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Dream of a conducive learning environment: One DREEM for all medical students!

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ORIGINAL ARTICLE

Dream of a conducive learning environment: One DREEM for all medical students!

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Abstract

Objective: To compare students' response assessed by Dundee Ready Educational Environment Measure on the basis of the year of study, gender and pre-medical educational background.

Methods: This cross-sectional study was carried out at the Aga Khan University Medical College, Karachi, Pakistan, from June 2014 to March 2015, and comprised medical students. The average scores of Dundee Ready Educational Environment Measure scales and subscales were compared between gender and educational background. Responses were also compared on the basis of year of study.

Results: Of the 416 participants, 184 (44%) were males and 232 (56%) were females. There were 100 (24%) students in the first year, 90 (21.6%) in second, 92 (22.1%) in third, 91 (21.9%) in fourth and 43 (10.3%) in the fifth year. The mean Dundee Ready Educational Environment Measure score was 125.7±16.8. The mean score of females and students with higher secondary school background was significantly better as compared to males and students in British General Certificate of Education background, respectively ($p<0.0001$, $p=0.017$). Female medical students were satisfied with the atmosphere of teaching and learning ($p<0.0001$; $p=0.011$). Year-wise comparison showed significantly better Dundee Ready Educational Environment Measure score responses by fourth-year students ($p<0.0001$).

Conclusion: Assessment by Dundee Ready Educational Environment Measure endorsed approval of conducive learning environment with reference to atmosphere, teaching, learning, sense of well-being, academic self-perception and achievement by all medical students.

Keywords: Dundee ready education environment measure (DREEM), Learning environment, Medical students. (JPMA 67: 7; 2017)

Introduction

Educational and professional environments for medical students across the world are considered highly stressful.[1,2] The educational environment (EE) is one of main factors that regulates student learning and is often employed for evaluation of medical education programmes.[3] An assessment of the educational environment helps to identify strengths and areas of improvement to facilitate ongoing learning, which in turn has an impact on performance of medical students and determines the success of an institution.[4,5]

The undergraduate medical curriculum at the Aga Khan University Medical College (AKUMC), a private medical college in Pakistan, is a five-year programme at the completion of which graduates are awarded a Bachelor in Medicine, Bachelor in Surgery (MBBS) degree. Incoming students hail from a diverse background, including those who graduate from the local higher secondary certificate (HSC) system, the British General Certificate of Education (GCE) which comprises of ordinary (O) and advanced (A) levels. Most students are from within Pakistan, with a small minority of students of mostly Pakistani origin from Middle East countries, the United Kingdom (UK) and the United States (US). The AKUMC follows an integrated, hybrid problem-based, spiral curriculum, using a number of teaching methodologies like interactive lectures, laboratory sessions, tutorials, clinical skills sessions and field visits. The first two years focus on the teaching of basic sciences in the context of clinical problems, while in 3rd, 4th and 5th years students learn problem-solving and management in clinical clerkships.

In order to assess EE in the AKUMC, we used the Dundee Ready Educational Environment Measure (DREEM), a valid instrument for assessing students' perceptions. This questionnaire has been used globally in medical, nursing and veterinary schools.[6-10] DREEM consists of several subscales; scores achieved overall and in each subscale can be interpreted on a spectrum from very poor or negative to very good or positive.[11] The current study was planned to compare students' response assessed by

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DREEM scores based on the year of study, gender and educational background.

Subjects and Methods

This cross-sectional study was conducted at the AKUMC, Karachi, Pakistan, from June 2014 to March 2015, and comprised medical students. Simple random sampling was used. The ethical approval was taken from the institutional committee. Sample size was collected as 10 samples per item using one of the rules for factor analysis. Multi-staged sampling (all the years at different times according to their schedule) was used with medical students of all years with age range 18-24 years, both genders and all ethnic groups. No exclusion criterion was applicable. The DREEM questionnaire[11] evaluated aspects of perception of learning environment on the basis of 50 items or statements, each scored 0-4 on a 5-point Likert scale (0 = strongly disagree (SD) to 4 = strongly agree (SA)) which were later summed into subscales; students' perceptions of learning (PoL; 12 items, maximum score 48), students' perceptions of teachers (PoT; 11 items, maximum score 44), students' academic self-perception (ASP; 8 items, maximum score 32), students' perceptions of atmosphere (PoA; 12 items, maximum score 48), students' social self-perceptions (SSP; 7 items, maximum score 28). There were nine negatively stated items (questions 4, 8, 9, 17, 25, 35, 39, 48 and 50) which are scored in reverse (0 = strongly agree to 4 = strongly disagree).

The categorical variables are presented as frequency and percentages. Continuous variables (responses of each items and scores) presented as mean ± standard deviation (SD) or standard error of mean (SEM). Cronbach's alpha was computed to measure consistency within the responses of students along with item total correlation to check correlation of each item with total score.

Non-parametric analyses were performed to proceed for comparative and association analyses. The mean scores of DREEM scales and subscales were compared between gender, year of study and pre-medical educational background using Mann-Whitney U test. For comparing mean scores among students of all five years, Kruskal-Wallis test was run. Tukey's test was further used to observe pair-wise comparison of scores. P<0.05 was considered significant.

Results

Of the 416 participants, 184(44%) were males and 232(56%) were females. There were 100(24%) students in the first year, 90(21.6%) in second, 92(22.1%) in third, 91(21.9%) in fourth and 43(10.3%) in the fifth year. The mean score of overall DREEM scale was 125.7±16.8. The reliability of the scale was measured to be 91.3% indicating excellent consistency of responses by students while filling in the questionnaire. Students' PoT also showed good consistency in the responses with reliability scale as 73.1%. The values of Cronbach's alpha for students' ASP and students' SSP were 68% and 62%, respectively, indicating fair consistency in the responses under these subscales.

The mean DREEM score of female students was significantly higher than that of male students (128±20.7 vs 120±21.3, p<0.0001). Females also scored significantly higher in all subscales than males. For instance, the mean DREEM score for student's PoL was 30.51±6.25 among females and 28.72±6.64 among males (p=0.011) and PoT was 25.22±5.12 and 23.36±5.22, respectively (p<0.0001). Participants having an HSC background had higher overall DREEM score (130.93±19.63) as compared to their counterparts who came from the GCE A level background (123.29±21.40) (p=0.017). Viewing the comparison of each subscale, it was observed that perceptions for teachers and towards their social life were not significantly different in these two groups of students (p=0.290 and p=0.192). Towards atmosphere, students'

Table-1: Comparison with respect to gender and high school attended.

DREEM Scales	Gender			Premedical Background		
	Male	Female	P Value	HSC	GCE	P Value
Student's Perception of Learning	28.72 ± 6.64	30.51 ± 6.25	0.011	32.11 ± 5.35	29.24 ± 6.59	0.001
Student's Perception of Teachers	23.36 ± 5.22	25.22 ± 5.12	<0.0001	24.93 ± 5.91	24.33 ± 5.08	0.290
Student's Academic Self-Perception	20.46 ±4.16	21.28 ± 3.87	0.173	21.92 ± 2.95	20.72 ± 4.18	0.016
Student's Perception of Atmosphere	30.23 ±7.03	32.84 ± 6.64	<0.0001	33.58 ± 6.88	31.33± 6.89	0.057
Student's Social Self-Perception	17.32±3.66	18.15 ± 3.97	0.015	18.39 ± 3.65	17.67 ± 3.89	0.192
Total DREEM Score	120.10 ± 21.26	128.00± 20.67	<0.0001	130.93 ± 19.63	123.29± 21.40	0.017

DREEM: Dundee Ready Educational Environment Measure
HSC: Higher secondary certificate
GCE: General Certificate of Education
Values are Mean ± SD. Comparison on the basis of Mann Whitney test.

Table-2: Comparison with respect to Class Year and type of study.

DREEM Scale	Year of Study						Type of Study		
	Year I	Year II	Year III	Year IV	Year V	P Value	Preclinical	Clinical	P-value
Student's Perception of Learning	31.49 ±5.15	28.18 ±5.71	27.60 ± 6.43	32.70 ± 7.09	27.19 ± 6.09	<0.0001	29.92 ± 5.66	29.58 ± 7.10	0.886
Student's Perception of Teachers	24.03 ± 3.96	23.86 ± 4.51	23.71± 5.23	27.32 ± 6.27	21.84 ± 4.49	<0.0001	23.95 ± 4.22	24.81 ± 5.94	0.075
Student's Academic Self-Perception	20.98 ± 3.94	20.41 ± 3.91	20.43± 3.90	21.96 ± 3.99	20.74 ± 4.42	0.002	20.71 ± 3.92	21.1 1 ± 4.08 7.65	0.101
Student's Perception of Atmosphere	31.28 ±5.49	30.42 ± 6.25	30.57± 5.54	35.45 ± 9.24	29.88 ± 5.49	<0.0001	30.87 ± 5.86	32.40 ±	0.011
Student's Social Self-Perception	18.07 ± 3.71	16.94 ± 4.62	17.7 0 ± 3.22	18.78 ± 3.81	17.00 ± 3.33	0.002	17.54 ± 4.19	18.00 ± 3.5	0.263
Total DREEM Score	125.85 ± 16.24	119.81 ±19.70	120.00 ± 19.30	136.21 ± 26.33	116.65 ± 16.97	<0.0001	122.99 ± 18.17	125 .89 ± 23.52	0.121

DREEM: Dundee Ready Educational Environment Measure

Values are Mean ± SD .

Kruskal-Wallis test was run. Tukey's test was further used to observe pair-wise comparison of scores.

perception was nearby significant (p=0.057). Significant difference was found in the scores of perceptions towards their academic (p=0.016) and learning environment (p=0.001) (Table-1).

The overall mean DREEM score was 125.85±16.24 among students of first year, 119.81 ±19.70 in second year, 120.00±19.30 in third, 136.21±26.33 in fourth and 116.65±16.97 among students of the fifth year (p<0.0001). It was found that fourth-year medical students attained the significant highest score in all aspects, while fifth-year students had the lowest scores in DREEM scale and subscales, with the exception of perception towards academic environment (20.74±4.42). Second-year students (20.41±3.91) followed by third-year medical students (20.43±3.90) obtained lowest scores in this subscale. Students from clinical years (years III to V) scored significantly higher in the subscale of perception towards atmosphere as compared to students from basic science years (p=0.011). The two groups did not score significantly different in other subscales and overall scale (Table-2).

Discussion

The ultimate objective of medical education is to develop a curriculum with an EE that inculcates all learning capabilities and skills that are required to become true healers in terms of practicing physicians. Current advances in research have shown that analysis of EE should form part of the appropriate educational practices developed by any institution which can be made possible using DREEM scale.[12,13] There is a need to review whether the existing teaching in the AKUMC over-emphasises factual learning, which appears to be an area of common concern as evidenced from other reports in the literature.[6,11,14-16]

In the current study, the majority of the students taking the survey were females. The overall DREEM score and subscale scores of female students were significantly higher than male students. Our results are consistent with findings from studies conducted elsewhere.[17-19] Specifically, a study from Malaysia showed better self-perception of EE by female undergraduate medical students[20] and a recent study conducted at six undergraduate medical institutions in Pakistan also reported similar results.[21]

The medical students are products of the diverse systems of pre-medical educational backgrounds that have different expectations, standards, learning styles, adaptive skills and coping mechanisms. Differences on the basis of pre-medical educational background have been reported before for a study conducted in Malaysia, in which students from the 1st-year matriculation programme had more positive perceptions, as compared to those who participated in the 2nd-year matriculation programme before joining medical schools.[20] Students in the AKUMC coming from the local HSC background scored significantly higher overall than students from the British system and other backgrounds, and also in all subscales. This difference was not unexpected as the local system differs substantially from other secondary educational systems.[22]

Students in pre-clinical years in our study rated perception towards atmosphere higher than students in the clinical years, but no significant differences were seen in any other modality tested. Previous studies have shown mixed results with medical and dental students in India and Pakistan reporting varied results.[17,20,23] Moreover, fourth-year medical students achieved the highest overall DREEM score in our study. A study conducted in Iran also reported that students in clinical years perceived pre-clinical EE as more positive.[24]

As has been reported before,[6,25] there were significant differences between students in different years of study

in the five-year programme. In overall and in subscales related to perception of learning, teachers, atmosphere and social self-perception, students in Year 4 had higher average scores. This may be due to the Year 4 curriculum, which during internal reviews has been identified as the strongest in the clinical years with regards to rotation structure, teaching, learning, and assessment and remediation strategies. The significantly lower scores of Year 1 and 2 students as compared to their peers in other years with regards to learning and teachers could be attributed to the dense curriculum of the first two years, challenges faced by the students to adapt the problem-based curriculum and administrative challenges related to adequate basic science staffing. Although it was not the scope of the study but we observed a significant difference between students living in the hostel and those attending as day scholars in the subscale of students PoA ($p<0.05$). Given the challenging geo-political and security situation in Karachi, students living in the hostel have limited options for recreation and relaxation off-campus. This gives us the opportunity to emphasize the need to continue and strengthen social and leisure activities as a support mechanism to generate a more positive environment for all students and for students living in hostel accommodation, in particular.

Conclusion

Assessment by DREEM endorsed approval of conducive learning environment with reference to atmosphere, teaching, learning, sense of well-being, academic self-perception and achievement by all medical students in general. Female medical students, however, were consistently satisfied with the institutions' educational environment as compared to their male counterparts. Students from both sets of educational background perceived the atmosphere conducive to learning; however, academic self-perception and learning was reported more by HSC students.

Targeted strategies need to be employed to address any deficiencies, for example drawing from the experience of fourth-year students who have significantly higher DREEM scores as compared to students in other years of study to improve the EE as needed across all years.

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References

1. Salam A, Yousuf R, Bakar SMA, Haque M. Stress among Medical Students in Malaysia: A Systematic Review of Literatures. Int Med J. 2013;20:649-55.
2. Rahman NIA, Ismail SB, Ali RM, et al. Stress among first batch of MBBS students of Faculty of Medicine and Health Sciences, Universiti Sultan Zainal Abidin, Malaysia: When final professional examination is knocking the door. Int Med J. In press 2015.
3. McAleer SR, Sean. What is educational climate? Medical Teacher. 2001;23:333-4.
4. Rehman R, Khan R, Akhaai M, Hassan F. Approach of freshly inducted medical students towards learning at Bahria University Medical & Dental College. J Pak Med Assoc. 2013;63:320-6.
5. Mayya S, Roff S. Students' perceptions of educational environment: a comparison of academic achievers and under-achievers at kasturba medical college, India. Educ Health (Abingdon). 2004;17:280-91.
6. Vaughan B, Mulcahy J, McLaughlin P. The DREEM, part 2: psychometric properties in an osteopathic student population. BMC Med Educ. 2014;14:100.
7. Ahmad MS, Bhayat A, Fadel HT, Mahrous MS. Comparing dental students' perceptions of their educational environment in Northwestern Saudi Arabia. Saudi Med J. 2015;36:477-83.
8. Rochmawati E, Rahayu GR, Kumara A. Educational environment and approaches to learning of undergraduate nursing students in an Indonesian school of nursing. Nurse Educ Pract. 2014;14:729-33.
9. Lokuhetty MD, Warnakulasuriya SP, Perera RI, De Silva HT, Wijesinghe HD. Students' perception of the educational environment in a medical faculty with an innovative curriculum in Sri Lanka. South East Asian J Med Educ. 2010;4:9-16.
10. Khan JS, Tabasum S, Yousafzai UK, Fatima M. DREEM on: validation of the dundee ready education environment measure in Pakistan. J Pak Med Assoc. 2011;61:885.
11. Jiffry MT, McAleer S, Fernando S, Marasinghe RB. Using the DREEM questionnaire to gather baseline information on an evolving medical school in Sri Lanka. Medical teacher. 2005;27:348-52.
12. Soemantri D, Herrera C, Riquelme A. Measuring the educational environment in health professions studies: A systematic review. Medical teacher. 2010;32:947-52.
13. Hammond SM, O'Rourke M, Kelly M, Bennett D, O'Flynn S. A psychometric appraisal of the DREEM. BMC Med Educ.12:2.
14. Bassaw B, Roff S, McAleer S, Roopnarinesingh S, De Lisle J, Teelucksingh S, et al. Students' perspectives on the educational environment, Faculty of Medical Sciences, Trinidad. Medical teacher. 2003;25:522-6.
15. Riquelme A, Oporto M, Oporto J, Mendez JI, Viviani P, Salech F, et al. Measuring students' perceptions of the educational climate of the new curriculum at the Pontificia Universidad Catolica de Chile: performance of the Spanish translation of the Dundee Ready Education Environment Measure (DREEM). Educ Health (Abingdon). 2009;22:112.
16. Shehnaz SI, Sreedharan J. Students' perceptions of educational environment in a medical school experiencing curricular transition in United Arab Emirates. Medical teacher.2011;33:e37-42.
17. Thomas BS, Abraham RR, Alexander M, Ramnarayan K. Students' perceptions regarding educational environment in an Indian dental school. Medical teacher. 2009;31:e185-e8.
18. Kossioni A, Varela R, Ekonomu I, Lyrakos G, Dimoliatis I. Students' perceptions of the educational environment in a Greek Dental School, as measured by DREEM. Eur J Dental Educ. 2012;16:e73-e8.
19. Brown T, Williams B, Lynch M. The Australian DREEM: evaluating student perceptions of academic learning environments within eight health science courses. Int J Medical Educ. 2011;2:94-101.

20. Rahman NIA, Aziz AA, Zainal Zulkifli MAH, Nasir FHBM, Pergalathan S, Hamidi MI, et al. Perceptions of students in different phases of medical education of the educational environment: Universiti sultan Zainal Abidin. Advances in medical education and practice. 2015;6:211.
21. Imran N, Khalid F, Haider II, Jawaid M, Irfan M, Mahmood A, et al. Student's perceptions of educational environment across multiple undergraduate medical institutions in Pakistan using DREEM inventory. J Pak Med Assoc. 2015;65:24-8.
22. Lynd D. The Education System in Pakistan: Assessment of the National Education Census. Islamabad: UNESCO, 2007 Contract No.: 978 969 8035 06 8.
23. Abraham R, Ramnarayan K, Vinod P, Torke S. Students' perceptions of learning environment in an Indian medical school. BMC Medical Educ. 2008;8:20.
24. Aghamolaei T, Fazel I. Medical students' perceptions of the educational environment at an Iranian Medical Sciences University. BMC Medical Educ. 2010;10:87.
25. Edgren G, Haffling AC, Jakobsson U, McAleer S, Danielsen N. Comparing the educational environment (as measured by DREEM) at two different stages of curriculum reform. Medical teacher 2011;.32:e233-8.