be a great success. The last 18 months of undergraduate medical education in Iran is considered as an internship. Interns have two months mandatory emergency department rotation during that period. This study has design to evaluate the medical students' conception about the educational environment using the Dundee Ready Education Environment Measure (DREEM) questionnaire. 156 undergraduate interns during their two months emergency medicine rotation from October 2009 to March 2010 enrolled into a cross sectional observational study to anonymously fill up the DREEM questionnaire on the last week of the course. The overall mean score of DREEM questionnaire was 134.79 out of 200 for the emergency department. The mean scores are 135.37 in female (n=87) group and 131.56 in male (n=69) group. There was not any significant difference between two genders ($P>0.05$). A score of 134.79 is compatible with the modern universities. Scores of 100 or less indicate serious problems and scores above 170 is compatible with ultimate student centered and modern educational environment. Such an achievement in the start of the new installed Emergency Medicine program is admirable, hence great effort must be put to pinpoint problems and fix them. DREEM questionnaire helped us moving toward a more student center environment in the emergency department.

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Introduction

When medical students enter a new educational environment (1), they have a unique perspective on the course atmosphere and its instructors. Although their perception will be influenced by their own academic, social, and learning abilities, in a controlled environment course organizers may establish or modify the curriculum and the environment to reach the identified goal and certain standards (2). Students' expectations and aspirations are often influenced by their previous experiences and the media, and are constantly changing. Consequently, their feedback must be monitored. By knowing this dynamic aspect of students' mind, an

evaluation instrument should be considered to meet objectives.

Since educational climate and students' perception have an inevitable effect on students' learning behavior and their final academic success (3), it is essential to evaluate and compare the educational environments of different medical school departments. Ultimately, in order to facilitate students' learning and to help them accomplish their educational goals, the results of educational environment evaluations must be put into practice (3).

Emergency medicine as a postgraduate training program was established nearly 10 years ago in Iran. The program was founded seven years ago at the Tehran

Corresponding Author: Sh. Bagheri-Hariri

Department of Emergency Medicine, Faculty of Medicine, Tehran University of Medical Sciences, Tehran, Iran
Tel: +98 21 66904848, Fax: +98 21 66904877, E-mail address: hariiri@sina.tums.ac.ir

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University of Medical Sciences (TUMS), Imam Khomeini hospital. Since then, the emergency department has provided a 3-year-residency program and a 2-month-internship rotation. Ultimately, to graduate medical school and practice as a general practitioner in Iran, interns must complete a rotational internship of 18 months in all major medical and surgery fields. In collaboration with this policy, every two months an average of 40 interns are allocated to the emergency department.

The internship curriculum was developed according to the SPICES (4) Strategy and was implemented in the emergency department three years ago.

The authors designed this study of the newly-founded teaching department in recognition of the importance of monitoring and evaluation of the educational environment. The purpose is to assess the interns' perceptions of their educational climate during their internship in the emergency department. We also show whether students' perception is affected by gender or previous experiences in other medical school departments.

To assess the interns' perceptions of their learning climate, the Dundee Ready Education Environment Measure (DREEM) questionnaire was used. The DREEM questionnaire is a validated questionnaire often used to assess undergraduate medical and nursing students (5). The findings of the current study will help the emergency department assess the weaknesses and strengths of its internship program and promote an environment conducive to learning.

Materials and Methods

This study is a cross sectional – observational survey, from October 2009 to March 2010, approved by the ethics committee of TUMS.

The DREEM questionnaire has been validated and standardized by the Delphi panel from 100 different countries in various parts of the world (6). It has 50 questions divided into five different categories. The questionnaire is based on a Likert Scale, and the total score of the questionnaire is 200 (6):

1. Students' perception of the atmosphere (12 questions and total score is 48)
2. Students' academic self-perception (8 questions and total score is 32)
3. Students' perception about teachers' performance (11 questions and total score is 44)
4. Students' perception about their social life

(seven questions and total score is 28)

5. Students' perception about learning (12 questions and total score is 48)

With the permission, the questionnaire was translated to Farsi and its validity and reliability were verified through a pilot study conducted by the Educational Development Office of the Tehran University of Medical Sciences, School of Medicine. The translated questionnaire was used in our survey.

By census method, all of the Imam-Khomeini emergency department's interns, present from October 2009 to March 2010, were enrolled in this study. All students who participated in the study did so freely and gave their informed consent in written form. To protect the students' privacy, all of the questionnaires were anonymous.

Interns completed their questionnaires in the last week of their 2-month-long emergency department internship. Using SPSS 11, means and standard deviations were calculated, and significant differences were compared among various groups by independent sample t-tests. A p-value < 0.05 was considered as statistically significant.

Results

156 out of 158 interns (98.7%) signed consent forms to participate in the study and completed the questionnaire.

69 interns (44.2%) were male, and 87 interns (55.8%) were female.

17 interns (10.9%) had passed 0-6 months, 34 interns (21.8%) had passed 6-12 months, and 105 interns (67.3%) had passed 12-18 months of their total internship rotation period.

The overall mean score of the DREEM questionnaire evaluating the emergency department was 133.72 out of 200. Among females, the mean score was 135.37, and among males, the mean score was 131.56 out of 200. There was no significant difference between the two genders. ($p > 0.05$)

The mean scores for each of the five main categories are:

- . 30.75 for Students' perception of learning (SPL) category (total score of 48)
- . 31.83 for Students' perception of teacher's performance (SPT) category (total score of 44)
- . 20.32 for Students' academic self-perception (SAP) category (total score is 32)

- 34.29 for Students' perception of atmosphere (SPA) category (total score is 48)
- 17.69 for Students' Social life perception (SSP) category (total score is 28).

Although male interns had a higher mean score in the SAP category, compared to the mean score of females, the difference was not significant. Female interns had higher mean scores in the four other categories; there was a significant difference for the SSP category ($p < 0.01$).

The mean scores of every one of the 50 questions were compared between both genders. Female interns scored higher (with significant differences) in response to the following questions:

- The atmosphere motivates me as a learner
- The teaching is too teacher centered
- The course organizers are well prepared for their teaching sessions
- There is a real support system for registrars who get stressed
- My social life is good
- My accommodation is pleasant

30 interns were married, and there was no significant difference between the married and unmarried interns in the mean scores of the five main categories. However, when analyzing and comparing each of the 50 questions separately, married students had higher scores (with

significant difference) in response to the following questions:

- The course organizers are well prepared for their teaching sessions
- The atmosphere motivates me as a learner
- My accommodation is pleasant
- The course organizers provide constructive criticism here
- I am encouraged to participate in teaching sessions
- The unmarried interns scored higher in response to one question: "I have good friends in this course."

When interns were categorized based on the length of time of their internship experiences, significant differences were found in the scores for three questions as seen in Figure 1:

The mean score (without significant difference) for each group are as follows:

- 143.42 for interns in the first 6 months period of internship
- 139.19 for interns in the second 6 months period of internship
- 130.39 for interns in the third 6 months period of internship

The mean scores for every question are shown in Table 1.

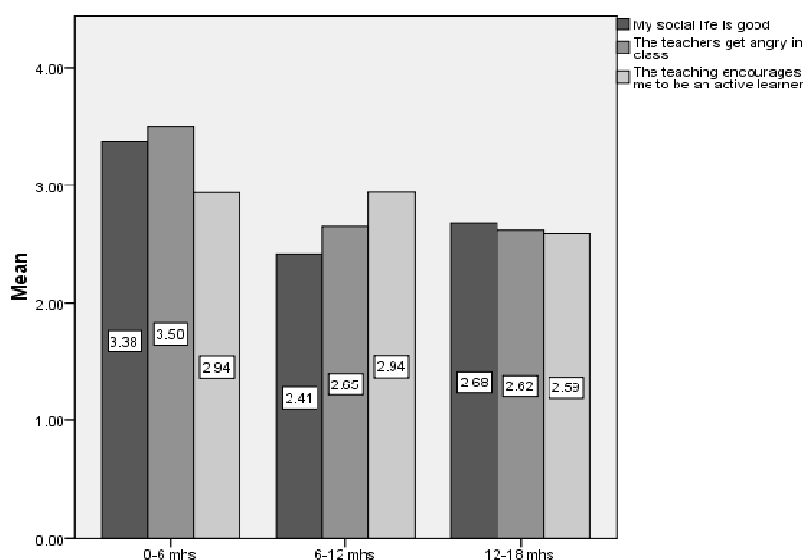


Figure 1. Mean scores of three questions of DREEM questionnaire in three sequential 6-month periods of internship

Discussion

An ideal medical education environment, as perceived by trainees, would result in a DREEM score

of 200 (6). Our emergency department achieved the overall score of 133.72. Scores lower than 100 indicate serious problems (6) in that medical education facility, whereas the score of 120 is considered acceptable for

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old school medical education. Our score in this study indicates that students' perspective of the learning environment is "more positive than negative" (6). This score establishes a baseline with which educators at the Tehran University of Medical Sciences may use to monitor and improve the educational climate. Similar studies in Sweden (7) and Ireland (8) as examples of

modern educational facilities show the scores of 145 and 130 respectively. DREEM scores in other Middle East countries (such as Turkey (9) and Kuwait (10), which has a similar cultural and socioeconomic characteristic to Iran, indicate that over the past decade, these countries have been improving in their provision of a modern medical education environment.

Table 1. DREEM questionnaire final and total results

| Students' perception about learning (Sum of 30.75 (7.8345 SD) from total 48 points) | Mean scores | SD |
|---|--------------------|-----------|
| 1. I am encouraged to participate during teaching sessions | 2.8354 | 0.9830 |
| 2. The teaching helps to develop my confidence | 2.7452 | 1.0247 |
| 3. The teaching encourages me to be an active learner | 2.6815 | 1.0066 |
| 4. The teaching is well focused | 2.6474 | 1.0336 |
| 5. The teaching helps to develop my competence | 2.8333 | 0.9075 |
| 6. I am clear about the learning objectives of the course | 2.6306 | 1.0758 |
| 7. The teaching is often stimulating | 2.6474 | 1.0883 |
| 8. The teaching time is put to good use | 2.5519 | 1.0481 |
| 9. The teaching is registrar centered | 2.4091 | 1.1062 |
| 10. Long term learning is emphasized over short term learning | 2.3974 | 1.0514 |
| 11. The teaching is too teacher-centered | 2.0833 | 1.2072 |
| 12. The teaching over-emphasizes factual learning | 2.1538 | 1.1648 |
| Students' perception about teachers' performance (Sum of 31.83 (5.9540 SD) from total 44 points) | | |
| 13. The course organizers are good at providing feedback to registrars | 2.9809 | 0.9300 |
| 14. The course organizers have excellent communication skills with patients | 3.2662 | 0.7051 |
| 15. The course organizers are knowledgeable | 3.1329 | 0.8147 |
| 16. The course organizers give clear examples | 3.0949 | 0.7802 |
| 17. The course organizers are well prepared for their teaching sessions | 2.9615 | 0.8790 |
| 18. The course organizers provide constructive criticism here | 2.7051 | 0.9382 |
| 19. The course organizers ridicule the registrars | 2.8025 | 1.2630 |
| 20. The course organizers get angry in teaching sessions | 2.7070 | 1.1996 |
| 21. The course organizers are authoritarian | 2.3355 | 1.3007 |
| 22. The course organizers espouse a patient-centered approach to consulting | 3.0261 | 0.7690 |
| 23. The registrars irritate the course organizers | 2.7368 | 1.2161 |
| Students' academic self – perceptions (Sum of 20.23 (5.1936 SD) from total 32 points) | | |
| 24. I am able to memorize all | 2.3618 | 1.0890 |
| 25. Much of what I have to learn seems relevant to a career in healthcare | 2.8831 | 0.9354 |
| 26. I feel I am being well prepared for my profession | 2.3631 | 1.1499 |

Table 1 (continue). DREEM questionnaire final and total results

| | | |
|---|--------|--------|
| 27. Last years' work has been a good preparation for this year work | 2.8790 | 0.9012 |
| 28. My problem solving skills are being well developed here | 2.5484 | 0.9615 |
| 29. I am confident about my passing this year | 2.4103 | 1.0024 |
| 30. I have learnt a lot about empathy in my profession | 2.4194 | 0.9319 |
| 31. I need To learn strategies which worked for me before continuing to work for me now | 2.4533 | 1.0400 |
| Students' perception of atmosphere (Sum of 34.29 (7.2525 SD) from total 48 points) | | |
| 32. The atmosphere is relaxed during lectures | 3.0724 | 0.7555 |
| 33. I feel able to ask the questions I want | 3.1039 | 0.8017 |
| 34. I feel comfortable in teaching sessions socially | 3.0128 | 0.9157 |
| 35. There are opportunities for me to develop interpersonal skills | 2.9216 | 0.8997 |
| 36. The atmosphere is relaxed during seminars / tutorials | 3.0194 | 0.8861 |
| 37. The enjoyment outweighs the stress of the course | 2.9805 | 1.0631 |
| 38. The atmosphere motivates me as a learner | 2.8961 | 0.8861 |
| 39. I am able to concentrate well | 2.6536 | 1.0151 |
| 40. The atmosphere is relaxed during consultation teaching | 2.8065 | 1.0325 |
| 41. This course is well timetabled | 2.5097 | 1.1753 |
| 42. I find the experience disappointing | 2.7677 | 1.2934 |
| 43. Cheating is a problem on this course | 2.5000 | 1.3071 |
| Students' perception about their social life (Sum of 17.69 (4.9261 SD) from total 28 points) | | |
| 44. I have good friends on this course | 3.2129 | 0.8137 |
| 45. There is a real support system for registrars who get stressed | 2.3205 | 1.1694 |
| 46. I am too tired to enjoy the course | 2.4359 | 1.2296 |
| 47. I am rarely bored on this course | 2.0839 | 1.3577 |
| 48. My accommodation is pleasant | 2.1553 | 1.2686 |
| 49. My social life is good | 2.6903 | 1.0905 |
| 50. I seldom feel lonely | 2.7613 | 1.0387 |
| Total Score (Sum of all domain scores 133.72 (24.1323 SD) from total 200 points) | | |

There were two other independent studies using the DREEM inventory carried out a few years ago in Iran. One 2007 studies at the Hormozgan University of Medical Sciences resulted in a total score of 96.6 (11) out of 200. A second study implemented in 2008 at the former Iran University of Medical Sciences (which in 2010 became merged with the Tehran University of Medical Sciences) followed 107 interns and 86 residents in the Medicine, Surgery, OB/GYN and Pediatric departments. The total mixed score was 140.6 (12) out of 200. The DREEM inventory is designed only for undergraduates, so the mixed scores of the interns and

residents is not validated in this study. In a very similar study of 206 OB/GYN interns in West Midlands, Australia, the total score was 139 (13).

Over the past decade, medical education world-wide has been shifting to become more dynamic, goal-directed, and trainee-centered. The Tehran University of Medical Sciences (TUMS) has a nearly 80-year long history of medical education. Its transition from traditional medical school to a modern one over the past decade has been ground-breaking in the country. Imam Khomeini Complex Hospital is the main medical referral and trauma center of Tehran and is also affiliated with

TUMS. The hospital's emergency department has been a leading role model in the country, so any improvements made, in terms of its educational climate, will directly influence other hospitals and programs in the rest of the country. The emergency department's DREEM score is not significantly lower or higher than other modern programs and universities in our country or other countries in the world. The score reported in our study can be used as a tool for comparing the quality of medical education and for diagnosing problems in future assessments.

The scores in each domain of the DREEM inventory showed the relative weaknesses and strengths¹⁴ of our program, and thus the areas that potentially be fixed or enhanced.

In the "student's perception of learning" subscale, we scored 30.75 (out of total 48) which are 64% of the ideal score; this signifies a more positive perception (6) of their learning ability acquired during the course. However, we received the lowest mean score (2.08 out of 4) on the "teacher-centered rather than student-centered education" and the only slightly higher mean scores (2.83 out of 4) in both the "I am encouraged to participate during teaching sessions" and the "teaching helps to develop my competence" sections. Thus, we must improve our faculty's teaching methods to favor a more student-centered environment, in order to increase students' competence and motivation.

In the "Students' perception about teachers' performance" subscale we scored 31.83 (out of a total of 44), which is 66% of the ideal, indicating a shift in the correct direction (6). In regards to the organization, we had a low score (2.33 out of 4) for "the course organizers are authoritarian" and a high score (above 3 out of 4) for the following sections: "the course organizers have excellent communication skills with patients", "the course organizers are knowledgeable", and "the course organizers espouse a patient-centered approach to consulting". This data indicates that our more traditional way of practicing medicine is steadily improving toward a more patient-centered and trainee centered approach.

In the "Students' academic self – perceptions" subscale, we scored 20.23 (out of total 32) which is 63% of the ideal score, which signifies a more positive feeling⁶ among our trainees. Our lowest score (2.36 out of 4) was in the following sections: "I am able to memorize all" and "I feel I am being well prepared for my profession." Finally, we scored the highest score (2.88 out of 4) for both "much of what I have to learn seems relevant to a career in healthcare" and "last year

work has been a good preparation for this year work." This data demonstrates that students recognize the relevancy of their courses to their future careers but that they experience difficulties related to the physical fatigue of their extended work-hours and the inherent stress of the emergency department these negative perspectives should be studied in a controlled environment in an independent study in the future.

In the "Student perception of atmosphere" subscale, we scored 34.29 (out of total 48) which is 71% of the ideal score, thus indicating a more positive outlook among students. The scores were high (above 3 out of 4) for the following subscales: "the atmosphere is relaxed during lectures, seminars and tutorials" and "I feel able to ask the questions I want" and "I feel comfortable socially in the teaching session." However, the lowest score (2.5 out of 4) on the "some exam cheating" and "not-so-well timetabled course" indicate a need for improvement by our management team.

In the "Student's social self-perception" subscale we scored 17.69 (out of total 28), which is 63% of the ideal score, with the highest score (3.21 out of 4) referring to "I have good friends on this course" and with the lowest score (2.08 out of 4) referring to "my accommodation is pleasant" and "there is a real support system for registrants who get stressed" (with the score of 2.32 out of 4). We must thus improve the rest area for our trainees and design a stress-management protocol.

We did not find any significant differences between the genders in each of the 5 subscales.

This study was the first investigation in the emergency department that the educational environment was assessed with the DREEM questionnaire. Consequently, interns were not familiar with the content and format of the forms.

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