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The Quality of Clinical Education Environment Based on the DREEM Model in Medical Universities of Iran from Students and Professors' Perspective; Systematic Review and Meta-analysis

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Abstract

Background: Appropriate and desirable learning outcomes and achievements are positively associated with desirable aspects of psycho-social learning environments; that is, the best environment gives the best results. The learning environment in medical education is one of the most essential elements that determine the success of an efficient curriculum. Education in hospital departments provides unique opportunities for students to learn through the use of various strategies and different teaching styles. The purpose of this study is a systematic review and meta-analysis regarding the quality of the clinical education environment based on the DREEM model.

Methods: This study employed a systematic review and meta-analysis approach. All articles related to the quality of the clinical education environment (educational climate) based on the DREEM model in Iran were searched in 8 databases, collected, and evaluated for quality. Finally, 19 articles were analyzed using Comprehensive Meta-Analysis software.

Results: Overall, 190 studies were identified, of which 115 records were screened and 39 were selected and included in the review. Finally, 30 studies comprising 2 psychometric studies of varying quality, provided data on the total score of the DREEM questionnaire and were included in the meta-analysis. The effect measure was the mean of reported scores. The pooled total score was 119.18 out of 200 (95% CI, 112.09-126.26). The highest score was observed in "perception of learning" (28.33, 95% CI, 25.96-30.70), and the lowest score was observed in "social self-perception" (17.52, 95% CI, 16.45-18.74).

Conclusion: This is the first systematic review and meta-analysis study in the Islamic Republic of Iran, which has determined the overall situation regarding the quality of the educational climate based on the DREEM model. The results show that the total score is slightly higher than 50%, indicating that social self-perception requires further national planning for improvement.

Keywords: Systematic Review, Meta-analysis, Educational Climate, Quality of Education Environment, DREEM Model, Medical University

Conflicts of Interest: None declared
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Introduction

Learning environments are composed of elements that are meaningful together, and the characteristics and qualities of each are effective in shaping different behaviors (1). Appropriate and desirable learning outcomes and achievements are positively associated with desirable aspects of psycho-social learning environments; that is, the

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↑What is "already known" in this topic:
The DREEM questionnaire assesses the educational environment in health programs, highlighting strengths and weaknesses.

→What this article adds:
This study is the first to assess the clinical education environment in Iran, focusing on perceptions from students and professors in medical sciences universities. The overall score was slightly above 50%, indicating significant room for improvement. The highest score was in "perception of learning," while the lowest were in "social self-perception" and "academic self-perception." The results emphasize the need for effective educational methods and suggest reorienting policies to enhance mental well-being and reduce stress for both professors and students.

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best environment gives the best results (2). The learning environment in medical education is one of the most essential elements that determine the success of an effective curriculum (3). The evidence suggests that an individual's understanding of the learning environment has a significant impact on the educational outcomes of the learning atmosphere (4). It is worth noting that the academic climate is a multidimensional category that affects learners, teachers, staff, and other stakeholders. Additionally, the educational environment has a profound impact on the psychological and social development of students. The academic atmosphere and the quality of teaching and learning are a function of the physical, intellectual, and psychological environment; thus, creating a positive atmosphere provides a strong foundation for student development (5, 6).

Clinical education forms a fundamental and essential part of medical education and is considered the primary source of learning, shaping medical students' professional identity (7). Hospital wards are not always the ideal environment for training; however, a suitable place can be created. Education in hospital departments offers unique opportunities for students to learn through the use of various strategies and diverse teaching styles (8). One of the models used to evaluate the educational environment is the DREEM model, which is employed to diagnose curricular problems, assess the effectiveness of academic changes, and identify the gap between the actual and desired environments (9).

To date, several studies have been conducted on the educational environment using this model in Iran. Evaluation of the academic environment from the perspective of clinical psychology students of the Islamic Azad University of Tehran Medical Sciences (10), a study in Kerman on the views of interns and medical assistants (11) and professors (12) about their learning environment, a survey of Golestan medical students (13), a study on undergraduate students in the operating room of Iran University of Medical Sciences (14), as well as a comparison of different clinical departments in the Faculty of Dentistry from the perspective of specialized assistants (15) and a study on nursing students of Islamic Azad University of Mashhad (16), Birjand (17), Kurdistan (18) and Rafsanjan (19), research from the point of view of medical students and medical faculty members (20), are among published reports. All studies used the DREEM questionnaire as a tool. There are five dimensions in this questionnaire, which include 50 questions in the form of a graded list of five options (Likert) in five areas of learning, professors, students' perception of scientific self-ability, educational atmosphere, and students' perception of their social conditions, and the maximum points are 200 (11, 12).

However, the need for a single, pooled image of the clinical environment climate in Iran remains unanswered. Considering the need to aggregate results and provide evidence-based decision-making for macro-educational policies, this study was conducted to perform a systematic review and meta-analysis of the quality of the clinical education environment (educational climate) based on the DREEM model.

Methods

Protocol and Registration

We conducted this systematic review of original articles according to a proposal registered at Mashhad University of Medical Sciences (ID: 4001780) and was approved by the Ethics Committee of Mashhad University of Medical Sciences (ID: IR.MUMS.REC.1401.108). The development of the protocol was guided by the 2015 Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) statement (21) and the updated version (i.e., PRISMA 2020 statement) (22). Conduct and reporting followed methodological recommendations for conducting a systematic review, as outlined in Lunny et al's (23) comprehensive publications, which provide recommendations for conducting an overview, and the PRISMA statement.

Eligibility Criteria

All studies that evaluated the educational environment in Iranian medical universities using the DREEM questionnaire, employing an observational design, were included in the study. The target population of included studies was considered to be students and professors in different disciplines of medical sciences universities. No restrictions on time or language were considered. However, letters to the editors and review articles were excluded. If no full text was found even after contacting the authors, the study was also excluded (Table 1).

Search Strategy

We designed a comprehensive search strategy with support from a medical librarian. We employed a comprehen-

Table 1. Inclusion and exclusion criteria

Criteria	Inclusion	Exclusion
Design	Cross-sectional	Letter to the editor, review articles, short communications
Participants	Medicine, nursing, midwifery, health, dentistry, pharmacy, paramedicine, complementary medicine	Students of other disciplines
Date	Before March 2024	—
Outcome Measure	Mean and 95% confidence interval (CI) or standard deviation (SD)	Results are not amenable to averaging or standard deviation calculation
Setting	University of Medical Sciences in Iran	Other academic settings
Databases	PubMed, ERIC, Scopus, Embase, Cochrane Library, CINAHL, Web of Science, Science Direct, Google Scholar, SID, CIVILICA, MAGIRAN	Other databases
Language	English, Persian	—
Full Text Available	Yes	No

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sive search strategy to ensure that relevant studies not indexed correctly in the electronic databases were not missed (namely, "DREEM Model" OR "Dundee Ready Educational Environment Measure" OR "quality of clinical education environment" OR "educational climate"). The English and Persian languages were searched separately. We combined search terms and MeSH terms in a search strategy developed for PubMed and adapted it for the other databases. Some keywords that were searched included the educational climate, the quality of the clinical environment, the training field, and the DREEM model. The search query for Google Scholar (to cover grey literature) is {"education* environment" OR "education* climate" OR dreem AND Iran AND "medical sciences"} and the search query for PubMed is {(("education* environment" [Title/Abstract]) OR ("education* climate" [Title/Abstract]) OR ("Education"[Mesh])) AND (medicine OR medical sciences [Title/Abstract]) AND (Dundee Ready Education Environment Measure [Title/Abstract] OR dreem [Title/Abstract]) AND (Iran [Title/Abstract])}

Electronic Searches

We conducted a comprehensive search across several databases, including PubMed, ERIC, Scopus, Embase, Cochrane Library, CINAHL, Web of Science, ScienceDirect, and Google Scholar, as well as SID, CIVILICA, and MAGIRAN, from December 1st to 10th, 2023. The search was conducted independently by two researchers (MM and MKR), leveraging their expertise in scientific databases to ensure no overlap in the searches.

Initially, we identified 1,343 articles in Google Scholar, 15 in PubMed, 88 in SID, 104 in MAGIRAN, 2 in CINAHL, 120 in ScienceDirect, and 14 in CIVILICA. After removing 250 duplicate records, we screened the remaining articles based on their titles and abstracts. We also examined the reference lists of the included studies for any additional potentially relevant articles. If full texts were unavailable or data were incomplete, we contacted the authors via email. In our final search, we also explored gray literature, but no additional articles were found.

Selection of Articles

Two reviewers (MM and MKR) independently screened titles and abstracts retrieved from the searches and assessed these for eligibility against the predetermined inclusion criteria (PCC). Considering that the study is in the field of education, the research question is based on the PCC (population, concept, context) framework, which is recommended for educational studies (24, 25). We retrieved all titles and abstracts meeting the inclusion criteria in full text. Two independent reviewers (MM and AS) read these full-text articles to assess eligibility. Disagreements between reviewers were resolved by consensus.

Assessment of Methodological Quality of Included Reviews

We used the JBI Critical Appraisal Checklist for Analytical Cross-Sectional Studies (2017) to assess the methodological quality of the included articles (26). There are a few quality assessment tools suitable for descriptive cross-sectional studies, and the JBI critical appraisal checklist for studies reporting prevalence data is one of them (27, 28). This instrument has 8 questions: (1) Were the criteria for inclusion in the sample clearly defined? (2) Were the study subjects and the setting described in detail? (3) Was the exposure measured validly and reliably? (4) Were objective, standard criteria used for measurement of the condition? (5) Are there any confounding factors identified? (6) Were strategies to deal with confounding factors stated? (7) Were the outcomes measured validly and reliably? (8) Was an appropriate statistical analysis used? There are four options for each question: Yes (1), No (0), Unclear (0), and not applicable. Question 3 was excluded from this review to ensure the total score ranged from 0 to 7. Two reviewers (MM and MKR) independently performed this assessment. Before the actual evaluation, an educational session was held, and a sample paper was reviewed through a group discussion. Disagreements in the evaluations were handled in a consensus dialogue after comparing discrepancies between assessors. The detailed result of the quality assessment is presented in Table 2.

Data Extraction

One reviewer (MM) extracted data from the included reviews, and a second reviewer (AS) verified the accuracy of the extraction. In cases where the data was not complete, an attempt was made to request the raw data through correspondence with the author in charge. We extracted the data into a purpose-built data extraction form, adapted from our previously published systematic review and meta-analysis in the field of medical education (29).

Data Synthesis

We synthesized the data quantitatively when possible. We present the findings from the articles in summary tables of findings for each outcome (questionnaire dimensions) and the number of participants. We report data with weighted mean difference (WMD) and SD. The rescaling of the data shows that we can also use WMD for the aggregated effects, which is easier to interpret than the standardized mean difference (SMD). Effects were estimated using the inverse variance heterogeneity model, a robust estimation method for addressing issues of underestimation of statistical error and overconfident estimates (30). We defined statistical significance as the 95% confidence interval, not including zero. We used the free meta-analysis software (Comprehensive Meta-Analysis version 2) for the statistical analyses (31). A forest plot was generated using the meta-analysis software (CMA) to present the final analysis based on the random-effects model. We also assessed publication bias. Trim and Fill builds on the key idea behind the funnel plot: that in the absence of bias, the plot would be symmetric about the summary effect. If there are more small studies on the right than on the left, the concern is that studies may be missing from the left. The Trim and Fill procedure imputes these missing studies, adds them to the analysis, and then re-computes the summary effect size. By default, the tool will look for

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Table 2. Descriptive characteristics of the 39 included articles

Characteristics	
Study design	Cross-sectional: 38 studies
	Quasi-experimental: 1 study
participants	Medical Students: 16 studies; Interns/Externs: 6 studies
	Nursing Students: 12 studies
	Midwifery Students: 3 studies
	Dental Students: 1 study
	Pharmacy Students: 1 study
	Paramedicine Students: 1 study
	Psychology Students: 1 study
	Anaesthesia Students: 2 studies
	Operating Room Students: 2 studies
	Laboratory Students: 2 studies
	Radiology Students: 2 studies
	Emergency Students: 2 studies
	Occupational/Environmental/Public Health Students: 1 study
	Residents: 6 studies
	Professors: 2 studies
Publication date	2005-2010
	• 2007: 1 study
	• 2008: 2 studies
	2010-2014
	• 2010: 1 study
	• 2012: 1 study
	• 2013: 2 studies
	• 2014: 5 studies
	• 2015: 6 studies
	2015-2019
	• 2015: 6 studies
	• 2016: 3 studies
	• 2017: 4 studies
	• 2018: 1 study
	• 2019: 2 studies
	2020-2022
	• 2020: 4 studies
	• 2022: 1 study
language	English: 20 studies
	Persian: 19 studies
Quality assessment	Score 1-3: 5 studies
Range (1-7)	Score 4-6: 23 studies
	Score 7: 11 studies

missing studies to the left of the summary effect. In our research, there is no imputed missing study. In addition, the report tells us that: "Under the fixed effect model, the point estimate and 95% confidence interval for the combined studies is 115.732 (115.239, 116.226). Using Trim and Fill, the imputed point estimate is 119.179 (112.099, 126.260).

Results

Search Results

The searches retrieved 39 unique records. After screening titles and abstracts, 30 full-text articles were selected for assessment. We included 30 studies. The numbers needed to read were 190, and the precision of the search was 97%.

The flowchart in Figure 1 illustrates the selection process. The supplementary search conducted in March 2024 did not yield any additional articles that met the inclusion criteria.

Description of Included Reviews

The included studies were published between 2007 and 2022. There were 2.5±1.5 (min-max= 0-8) years between the study date and the publication date. The basic characteristics of the included studies are presented in Tables 2 and 3.

The Methodological Quality of the Included Reviews

The JBI checklist for cross-sectional studies was used to perform the quality assessment of the included studies. The median JBI score (of a maximum 7) was 5 (range 1-7). Most articles (20 studies, 49%) suffered from inadequate description of study subjects and the setting, followed by inadequate description of clear definition for inclusion criteria (15 studies, 38%), inadequate dealing with confounding factors (12 studies, 31%), inadequate identification of confounding factors (10 studies, 26%), lack of valid and reliable measurement of outcomes (8 studies, 21%), and inappropriate statistical analysis (1 study, 3%). All studies employed objective, standardized

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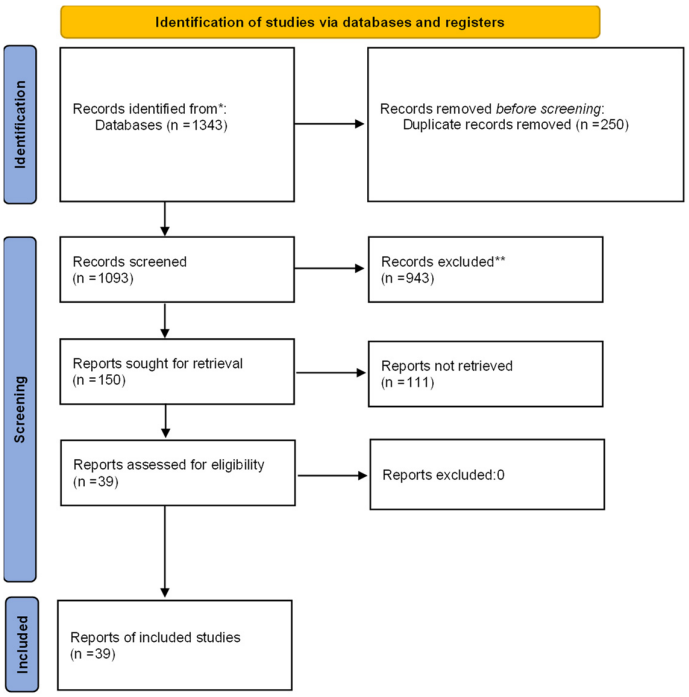

Figure 1. The flowchart of the systematic review.

*Consider, if feasible to do so, reporting the number of records identified from each database or register searched (rather than the total number across all databases/registers).
**If automation tools were used, indicate how many records were excluded by a human and how many were excluded by automation tools.
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criteria for measuring the condition.

Outcome Measures

Data were often transformed and presented with mean, 95% CI, or standard deviation (SD).

Total Score

In our analysis, a total of 39 studies were included. Among them, 30 studies, comprising 2 psychometric studies of varying quality, provided data on the total score of the DREEM questionnaire and were included in this part of our analysis. Nine studies were excluded for various reasons. Montazeri (2020) reported a total score of 172 based on four dimensions, making it incomparable to other studies. Additionally, seven studies did not report the standard deviation (SD) for the total score: Ghaemi (2015), Farahmand (2014), Managheb (2014), and 4 other studies. Among these, Soltani Arabshahi (2008) and Vatankhah (2015), as well as Soltani Arabshahi (2007), reported only three dimensions (1, 2, and 4), with a total score of 140, which was not comparable to the rest. Ghaemi-Amiri (2015) reported three dimensions (1, 2, and 5) with a total score of 120. Furthermore, Koohpayezadeh (2014) was omitted from the analysis due to the exclusion of six questions from four dimensions.

We were able to pool data for the total score and each dimension of the questionnaire. A meta-analysis of 30 studies yielded a mean score of 119.18 (95% CI: 112.09-126.26) (Figure 2, Table 4).

Dimension 1-Perception of Learning:

Thirty studies, including two psychometric studies, presented data on the first dimension of the DREEM questionnaire. However, 8 studies were excluded from the analysis for specific reasons. Six of these studies did not report the standard deviation (SD) for the mean of the first dimension, namely Rahbar (2012), Ghaemi (2015), Soltani Arabshahi (2007), Soltani Arabshahi (2008), Farahmand (2014), and Ghaemi-Amiri (2015). In 2 studies (Azizi, 2013; Koohpayezadeh, 2014), 6 questions were omitted, rendering the mean incomparable to those of others.

The pooled data for the first dimension of the questionnaire revealed a mean score of 28.33 (95% CI, 25.96-30.70), as illustrated in Figure 3 and Table 5.

Dimension 2-Perception of Course Organizers

Out of the 32 studies that reported the second dimension, six studies did not provide the standard deviation (SD) for their data (Rahbar 2012; Ghaemi 2015, Soltani Arabshahi 2007, Soltani Arabshahi 2008, Farahmand 2014; Ghaemi-Amiri 2015). In 2 studies (Azizi 2013; Koohpayezadeh 2014), 6 questions were omitted, rendering the mean incomparable to others.

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Table 3. Characteristics of included studies

First Author (Year)	University	Title	Mean(sd)	Design/ Language	Publication Date	Study Date	Sample Size	Target Population	Male**	Female**
Rahbar (2012)	Gilan	Assessment of students' perceptions of educational environment in clinical wards of university hospitals at an Iranian medical sciences university	107.94 (sd=22.2)	c-s Eng	2012	2011	154	Intern-extern	90	64
Ghaemi (2015)	Babol	Comparison of viewpoints of residents in different courses in babol university of medical sciences towards the clinical learning environment based on the dreem questionnaire	120.8*	c-s Eng	2015	2013	106	Resident	56	44
Heidari gorji (2013)	Mazandaran	The viewpoints of nursing and midwifery students of Mazandaran University of Medical Sciences regarding the values of teaching and learning using the DREEM model in 2013	198.31 (sd=22.4)	c-s Per	2016	2014	243	Nursing and midwifery students	81	162
Heidari hengami (2014)	Hormozgan	An educational survey of the main clinical departments in teaching hospitals of Hormozgan University of Medical Sciences from the point of view of medical students	104.83 (sd=27.16)	c-s Per	2015	2014	184	Intern-extern	74	98
Rezaei (2017)	Kermanshah	Assessing medical and dentistry students' perception of learning environment in Kermanshah University of Medical Sciences	92.49 (sd=21.73)	c-s Eng	2017	2015	472	Dental and medical students	199	273
Soltani-arabshahi (2007)	Iran	Examining the professors' workshop about the educational atmosphere of the main clinical departments of the teaching hospitals of Iran University of Medical Sciences based on the modified DREEM model	116*	c-s Per	2007	-	53	Professors	-	-
Jalili (2014)	Tehran (Azad)	Evaluation of the educational environment based on the DREEM model from the point of view of clinical psychology examinees of the Islamic Azad University of Tehran Medical Sciences	163.07 (sd=56.69)	c-s Per	2014	2014	30	-	-	-
Farajpour (2016)	Mashhad (Azad)	Examining nursing students' perception of teaching-learning environment using DREEM model in Islamic Azad University of Mashhad	107.05 (sd=23.39)	c-s Per	2016	2014	136	Nursing student in field and semester 2 to 6	56	80
Aarabi (2020)	Alborz	Studying the educational environment of the main clinical departments of Alborz University of Medical Sciences teaching hospitals from the point of view of medical students	93.8 (sd=28.9)	c-s Per	2020	2017	27	extern	39.1%	60.1%

*The Standard deviation was not mentioned in the study or it was not possible to aggregate data; c-s=Cross-sectional; Eng= English; Per= Persian

** Data reported as frequency otherwise specified with percentages.

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Table 3. Characteristics of included studies

First Author (Year)	University	Title	Mean(sd)	Design/ Language	Publication Date	Study Date	Sample Size	Target Population	Male**	Female**
Montazeri (2014)	Yazd	Perceptions of students and clinical instructors of academic learning environment at yazd university of medical sciences	110 (sd=21.2)	c-s Eng	2014	2012	158	Final year students of nursing, anaesthesia, operating room, midwifery, laboratory, radiology and their instructors	49	109
Andalib (2015)	Tehran	Evaluation of educational environment for medical students of a tertiary pediatric hospital in Tehran, using DREEM questionnaire	95.8 (sd=25.4)	c-s Eng	2015	2012	77	6th year medical students	24	36
Soltani arabshahi (2008)	Iran	Investigation of educational climate in major clinical wards in iran university of medical sciences(IUMS) based on DREEM model	116*	c-s Eng	2008	-	53	Professors	31	22
Matlabnegad(2014)	Babol	Evaluation of the educational environment of Babol dental school from the point of view of specialized assistants based on the DREEM model	114.53 (sd=16.86)	c-s Per	2014	2012-13	77	Residents entered 2009 to 2012	27	50
Managheb (2014)	Jahrom	Evaluation of the clinical education environment based on the DREEM model from the perspective of nursing students of Jahrom University of Medical Sciences in 1990	96.58*	c-s Per	2014	2011	174	Nursing intern	47	56
Zarvaj hoseini (2015)	Shahrood	Examining students' views of the teaching and learning environment based on the DREEM model at Shahrood University of Medical Sciences in 2013	117.22 (sd=23.67)	c-s Per	2015	2014	332	Students of the following fields: Medicine, midwifery, nursing, anaesthesia Operating room, emergency,occupational/environmental/public health.	35.8%	64.2%
Vatankhah (2015)	Kerman	Investigating the quality of the clinical ventilation environment of teaching hospitals of Kerman University of Medical Sciences from the professors' point of view	121.19*	c-s Per	2015	2012	50	Professors		

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Table 3. Characteristics of included studies

First Author (Year)	University	Title	Mean(sd)	Design/ Language	Publication Date	Study Date	Sample Size	Target Population	Male**	Female**
Jafari (2020)	Ahvaz	Investigating the relationship between nursing students' perception of the educational environment and the level of their academic involvement in Jundishapur University of Medical Sciences, Ahvaz in the academic year 2017-2018	125.6 (sd=12.81)	c-s Per	2020	2018-19	291	nursing students	93	198
Daryazadeh (2020)	Kashan	Evaluation of clinical environment from the perspective of medical learners of Kashan University of Medical Sciences based on DREEM model in 2018	90.78 (sd=17.72)	c-s Eng	2020	2018	145	Intern-extern-resident	43.8%	56.2%
Faghani (2013)	Golestan	Examining students' views on educational atmosphere (DREEM model) in Golestan University of Medical Sciences in 2019	160.2 (sd=21.30)	c-s Per	2013	2011	48	Students of medicine, nursing-midwifery, paramedicine	46	102
Soltaniarabshahi (2008)	Iran	The educational environment of the main clinical departments of Iranian medical sciences teaching hospitals from the perspective of learners based on the DREEM model	140.6 (sd=23.21)	c-s Per	2008	2006	193	Resident-Intern	106	90
Bagheri (2019)	ghom	Evaluation of the educational climate and related factors from the perspective of Qom University of Medical Sciences students in 2017	114.1 (sd=23.3)	c-s Per	2019	2017-18	306	University students	215	91
Montazeri (2020)	Jahrom	Investigation of nursing students; perceptions regarding the educational atmosphere of pharmacology course at jahrom university of medical sciences	98.5* (sd=18.86)	c-s Eng	2020	2015	30	All nurses in the pharmacology course	14	16
Hasanabadi (2017)	Rafsanjan	Examining medical students' understanding of the learning environment at Rafsanjan University of Medical Sciences in 2014	89.01 (sd=22.74)	c-s Per	2017	2015	(260)370	All medical students from 2015-16(Feb)	100	160
Sayadi (2015)	Kordestan	Examining Kurdistan University of Medical Sciences students' understanding of the educational environment based on the DREEM model in 2014	109.04 (sd=22.03)	c-s Per	2017	2014-15	300	Medical students between 2nd and 8th semester		
Mousavi (2014)	Iran	Assessment of the educational environment of the main clinical departments of Iran University of Medical Sciences from the point of view of interns based on the modified DREEM model	96.1 (sd=21.64)	c-s Per	2014	2012-13	250	Intern-extern	82	181
Zolfaghari (2015)	Birjand	The point of view of medical students on the clinical training environment of teaching hospitals covered by Birjand University of Medical Sciences based on the DREEM model	155.03 (sd=27.86)	c-s Per	2015	2013-14	116	Intern-resident	51	65
Bakhshi (2013)	Rafsanjan	Nursing students' perceptions of their educational environment based on DREEM model in an Iranian university	114.3 (sd=20.6)	c-s Eng	2013	2009	202	nursing students	91	111

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Table 3. Characteristics of included studies

First Author (Year)	University	Title	Mean(sd)	Design/ Language	Publication Date	Study Date	Sample Size	Target Population	Male**	Female**
Bakhshi (2014)	Rafsanjan	students' perceptions of the educational environment ia an Iranian model school,as measured by the Dundee reasy education environment measure	113.8 (sd=17.31)	c-s Eng	2014	2010	234	Medical students before 6th year	106	128
Aghamolaei (2010)	Hormozgan	Medical students' perceptions of the educational environment at an Iranian medical sciences university	99.6 (sd=22.9)	c-s Eng	2010	2009	210	Medical students of the course of basic sciences and patho-physiology	38.5%	61.5%
Bakhshialiabad (2015)	Rafsanjan	students' perceptions of the academic learning environment in seven medical sciences courses based on DREEM	113.5 (sd=21.9)	c-s Eng	2015	2009-10	527	University students((BSc)	201	292
Farahmand (2014)	Tehran	Evaluating the quality of the educational environment for medical interns in an emergency department using the DREEM inventory	134.79*	c-s Eng	2014	2009-2010	156	interns in emergency ward	69	87
Farajpour (2017)	Mashhad (Azad)	Perception of educational environment among undergraduate student of health disciplines in an Iranian university	106 (sd=24.6)	c-s Eng	2017	2015	378	Students of: Medicine-nursing-midwifery	80	298
Imanpour (2015)	Tehran	Evaluating the educational environment of a nursing school by using the DREEM inventory	104.39 (sd=22.5)	c-s Eng	2015	2013	500	Midwifery & nursing students	89	281
Bakhshialiabad (2019)	Rafsanjan	Improving students' learning environment by DREEM: an educational experiment in an Iranian medical sciences university(2011-2016)	118.49 (sd=16.65)	prospective quasi-experimental study Eng	2019	2011-2016	982	Nursing-midwifery-radiology-operating room-laboratory-anaesthesiology-emergency department students	201	292
Koohpayezadeh (2014)	Iran	Assessing and reliability of Dundee ready educational environment measure(DREEM) in Iran	96.15 (sd=21.64)*	c-s Eng	2014	2012-2013	267	Intern, extern	82	181
Behkam (2022)	Tehran	students' perceptions of educational environment based on Dundee ready education environment measure and the role of peer mentoring: a cross-sectional study	144 (sd=19.3)	c-s Eng	2022	2019	169	First year medical students	86	83
Falah langroudi (2012)	Mazandaran	Validation of the Persian version of the Educational Environment Measurement Questionnaire (Dreem)	127.53 (sd=23.66)	c-s Per	2012	2011-12	250	medical students	202	148
Azizi (2013)	Mazandaran	Attitudes of pharmacy students to educational conditions in Mazandaran university of medical sciences	152.13 (sd=20.65)	c-s Eng	2013	2012	86	Pharmacology students	32	56
ghaemi-amiri (2015)	Babol	The viewpoint of residents studying in hospitals affiliated to Babol university of medical sciences and health services on clinical training environment	117.81*	c-s Eng	2015	-	100	Resident	66	34

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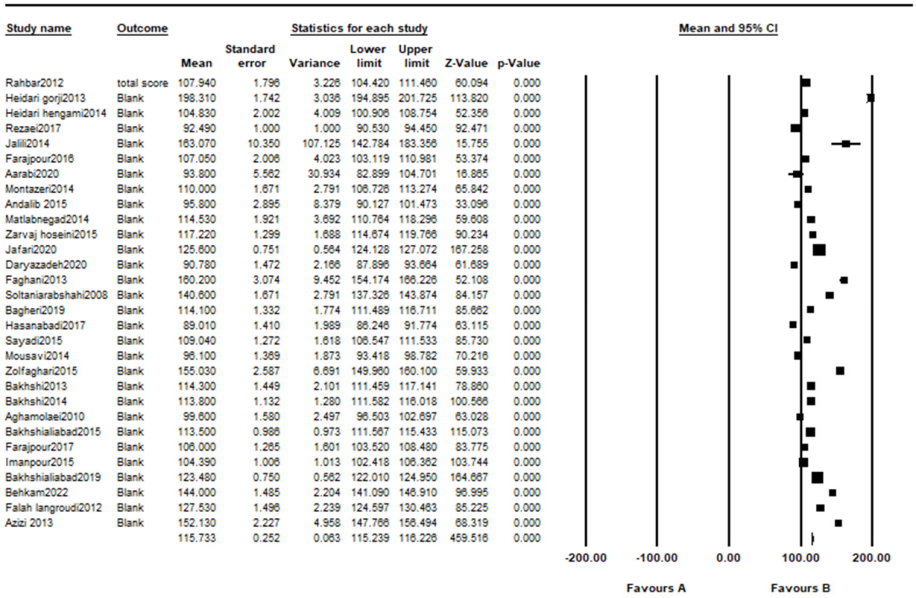

Figure 2. The forest plot of included studies for pooling the total score of DREEM

Table 4. The pooled estimate of the Total score for DREEM

Model	Effect size (95% CI)			Test of null	Heterogeneity			Tau-squared
	Point estimate	Lower limit	Upper limit	*P*-value	Q-value	*P*-value	I-squared	
Fixed	115.73	115.23	116.22	<0.001	5764.691	<0.001	99.497	385.02
Random	119.18	112.09	126.26	<0.001				

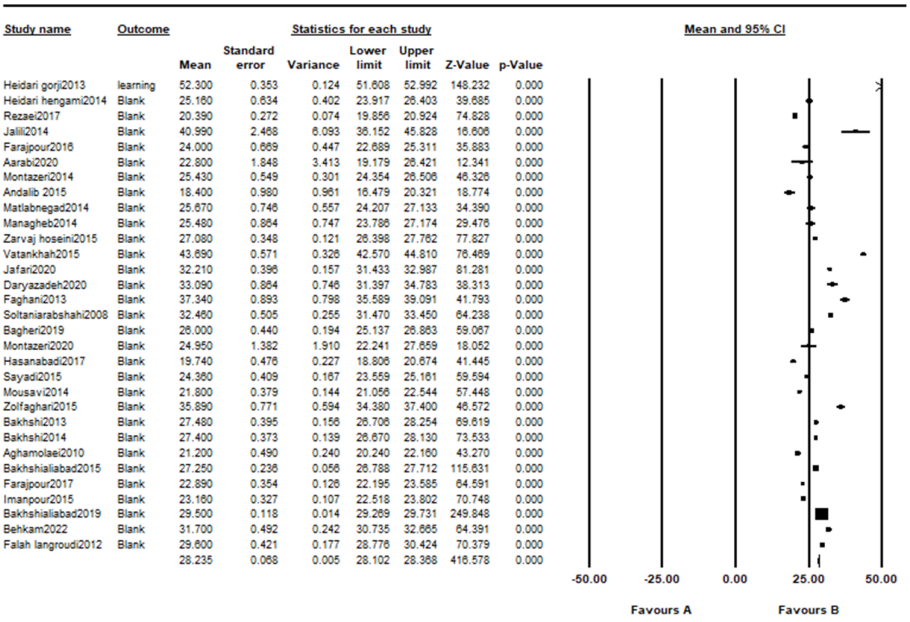

Figure 3. The forest plot of included studies for the pooling perception of learning of DREEM

The pooled data for the second dimension of the questionnaire indicated a mean score of 26.33 (95% CI: 24.45-28.21), as depicted in Figure 4 and Table 6.

Dimension 3-Academic Self-Perception

A total of 30 studies reported the third dimension and were included in our analysis. Ten studies were excluded because three did not provide the standard deviation (SD) for their data (Rahbar, 2012; Ghaemi, 2015; Farahmand, 2014). In 2 studies (Azizi, 2013; Koohpayezadeh, 2014), six questions were omitted, making the mean incomparable to those of others. In 4 studies (Soltani Arabshahi

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Table 5. The pooled estimate of the perception of learning score for DREEM

Model	Effect size (95% CI)			Test of null		Heterogeneity		Tau-squared
	Point estimate	Lower limit	Upper limit	*P*-value	Q-value	*P*-value	I-squared	
Fixed	28.235	28.102	28.368	<0.001	8478.578	<0.001	99.646	44.788
Random	28.336	25.964	30.708	<0.001				

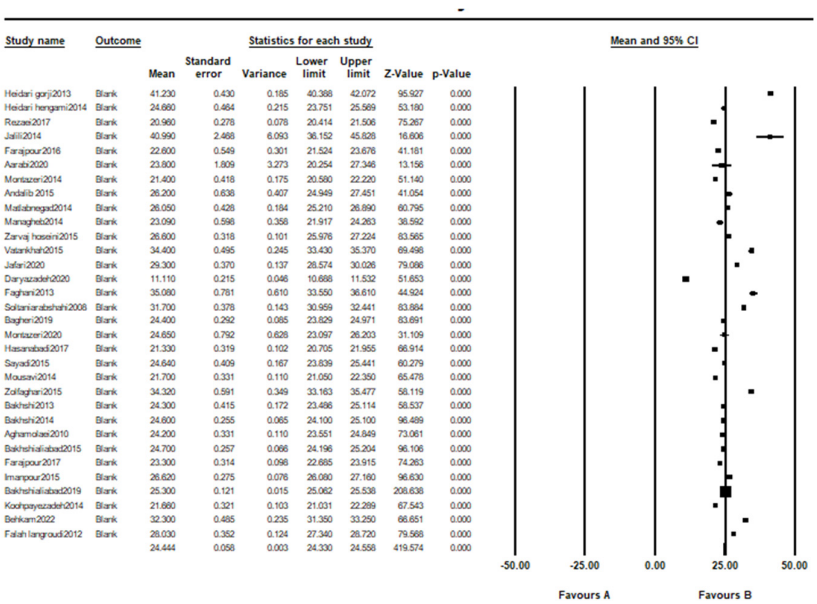

Figure 4. The forest plot of included studies for the pooling perception of course organizers of DREEM

Table 6. The pooled estimate of the perception of course organizers' score for DREEM

Model	Effect size (95% CI)			Test of null		Heterogeneity		Tau-squared
	Point estimate	Lower limit	Upper limit	*P*-value	Q-value	*P*-value	I-squared	
Fixed	24.44	24.33	24.55	<0.001	7850.984	<0.001	99.605	28.87
Random	26.33	24.45	28.21	<0.001				

2008, Soltani Arabshahi 2007; Vatankhah 2015; Ghaemi-Amiri 2015), the third dimension was not reported.

The pooled data for the third dimension of the questionnaire revealed a mean score of 20.49 (95% CI: 18.49-22.50), as illustrated in Figure 5 and Table 7.

Dimension 4-Perception of Learning Atmosphere

A total of 31 studies reported the fourth dimension and were included in our analysis. However, nine studies were excluded, with five not providing the standard deviation (SD) for their data (Rahbar 2012; Ghaemi 2015; Soltani Arabshahi 2007; Soltani Arabshahi 2008; Farahmand 2014). In two studies (Azizi, 2013; Koohpayezadeh, 2014), six questions were omitted, resulting in incomparable means. Additionally, in one study (Ghaemi-Amiri 2015), the fourth dimension was not reported.

The pooled data for the fourth dimension of the questionnaire indicated a mean score of 27.19 (95% CI, 25.42-28.96), as depicted in Figure 6 and Table 8.

Dimension 5-Social Self-Perception

In our analysis, 29 studies reported the fifth dimension. However, 11 studies were excluded, as 4 did not provide the standard deviation (SD) for their data (Rahbar, 2012; Ghaemi, 2015; Farahmand, 2014; Ghaemi-Amiri, 2015). In 5 studies (Azizi 2013; Soltani Arabshahi 2008, Soltani Arabshahi 2007; Vatankhah 2015; Montazeri 2020), the fifth dimension was not reported.

The pooled data for the fifth dimension of the questionnaire revealed a mean score of 17.52 (95% CI, 16.30-18.74), as illustrated in Figure 7 and Table 9.

Table 10 shows the aggregated results in various dimensions and the total score of the DREEM questionnaire. It can be observed that the number of included studies varies across different dimensions, and the heterogeneity index is high, with a significant P-value, which justifies the use of random effects models.

Discussion

The future of every society is closely tied to its human resources. One of the primary concerns in this regard is the provision and promotion of health. The medical sciences universities are responsible for training the required workforce. In other languages, current students in various medical sciences disciplines are often regarded as the future guardians of health in every society. With this issue in

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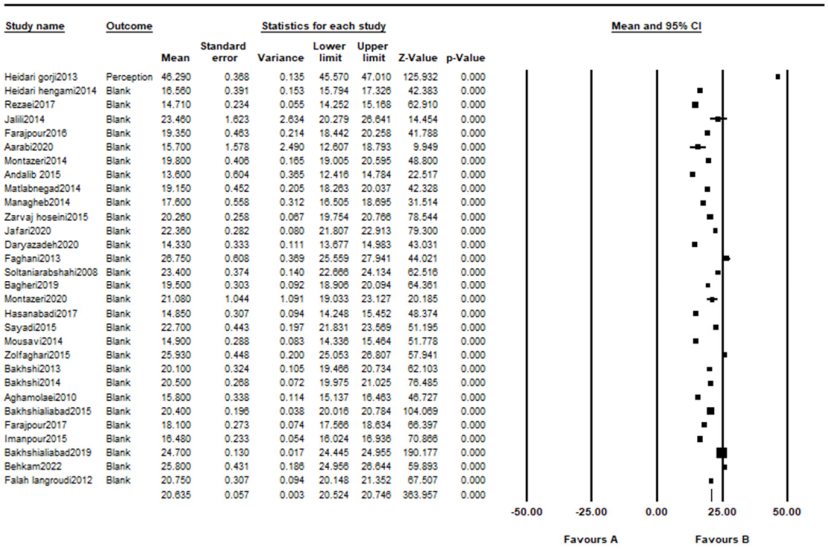

Figure 5. The forest plot of included studies for pooling academic self-perception of DREEM

Table 7. The pooled estimate of academic self-perception score for DREEM

Model	Effect size (95% CI)			Test of null	Heterogeneity			Tau-squared
	Point estimate	Lower limit	Upper limit	*P*-value	Q-value	*P*-value	I-squared	
Fixed	20.63	20.52	20.74	<0.001	9042.094	<0.001	99.679	31.132
Random	20.49	18.49	22.50	<0.001				

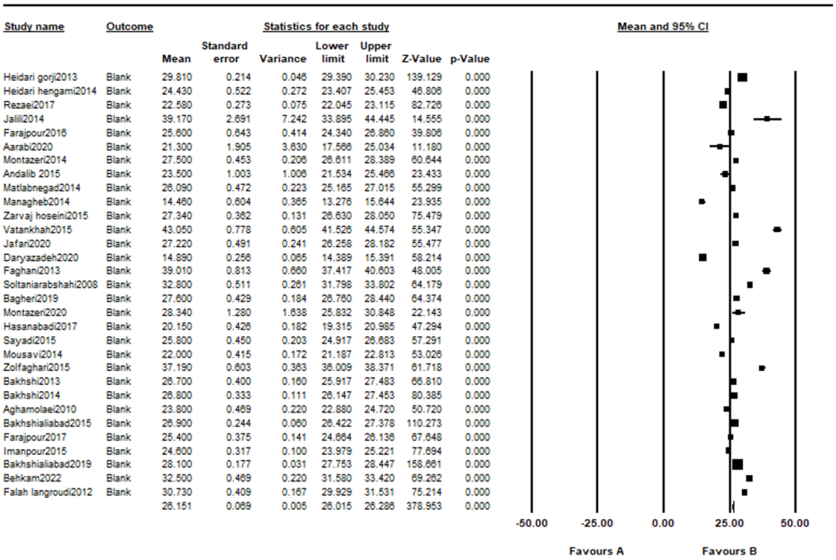

Figure 6. The forest plot of included studies for pooling perception of learning atmosphere of DREEM

Table 8. The pooled estimate of perception of learning atmosphere score for DREEM

Model	Effect size (95% CI)			Test of null	Heterogeneity			Tau-squared
	Point estimate	Lower limit	Upper limit	*P*-value	Q-value	*P*-value	I-squared	
Fixed	26.151	26.015	28.286	<0.001	4887.167	<0.001	99.386	24.715
Random	27.192	25.422	28.962	<0.001				

mind, the educational system needs high attention. The prerequisite for every plan is having robust knowledge about the current condition. Education research in medical sciences often suffers from providing an overall image and instead focuses on individual studies. For example, this was also true for evaluating the educational quality of services based on the SERVQUAL model in Iran (29, 32-35), which was supported by a systematic review and meta-analysis (36). Regarding the educational environment, we found a considerable number of individual studies

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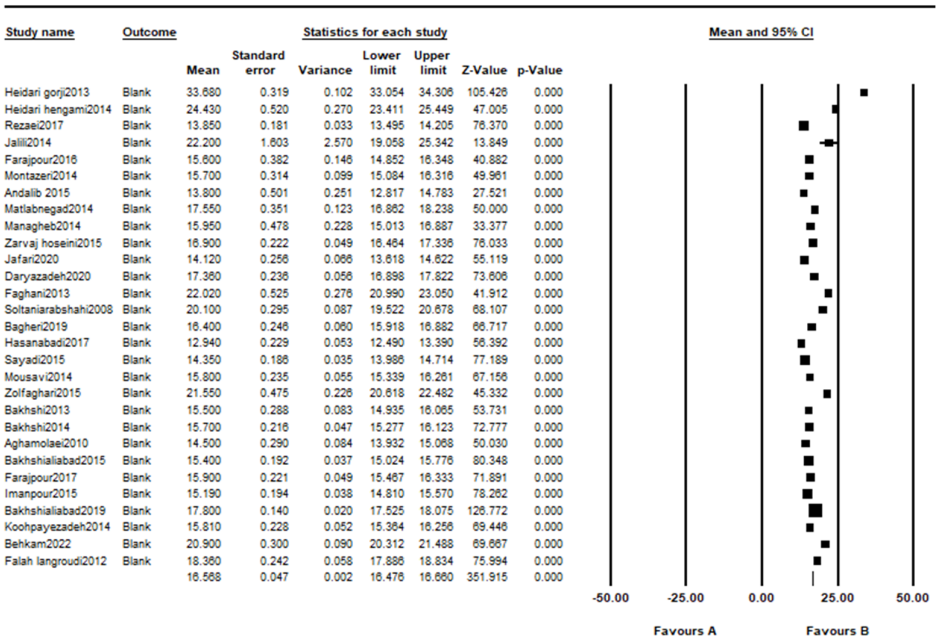

Figure 7. The forest plot of included studies for pooling the social self-perception of DREEM

Table 9. The pooled estimate of the social self-perception score for DREEM

Model	Effect size (95% CI)			Test of null	Heterogeneity			Tau-squared
	Point estimate	Lower limit	Upper limit	*P*-value	Q-value	*P*-value	I-squared	
Fixed	16.568	16.476	16.660	<0.001	4787.041	<0.001	99.415	11.104
Random	17.526	16.453	18.747	<0.001				

Table 10. The aggregated results of the 5 dimensions and the total score of DREEM

	N	SE	Effect size with 95% CI (Random effect model)	Heterogeneity (I^2)	Tau-squared	*P*-value
Total score	30	3.61	119.18(112.09 -126.26)	99.49	385.02	<0.001
Dimension 1 (perception of learning)	31	1.21	28.33 (25.96 – 30.70)	99.64	44.78	<0.001
Dimension 2 (perception of course organizers)	32	0.95	26.33(24.45 - 28.21)	99.60	28.87	<0.001
Dimension 3 (academic self-perception)	30	1.02	20.49(18.49 - 22.50)	99.67	31.13	<0.001
Dimension 4 (perception of learning atmosphere)	31	0.90	27.19(25.42-28.96)	99.38	24.71	<0.001
Dimension 5 (social self-perception)	29	0.62	17.52(16.45-18.74)	99.41	11.10	<0.001

conducted in various universities in Iran. However, the need to provide a single pooled result for decision-makers was present.

This study showed no considerable publication bias; moreover, the included studies had an acceptable quality based on the JBI (5.5 out of 7). The result showed that the pooled total score of the DREEM questionnaire was 119.1 (out of 200) among published studies in Iran. Since the included studies were from various universities and the target groups were diverse (namely, different majors and disciplines), we encountered a high heterogeneity. However, using a random effect model could provide a pooled overview of the educational environment in Iran.

The lowest score was observed in social self-perception among the 5 dimensions. The questions of this domain are: There is a sound support system for students who get stressed; I am too tired to enjoy this course; I am rarely bored in this course; I have good friends in this school; My social life is good; I seldom feel lonely; and My accommodation is pleasant. Therefore, it appears that the social support system in medical sciences universities should reevaluate their strategies to provide a more efficient delivery of services. It should be noted that the findings are based on self-reports, so it can be assumed that the present services are sufficient; however, the perception of end-users shows a point that needs action. It can be suggested that empowering students with essential soft skills, including stress management, time management, and future planning, can foster a more positive environment in universities.

The second domain with the lowest score was academic self-perception. The questions of this domain are Learning strategies that worked for me before continue to work for me now; I am confident about passing this year; I feel I am being well prepared for my profession; Last year's work was good preparation for this year's work; I can memorize all I need; I have learned a lot about empathy in my profession; My problem-solving skills are being well developed; and much of what I have to learn seems relevant to a career in healthcare. This domain primarily fo-

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cuses on preparing for a future career. It is not surprising that student plans for their future even in the first semester after entering university (37). However, their motivation and expectations for future careers can change during the education period (37, 38). Therefore, a robust support system needs to be reestablished to ensure that the high-value motivational factor remains intact even after graduation and that students are well-prepared for their future responsibilities. In their systematic review of 24 articles about the competencies of physicians in Iran, Changiz et al reported that in 70% of assessed skills, physicians' competencies were estimated as low to moderate (39). Another report from Bandarabas University of Medical Sciences showed that the highest acquired competency in graduate medical students was clinical and communication skills, and all other competencies were below average. The authors suggested that a fundamental revision of educational methods, resources, and topics related to teaching and learning is necessary (40).

The first middle score belonged to the perception of the course organizers' dimension. The questions in this domain are: Are the program organizers knowledgeable? Do the lectures emphasize student care during the teaching sessions? Do teachers ridicule the registrars? The teachers are authoritarian; The teachers have good communication skills with the students; The teachers are good at providing feedback to students; The teachers provide constructive criticism here; The teachers give clear examples; The teachers get angry in teaching sessions; The teachers are well prepared for their classes; I feel able to ask the questions I want. Therefore, it seems that the course arrangement was not on the right path. Since students encounter patients in various clinical settings, their course should be planned, and teachers should serve as role models (41). The findings of research by Rokhafrooz et al highlighted the need for faculty development programs to enhance teaching skills (42). Additionally, the studies were conducted in Eastern Nepal (43) and Sri Lanka (44), where students also held a fairly positive perception. There is a contrast in these studies with our results.

Regarding the second middle score, it was presented in relation to the perception of the learning atmosphere domain. The questions in this domain are as follows: The atmosphere is relaxed during teaching sessions; this program is well-timed. Cheating is a problem in this program. The atmosphere is relaxed during lectures; There are opportunities for me to develop interpersonal skills. I feel comfortable in class socially. The atmosphere is relaxed during seminars/tutorials. I find the experience disappointing. I can concentrate well. The enjoyment outweighs the stress of the program. The atmosphere motivates me as a learner. Hence, based on the results, it can be inferred that the learning atmosphere was appreciated to some extent by the participants. The most influential sub-branch in the quality of clinical education was reported in the field of educational environment (45). Another study from Rasht University of Medical Sciences represented the highest satisfaction among dentistry students (46).

Moreover, the greatest score was associated with students' perception of learning. The questions of this domain are as follows: I am encouraged to participate in a teaching session. The teaching is often stimulating. The teaching is student-centered. The teaching helps to develop my competence. The teaching is well-focused. I feel that I am well-prepared for my profession. The teaching time is put to good use. The teaching overemphasizes factual learning. I am clear about the learning objectives of the program. The teaching encourages me to be an active learner, with a focus on long-term learning over short-term learning. However, the teaching is too teacher-centered. It is clear that the learning rate was stabilized, as indicated by the highest score. This illustrates that learning occurs through high levels of pleasure in clinical fields and training environments. Orakifar et al reported that the educational environment was in good condition and the attitude of students was positive (47). In addition, Rokhafrooz et al (42) reported the maximum score for students' perceptions of learning. Another study in Chile also found similar results (48). It appears that the highest mean score in this domain is due to the effective planning of the schedule and table time training.

This study is not without limitations. We encountered high heterogeneity among studies, which was due to the diversity of included studies in terms of majors and disciplines. This was addressed using a random effects model. However, to the best of our knowledge, there are no published systematic reviews or meta-analyses on DREEM, and this study can provide sufficient evidence for educational decision-makers.

Conclusion

The prerequisite for every plan is a profound understanding of the current condition. This is the first systematic review and meta-analysis study in Iran, which provided an overall picture of the quality of the educational climate based on the DREEM model. The review results indicate that the total score is moderately higher than 50%, suggesting considerable room for improvement. Furthermore, social self-perception has the lowest situation and needs high attention and much further national planning for improvement.

Authors' Contributions

Conception and study design: M.K.R., R.V.
Data gathering: R.V., M.M.
Data analysis: M.K.R., A.S.
Drafting the manuscript: R.V., A.S., M.M.
Critical revising of the manuscript: M.K.R., A.S.
Final approval: M.K.R., R.V., A.S., M.M.

Ethical Considerations

This study was approved by the Ethics Committee at Mashhad University of Medical Sciences (ID: IR.MUMS.REC.1401.108).

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Conflict of Interests

The authors declare that they have no competing interests.

References

1. Lotf AA. Effect of environmental factors on behaviours and learning, in educational spaces (especially elementary schools). Modiriyat Shahri. 2008;21:73-90.
2. Rotthoff T, Ostapczuk MS, De Bruin J, Decking U, Schneider M, Ritz-Timme S. Assessing the learning environment of a faculty: psychometric validation of the German version of the Dundee Ready Education Environment Measure with students and teachers. Med Teach. 2011 Nov 1;33(11):e624-36.
3. Aghamolaei T, Fazel I. Medical Students' Perceptions of the Educational Environment at an Iranian Medical Sciences University. BMC Med. 2010 Dec;10:1-7.
4. Al Rukban MO, Khalil MS, Al-Zalabani A. Learning environment in medical schools adopting different educational strategies. Educ Res Rev. 2010 Mar 1;5(3):126.
5. Daryazadeh S, Yavari M, Sharif MR, Azadchahr MJ, Rezvani A, Akbari H. Evaluation of clinical environment from the perspective of medical learners of Kashan University of Medical Sciences based on DREEM model in 2018. Horiz Med Educ Dev. 2020; 11(3): 44-33.
6. Nasiri F, Ghaffarifar S, Motevalli A, Naseri A, Hosseini M. Medical philosophy: The forgotten necessity in medical education. Horiz Med Educ Dev. 2022; 13(2): 90-81.
7. TavakkoliGhuchani H, Karimi Z, Taefi Z, Hoseini R. Characteristics of effective clinical instructor of nursing and midwifery students in North Khorasan University of Medical Sciences. J North Khorasan Univ Med Sci. 2008;1(2-3):65-70.
8. Dent J. A, Harden R. M. A practical guide for medical teachers. Elsevier Churchill Livingstone, Harcourt Publishers Limited. 2005, Page 42
9. Varma R, Tiyagi E, Gupta JK. Determining the quality of educational climate across multiple undergraduate teaching sites using the DREEM inventory. BMC Med. 2005 Dec; 5:1-4.
10. Jalili Z, Sahbaei-Rooy F. An evaluation of educational environment from the view of students of Islamic Azad University based on Dundee ready educational environment measure (DREEM) model. Strides Dev Med Educ J. 2015 Feb 1;11(4):464-70.
11. Vatankhah R, Sabzevari S, Baneshi M. Clinical environment assessment based on DREEM model from the viewpoint of interns and residents of hospitals affiliated with kerman university of medical sciences, Iran. Strides Dev Med Educ J. 2015 Jul 1;12(Supplement):281-7.
12. Vatankhah, Sabzevari, Seyedeh Sakineh, Banshi. Investigating the quality of the clinical learning environment of teaching hospitals of Kerman University of Medical Sciences from the perspective of professors. Horiz Med Educ Dev. 2016 Feb 20;6(2):28-32 .
13. Mansorian A. Views of learners on learning environment based on the model DREEM in Golestan University. Med Educ Dev. 2013 Dec 10;6(12):43-50.
14. Nasiri F, Fatollahi S, Hanani S. Evaluation of difference between operating room men and women student's views about quality of educational environment in Iran university of science in the year 2016-2017. J Paramed Sci. 2017;12(3):29-34.
15. Motallebnejad M, Bayani AA, Khafri S, Gilchini F. Postgraduate dental students, perceptions of the educational environment in dental school, Babol university of medical sciences according to dreem model. Med Educ. 2014 Sep 15;2(2):14-21.
16. Faraj Pour A, Sarafraz Yazdi M, Homam M, Raisolsadat MA, Sarvghad Moghadam S. Appraise of Students' Perception of Educational-Learning Environment Utilizing DREEM Model in Islamic Azad University of Mashhad. Educ Dev Judishapur. 2016 Feb 1;7(2):194-203.
17. Zolfahari SH, Bijari B. Medical students' perspective of clinical educational environment of hospitals affiliated with Birjand University of Medical Sciences, based on DREEM model. J Birjand Univ Med Sci. 2015 Dec 15;22(4):368-75.
18. Hassanabadi M, Zare-Bidaki M, Rezaeian M. Medical students' perceptions of the educational environment in Rafsanjan university of medical sciences in 2016. J Rafsanjan Univ Med Sci. 2017 Sep 10;16(5):465-78.
19. Sayyadi M, Vahabi A, Vahabi B, Sayyad S, Moradi M, Rasoulabadi M et al. A survey of Kurdistan University of Medical Sciences students' perceptions of educational environment based on DREEM model in 2015. J Kurdistan Nurs Midwifery Paramed Fac. 2017; 2 (4) :56-67
20. M. Khadem-Rezaiyan, A. Avazzadeh, R. Vatankhah, H. Kianifar, N. Pourbadakhshan. Investigating The Quality of The Clinical Learning Environment Based on The DREEM Model In Akbar Educational Hospital of Mashhad in 1400. Med Educ. 2023;12:1-14.
21. Moher D, Shamseer L, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart LA, Prisma-P Group. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. Systematic reviews. 2015 Dec; 4:1-9.
22. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, Shamseer L, Tetzlaff JM, Akl EA, Brennan SE, Chou R. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ. 2021 Mar 29;372.
23. Lunny C, Tricco AC, Veroniki AA, Dias S, Hutton B, Salanti G, Wright JM, White I, Whiting P. Methodological review to develop a list of bias items used to assess reviews incorporating network meta-analysis: protocol and rationale. BMJ Open. 2021 Jun 1;11(6): e045987.
24. Peters MD, Godfrey C, McInerney P, Munn Z, Tricco AC, Khalil H. Scoping reviews. JBI manual for evidence synthesis. 2020 Jan; 10:10-46658.
25. Aromataris E, Stern C, Lockwood C, Barker TH, Klugar M, Jadotte Y, Evans C, Ross-White A, Lizarondo L, Stephenson M, McArthur A. JBI series paper 2: tailored evidence synthesis approaches are required to answer diverse questions: a pragmatic evidence synthesis toolkit from JBI. J Clin Epidemiol. 2022 Oct 1;150: 196-202.
26. Moola SZ, Munn Z, Tufanaru C, Aromataris E, Sears K, Sfetcu R, Currie M, Qureshi R, Mattis P, Lisy KM, Mu PF. Systematic reviews of etiology and risk. Joanna Briggs Institute reviewer's manual. 2017;5:217-69.
27. Munn Z, Moola S, Lisy K, Riitano D, Tufanaru C. Methodological guidance for systematic reviews of observational epidemiological studies reporting prevalence and cumulative incidence data. JBI Evidence Implementation. 2015 Sep 1;13(3):147-53.
28. Ma LL, Wang YY, Yang ZH, Huang D, Weng H, Zeng XT. Methodological quality (risk of bias) assessment tools for primary and secondary medical studies: what are they and which is better? Mil Med Res. 2020 Dec;7:1-1.
29. Shekofteh K, Karimi FZ, Saghi M, Sahranavard M, Arekhi S, Akhavan Rezayat A, Youssefi M. Students' expressed items related to educational services in Mashhad University of Medical Sciences-based on SERVAQUAL model. Med Educ Dev. 2019 Apr 10;6(1):85-98.
30. Doi SA, Barendregt JJ, Khan S, Thalib L, Williams GM. Advances in the meta-analysis of heterogeneous clinical trials I: the inverse variance heterogeneity model. Contemp Clin Trials. 2015 Nov 1;45:130-8.
31. Borenstein M. Comprehensive meta-analysis software. Systematic reviews in health research: meta-analysis in context. 2022 Apr 22:535-48.
32. Yousefi M, Jahantab Z, Khadem-Rezaiyan M. Quality of educational services in a type one medical sciences university based on SERVQUAL model from the perspective of faculty members. Med Educ Dev. 2021 Dec 10;8(3):1-0.
33. Jahantab Z, Yousefi M, MohammadHoseinzadeh M, Khadem-Rezaiyan M. Evaluating the quality of educational services from the perspective of learners at Mashhad University of Medical Sciences in 2018. Med Educ Dev. 2020,15(4): 234-243.
34. Rezaiyan MK, Bazaz SM. Quality Gap in educational services based on SERVQUAL Model in Mashhad Medical School. Med Res. 2016 Sep 21;40:17-23.

[Downloaded from mjiri.iums.ac.ir on 2026-09-13]

[DOI: 10.47176/mjiri.39.135]

35. Khadem Rezaiyan M, Etezad Razavi M, Javadi B, Feyzabadi Z, Omidkhoda M, Saeedinejat S, Yavari M, Meraji M, Akbarzadeh F, Youssefi M. Educational quality gap from students' viewpoints; results from a survey in Mashhad University of Medical Sciences. Future Med Educ J. 2017 Dec 1;7(4):31-5.
36. Arekhi S, Rezayat AA, Khadem-Rezaiyan M, Youssef M. Educational quality of services in medical universities of Islamic Republic of Iran: A systematic review and Meta-Analysis. J Med Educ. 2019 Jun 30;18(2):104-116.
37. Khadem-Rezaiyan M, Zeinalipour Z, Rashidtorabi Z, Youssefi M. The future of medical students; perspectives and expectations: a cross-sectional study in Mashhad University of Medical Sciences. Res Dev Med Educ. 2018 Jun 30;7(1):26-31.
38. Khadem Rezaiyan M, Omranzadeh A, Akhavan Rezayat A, Youssefi M. From Prestige to Humanism: The Experiences of Medical Students about Motivational Factors. Med Educ Dev. 2019 Aug 10;12(34):14-21.
39. Changiz T, Fakhari M, Jamshidian S, Zare S, Asgari F. Systematic Review of Studies in the Field of Competencies of New or Soon To BeGraduate General Physicians in Iran. Strides Dev Med Educ J. 2015 Aug 1;12(2):325-43.
40. Abedini S, Kamalzade H, Javadi R. A survey on the of medical graduates' achievements in the capabilities approved by the general medical education council of Bandar Abbas University of Medical Sciences in 2014. Dev Stra Med Educ. 2018; 5 (2) :33-47
41. Utami RS, Pujianto A, Setyawan D, Naviati E, Rochana N. Critical care nurses' experiences of end-of-life care: a qualitative study. Nurse Media J Nurs. 2020; 10(3) :260-274.
42. Rokhafrooz D, Alborz Z, Sadat Ghaemi Zade Shustari S. Nursing students' perception of the educational environment in a public university in Ahvaz, Iran: A study based on Dreem questionnaire. Nurse Media J Nurs. 2022; 12(1): 88-99.
43. Shrestha E, Mehta RS, Mandal G, Chaudhary K, Pradhan N. Perception of the learning environment among the students in a nursing college in Eastern Nepal. BMC Med. 2019 Dec;19:1-7.
44. Jayaweera P, Thilakarathne A, Ratnayaka M, Shashikala T, Arachchige R, Galgamuwa LS, Karunathilaka N, Amarasekara T. Evaluation of learning environment among Nursing undergraduates in state universities, Sri Lanka. BMC Nurs. 2021 Dec;20:1-8.
45. Rostami-Moez M, Mortazavi Z, Najafivosough R, Shahbazi M, Mortazavi SS. The relationship between the quality of clinical education and the students' interest in their field of study of rehabilitation faculty. Horiz Med Educ Dev. 2022 May 22;13(1):37-47.
46. Bashardoust N, Mohammadi Gavabar M, Mirfarhadi N. Quality of education in each of the clinical departments from the perspective of fifth and sixth year dental students in 1399. Horiz Med Educ Dev. 2022 Nov 22;13(3):18-6.
47. Orakifar N. Comparison of educational environment from the view point of undergraduate students of different fields in Ahvaz Faculty of Rehabilitation Sciences, 2019. Med Educ Dev. 2020 Sep 10;13(37):31-40.
48. Quiroga-Marabolí P, Antúnez-Riveros MA, Aguirre-Jerez M, Saldaña AB, Peralta-Camposano J, de Gauna Bahillo MP. Perceptions of the educational environment among undergraduate physical therapy students in a competency-based curriculum at the University of Chile. J Educ Eval Health Prof. 2019 Apr 29;16:9.

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