

# The Dundee Ready Education Environment Measure

## A prospective comparative study of undergraduate medical students' and interns' perceptions in Oman

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### مقياس دندي لجاهزية بيئة التعليم دراسة مقارنة استباقية لإدراك طلبة الطب والمتدربين في عمان

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**ABSTRACT: Objectives:** This study aimed to assess perceptions of the educational environment in Oman among medical undergraduate students and interns using the Dundee Ready Education Environment Measure (DREEM) tool. **Methods:** This cross-sectional study was conducted between October 2016 and April 2017 at the Oman Medical College (OMC), Sohar, Oman. A total of 737 medical undergraduate students and interns from the OMC and College of Medicine & Health Sciences of Sultan Qaboos University in Muscat, Oman, were invited to complete the DREEM questionnaire in the form of an online survey. Mean overall scores, subscale scores and individual item scores were subsequently compared between undergraduate students and interns. **Results:** A total of 418 undergraduate students and interns completed the survey (response rate: 56.7%). The mean overall DREEM score was  $130.75 \pm 12.69$ . While interns had higher mean DREEM scores than undergraduate students, this difference was not significant ( $133.00 \pm 17.64$  versus  $128.50 \pm 15.53$ ;  $P = 0.326$ ). The mean score percentages for the perceptions of learning (66.7% versus 58.3%;  $P = 0.028$ ) and perceptions of teachers (75% versus 68.2%;  $P = 0.038$ ) subscales were significantly higher among OMC interns compared to undergraduate students from the same college. The perceptions of the environment subscale received the lowest mean score percentages among undergraduate students and interns from both colleges. **Conclusion:** Overall, medical undergraduate students and interns viewed the educational environment in Oman in a positive light. It is possible that undergraduate students' perceptions of the educational environment may become more favourable as they progress with their medical career and become interns.

**Keywords:** Medical Education; Undergraduate Medical Students; Internships; Perceptions; Oman.

**المخلص:** الهدف: تهدف هذه الدراسة إلى تقييم إدراك البيئة التعليمية في عمان بين طلاب الطب والمتدربين باستخدام مقياس دندي لجاهزية بيئة التعليم. الطريقة: تم إجراء هذه الدراسة المستعرضة بين أكتوبر 2016 وأبريل 2017 في كلية عمان الطبية، صحر، عمان. تمت دعوة مجموع 737 من طلاب الطب والمتدربين من كلية عمان الطبية وكلية الطب والعلوم الصحية بجامعة السلطان قابوس، مسقط، عمان، للمشاركة بإكمال إستبيان مقياس دندي لجاهزية بيئة التعليم عبر مسح الأنترنت. تمت مقارنة متوسط إجمالي الدرجات، درجات الفروع الجانبية ودرجات العناصر الفردية بين طلبة الطب والمتدربين. النتائج: أكمل عدد 418 من طلاب الطب والمتدربين (معدل الاستجابة 56.7%). كان متوسط الدرجات الإجمالية لمقياس دندي لجاهزية بيئة التعليم  $130.75 \pm 12.69$ . في حين كان متوسط معدل المقياس أعلى عند المتدربين بالمقارنة بطلاب الطب، لم يكن الفارق معتد به إحصائياً ( $133.00 \pm 17.64$  مقابل  $128.50 \pm 15.53$ ,  $P = 0.326$ ). متوسط النسبة المئوية لنتائج إدراك التعليم (66.7% مقابل 58.3%,  $P = 0.028$ ) وكان متوسط الفروع الجانبية لإدراك المدرسين (75% مقابل 68.2%,  $P = 0.038$ ) أعلى بكثير بين المتدربين من كلية عمان الطبية بالمقارنة مع طلاب الطب من نفس الكلية. كان أقل متوسط للنسبة المئوية للنتائج في إدراك الفروع الجانبية للبيئة بين طلاب الطب والمتدربين من كلا الكليتين. الخلاصة: إجمالاً، كانت نظرت طلاب الطب والمتدربين للبيئة التعليمية في عمان إيجابية. من الممكن أن يصبح إدراك طلبة الطب للبيئة التعليمية أكثر ملاءمة عند تقدمهم المهني ووصولهم إلى مرحلة متدرب.

الكلمات المفتاحية: التعليم الطبي؛ طلاب الطب؛ التدريب الداخلي؛ الإدراك؛ عمان.

#### ADVANCES IN KNOWLEDGE

- To the best of the authors' knowledge, this is the first study reporting undergraduate students' and interns' perceptions of the medical educational environment in Oman. The findings of the study suggest that undergraduate students' perceptions of their educational environment may become more favourable as they advance to their internship.

#### APPLICATION TO PATIENT CARE

- This study serves as an important initial step in identifying strengths and weaknesses in the current medical learning climate of Oman. This knowledge may help educational administrators identify underlying factors that hamper medical students' learning experiences, ultimately improving the overall quality of medical education and clinical care in Oman.

THE GOAL OF MEDICAL EDUCATION IS TO produce graduates with the necessary knowledge, clinical skills and professional attributes to be successful doctors.<sup>1</sup> To a certain extent, a physician's level of competence in these areas reflects the educational institution they attended and the medical education they received.<sup>2</sup> Therefore, it is vital to appraise the educational environment in which medical students learn, including the institutional culture, curriculum and learning climate.<sup>3</sup> Meaningful learning correlates positively with students' perceptions of their educational environment, as this can influence how, why and what students learn.<sup>4,5</sup>

While various tools are available to allow medical educators to evaluate students' perceptions of their educational environments, the 50-item Dundee Ready Education Environment Measure (DREEM) tool is currently most frequently utilised.<sup>6-8</sup> The DREEM tool is a widely accepted and globally validated instrument for assessing the educational environment in undergraduate medical institutions and has five subscales including perceptions of learning, perceptions of teachers, academic self-perceptions, perceptions of the environment and social self-perceptions.<sup>5-7</sup> The internal consistency of the questionnaire has been validated in previous research.<sup>9</sup> Such tools can help educational administrators identify problem areas at the curricular or institutional level and make necessary changes, resulting in significant improvements in the learning environment and, therefore, student performance.

In Oman, the Ministry of Health recognises the importance of developing health education and training programmes so as to ensure a high level of clinical care.<sup>10</sup> However, to the best of the authors' knowledge, no studies to date have analysed medical undergraduates' and interns' perceptions of the educational environment in Oman. As such, this study aimed to assess undergraduate students' and medical interns' perceptions of various aspects of the educational environment in Oman, including a range of topics directly related to the educational climate and every day learning. In addition, this study aimed to identify specific problem areas for elucidation and improvement.

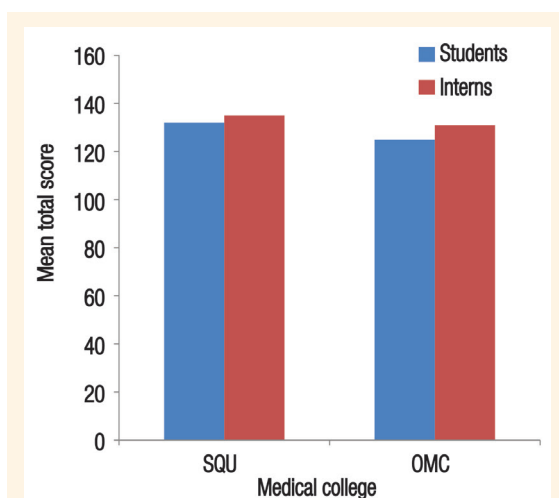
## Methods

This prospective descriptive cross-sectional study took place at the Oman Medical College (OMC) in Sohar, Oman, between October 2016 and April 2017. Students in the clinical phase of the OMC medical degree programme (i.e. years 5 and 6) and phase III of the medical degree programme at the College of Medicine

& Health Sciences of Sultan Qaboos University (SQU) in Muscat, Oman, were eligible to participate in the study. In addition, former medical students who had graduated from either institution during the 2016–2017 academic year and begun internships were also included. As all 737 eligible students and interns at these institutions could be contacted and were given an opportunity to participate in the study, a precision-based sample size calculation was not performed.

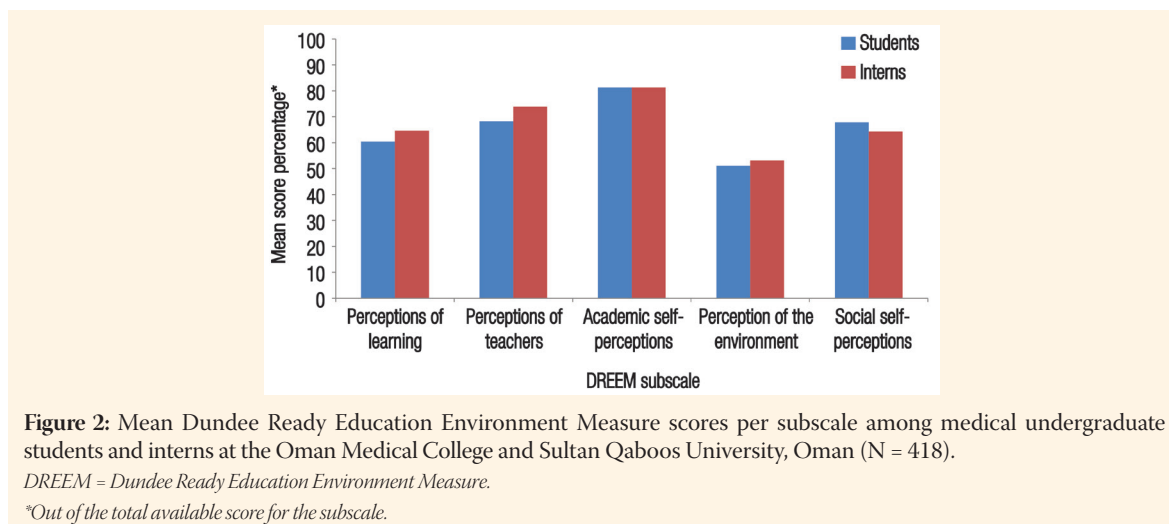
The original English-language version of the 50-item DREEM tool was incorporated into an online survey using QuestionPro™ software (QuestionPro Inc., San Francisco, California, USA).<sup>7</sup> Subsequently, a link to the survey was forwarded to the institutional e-mails of all eligible students, with a three-week timeframe to complete the questionnaire. Responses to the questionnaire were monitored in real time using the QuestionPro™ software (QuestionPro Inc.). Reminders to complete the survey were sent to previously established WhatsApp groups (WhatsApp Inc., Menlo Park, California, USA), whenever available, and follow-up e-mails were sent every fifth day. The QuestionPro Inc. online assistance team was consulted to overcome any technical difficulties in the electronic delivery of the questionnaire and data collection. In cases where these issues remained unresolved, printed questionnaires were hand-delivered to the participants.

Responses to each individual item in the DREEM survey were scored on a five-point Likert scale from four to zero as either strongly agree, agree, uncertain, disagree or strongly disagree, respectively.<sup>7</sup> Nine negatively-worded items (items #4, #8, #9, #17, #25, #35, #39, #48 and #50) were reverse scored. In total,



**Figure 1:** Mean total Dundee Ready Education Environment Measure scores of medical undergraduate students and interns at the Oman Medical College and Sultan Qaboos University, Oman (N = 418).

SQU = Sultan Qaboos University; OMC = Oman Medical College.



the maximum overall DREEM score was 200, indicating an ideal educational environment.<sup>7,9</sup> All questionnaires with incomplete data were excluded from the analysis. The overall total scores and those of each subscale were calculated separately for students and interns at each college, with average scores tabulated for each group. Agreement or disagreement with individual items was calculated by combining responses in the agree and strongly agree categories and the disagree and strongly disagree categories, respectively.<sup>11</sup> The total scores, subscale scores and individual item scores were expressed as means  $\pm$  standard deviation. The mean scores of undergraduate students and interns were compared using a Student's t-test. The Statistical Package for the Social Sciences (SPSS), Version 17.0 (IBM Corp., Armonk, New York, USA) was used for the data analysis. The level of statistical significance was set at  $P < 0.050$ .

This study received ethical approval from the Institutional Proposal Evaluation Committee of the OMC. All participants gave informed consent, either via digital acknowledgement during completion of the online survey or by signing a written consent form. The privacy and anonymity of the participants were ensured at all times during the delivery and collection of the questionnaires.

## Results

Of the 737 medical undergraduate students and interns at OMC and SQU invited to participate in the study, a total of 418 completed the questionnaire (response rate: 56.7%). Of these, there were 326 undergraduate students (response rate: 58%) and 92 interns (response rate: 52.2%). There were significantly higher response rates among the OMC undergraduate students (74.3% versus 65%;  $P = 0.001$ ) and medical interns (47.8% versus 51.7%;  $P = 0.002$ ) compared to those from SQU.

The mean overall total DREEM score was  $130.75 \pm 12.69$  [Figure 1]. While interns had higher mean DREEM scores than undergraduate students, this difference was not significant ( $133.00 \pm 17.64$  versus  $128.50 \pm 15.53$ ;  $P = 0.326$ ). The mean score percentages per subscale (i.e. the percentage out of the total available score per subscale) among medical undergraduate students and interns from both colleges is shown in Figure 2 and Table 1. According to subscale, the mean score was  $30.50 \pm 5.90$  for perceptions of learning (63.5%),  $34.00 \pm 5.80$  for perceptions of teachers (77.2%),  $27.25 \pm 3.32$  for academic self-perceptions (85.1%),  $28.00 \pm 6.20$  for perceptions of atmosphere (58.3%) and  $20.25 \pm 5.80$  for social self-perceptions (72.3%) items. The mean scores of individual items

**Table 1:** Mean Dundee Ready Education Environment Measure subscale scores according to institution among medical undergraduate students and interns at the Oman Medical College and Sultan Qaboos University, Oman (N = 418)

Subscale	Mean percentage*		P value	Mean percentage*		P value
	OMC students (n = 162)	OMC interns (n = 52)		SQU students (n = 164)	SQU interns (n = 40)	
Perceptions of learning	58.3	66.7	0.028	62.5	62.5	0.771
Perceptions of teachers	68.2	75	0.038	68.2	72.7	0.585
Academic self-perceptions	78.1	75	0.342	84.4	87.5	0.283
Perceptions of the environment	50	52.1	0.278	52.1	54.2	0.294
Social self-perceptions	64.3	60.7	0.403	71.4	67.9	0.783

OMC = Oman Medical College; SQU = Sultan Qaboos University.

\*Out of the total available score for the subscale.

**Table 2:** Mean Dundee Ready Education Environment Measure scores for individual items among medical undergraduate students and interns at the Oman Medical College and Sultan Qaboos University, Oman (N = 418)

Item	Mean score ± SD				
	OMC students (n = 162)	OMC interns (n = 52)	SQU students (n = 164)	SQU interns (n = 40)	
Perceptions of learning	1. I am encouraged to participate in class.	3.12 ± 1.05	3.22 ± 1.21	3.02 ± 1.16	3.12 ± 1.03
	7. Teaching is often stimulating.	3.18 ± 1.22	3.28 ± 1.08	3.28 ± 1.03	3.19 ± 1.06
	13. Teaching is student-centred.	1.96 ± 0.92	2.06 ± 1.08	2.16 ± 0.86	2.26 ± 1.18
	16. The teaching helps to develop my competence.	2.23 ± 1.04	2.13 ± 1.03	2.20 ± 1.12	2.53 ± 1.03
	20. The teaching is well focused.	2.63 ± 1.05	2.13 ± 1.12	2.60 ± 0.98	2.58 ± 0.94
	21. The teaching helps to develop my confidence.	2.30 ± 1.17	2.28 ± 1.02	2.42 ± 1.04	2.16 ± 0.97
	24. The teaching time is put to good use.	1.92 ± 1.07	2.12 ± 0.97	2.92 ± 1.07	3.12 ± 1.07
	25. The teaching overemphasises factual learning.	2.98 ± 0.96	3.21 ± 1.12	3.17 ± 1.06	3.08 ± 1.20
	38. I am clear about the learning objectives of the course.	3.50 ± 1.12	3.58 ± 1.06	3.82 ± 1.03	3.63 ± 1.14
	44. The teaching encourages me to be an active learner.	3.25 ± 0.79	3.55 ± 1.13	3.89 ± 0.96	3.62 ± 0.79
	47. Long-term learning is emphasised over short-term learning.	2.18 ± 1.21	2.26 ± 0.87	3.18 ± 1.02	3.05 ± 1.01
	48. The teaching is too teacher-centred.	1.52 ± 0.87	1.87 ± 1.12	2.11 ± 0.92	2.82 ± 1.02
Perceptions of teachers	2. The teachers are knowledgeable.	3.11 ± 0.92	3.2 ± 1.01	3.21 ± 1.02	3.11 ± 1.04
	6. The teachers are patient with students.	3.23 ± 1.21	3.23 ± 0.92	3.17 ± 1.27	3.2 ± 0.89
	8. The teachers make fun of their students.	2.48 ± 1.31	3.08 ± 0.91	2.58 ± 1.21	2.31 ± 0.96
	9. The teachers are strict and controlling.	2.43 ± 1.09	3.04 ± 1.21	2.22 ± 1.02	2.52 ± 0.94
	18. The teachers appear to have effective communication skills with students.	2.59 ± 1.23	2.43 ± 1.07	2.6 ± 1.72	2.49 ± 0.98
	29. The teachers are good at providing feedback to students.	2.29 ± 1.12	2.28 ± 1.21	2.42 ± 1.02	2.26 ± 1.12
	32. The teachers provide constructive criticism.	2.21 ± 1.02	2.12 ± 0.92	2.91 ± 1.08	3.03 ± 0.97
	37. The teachers give clear examples.	3.03 ± 1.71	3.87 ± 0.97	2.17 ± 1.21	3.1 ± 0.87
	39. The teachers get angry in teaching sessions.	3.01 ± 1.36	3.31 ± 1.28	2.42 ± 1.29	3.33 ± 0.86
	40. The teachers are well prepared for their classes.	2.95 ± 1.58	3.55 ± 1.22	3.29 ± 0.98	3.62 ± 0.85
	49. The students irritate and annoy the teachers.	3.17 ± 1.75	3.22 ± 1.09	3.11 ± 0.92	3.05 ± 0.85
	3. There is a good support system for students who get stressed.	1.15 ± 0.67	1.67 ± 0.76	1.92 ± 0.86	1.95 ± 0.96
Social self-perceptions	4. I am too tired to enjoy this course.	2.23 ± 1.08	2.28 ± 0.85	3.28 ± 0.91	3.12 ± 1.03
	14. I am rarely bored in this course.	3.96 ± 0.89	3.23 ± 1.04	3.16 ± 0.92	3.29 ± 1.06
	15. I have good friends in this school.	3.97 ± 0.85	4.21 ± 1.07	4.22 ± 0.95	4.53 ± 1.06
	19. My social life is good.	2.2 ± 0.87	2.13 ± 0.98	2.72 ± 0.87	2.58 ± 0.96
	28. I seldom feel lonely.	3.52 ± 0.85	2.28 ± 0.98	3.42 ± 0.92	2.06 ± 0.91
	46. My accommodation is pleasant.	1.21 ± 0.77	1.33 ± 0.78	2.01 ± 0.67	1.98 ± 0.62
Academic self-perceptions	5. Learning strategies which worked for me before continue to work for me now.	1.89 ± 1.02	2.12 ± 0.84	3.02 ± 0.89	3.12 ± 0.93
	10. I am confident about passing this year.	3.92 ± 1.04	3.11 ± 1.07	4.12 ± 0.88	4.32 ± 0.96
	22. I feel I am being well prepared for my profession.	1.86 ± 0.89	3.21 ± 1.03	2.12 ± 0.99	2.18 ± 0.89
	26. Last year's work was good preparation for this year's work.	4.23 ± 0.94	4.11 ± 0.97	4.24 ± 1.04	4.02 ± 1.02
	27. I am able to memorise all I need.	1.54 ± 0.95	1.76 ± 0.88	1.98 ± 0.87	2.01 ± 0.94
	31. I have learned a lot about empathy in my profession.	4.87 ± 0.78	4.32 ± 0.81	4.22 ± 0.77	4.18 ± 1.03
	41. My problem-solving skills are being well developed.	3.76 ± 1.06	3.12 ± 0.79	4.02 ± 0.95	4.13 ± 0.98
	45. Much of what I have to learn seems relevant to a career in healthcare.	3.12 ± 0.89	3.01 ± 0.86	3.82 ± 0.96	4.09 ± 0.96

**Table 2 (contd.):** Mean Dundee Ready Education Environment Measure scores for individual items among medical undergraduate students and interns at the Oman Medical College and Sultan Qaboos University, Oman (N = 418)

Item	Mean score $\pm$ SD			
	OMC students (n = 162)	OMC interns (n = 52)	SQU students (n = 164)	SQU interns (n = 40)
11. The atmosphere is relaxed during ward teaching.	3.16 $\pm$ 0.96	3.29 $\pm$ 1.07	3.02 $\pm$ 0.87	3.19 $\pm$ 1.12
12. This school is well time-tabled.	1.92 $\pm$ 0.95	1.82 $\pm$ 0.79	1.95 $\pm$ 0.94	2.03 $\pm$ 1.19
17. Cheating is a problem in this school.	1.22 $\pm$ 0.87	1.38 $\pm$ 1.08	1.43 $\pm$ 1.02	1.52 $\pm$ 1.02
23. The atmosphere is relaxed during teaching.	2.83 $\pm$ 0.78	2.81 $\pm$ 1.04	2.29 $\pm$ 0.92	2.23 $\pm$ 1.05
30. There are opportunities for me to develop interpersonal skills.	2.08 $\pm$ 0.83	2.89 $\pm$ 0.77	2.6 $\pm$ 0.93	2.58 $\pm$ 0.97
33. I feel comfortable in teaching sessions socially.	1.32 $\pm$ 0.93	1.54 $\pm$ 0.92	1.92 $\pm$ 0.88	2.04 $\pm$ 0.92
34. The atmosphere is relaxed during tutorials.	2.11 $\pm$ 0.78	2.12 $\pm$ 0.95	2.32 $\pm$ 1.05	2.51 $\pm$ 0.82
35. I find the experience disappointing.	1.98 $\pm$ 1.03	2.02 $\pm$ 0.93	2.38 $\pm$ 0.79	2.44 $\pm$ 1.02
36. I am able to concentrate well.	1.21 $\pm$ 0.82	1.32 $\pm$ 0.79	1.23 $\pm$ 0.95	1.2 $\pm$ 0.84
42. The enjoyment outweighs the stress of the course.	1.82 $\pm$ 0.86	1.88 $\pm$ 0.82	2.08 $\pm$ 0.88	2.11 $\pm$ 0.86
43. The atmosphere motivates me as a learner.	1.87 $\pm$ 0.89	2.29 $\pm$ 1.07	2.11 $\pm$ 1.03	2.42 $\pm$ 0.86
50. I feel able to ask the questions I want.	3.21 $\pm$ 1.02	2.18 $\pm$ 0.79	2.03 $\pm$ 0.92	2.1 $\pm$ 0.97

SD = standard deviation; OMC = Oman Medical College; SQU = Sultan Qaboos University.

of the DREEM tool are shown in Table 2. The percentage of positive, neutral and negative responses for individual items of the DREEM tool are shown in Table 3.

## Discussion

To the best of the authors' knowledge, this study is the first to report the perceptions of medical undergraduate students and interns regarding the educational environment in Oman using the validated DREEM tool. Overall total DREEM scores have been reported to range from 45.0–72.5%.<sup>11,12</sup> The overall total DREEM score observed in the present study was high and comparable with findings from established international medical schools in the UK, South Africa and Ireland.<sup>1,12,13</sup> However, mean scores reported from medical schools at the University of East Anglia and University of Birmingham in the UK and the University of Lund in Sweden were higher.<sup>14–16</sup> In contrast, studies of medical schools in Korea, Germany and Spain have reported lower DREEM scores.<sup>17–19</sup> Such varied results could be due to potential differences in the learning preferences and social lives of these diverse student populations. Additionally, variations in students' and interns' perceptions may also reflect the complex construct of the learning environment at any educational institute.

According to standard interpretations of DREEM subscale scores, the mean score for the perceptions of learning subscale in the current study was deemed

“more positive”, while the score for the perceptions of teachers subscale suggested “movement in the right direction”. In addition, the mean scores for the academic self-perceptions, perceptions of the environment and social self-perceptions subscales indicated “confident feelings”, “a more positive attitude” and “not too bad”, respectively.<sup>7</sup> In terms of percentages of the total available score, the academic self-perceptions subscale had the highest mean score percentage, followed by the perceptions of teachers subscale for all participants, apart from SQU undergraduate students. Similarly, a study from the United Arab Emirates (UAE) conducted among faculty members found that the perceptions of teachers and perceptions of learning subscales had the highest mean scores, whereas the lowest mean score was noted in the social self-perceptions subscale.<sup>20</sup>

The psychological wellbeing of medical undergraduate students and interns is of paramount importance in terms of ensuring learning retention and quality healthcare delivery.<sup>3</sup> Although the mean subscale scores observed in the current study were highly encouraging, an analysis of the mean scores for individual items in the DREEM tool indicated a need to improve student accommodation services and recreational facilities. In addition, there was a need to improve the atmosphere in the classroom during teaching, which might be more conducive to students asking questions during class. Very few of the students and interns were of the opinion that their medical colleges had a good support system for stressed students, implying that these institutions



**Table 3:** Responses to individual items of the Dundee Ready Education Environment Measure among medical undergraduate students and interns at the Oman Medical College and Sultan Qaboos University, Oman (N = 418)

Item	Percentage of responses						
	Undergraduate students (n = 326)			Interns (n = 92)			
	Agree/ Strongly agree	Uncertain	Disagree/ Strongly disagree	Agree/ Strongly agree	Uncertain	Disagree/ Strongly disagree	
Perceptions of learning	7. Teaching is often stimulating.	40.2	30.4	29.4	44.3	25.2	30.5
	13. Teaching is student-centred.	41.2	29.2	29.6	32.1	28.2	39.7
	25. The teaching over emphasises factual learning.	50.3	25.1	24.6	45.3	32.1	22.6
	38. I am clear about the learning objectives of the course.	40.2	20.2	39.6	33.8	38.2	28
	44. The teaching encourages me to be an active learner.	30.7	40.1	29.2	38.2	31.6	30.2
Perceptions of teachers	48. The teaching is too teacher-centred.	33.5	39.2	27.3	39.1	38.1	22.8
	6. The teachers are patient with patients.	45.3	35.2	19.5	40.7	39.1	20.2
	8. The teachers make fun of their students.	35.8	39	25.2	40.1	44.1	15.8
	9. The teachers are strict and controlling.	44.5	30.2	25.3	30.6	49.2	20.2
Social self-perceptions	37. The teachers give clear examples.	44.8	29.1	26.1	35.2	39.6	25.2
	39. The teachers get angry in teaching sessions.	40.4	33.2	26.4	43.8	32	24.2
	3. There is a good support system for students who get stressed.	15.1	20.7	64.2	17.8	19.1	63.1
	4. I am too tired to enjoy this course.	35.1	49.3	15.6	30.9	51	18.1
	14. I am rarely bored in this course.	43.8	30.9	25.3	35.2	39.6	25.2
Academic self-perceptions	19. My social life is good.	30.3	54.1	15.6	32.5	49.2	18.3
	28. I seldom feel lonely.	34.3	22.4	43.3	40.7	21.1	38.2
	46. My accommodation is pleasant.	27.4	48.4	24.2	43.2	30.6	26.2
	10. I am confident about passing this year.	33.4	39.3	27.3	41.7	38.1	20.2
Perceptions of the environment	22. I feel I am being well prepared for my profession.	35.2	25.2	39.6	41.6	29.2	29.2
	27. I am able to memorise all I need.	22.2	48.2	29.6	26.2	41.3	32.5
	11. The atmosphere is relaxed during ward teaching.	40.7	30.8	28.5	40.4	25.2	34.4
	17. Cheating is a problem in this school.	20.2	30.2	49.6	29.2	32.2	38.6
	23. The atmosphere is relaxed during teaching.	31.3	48.3	20.4	35.8	40.9	23.3
	33. I feel comfortable in teaching sessions socially.	24.4	38.2	37.4	41.2	28.5	30.3
	34. The atmosphere is relaxed during tutorials.	33.5	43.3	23.2	41.4	29.3	29.3
	36. I am able to concentrate well.	24.3	39.9	35.8	36.3	38	25.7
42. The enjoyment outweighs the stress of the course.	20.7	29.8	49.5	35.6	25.7	38.7	

OMC = Oman Medical College; SQU = Sultan Qaboos University.

had inadequate facilities to cope with academic and/or social life-related stress. Therefore, the authors of the current study recommend prioritising the establishment of organised student support systems and psychological counselling centres at both the OMC and SQU so as to address the issue of stress among undergraduate students and interns. Further studies should be conducted to evaluate the effects of stress on academic performance during medical training in Oman and elucidate underlying factors that may lead to stressful conditions.

Other studies from the Middle Eastern region have addressed students' perceptions of the educational environment at various medical colleges [Table 4].<sup>11,21-33</sup> In general, the scores of medical schools in previous studies from 2004-2010 were much lower compared to those reported from more recent studies.<sup>11,21-33</sup> This observation suggests that significant improvements have been made to the learning environments of medical schools in the region. The results of a study from the UAE found that the use of an integrated curriculum led to significantly more

**Table 4:** Literature review of recent studies using the Dundee Ready Education Environment Measure tool at institutions in the Middle East<sup>11,21–33</sup>

Author and year of study	Institution and setting	Type of participants	Mean overall total score
Karim <i>et al.</i> <sup>11</sup> (2015)	Kuwait University, Kuwait	Undergraduates	108.7
Al Sheikh <sup>25</sup> (2014)	University of Dammam, Dammam, Saudi Arabia	Undergraduates	106
AlFarsi <i>et al.</i> <sup>27</sup> (2014)	King Saud University, Riyadh, Saudi Arabia	Undergraduates	118.5
El-Sobkey <sup>28</sup> (2015)	King Saud University, Riyadh, Saudi Arabia	Physiotherapy trainees	135.6
Soliman <i>et al.</i> <sup>24</sup> (2017)	King Saud University, Riyadh, Saudi Arabia	Undergraduates	171.5*
Al-Ayed <i>et al.</i> <sup>23</sup> (2008)	King Saud University, Riyadh, Saudi Arabia	Undergraduates	89.9
Al-Hazimi <i>et al.</i> <sup>22</sup> (2002)	King Abdulaziz University, Jeddah, Saudi Arabia	Undergraduates	102
Al-Hazimi <i>et al.</i> <sup>21</sup> (2002)	Umm Al-Qura University, Mecca, Saudi Arabia	Undergraduates	107
	Sana'a University, Yemen	Undergraduates	100
Shehnaz <i>et al.</i> <sup>29</sup> (2012)	Gulf Medical College, Ajman, UAE	Teaching faculty	139
		Undergraduates	135
Farahmand <i>et al.</i> <sup>30</sup> (2014)	Imam-Khomeini Hospital, Tehran, Iran	Emergency medicine interns	133.72
Imanipour <i>et al.</i> <sup>31</sup> (2015)	Tehran University of Medical Sciences, Tehran, Iran	Nursing or midwifery students	104.39
Andalib <i>et al.</i> <sup>32</sup> (2015)	Tehran University of Medical Sciences Children's Medical Center, Tehran, Iran	Undergraduates	95.8
Bakhshialiabad <i>et al.</i> <sup>33</sup> (2015)	Rafsanjan University of Medical Sciences, Rafsanjan, Iran	Undergraduates	113.5
Taheri <sup>26</sup> (2009)	Gilan University of Medical Sciences, Gilan, Iran	Basic science students	100.96
		Clinical students	94.19

UAE = United Arab Emirates.

\*Out of a total score of 250, instead of 200.

positive perceptions compared to a discipline-based curriculum.<sup>20</sup> A previous study conducted in Ireland reported similar results.<sup>12</sup> These findings highlight the importance of curricular reforms in improving the overall learning environment of medical schools.

In the current study, interns on the whole had more positive perceptions of the educational environment compared to the undergraduate students. In contrast, investigators from Saudi Arabia and Iran have reported that second-year undergraduate students had higher DREEM scores compared to third-year students.<sup>25,26</sup> It is possible that curricular differences and the use of heterogeneous samples from different sociocultural backgrounds could result in these varying observations. Curriculum planners in Oman should heed the feedback of medical students and interns, as their opinions may be valuable in determining potential areas for and methods of improving the learning climate at specific institutions, thus ensuring the students' and interns' preparedness for clinical work.<sup>34</sup>

The findings of the current study are limited by pre-existing constraints and criticisms of the DREEM tool, particularly its psychometric properties, as items included in the DREEM subscales may not be wholly

independent. In addition, there is some scope for cultural bias with use of this tool.<sup>35</sup> Other limitations include lack of analysis of the effect of demographic factors such as age, gender and nationality on the overall DREEM and subscale scores. However, it should be noted that approximately 80–90% of the sample consisted of Omani females; as such, nationality and gender were unlikely to have affected the results. Another limitation was the overall lower response rate of interns compared to their undergraduate counterparts; this was due to difficulties in locating interns providing clinical services at different hospitals in Oman. Additionally, there was a higher response rate among students and interns at OMC compared to those from SQU; this was probably due to the fact that the study itself was conducted at OMC, potentially resulting in greater awareness of the study among the OMC-affiliated participants.

## Conclusion

Overall, the findings of this study suggest that medical undergraduate students and interns at the OMC and SQU viewed the educational environment in Oman in a positive manner. Moreover, it is possible

that undergraduate students' perceptions of the educational environment may become more positive once they graduate and become interns.

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## CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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