



## Perception of Educational Environment among Medical Residents Enrolled in Dubai Residency Training Program (DRTP) by Using DREEM Inventory

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### **Authors' contributions**

*This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.*

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### **ABSTRACT**

**Objectives:** To validate Dundee Ready Education Environment Measure (DREEM) inventory in the educational environment of Dubai Residency Training Program (DRTP).

**Methods:** The 50-items DREEM questionnaire was administered to all medical residents (n = 60) at various academic sessions. The ethical approval was taken and the purpose of the study was explained to the residents before the questionnaire was distributed.

**Results:** An observational cross-sectional survey was applied in the conduct of our research. A total number of 60 residents from Dubai Residency Training Program (DRTP) in 2012 – 2014 participated in the study (response rate 98.3%). The overall DREEM score was 116.7/200

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(58.35%) indicating that the DRTP residents' perception of educational environment was more positive than negative. The DREEM questionnaire was further subdivided into 5 subclasses and the mean score were measured. These include Residents' perceptions of learning (27.45 = A more positive perception), residents' perceptions of course organizers (25.9= Moving in the right direction), residents' academic self perceptions (17.9= Feeling more on the positive side), residents' perceptions of atmosphere (28.5= A more positive attitude), and residents' social self perception (15.47= Not too bad). Nevertheless, the study also revealed some problem areas within the educational environment.

**Conclusion:** Our study revealed that the post graduate medical residents enrolled in DRTP perceived a more positive than negative learning environment. Some low-scored areas identified when interpreting the results in more depth require further exploration to address the exact problems. The relatively small study population selected was the major limitation of the study and signifies that the study findings cannot be generalized.

*Keywords: Dundee ready education environment measure (DREEM); perception; environment; questionnaires; residents.*

## 1. INTRODUCTION

Dubai Residency Training Program (DRTP) [1] is competency based training program sponsored by Dubai Health Authority (DHA). The duration of training varies from four to six years depending up on the specialty. Current DRTP is being offered in eleven clinical specialties. DRTP's objectives are to develop a training program that will produce specialists who (1) are capable of practicing medicine independently to high international standards expertly, humanely and ethically and have achieved competency as a scholar, a collaborator, a communicator, a manager, a health advocate and as a professional, (2) can successfully compete for advanced fellowship training positions elsewhere.

Although DRTP is inducting many new residents each year and is being appreciated by peers and administrative staff but the perception of the trainees about the program has never been addressed. A training program should be focused on positive and healthy educational environment. The 'educational environment' defined as everything that happens within the classroom, department, faculty or university is crucial in determining the success of undergraduate medical education [2]. Genn has exemplified the educational environment by the following quote, "Considerations of climate in the medical school, along the lines of continuous quality improvement and innovation, are likely to further the medical school as a learning organization with the attendant benefits" [3].

## 2. METHODOLOGY

### 2.1 Research Design

An observational cross-sectional survey was applied in the conduct of our research. A total number of 60 residents from Dubai Residency Training Program (DRTP) in 2012 – 2014 participated in the study (response rate 98.3%, 1 participants did not return the questionnaire). This comprised of 33 residents from internal medicine discipline and 26 emergency medicine residents. Convenience sampling was used to source participants from each discipline. Inclusion criteria for participants were, a) being enrolled at Dubai Residency Training Program with Dubai Health Authority, b) able to provide consent to take part in the study, and c) having a working knowledge of the English language.

### 2.2 Tool (Instrument)

We utilized a modified version of Dundee Ready Education Environment Measure (DREEM) to measure educational environment at DRTP level. The DREEM inventory was originally developed and validated between 1994 and 1996 by a Delphi panel of nearly 100 medical and health profession educators from several countries who were enrolled in various courses in the Medical Education Centre in Dundee, Scotland. It is intended to be a universal and culture-free inventory. The DREEM has been used by masters registrars and doctoral registrars in all five continents [4]. It has been used to produce global readings and diagnostic analyses of undergraduate educational environments in medical schools and other health professions

institutes [5,6]. It is non-culturally specific and allows quality assurance comparisons between curriculums as well as within components of a curriculum. DREEM questionnaire has also been translated and applied in different learning environments in many countries [7,8,9].

### 2.3 Data Collection

The 50-item DREEM inventory has a maximum score of 200 indicating the ideal educational environment as perceived by the residents. Residents were asked to read each item carefully and to respond using a 5 point Likert-type scale ranging from strongly agree to strongly disagree. It is important that each resident was asked to apply the items to their own current learning situation and response to all 50 items. The DREEM paper-pencil questionnaire was distributed among residents by face-to-face interaction during various academic sessions in Rashid Hospital Dubai.

### 2.4 Procedures

An ethical approval was obtained from the Ethical & Research Review Board, Director DRTP and the Director Emergency Medicine Residency Program, Dubai Health Authority. The DREEM and demographic information questionnaire were distributed to residents towards the end of academic activities. A non-teaching member of staff facilitated the process and collected the completed surveys. All the participants received an explanatory statement detailing the study and its ethical approval and were informed that all data collected would remain anonymous.

## 3. DATA ANALYSIS AND THE STATISTICAL MODELS

### 3.1 Segmentation

We have divided students into 4 segments (R1, R2, R3, and R4) which will help us in getting the

results for the most efficient segment and which segment have chances of improving.

### 3.2 Classification

The four segments were further divided into two groups for each segment.

- 1- Internal Medicine
- 2- Emergency Medicine

### 3.3 Mean Analysis

We then implemented mean analysis for seeing the difference between the max score and the resident score.

$$1- \bar{X} = \frac{\sum_{i=1}^{i=n} X_i}{n}$$

However, equation 1 can only be used when the error associated with each measurement is the same or unknown. Otherwise, the weighted average, which incorporates the standard deviation, should be calculated using equation below.

$$2- X_{wav} = \frac{\sum w_i x_i}{\sum w_i}$$

$$w_i = \frac{1}{\sigma_i^2}$$

Where  $w_i$  and  $x_i$  is the data value.

## 4. RESULTS

### 4.1 Demographic Results

A total of 59 residents were offered the DREEM questionnaire. Tables and figures 1 and 2 reveals the demographic distribution according to the type of specialty, year of residency training and gender distribution.

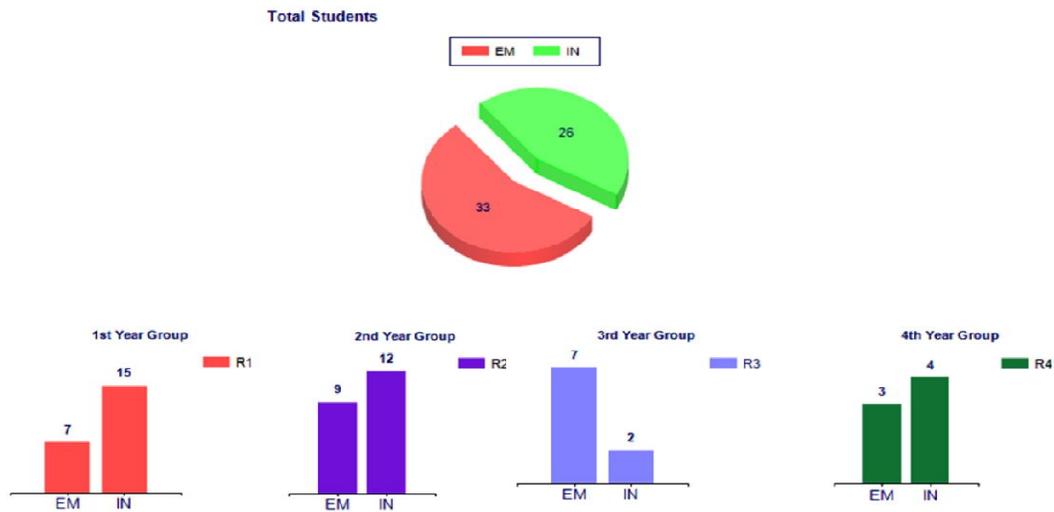
**Table 1. Demographic results of residents according to specialty and year of residency training**

Specialty	R1	R2	R3	R4
Internal medicine (n=26)	15	12	2	4
Emergency medicine (n=33)	7	9	7	3
All residents (n=59)	22 (37.28%)	21 (35.59%)	9 (15.25%)	7 (11.86%)

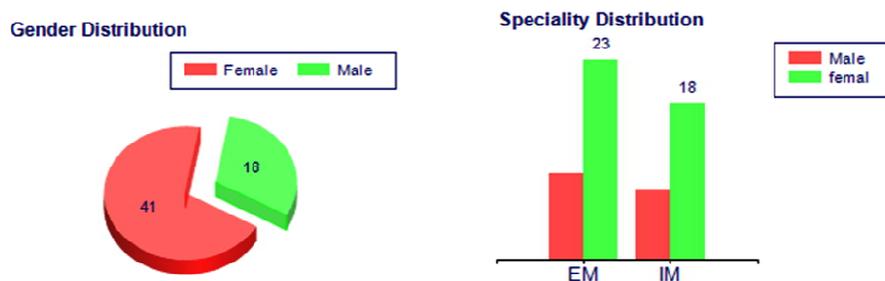
**Table 2. Demographic results of residents according to gender distribution**

Specialty	Male	Female
Internal medicine (n=26)	8	18
Emergency medicine (n=33)	10	23
All residents (n=59)	18 (30.5%)	41(69.5%)

DRTP=Dubai residency training program, R= Residency training year



**Fig. 1. Demographic results of residents according to specialty and year of residency training**



**Fig. 2. Demographic results of residents according to gender distribution**

#### 4.2 DREEM and Its Subclasses Results

The DREEM questionnaire addresses a range of topics directly relevant to educational environment and was found to be an internally reliable instrument for measuring residents' views of the educational environment at Dubai Residency Training Program (DRTP). We apply the Likert scale to answer all 50 items in DREEM questionnaire with a score of 4 for Strongly Agree, 3 for Agree, 2 for Uncertain, 1 for Disagree and 0 for Strongly Disagree. It is worth notice to see that 9 of the 50 items (numbers 4, 8, 9, 17, 25, 35, 39, 48 and 50) are negative

statements and are scored 0 for Strongly Agree, 1 for Agree, 2 for Uncertain, 3 for Disagree and 4 for Strongly Disagree. A score of 0 is the minimum and would be considered a very worrying result for DRTP. A score of 100 is interpreted as environment with variable responses and needs to be improved.

We further divided the entire DREEM questionnaire into 5 subclasses as suggested by McAleer and Roff [4]. These include Residents' perceptions of learning (12 items, maximum score 48), residents' perceptions of course organizers (11 items, maximum score 44),

residents' academic self perceptions (8 items, maximum score 32), residents' perceptions of atmosphere (12 items, maximum score 48), and residents' social self perception (7 items, maximum score 28). Table 3 and Fig. 3 show the overall DREEM score and the mean scores of all 5 subclasses in DRTP.

The results were interpreted with the guide shown in Table 4. The score were marked against the maximum scores of each class and analyzed in bold letters as found in our study.

Fig. 4 describes mean analysis for the values mentioned in the table above which gives us knowledge of the maximum mean score and the mean resident score. This will allow us to

conclude regarding the performance of students whose mean score is more than 55% for all the types DREEM subclass.

### 5. DISCUSSION

An overall score of 100 is interpreted as an environment which carries mixed and contradictory ideas that needs to be improved. In our study, we achieved an overall score of 116.7/200 (58.35%) which indicates that the DRTP carries more positive things than negative and the overall perception of educational environments is acceptable, though not excellent.

**Table 3. DREEM maximum score and residents' mean scores**

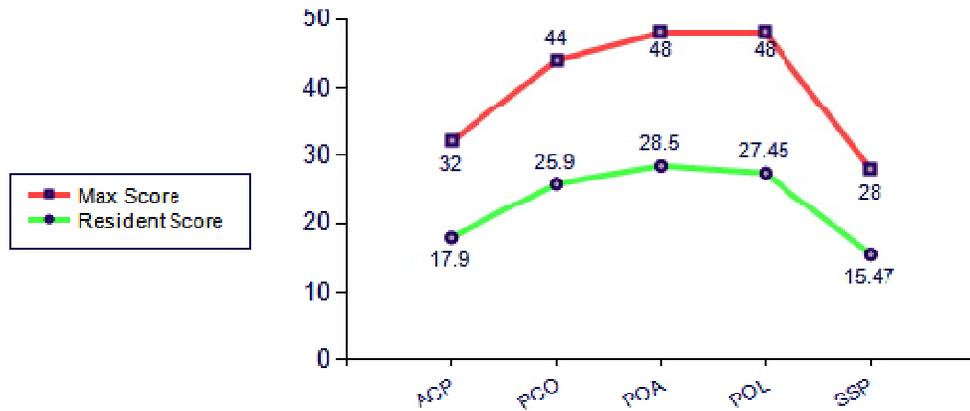
Scores	DREEM all items	Subclasses				
		POL	PCO	ACP	POA	SSP
Max scores	200	48	44	32	48	28
Residents' mean score	116.7	27.45	25.9	17.9	28.5	15.47
Percentage	58.35%	57.18%	58.86%	55.93%	59.37%	55.25%

*DREEM= Dundee Ready Education Environment Measure, POL: perception of learning, PCO: perception of course organizers, ACP: academic self perception, POA: perception of atmosphere, and SSP: social self perception*

**Table 4. Interpretation of DREEM overall and subclasses scores**

DREEM & its subclasses	Max score	Resident's mean score	Scores & categorization of subscales
<b>All items</b>	200	116.7	0 – 50 = Very poor 51 – 100 = Plenty of problems 100 – 150 = More positive than negative 151 – 200 = Excellent
<b>POL</b>	48	27.45	0 – 12 = Very Poor 13 – 24 = Teaching is viewed negatively 25 – 36 = A more positive perception 37 – 48 = Teaching highly thought of
<b>PCO</b>	44	25.9	0 – 11 = Abysmal 12 – 22 = In need of some retraining 13 – 33 = Moving in the right direction 34 – 44 = Model course organizers
<b>ACP</b>	32	17.9	0 – 8 = Feelings of total failure 9 – 16 = Many negative aspects 17 – 24 = Feeling more on the positive side 25 – 32 = Confident
<b>POA</b>	48	28.5	0 – 12 = A terrible environment 13 – 24 = There are many issues which need changing 25 – 36 = A more positive attitude 37 – 48 = A good feeling overall
<b>SSP</b>	28	15.47	0 – 7 = Miserable 8 – 14 = Not a nice place 15 – 21 = Not too bad 22 – 28 = Very good socially

**DREEM MEASURES**



**Fig. 3. DREEM maximum score and residents' mean scores**

**Mean Variance Analysis**



**Fig. 4. Mean variance analysis**

The DREEM subclasses scores are analyzed in Tables 4, 5 and Fig. 5. The residents' perception of learning (27.45/48) is more towards positive side, residents' perception of course organizers (25.9/44) reveals the training is moving towards right direction, residents' academic self-perception (17.9/32) is being felt more towards positive side, the perception of atmosphere (28.5/48) shows a more positive attitude, and the residents' social self-perception (15.47/28) is not too bad. All these results trend towards some acceptability but not towards excellence and ideal educational environment. This is due to the fact that the medical residents have very limited post graduate training opportunities in Dubai and DRTP is in early stages and the first batch started training four years ago. These results are

comparable with many other reported studies using the DREEM inventory [10,11,12,13,14].

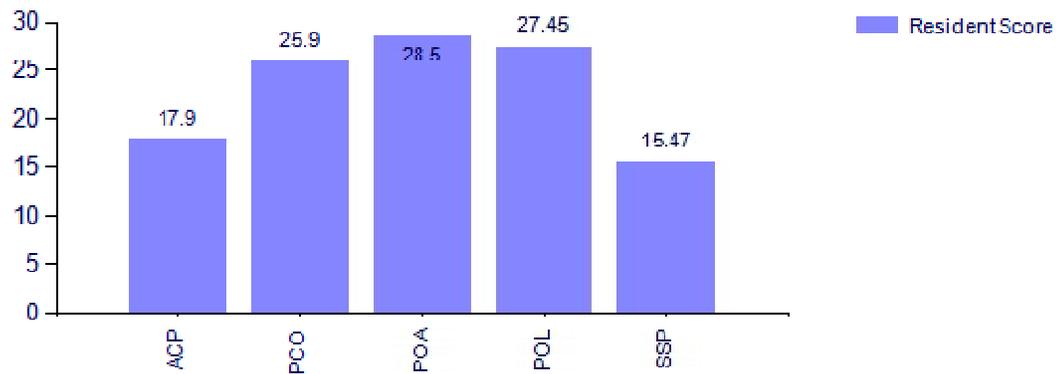
We also compared the DREEM subclasses scores between the internal medicine group and emergency medicine group as shown in Table 5 and Fig. 6. The residents' perception of learning, residents' academic self perception and residents' perception of atmosphere show the similar results with a more positive trend in both groups. This trend shows that the post graduate residents are generally satisfied on these fronts. On the other hand, the residents' perception of course organizers varies in two groups (21.8/44 vs. 30/44). The internal medicine group seems to be unhappy about course organizers and teachers and perceive that they need some

retraining. This perception is due the fact that most of the clinical faculty is not trained and developed. The assigned faculty is more committed towards their patient-centered duties rather than academic focused activities. The post-graduate residents' social self-perception is also different in two groups and the internal medicine group feels that the training place is not nice compare to emergency medicine group which feels that the place is not too bad (14/28 vs. 17/28). This negative perception about social environment among internal medicine residents is logical. Most of the academic activities are organized by emergency medicine faculty because they have adequate resources and logistics, their newly built physical space is more conducive to learning, and they have locum and

permanent faculty all across the globe. The internal medicine group, on the other hand is dealing mostly the local faculty, and old physical classrooms and wards.

There are many factors which drive post-graduate residents unsatisfied about their academic self-perception which is towards downward trend in our study. One of the factors is multi-cultural society in Dubai and this limits the strong social and academic relationship to develop at the training place. Other factors like unclear exit degree, long duration of training (average 5 years), shortage of medical educators, and frequent changing and job termination of clinical faculty further compound the problem.

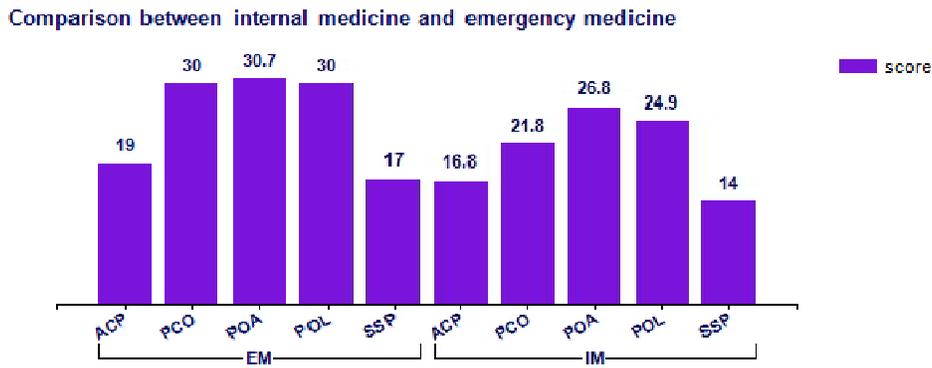
**Subclasses and theirs scores**



**Fig. 5. DREEM subclasses and theirs mean scores**

**Table 5. Comparison between internal medicine and emergency medicine residents**

Specialty	Perceptions of learning (POL)	Perceptions of course organizers (PCO)	Academic self perceptions (ACP)	Perceptions of atmosphere (POA)	Social self perceptions (SSP)
Internal Medicine Residents	24.9 <i>A more positive perception</i>	21.8 <i>In need of some retraining</i>	16.8 <i>Feeling more on positive side</i>	26.8 <i>A more positive attitude</i>	14 <i>Not a nice place</i>
Emergency Medicine Residents	30 <i>A more positive perception</i>	30 <i>Moving in the right direction</i>	19 <i>Feeling more on positive side</i>	30.7 <i>A more positive attitude</i>	17 <i>Not too bad</i>
All Residents	27.45 <i>A more positive perception</i>	25.9 <i>Moving in the right direction</i>	17.9 <i>Feeling more on positive side</i>	28.5 <i>A more positive attitude</i>	15.47 <i>Not too bad</i>



**Fig. 6. Comparison of DREEM scores between internal medicine and emergency medicine residents**

The DREEM inventory can also be used to address more specific strengths and weaknesses within the educational environment by looking at the responses to individual items. The scoring for each item ranges 0 – 4, and a mean score of 3.5 or over is taken as a real positive score. Any item with a mean of 2 or less indicates a problem and should be addressed aggressively. The items with a mean of 2 – 3 are the areas which should be improved. In our study, 9 out of 50 items were score less than 2 and this is a strenuous challenge to DRTP and must be addressed to enhance the perception of educational environment. Table 6 shows the DREEM individual items scores according to specialty, year of residency training and gender distribution. The items scores which are marked bold indicate a score of less than 2 and recommended to address vigorously.

The mean scores of individual item provided us a great opportunity to look into certain weaknesses and strength in educational environment offered by DRTP. In our study 9 out of 50 DREEM items are perceived negatively by the post graduate residents at DRTP. This finding is itself alarming and poses many questions to course organizers and faculty involved. Two items i.e. the teaching is often simulating (mean score 1.95), and the teaching over emphasizes factual learning (mean score 1.89) is perceived by the residents as a weakness and lot of improvement is needed. This shows that the faculty is not up to mark to address the dynamics of students centered learning, simulation and factual learning. These findings are consistent with the findings of Mayya and Roff [11].

Additional the individual item “The course organizers are authoritarian” (mean score 1.89)

is also perceived negatively by the residents and again it reflects the faculty and the course organizers are influenced by other forces like strong political administrative discipline than the learning environment. The item addressing the learning strategies which worked for residents before continue to work for them now (mean score 1.86) explains that the residents are finding difficulties to cope with new learning strategies at DRTP and such strategies need to be revised. Memory related item “I am able to memorize all I need” (mean score 1.69) is very much expected because the residents are more into training program at post graduate level rather than learning in medical school. This means score of 1.69 is the lowest-scored item as observed in other published articles [15,10,16,17]. The residents also feel that the enjoyment outweighs the stress of the course (mean score 1.96) which emphasize the level of stress in their learning environment and they feel that they are too tired to enjoy the course (mean score 1.82). Because of such stresses and tiredness, they seldom feel lonely (mean score 1.92). It is worth noticing that none of the item score 3 and above. This indicates that we are far behind the excellence and there are many issues which need to improve in enhancing the education environment in DRTP.

The overall result (58.35%) in our study seems to be encouraging and is just comparative to some other studies done worldwide [10,16,17] as seen in Table 7. Among all the DREEM studies, the one accomplished by Roff et al. [4] reveal the best results 69.50%as compared to Till [12] that shows the lowest overall (48.5%) result. Similar trend is observed in all five DREEM subclasses and the results in our study are not too bad.

**Table 6. DREEM individual items scores according to specialty, year of residency training and gender distribution**

Sub-class	DREEM items	Int. Med (n=26)	Em. Med (n=33)	Mean (n=59)	
POL	I am encouraged to participate during teaching sessions	2.75	3.15	2.95	
	<b>The teaching is often stimulating</b>	<b>1.90</b>	<b>2.0</b>	<b>1.95</b>	
	The teaching is resident centered	1.72	3.07	2.39	
	The teaching helps to develop my competence	2.39	3.07	2.73	
	The teaching is well focused	1.75	2.46	2.10	
	I feel I am being well prepared for my profession	1.93	2.11	2.02	
	The teaching time is put to good use	2.15	2.53	2.34	
	<b>The teaching over emphasizes factual learning</b>	<b>2.03</b>	<b>1.76</b>	<b>1.89</b>	
	I am clear about the learning objectives of the course	2.06	2.19	2.12	
	The teaching encourages me to be an active learner	1.81	2.61	2.21	
	Long term learning is emphasized over short term learning	2.12	2.73	2.42	
PCO	The teaching is too teacher centered	2.24	2.26	2.25	
	The course organisers are knowledgeable	2.69	3.42	3.05	
	The course organisers espouse a patient centered approach to consulting	2.12	2.50	2.31	
	The course organisers ridicule the registrars	1.81	2.61	2.21	
	<b>The course organisers are authoritarian</b>	<b>1.90</b>	<b>1.88</b>	<b>1.89</b>	
	The course organisers have good communication skills with patients	2.51	2.96	2.73	
	The course organisers are good at providing feedback to registrars	1.87	2.34	2.10	
	The course organisers provide constructive criticism here	1.78	2.34	2.06	
	The course organisers give clear examples	2.30	2.84	2.57	
	The course organisers get angry in teaching sessions	2.63	3.23	2.93	
	The course organisers are well prepared for their teaching sessions	2.15	2.92	2.53	
ACP	I feel able to ask the questions I want	2.33	2.96	2.64	
	<b>Learning strategies which worked for me before continue to work for me now</b>	<b>2.12</b>	<b>1.61</b>	<b>1.86</b>	
	I am confident about my passing this year	2.18	2.34	2.26	
	The teaching helps to develop my confidence	2.24	2.84	2.54	
	Last year's work has been a good preparation for this year's work	1.93	2.53	2.23	
	<b>I am able to memorize all I need</b>	<b>1.66</b>	<b>1.73</b>	<b>1.69</b>	
	I have learnt a lot about empathy in my profession	2.45	2.53	2.49	
	My problem solving skills are being well developed here	1.66	2.65	2.15	
	Much of what I have to learn seems relevant to a career in healthcare	2.57	2.76	2.66	
	POA	The atmosphere is relaxed during consultation teaching	2.18	2.61	2.39
		This course is well timetabled	1.78	2.34	2.06
Cheating is a problem on this course		2.51	2.61	2.56	
The atmosphere is relaxed during lectures		2.72	2.73	2.72	
There are opportunities for me to develop interpersonal skills		2.54	2.76	2.65	
I feel comfortable in teaching sessions socially		2.42	2.61	2.51	
The atmosphere is relaxed during seminars / tutorials		2.66	2.92	2.79	
I find the experience disappointing		1.75	2.30	2.02	
36. I am able to concentrate well		2.27	2.76	2.51	
<b>The enjoyment outweighs the stress of the course</b>		<b>1.66</b>	<b>2.26</b>	<b>1.96</b>	
The atmosphere motivates me as a learner		1.72	2.53	2.12	

	The registrars irritate the course organizers	2.57	2.19	2.38
	<b>3. There is a good support system for residents who get stressed</b>	<b>1.33</b>	<b>2.03</b>	<b>1.68</b>
	<b>4. I am too tired to enjoy the course</b>	<b>1.69</b>	<b>1.96</b>	<b>1.82</b>
<b>SSP</b>	14. I am rarely bored on this course	1.84	2.30	2.07
	15. I have good friends on this course	2.12	3.50	2.81
	19. My social life is good	2.60	2.73	2.66
	<b>28. I seldom feel lonely</b>	<b>2.12</b>	<b>1.73</b>	<b>1.92</b>
	46. My accommodation is pleasant	2.24	2.69	2.46

**Table 7. Comparison of DREEM scores at Dubai residency training program with other studies**

DREEM	Dundee [4]	Nepal [10]	Nigeria [10]	Trinidad [11]	Canada [12]	KSA [13]	Sri Lanka [2]	Dubai
TP	n=7905	n=86	n=127	n=106	n=407	n=450	n=151	59
All items (%)	69.50	65.00	59.0	55.0	48.5	51.1	53.72	58.35
POL (%)	70.83	68.75	68.8	58.3	39.6	45.8	55.98	57.18
PCO (%)	65.91	59.09	59.1	53.6	54.5	45.5	51.68	58.86
ACP (%)	71.88	68.75	65.6	58.8	46.9	53.1	56.94	55.93
POA (%)	72.92	66.67	56.3	52.2	52.1	47.9	51.50	59.37
SSP (%)	71.43	64.24	46.4	51.6	53.6	53.5	53.11	55.25

TP=total participants

Considering the findings from our study, the following assumption can be made about the educational environment with DRTP:

1. The overall educational environmental shows more positive than negative with an ample room for improvement.
2. The teaching is generally good in our DRTP and the teachers are very cooperative, well-prepared, but they are overloading the students with factual information and the teaching at times is not stimulating.
3. The residents are confident to excel in their academics but they feel that they have to learn new strategies the meet the challenges of post-graduate training. They feel that memory plays less role as compared to past studies.
4. The residents feel the environment is conducive for learning but sometimes the enjoyment outweighs the stress of the course
5. Residents' social life is good at DRTP but occasionally they feel bored.

## 6. CONCLUSION

DREEM questionnaire is a reliable, valid and sensitive tool capable of measuring the educational environment including the post graduate medical training programs anywhere in the world. Our study revealed that the post

graduate medical residents enrolled in DRTP perceived a "more positive than negative" learning environment. Some low-scored areas identified when interpreting the results in more depth require further exploration to address the exact problems.

## 7. LIMITATIONS

The major limitation with our study is the small sample size (59 participants only) so the results cannot be generalized [18].

## 8. STRENGTHS

In addition to overall DREEM and its subclasses results, we explore the individual items to understand the educational environment in more depth.

## 9. RECOMMENDATIONS

1. DREEM can be used as a monitoring tool that might permit timely interventions to improve the problematic educational environments<sup>14</sup>.
2. DREEM can also be used with modifications to suit regional, cultural and contextual settings.<sup>6</sup>
3. Similar study can be done in other residency training program within UAE or outside and the results can be compared.

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## CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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