Medical Interns' Perspectives on the Educational Environment in Cardiology and Dermatology Settings at an Iranian University

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Abstract- The quality of the educational environment is one of the key determinants of students' learning experiences and academic performance. This study aimed to assess medical interns' perceptions of the educational environmental quality in dermatology and cardiology wards at Ahvaz Jundishapur University of Medical Sciences (AJUMS). A descriptive cross-sectional design was employed, utilizing the Dundee Ready Education Environment Measure (DREEM) and the Ambulatory Care Learning Educational Environment Measure (ACLEEM). Data was analyzed using SPSS version 24, employing parametric tests for statistical analysis, including independent t-tests and Pearson's correlation. Among 146 questionnaires distributed, 123 were completed (84% response rate) out of which 54.5% were female, 78.9% single, and mean age was 25.80±1.299 years. The total mean DREEM score was 119.03±23.71, indicating a moderate educational environment, with dermatology scoring significantly higher than cardiology (P<0.05). The total mean ACLEEM score was 104.92±27.03, with dermatology rated as optimal and cardiology as semi-optimal (P<0.05). Significant differences were noted in perception of learning, teachers, and atmosphere. Married interns had more positive perceptions. Age was mildly correlated with DREEM scores. While the educational environment in dermatology and cardiology wards at AJUMS is perceived as relatively favorable, the outpatient cardiology clinic requires significant improvements. Key areas requiring improvement included faculty engagement, feedback mechanisms, and infrastructural support.

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Introduction

Medical education, as a foundational component of the healthcare system, plays a crucial role in shaping a professional competence and directly influences the quality of patient care (1). The clinical learning environment is pivotal in this process, serving as the bridge between theoretical knowledge and practical application, where interns cultivate essential clinical skills such as history taking, physical examination, and diagnostic reasoning (2).

The quality of this environment- shaped by factors like faculty supervision, educational resources, and case diversity- significantly impacts learning effectiveness, student motivation, and professional growth (3,4). Consequently, well-structured clinical programs that ensure diverse patient exposure, active learning, and constructive feedback are imperative for effective training (5).

The markedly different clinical landscapes of

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dermatology (largely outpatient and chronic) and cardiology (often inpatient and acute) necessitate distinct educational approaches. Understanding intern perceptions across these specialties is therefore essential for tailoring effective training ensuring clinical competency (6).

Several studies have underscored the significance of evaluating medical students' perceptions of their clinical learning environments, as these perceptions directly correlate with academic performance, professional competency, and overall satisfaction with medical training (7). Despite growing attention to educational evaluation, few studies have directly compared inpatient wards and outpatient clinics, and such comparisons in Iran- especially in dermatology and cardiology rotations- are particularly scarce. Although validated instruments such as Dundee Ready Education Environment Measure (DREEM) for inpatient settings and Ambulatory Care Learning Educational Environment Measure (ACLEEM) for outpatient clinics are widely used, their simultaneous application in a single comparative study is rare (8,9).

This gap underscores the need for research examining learners' perceptions across these contrasting environments. Therefore, this study aimed to compare medical interns' perceptions of the educational environment in dermatology and cardiology departments at Ahvaz Jundishapur University of Medical Sciences (AJUMS) using both DREEM and ACLEEM, providing evidence to support educational improvement and reform.

Materials and Methods

Study design

This study employed a descriptive cross-sectional design to assess the educational environment in inpatient wards and outpatient clinics of dermatology and cardiology at AJUMS teaching hospitals from the perspective of medical interns at Jundishapour University of Medical Sciences (AJUMS).

Participants

All medical interns who graduated at the end of the 2023-2024 academic year (N=146) were invited to participate. Inclusion criteria included attending and completing both the Cardiology and Dermatology courses in AJUMS affiliated hospitals, and a willingness to participate in the research. Questionnaires, with at least 10% of questions left unanswered and unwillingness to complete the questionnaire, were considered for exclusion criterion. Participation in this study was voluntary, and all responses were anonymized. No personally identifiable information was collected, and data was used solely for statistical analysis. Prior to completing the questionnaires, all participants were informed about the study's objectives and the significance of their contributions and informed consent was obtained.

Data collection

Two validated instruments, the Dundee Ready Education Environment Measure (DREEM) and the Ambulatory Care Learning Educational Environment Measure (ACLEEM) were utilized.

The questionnaires were sent to the students on an Online Survey Software (Porsline) via electronic invite links between 15th October and 20th November 2024. To minimize the possibility of non-response bias, invite links were sent again to the participants as reminder.

DREEM questionnaire

The DREEM questionnaire, developed by Roff *et al.*, (1997) at the Centre for Medical Education, University of Dundee, is widely used to assess medical students' perceptions of their educational environment (10). It consists of 50 items categorized into five domains:

1. Perceptions of Learning (12 items)
2. Perceptions of Teachers (11 items)
3. Academic Self-Perception (8 items)
4. Perceptions of the Educational Atmosphere (12 items)
5. Social Self-Perception (7 items)

Each item is rated on a five-point Likert scale (0-4), with total scores ranging from 0 to 200. Scores are interpreted as follows**:** 0-100 (very poor educational environment), 101-150 (moderate environment), and 151-200 (excellent environment) (4).

The Persian version of the DREEM questionnaire was validated by Mohammadi *et al*., and demonstrated high reliability, with a Cronbach's alpha coefficient of 0.88 (11).

ACLEEM questionnaire

The ACLEEM questionnaire was developed by Riquelme *et al*., at Pontificia Universidad Católica de Chile in collaboration with the University of Dundee to assess the educational climate in ambulatory settings, particularly for medical residents (12). It consists of 50 items across eight domains:

6. Clinical Faculty Capability (12 items)
7. Clinical Learning and Patient Care (11 items)
8. Time Allocation for Non-Clinical Activities (5

items)
9. Infrastructure (6 items)
10. Clinical Skills Development (6 items)
11. Assessment and Feedback (4 items)
12. Information, Communication, and Technology (3 items)
13. Clinical Supervision (3 items)

Responses are rated on a five-point Likert scale (0-4), with total scores ranging from 0 to 200, categorized as: 0-50 (unsatisfactory), 51-100 (semi-optimal), 101-150 (optimal), and 151-200 (highly satisfactory) (13).

The ACLEEM questionnaire was translated and culturally adapted for use in Iran by the Tehran University of Medical Sciences, with a reported Cronbach's alpha of 0.936, indicating excellent internal consistency (13). Additional validation studies, such as Salajegheh *et al*., confirmed a Cronbach's alpha of 0.8 (14).

Statistical analysis

Data was analyzed using SPSS version 24. Descriptive and inferential statistics were applied to interpret the findings. Normality of data distribution was assessed using the Kolmogorov-Smirnov test, confirming a normal distribution (P>0.05). Consequently, parametric tests, including independent t-tests and Pearson's correlation, were used for data analysis.

This study was authorized by the Shahid Beheshti University of Medical Sciences ethics committee board (the Ethical Approval Code IR.SBMU.SME.REC.1403.056).

Results

Of the 146 distributed questionnaires, 123 met the inclusion criteria and were fully completed, yielding a response rate of 84%. Among the respondents, 45.5% were male and 54.5% were female. Regarding marital status, 78.9% were single, and 21.1% were married. The mean age of the participants was 25.80±1.299 years (Table 1).

Table 1. Distribution of the participants' demographic characteristics

Variables	Categories	Frequency (n=123)	Percentage
Gender	male	56	45.53
	female	67	54.47
Age group	<25	14	11.38
	25-26	82	66.67
	27 & above	27	21.95
Marital status	single	97	78.86
	married	26	21.14

The total mean score of DREEM for both wards was 119.03±23.71 out of 200, which represents 59.5% of the total possible score. The cardiology ward had a mean score of 114.43±22.55, while the dermatology ward had a significantly higher mean score of 123.62±24.03 (P<0.05). The mean score of each of the five subscales of the DREEM questionnaire is as shown in Table 2.

A detailed analysis of the DREEM subscales revealed significant differences between the two wards. The dermatology ward scored significantly higher in perception of learning, perception of teachers, and perception of the educational atmosphere, indicating a more favorable clinical learning environment.

Table 2. Comparison of DREEM and ACLEEM Subscales Mean Scores between Cardiology and Dermatology inpatient Wards and Outpatient Clinics

Subscale		Cardiology (M±SD)	Dermatology (M±SD)	*P*
DREEM	Perception of Learning	24.65 ± 6.91	28.47 ± 7.44	<0.001
	Perception of Teachers	26.97 ± 4.81	28.60 ± 4.89	0.009
	Academic Self-Perception	17.98 ± 5.38	19.11 ± 5.48	0.105
	Perception of Atmosphere	28.47 ± 6.23	30.27 ± 6.01	0.022
	Social Self-Perception	16.35 ± 3.69	17.16 ± 3.98	0.102
	Total Score	114.43 ± 22.55	123.62 ± 24.03	0.002
ACLEEM	Clinical Faculty Capability	26.07 ± 7.60	30.34 ± 7.69	<0.001
	Clinical Learning & Patient Care	22.73 ± 7.44	24.00 ± 7.22	0.174
	Time Allocation for Non-Clinical Activities	8.36 ± 4.23	10.73 ± 4.31	<0.001
	Infrastructure	11.34 ± 3.62	11.61 ± 3.22	0.528
	Clinical Skills Development	15.55 ± 4.20	16.42 ± 4.05	0.100
	Assessment & Feedback	5.91 ± 3.18	7.14 ± 3.60	0.005
	Information & Technology	5.35 ± 2.10	5.73 ± 1.97	0.152
	Clinical Supervision	4.10 ± 2.18	4.39 ± 2.22	0.312
	Total Score	99.43 ± 26.88	110.40 ± 26.16	0.001

Abbreviations: M, Mean; SD, standard deviation

The total mean score of ACLEEM across both wards was 104.92±27.03, corresponding to 52.46% of the total score. The cardiology outpatient clinic had a mean score of 99.43±26.88, classified as a semi-optimal learning environment, whereas the dermatology clinic had a significantly higher score of 110.40±26.16, categorized as optimal (P<0.05). Comparison of ACLEEM subscales scores between the two clinics revealed significant differences in clinical faculty capability, time allocation for non-clinical activities, and assessment & feedback, where dermatology clinics were rated higher (Table 2).

The frequency distribution of total scores categorized into different levels is shown in table 3.

Table 3. Frequency distribution of total scores

Overall Score Interpretation		Frequency	Percentage
DREEM	Very Poor (0-100)	49	19.9
	Moderate (101-150)	179	72.8
	Excellent (151-200)	18	7.3
ACLEEM	Unsatisfactory	11	4.5
	semi-optimal	95	38.6
	optimal	133	54.1
	highly satisfactory	7	2.8

Correlations of total mean scores with Demographic Variables are shown in table 4. No significant differences were found between male and female interns regarding their perceptions of the educational environment (P>0.05). Married interns had significantly higher scores in both wards (P<0.05), particularly in dermatology inpatient settings. A weak but significant correlation was found between age and the total DREEM score (r=0.139, P=0.030).

Table 4. Correlations with Demographic Variables

Variables		Gender		*P*	Marital status		*P*	Age (r)	*P*
		Male	Female		Single	Married			
DREEM Score (M±SD)	**T**	121.48±24.45	116.98±22.96	0.139	116.59±23.58	128.13±22.09	**0.002**	0.139	**0.030**
	C	115.03±23.25	113.94±22.11	0.790	112.78±23.02	120.61±19.91	0.116	0.122	0.180
	D	127.92±24.10	120.02±23.55	0.069	120.40±23.64	135.65±21.95	**0.004**	0.160	0.078
ACLEEM Score (M±SD)	**T**	107.88±27.22	102.44±26.73	0.117	103.22±27.81	111.26±23.08	0.056	0.047	0.463
	C	101.12±27.12	98.02±26.80	0.527	98.22±27.97	103.96±22.23	0.336	0.022	0.811
	D	114.64±25.83	106.86±26.11	0.101	108.21±26.86	118.57±21.95	0.073	0.075	0.410

Abbreviations: M, Mean; SD, standard deviation; r, Pearson correlation coefficient; T, total; C, Cardiology; D, Dermatology

Discussion

The quality of the educational environment is one of the key determinants of students' learning experiences and academic performance (15). This study aimed to assess the educational environment in dermatology and cardiology wards at Jundishapur University of Medical Sciences (AJUMS) from the perspective of medical interns, using two validated instruments, the DREEM and ACLEEM questionnaires. This was the first study to evaluate the clinical educational environment of these wards from interns' perspectives utilizing these two tools.

The overall mean scores of DREEM for the inpatient cardiology and dermatology wards indicate a moderate to relatively favorable educational environment in both wards. Dermatology wards consistently scored higher than cardiology wards in both DREEM and ACLEEM assessments, suggesting a more favorable educational environment. Significant differences were observed in perception of learning, teachers, and atmosphere, with dermatology performing better. Although the interns' perceptions of these clinical settings were more positive

than negative, the findings suggest that these environments still require significant improvements to reach an ideal level. Studies conducted in medical schools in the United Kingdom, Australia, and Sweden have reported higher DREEM scores compared to the current study (16-18), whereas other studies from countries such as Iran, India, Kuwait, Sri Lanka, and Brazil have reported scores within a similar range (19-23). These variations may be due to differences in educational curricula, cultural and institutional factors, and the extent of active learning methods implemented in various medical schools. Among the DREEM subscales, the highest mean score was observed for the perception of teachers, whereas the lowest was for the perception of learning, indicating the need for enhanced teaching strategies and engagement in active learning.

The total mean scores of ACLEEM for the outpatient dermatology and cardiology clinics indicate that while the educational environment in the dermatology clinic was above average and classified as optimal, the cardiology clinic was rated as semi-optimal. Interns rated their supervisors and feedback mechanisms higher in dermatology compared to cardiology. Arjmand *et al*., conducted a similar study in AJUMS, reporting a semi-optimal educational environment in internal medicine and pediatrics clinics (24). One possible explanation for the dermatology clinic's relatively higher score is the nature of dermatology education, which primarily involves outpatient care. Since most dermatology cases are managed on an ambulatory basis, interns have fewer inpatient responsibilities, allowing them greater opportunities to engage in clinical learning. The significant variability between different departments within the same medical faculty underscores the necessity of assessing each clinical department separately.

Regarding the ACLEEM subscales, interns reported the lowest scores in areas related to non-clinical activities, infrastructure, assessment and feedback, information technology, and clinical supervision. These findings align with those of Arjmand *et al*., and Riquelme *et al*., both of which found that the lowest-rated domains in ACLEEM were related to supervision and feedback (12,24). Although faculty members in dermatology and cardiology were perceived as clinically competent and effective communicators, they were rated lower in terms of providing structured feedback, defining clear educational objectives, and employing diverse teaching strategies. Moreover, infrastructural deficiencies were also highlighted, with suboptimal physical environments in clinical settings negatively impacting the interns' learning experience.

These results highlight the need for targeted improvements in clinical teaching strategies, faculty engagement, and resource allocation to enhance the educational environment, particularly in cardiology wards.

A noteworthy finding in this study was the discrepancy between inpatient and outpatient educational environments within the same specialty. While the inpatient cardiology ward received a relatively favorable rating according to the DREEM questionnaire, the outpatient cardiology clinic was rated as semi-optimal based on the ACLEEM questionnaire. This disparity highlights the importance of evaluating inpatient and outpatient clinical settings separately with appropriate tools. A plausible explanation for this difference is that medical interns spend more time in inpatient settings due to the workload and patient volume, leading to limited exposure in outpatient settings. Additionally, outpatient subspecialty cardiology clinics may focus on advanced topics that are less relevant to general medical practice, potentially diminishing interns' perceived educational value.

No significant gender differences were observed in interns' perceptions of the educational environment. This finding is consistent with previous studies conducted by Riquelme *et al.*, Ahmady *et al.*, and Haque *et al*., which reported no significant gender-based differences in educational environment scores (12,25,26). However, Arjmand *et al*., reported significant gender differences in perceptions of clinical education at AJUMS (24). One potential explanation for this variation is the longer duration of major clinical rotations compared to minor ones, which may result in greater gender-based differences in perception. Additionally, the absence of gender disparities in the present study suggests that there is no significant gender bias in the educational experience provided by the cardiology and dermatology departments. However, Mousavi *et al*., found significant gender differences in their study, attributing this to a higher tendency for critical evaluation among female students (27).

Furthermore, although married interns had slightly more positive perception scores compared to their single counterparts, a statistically significant difference was observed only in the dermatology inpatient ward based on the DREEM questionnaire. Consistent with the study conducted by Eftekharian *et al.*, no significant correlation was found between age and educational environment perception scores, except mild correlation with DREEM scores indicating that older interns tended to have slightly more positive perceptions of their educational

environment (28).

Given the impact of the educational environment on student satisfaction and learning outcomes, continuous assessment and feedback collection from students regarding their perceptions of clinical education is essential. The evaluation of clinical education quality is an integral part of curriculum improvement, enabling educators to identify weaknesses and implement necessary modifications. Since multiple factors influence students' perceptions of the learning environment, improving any of these aspects could contribute to an overall enhancement of clinical education quality. Findings from this study will serve as a valuable resource for academic policymakers and medical educators in refining curricula and improving the overall educational experience for medical trainees.

According to the results of the present study, these findings can inform educational reforms in clinical training. The higher DREEM and ACLEEM scores in dermatology, compared with the semi-optimal status of cardiology clinics, suggest that improvement plans should not be limited to general institutional policies but should be tailored to the specific conditions of each department, including workload and organizational structure. In cardiology, where heavy service demands may reduce protected teaching time and limit structured feedback, curriculum planners should consider defining clearer learning objectives for both inpatient and outpatient rotations, reducing the number of learners in crowded clinics, and allocating fixed time for case discussion and formative feedback. In dermatology where the educational climate was more favorable, interventions may focus on maintaining and further strengthening existing strengths, for example through continued use of active, patient-centered teaching and ensuring adequate clinical exposure for all interns. In both specialties, faculty development programs that emphasize ambulatory teaching skills and effective feedback, together with considering teaching performance in promotion and evaluation processes, can help reinforce an educationally oriented culture. At the institutional level, regular application of tools such as DREEM in wards and ACLEEM in clinics as part of routine quality assurance would allow departments and curriculum committees to monitor changes in the educational environment over time and design targeted interventions to enhance both learning and patient care.

The findings of this study indicate that the educational environment in the inpatient dermatology and cardiology wards and the outpatient dermatology clinic at AJUMS was perceived as relatively favorable by medical interns. However, the outpatient cardiology clinic was rated as semi-optimal, suggesting room for improvement. Despite the generally acceptable educational climate, there are several areas that require attention, including faculty engagement in teaching, structured feedback provision, and physical infrastructure enhancement.

Given the observed differences in educational quality across various departments and between inpatient and outpatient settings, it is recommended that medical schools conduct separate assessments for different clinical settings using specialized evaluation tools. Furthermore, future studies should include faculty members, residents, and externs in evaluating the educational environment to obtain a comprehensive understanding of clinical education quality.

Limitations

This study has several limitations that should be considered when interpreting its findings. First, the cross-sectional design precludes the establishment of casual relationships between variables. Second, the reliance on self-reported data through questionnaires may be subject to recall biases. Third, the study was conducted at a single medical university, which may limit the generalizability of the findings to other institutions with different educational structures and cultural contexts. However, the use of validated instruments and the high response rate (84%) strengthen the internal validity of our results. Future multi-center studies incorporating qualitative methods could provide deeper insights into the factors influencing educational environments across different settings.

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