

# Comparison Of DREEM, Domines, And Item Scores Between Dental And Medical Colleges In Saudi Arabia: A Systematic Review

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## ABSTRACT

**Background:** Educational Environment (EE) could influence the teacher and student behaviors in dental as well as medical fields.

**Objectives:** This systematic review aimed to compare between genders in relation to the overall DREEM, domines, and item scores among EEs of dental and medical governmental and private colleges in SA universities.

**Methods:** Cross-sectional studies that measured the perception of student gender in EE in dental and medical colleges among Saudi universities via direct evaluation and interviews by using DREEM, domines, and item scores involved in this review. Studies conducted in 2011 up to 2021 were included. From all the included studies, the following pieces of information were extracted: researcher's name, year of publication, city, sample size, gender; overall-DREEM, domines, and item scores, gender, and domine significancy; and registered high as well as low item scores.

**Results:** A total of 19 studies were included in this review, of which 9 studies were conducted in dental colleges (one private and 8 governmental); however, 10 governmental studies were carried out among medical schools. Response rates (RRs) were 74% and 79% in the dental and medical studies, respectively. The gender numbers with significant and non-significant values were much higher in dental studies than medical ones. Overall, the DREEM scores were in the 'Plenty of Problems' and 'More positive than negative' in both dental and medical studies with scores between 51–100 and 101–150, respectively. For dental and medical studies, nearly equal scores were recorded in the SPL and SSSP domine, while SPT and SPA domines were slightly higher in the medical studies. Conversely, the opposite was recorded in the SASP domine.

**Conclusion:** This review scored good students' perceptions for EEs in both dental and medical studies with overall DREEM scores of 101–150 and meaning of "More positive than negative" with slightly higher score in the medical than dental field. Equal scores in the 5 domines were recorded.

**Keywords:** Dental education, medical education, DREEM, gender, Saudi Arabia.

## INTRODUCTION

In mid-1998, the World Federation for Medical Education highlighted teaching and learning climate as one of the goals for assessing dental and medical education programs [1]. The consequences of the EE as a learning, teaching, academic, and clinical setting are unanimously agreed between dental and medical educators as important determinants of dental and medical students' beliefs, understanding, competences, progress, and behaviors [2,3].

Evaluation of the EE at both academic, preclinical, and clinical locations is key to providing high value, student-centered programs [4,5]. To conduct such evaluation across several dental and medical sites, specialties, and student classes, one must use a comprehensive, valid, and reliable instrument such as DREEM.

Over the last five decades, educational researchers have attempted to define and measure the medical education environment [4,6–7], and the most widely used contemporary development is almost certainly

the Dundee Ready Education Environment Measure (DREEM) [5,8]. It has demonstrated itself to be globally valuable and effective in a variety of healthcare colleges, such as medical, dental, nursing and chiropractic learning, teaching, and EE [3,8].

The DREEM is a multidimensional and multicultural tool that can measure the five separate basics of EE, namely, learning, teachers, academic, atmosphere, and social self-perception [3,5]. DREEM was developed by a Delphi panel and has been used to highlight the weaknesses and strengths of an EE in dental, medical, and nursing institutes, as well as in several countries. It has also been translated to and replicated in many languages, such as Turkish, Romanian, Spanish, Greek, Urdu, and Arabic.

More than 20 dental colleges and 25 medical colleges were established in all cities of the SA with their own respective on-going programs. Health education among the different universities in SA has grown rapidly in the last 15 years. Many governmental and private dental as well as medical colleges were established in almost all the big cities of SA such as, Riyadh, Jeddah, Dammam, Abha, Qassiem, and Al Madinah Al Menwareh, among others. In parallel with these developments, all colleges were vying for accreditation through evaluation of their educational programs. With this goal, the core of the education (students) perception toward the EE, as well as the learning, teaching, academic, atmosphere, and social self-perception environments must undergo evaluation. This systematic review aimed to highlight and compare between genders in relation to the overall DREEM, domines, and item scores among EEs of dental and medical colleges in Saudi universities. This review also discussed the scores of DREEMs among genders.

## **METHODS**

The current systematic review was planned and created according to the Preferred Reporting Items for Systematic Review and Meta-analysis (28,29).

### **Research Protocols and Eligible Criteria**

The author conducted the search plan by using the state, context, and population framework on the basis of the following questions: "Are there overall DREEM, domine, and item gender difference values between dental and medical schools in the Saudi college of dentistry and medicine in different SA universities?". This question was investigated by determining the gender, DREEM, domine, and

item values among Saudis in SA dental and medical colleges and the factors related to this condition. Therefore, only cross-sectional studies that completely assessed and interviewed participants were included by applying the DREEM questionnaires with its 5 domines (3,5,8). Inclusive criteria were studies published in 2011 until January 2022 and conducted among dental and medical colleges; papers comparing genders, using DREEM questionnaires (50 items), and 5 domains; and published in English.

### **Search Method for Identification and Screening of Studies**

All peer-reviewed original research articles on dental and medical education were selected. The bibliography of PubMed, Science Direct, Scopus, Wiley Library, Google website search, and Web of Science databases were searched to identify the most relevant cross-sectional studies that assessed and measured the EE by using the DREEM inventory until 15<sup>th</sup> of January 2022. The search terms used were "dental education," "medical education," "DREEM," "gender," "dental colleges," and "medical colleges." The keywords were used individually or in combination by using the Boolean operators "AND" "OR" and "NOT" to search for the term "Dental and medical education" independently. Two reviewers manually completed the search by assessing selected journals that focus on dentistry and psychiatry.

### **Study Selection, Data Collection, and Data Items**

Apart from the aforementioned criteria, this study also assessed studies published in English that used the DREEM scale among dental and medical colleges to assess the student perception of the EE and those that considered the effects of gender, overall score, domine, and items. A researcher evaluated the validity and duplications of the studies. Studies that did not assess the EE among Saudis, longitudinal studies, case-control studies, systemic reviews, and case reports were excluded. Articles that did not indicate the number of subjects and participants or whose samples had been partly evaluated in other studies were also excluded. One investigator (S. AIQ) individually read all the titles and abstracts and carefully evaluated them. The researchers had to agree whether each study was related to the study question. Finally, a total of 19 studies were included, dental studies were 9; among those studies, one study was in a private college in

Buraydah, whereas the remaining 8 were governmental colleges (2 each in Jazan, Al-Madinah Al Mounwareh, 2 in Dammam, 1 in Riyadh, and 1 in Jeddah) (9-17); also included were 10 medical studies, distributed as 5 studies in Riyadh, and a single study in both Riyadh and Jeddah; while the remaining 4 studies were in Dammam, Tabuk, Al-Madinah Al Mounwareh, and in Dammam (18-27).

### **Data Extraction and Analysis**

The data from each study were extracted using unique tables designed by the investigator. These pieces of information included the researcher(s) name(s), year of publication, type of college and university, name of city, sample size, response rate, gender percentages; overall, DREEM, DREEM with its 5 domine instruments, 50 DREEM items; and notable differences among genders, significant differences between gender and domines, and strong and weak DREEM items (Table 1). Table 2 reveals the five separate domines of the student perception of EE, namely, Dental students' perception of learning (12 items), Dental students' perception of teachers (11 items), Dental students' academic self-perception (8 items), Dental students' perception of the atmosphere (12 items), and Dental students' social self-perception (7 items), while Table 3 represents the guide to the interpretations of the total or overall DREEMS (0-200 points), score of the 5 domines, and 50 DREEM items (3,5,8).

### **Quality of the Included Studies**

The quality of the involved studies was calculated using the suggestions from the Strengthening the Reporting of Observational Studies in Epidemiology (STORBE). This checklist was used to estimate the limitations and risk of bias of available research that could lead to an inaccurate analysis of the final outcomes. Even though it can raise the validity and strength of the conclusions and the reproducibility of the procedures, it is an indicator that enhances the overall quality of the involved and associated studies. Two investigators who conducted a whole count of all the studies participating in the current review evaluated the study.

### **Synthesis of the Results**

All data were presented in the unique tables. The aforementioned variables such as overall and 5 DREEM domines, 50 DREEM items, and gender

among the SA dental and medical colleges were compared.

## **RESULTS**

### **Study selection**

A total of 120 studies were gathered and analyzed, of which 87 were excluded because they were duplicates or not related to this review. Forty-one studies were further excluded from the remaining 33 because they were case studies or reviews. Finally, 19 studies were involved here (Graph 1). Apart from the aforementioned variables, the participants' occupation was extracted (Table 1).

### **Study Characteristics and Quality of the Reports**

All 19 studies were conducted in the SA, "title, keywords, aim, and scale used recorded the highest values of all parameters tested (100%)." The rest of the parameters with the lowest scores were "sample size calculation or pilot studies, and it was presented in 42% only." The score of the parameter "ethical committee," which most researchers commonly omitted, was 58%. The parameter "future research" was not indicated in 10 papers or 53% of the studies. Approximately 53% of the studies failed to assess "strengths and limitations." With regard to "reliability," approximately 63% of the researchers did not perform intra/interrater reliability tests. Overall, 11 studies were recorded 14/19 (74%) and above (Table 4).

### **Synthesis of Results**

All the papers and research included herein were cross-sectional in nature and used the DREEM scale. The percentage values of males to females were 54% to 46%, respectively, among dental studies; whereas in the medical studies, they accounted for 60% to 40%, respectively. The percentage of response rate among the participant in the dental studies was 74%, whereas it was higher among medical studies recorded at 79% (Graph 2). The average sample sizes were 173 and 402 participants for dental and medical studies, respectively.

RR is more or less equal in both fields and slightly higher in medical studies with 79%. The genders with significant and non-significant differences were much higher in dental studies than medicals ones with 88% and 12% for dental and 50% and 5% for the medical studies, respectively, as shown in

Graph 2. The recorded overall DREEM scores were in the “Plenty of Problems” and “More positive than negative” in both dental and medical fields and scored 33 and 67 for dental studies; while it recorded as 20 and 80 scores for the medical studies with scores between 51–100 and 101–150 as shown in Graph 3. Both scores were in the same 2 categories of the 4 categories of the total DREEM scores (Graph 3). Graph 4 demonstrated the values recorded for the 5 domains of the DREEM scale. For dental and medical studies, nearly equal scores were recorded in SPL domain and SSSP domain with scores of 27/48 and 15.5/28, respectively. Both had the same definitions which were “More Positive Approach” and “Not Very bad.” The SPT and SPA domains were slightly higher among medical studies (25.7/44 and 27.4/48) than the dental scores (24.3/44 and 25.8/44) and both of the studies mean “Moving in the right directions” and “A more positive atmosphere,” whereas the opposite was recorded in SASP domain in which dental studies were slightly higher than medical studies with scores 19.6 and 18.7 for dental and medical studies, respectively.

## DISCUSSION

EE is believed to be a major component of the educational curriculum. In addition, EE experienced by students has an impact on the satisfaction of the course of study, perceived well-being, as well as academic achievements. Accreditation is also one of the important goals of the institutes of higher education. Many Saudi dental, medical, and nursing studies have been carried out using the DREEM tool. However, higher scores at both dental and medical studies were gained in the last 5 years than the other traditional curricula which could be attributed to the process of curriculum shift toward integrated teaching and learning approaches (9,10). Another strong reason can be that all BDS programs for both dental and medical fields have started faculty development workshops for capacity building according to the framework of NCAAA (The National Center for Academic Accreditation and Evaluation) (9–11). This systematic review aimed to highlight and compare between genders in relation to the overall DREEM, domains, and items scores among the EEs of dental and medical colleges in SA universities. This review also discussed the scores of DREEMs among genders. The RR from all SA colleges was very high, which was achieved through the follow up made on the submission of questionnaire at the same time of

visit. Moreover, most of these studies were conducted by a person at the same zone or area either in dental or medical studies (private or governmental colleges).

Studies in other parts of the world propose a more positive than negative student perception of EE with its DREEM score, such as studies conducted in medical colleges in Arab countries in the United Arab Emirates, Kuwait, and Oman with 120, 108, and 131 total DREEM scores, respectively, in dental colleges (30–31). In a recent study conducted by Hernández-Crespo et al. (2020) in Spain, they recorded the dental student perception of the EE score for the overall DREEM during different academic years 2010–2011, 2013–2014, 2014–2015, and 2015–2016 with 118, 117, 116, and 112, respectively (33). Another study was published in 2021 and assessed the EE in dentistry at universities in the Netherlands (34), and study in the medical school at the Dundee University Medical School; both studies recorded slightly higher DREEM scores than scores in this review (35). Slightly higher values were recorded and conducted among dental students in Germany (36).

Until today, completely separate patterns of study were noted in Saudi Arabia on the teaching pedagogy for males and females in an individual building including administration offices, staff, classrooms, and exam duties. Thus, predictably no significant differences existed among genders in most of the dental and medical studies. Regarding gender differences, female students obtained a slightly higher mean DREEM score than male students. Females obtained significantly higher mean scores on items related to teaching strategies, teachers, and their social lives in school. This finding is consistent with those of past studies (36–37). Significant differences were recorded among Gulf countries in Oman, Kuwait, and UAE (30–32). Parallel findings were also recorded in Spain, the Netherlands, Australia, and Germany (33–36). In the dental field, Zamzuri et al. (2004) were the first to analyze EC for Dental Assistant and Dental Prosthesis Students from a Dental Training Institute in Malaysia, reporting 125 and 118 out of 200 (38). Subsequently, in a study involving 126 students from the Dentistry School of Manipal (India), Thomas et al. (39) found an EE mean of 115/200; similar score was reported by Stratulat et al. (40). All of those values were equal or higher than the values in this review either in the dental or medical fields, concluding that males or females and could be related to the difference in the teaching periods

among the universities. Most Health Science studies have reported EE values between 101–140 (40). From Graphs 4 the 5, the DREEM domines in these studies were more or less equal in both dental and medical studies. For dental studies, the DREEM domines were as follows: SPL for the 12 items was 27; SPT for the 11 items was 24.3; SASP for the 8 items was 19.6; SPA for the 12 items was 25.8; and SSSP was 15.5 for the 7 items. Marginal similar values were recorded for the medical studies, and recorded SPL for the 12 items was 27.1; SPT for the 11 items was 25.7 (slightly higher than dental); SASP for the 8 items was 18.5 (slightly lower than dental); SPA for the 12 items was 27.4 which was higher than in the dental, and SSSP was 15.8 for the 7 items which has similar values for the dental studies. The means of both values were “A More Positive Approach,” “Moving in the right directions,” “Feeling more in the positive side,” “A more positive atmosphere,” and “Not Very bad.” In Spain, a study recorded similar higher values for the 5 domines during different academic years (33) especially for SPL and SPA. Meanwhile, higher values were recorded in the 5 domines in a study conducted in the medical school at Dundee University Medical School, Australia (35). Higher values were recorded in a dental complex in the Netherlands, especially in SPL, SPT, and SSSP (36), and in India (39). Similar values in SASP and SSSP in studies conducted in the Dental Assistant and Dental Prosthesis Students from a Dental Training Institute Malaysia and in a Dentistry School of Manipal India and both recorded the “Moving in the right directions” and “Not Very bad” atmosphere (38,39).

Strong items are the same and similar in most of the dental and medical studies. The weak items are completely different, especially in our dental and medical studies. In addition, the causes were mentioned before such as the EE of the classes and the age of the colleges. In SPL, the weak items were Q numbers “25. The teaching overemphasizes factual learning,” “47. Long-term learning is emphasized over the short term,” and “48. The teaching is too teacher-centered.” For SPT, Q numbers “8. The teachers ridicule the students;” and “9. The teachers are authoritarian.” SASP did not record as a weak item in most of the dental studies, but more were recorded in weak items in medical studies (22, 25) and Q “27. I am able to memorize all I need,” finally SSSP Q “3. There is good support for students who get stressed,” and “4. I am too tired to enjoy this course.” A similar finding exists in the

weak items in the dental studies worldwide, especially in those studies recorded on the margin of the overall DREEM ranging from 100–110. Most of the dental and medical studies which recorded strong and weak DREEM items were completely different than items recorded in our local studies. The limitation of this review was that the number of studies included herein was low (19 cross-sectional studies). Studies that assessed the student perception of EE using DREEM tools in the SA were minimal than the number of dental and medical colleges. This systemic review included a few studies, especially in the private colleges and some governmental universities, which did not measure the student perception of EE.

### Conclusion

This review scored the good students’ promising perceptions of educational environments in both dental and medical studies. The scores of the overall DREEM were in the “Plenty of Problems” and “More positive than negative” in both dental and medical fields with scores between 51–100 and 101–150, which were slightly higher in the medical than dental fields. Among the 5 domines, nearly equal scores were obtained in the Students’ perception of learning and Students’ social self-perception (SPL and SSSP) domines, and both had the same definitions which were “More Positive Approach” and “Not Very bad.” Students’ perception of teaching and Students’ perception of the atmosphere (SPT and SPA) domines were slightly higher among the medical studies than the dental scores with means of “Moving in the right directions” and “A more positive atmosphere.” For Students’ academic self-perception (SASP) domine, the dental studies were slightly higher than the medical studies with scores. Follow-up studies must be conducted in the included colleges. Meanwhile, other colleges, especially the private colleges, should start conducting educational research that investigates the student’s perception of EE using the same scales.

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**Table 1 Dental and Medical student perception of the EE Using DREEM Domines and Items Conducted in SA (n = 19).**

Researcher/Year/College, University, City	Sample Size, RR,	Overall -REEM Score, SD, Subscale, and Domains	Gender and Domine Significances, Strong and Weak items
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	Male: Female%		
<b>Dental Colleges Studies</b>			
<b>9. Arora et al. /2021</b>  DC, MU, Buraydah	92/ RR; 77%  Males 44% Females 56%	<b>130.9 ± 32.73 (More Positive than Negative)</b> (SPL) 32.8±8.63/48 (SPT) 27.4±7.08/44 (SASP) 22.0±6.24/32 (SPA) 31.2±8.18/48 (SSSP) 17.5±5.09/28	NSD ↔ Gender NSD ↔ Domines  <b>Strong items; NO</b> <b>Weak items; (SPL) Q47, Q 48;</b> <b>(SPT) Q8, Q9; (SPA) Q11, Q36;</b> <b>(SSSP) Q4</b>
<b>10. Aldowsari et al./ 2021</b>  DC, JU, Jazan	272/ RR; 61%  Males 57% Female 43%	<b>125.19±15.11 (More Positive than Negative)</b> (SPL) 31.4±4.69/48 (SPT) 26.2±3.24/44 (SASP) 21.9±3.52/32 (SPA) 28.1±5.29/48 (SSSP) 17.6±3.03/28	NSD ↔ Gender NSD ↔ Domines  <b>Strong items; (SPL) Q47; (SPT) Q2, Q39, Q50; (SASP) Q5; (SSSP) Q15, Q46</b> <b>Weak items; (SPL) Q25, Q48;</b> <b>(SPT) Q8, Q9; (SPA) Q17, Q35;</b> <b>(SSSP) Q3</b>
<b>11. Al Moaleem et al./ 2020</b>  DC, JU, Jazan	286/ RR; 86%  Males 57% Female 43%	<b>130.5 (More Positive than Negative)</b> <b>130.8 Male &amp; 130.2 Females</b> (SPL) 32.1/48 (SPT) 29.1/44 (SASP) 21.7/32. (SPA) 30.0/48 (SSSP) 17.5/28	NSD ↔ Gender <u>NSD ↔ SPL, SPT, SASP,</u> <u>SSSP.....SD ↔ SPA</u>  <b>Strong items; (SPL) Q47; (SPT) Q2; (SASP) Q 10; (SSSP) Q15, Q46</b> <b>Weak items; (SSSP) Q3, Q4</b>
<b>12. Sabbagh et al./ 2020</b>  DC, KA-B U, Jeddah	217/ RR; 44%  Males 58% Females 42%	<b>125 (More Positive than Negative)</b> <b>120.1 Male &amp; 128.7 Females</b> (SPL) 30. 4/48 (SPT) 23.9/44 (SASP) 23.6/32. (SPA) 29.5/48 (SSSP) 18.5/28	NSD ↔ Gender NSD ↔ Domines  <b>Strong items; (SSSP) Q15</b> <b>Weak items; (SPL) Q48; (SPT) Q8, Q9, Q39; (SPA) Q17; (SSSP) Q3, Q4</b>
<b>13 Al-Saleh et al./ 2018</b>  DC, KSU, Riyadh	302/ RR; 61%  Males 44% Females 56%	<b>108.42 (More Positive than Negative)</b> (SPL) 25.3/48 (SPT) 24.4/44 (SASP) 19.8/32 (SPA) 25.2/48 (SSSP) 14.5/28	NSD ↔ Gender <u>NSD ↔ SPL, SPT, SASP,</u> <u>SSSP.....SD ↔ SPA</u> <b>Strong items; (SPT) Q2; (SSSP) Q15</b> <b>Weak items; (SPL) Q25, Q48;</b> <b>(SPT) Q8, Q9, Q39, Q50; (SASP) Q27; (SPA) Q11, Q17, Q35, Q42, Q43; (SSSP) Q3, Q4, Q14</b>
<b>14. Al-Samadani et al./ 2016</b>  DC, TU, Al Madinah	110/ RR; 91%  Males 53% Female 47%	<b>90 (More Negative than Positive, Plenty of Problems)</b>  (SPL) 19.4 ± 7.43/48 (SPT) 19.4 ± 6.77/44 (SASP) 17.2 ± 5.60 /32	NSD ↔ Gender NSD ↔ Domines <b>Strong items; NO</b> <b>Weak items; (SPL) Q1, Q7,Q13,Q16,Q20, Q22, Q24, Q25, Q38, Q44, Q47, Q48; (SPT) Q2,</b>



		(SPA) 18.4 ± 7.93/ 48 (SSSP) 13.8 ± 3.85/24	Q6, Q8, Q9, Q18, Q29, Q32, Q37, Q39, Q40; (SASP) Q5, Q10, Q21, Q26, Q27, Q31, Q41, Q45; (SPA) Q11, Q12, Q17, Q23, Q30, Q33, Q34, Q35, Q36, Q42, Q43, Q49; (SSSP) Q3, Q4, 14, Q15, 19, Q28, Q46.
<b>15. Ahmad et al. 2015/</b> DC, TU, Al-Madinah	64/ RR; 88%  Males 50% Females 50%	<b>92.3 (More Negative than Positive, Plenty of Problems)</b> <b>2009 (92.3) &amp; 2014 (90.4)</b> (SPL) 21.6 ± 5.8----- 19.4 + 6.3/48 (SPT) 21.3 ± 6.6 ----- 21.0 ± 5.3/44 (SASP) 17.7 ± 5.6 -----16.9± 5.5/32 (SPA) 21.5 ± 6.2 -----21.3 ± 5.5/48 (SSSP) 10.2 ± 2.4 -----9.8 ± 3.0/28	NSD ↔ Genders NSD ↔ Domines <b>Strong items; (SSSP) Q15, Q28</b> <b>Weak items; (SPL) Q1, Q7, Q13, Q16, Q20, Q22, Q44, Q48; (SPT) Q8, Q39, Q40; (SASP) Q5, Q26, Q27; (SPA) Q11, Q12, Q23, Q30, Q42, Q43; (SSSP) Q3, Q4, 14.</b>
<b>16. Farooqi et al./ 2015</b> CD, DU, Dammam	55/ RR; 72% Males 46% Females 54%	<b>110.1 (More Positive than Negative)</b> <b>Expected 114.7 .....105.5</b> <b>Actual</b> (SPL) 28.2 .....26.0/ 48 (SPT) 25.1 .....23.9/ 44 (SASP) 19.7 .....16.1/ 32 (SPA) 26.3 .....24.6/48 (SSSP) 15.3..... 14.9/28	NSD ↔ Genders NSD ↔ Domines <b>Strong items; (SPT) Q2; (SASP) Q10; (SSSP) Q15</b> <b>Weak items; (SPL) Q25, Q48; (SPT) Q8, Q9, Q39; (SASP) Q7; (SPA) Q17,35; (SSSP) Q4</b>
<b>17. Ansari et al./ 2015</b> DC, DU, Dammam	162/ RR; 82%  Males 85% Females 15%	<b>97.7 (More Negative than Positive, Plenty of Problems)</b>  (SPL) 23.7/48 (SPT) 22.1/44 (SASP) 14.8 /32 (SPA) 22.8/48 (SSSP) 14.3/28	<b>SD ↔ Genders</b> NSD ↔ Domines <b>Strong items; NO</b> <b>Weak items; (SPL) Q1, Q7, Q13, Q16, Q24, Q25, Q44, Q47, Q48; Q50 (SPT) Q2, Q6, Q8, Q9, Q18, Q37, Q39, Q40; (SASP) Q5, Q10, Q21, Q26, Q27, Q31, Q41, Q45; (SPA) Q11, Q12, Q17, Q23, Q30, Q33, Q34, Q35, Q36, Q42, Q43, Q49; (SSSP) Q3, Q4, 14, Q15, 19, Q28, Q46.</b>
<b>Medical Colleges Studies</b>			
<b>18. Aga et al./ 2021</b> MC, KSAU-HS, Riyadh & NGHHA, Jeddah	220/ RR; 100%  Males 65% Males 35%	<b>129.6 (More Positive than Negative)</b> (SPL) 30.2/48 (SPT) 28.5/44 (SASP) 21.2/32	<b>SD ↔ Gender</b> NSD ↔ SSSP ..... <b>SD ↔ SPL, SPT, SASP, SPA</b> <b>Strong items; (SPT) Q2; (SASP) Q10; (SSSP) Q4</b>

		(SPA) 31.4/48 (SSSP) 18.4/28	<b>Weak items; (SPA) Q35</b>
<b>19. Al-Natour SH/ 2019</b>  MC, IA-RBFU, Dammam	121/ RR; 100%  Males 65% Females 35%	<b>126.4 (More Positive than Negative and Satisfactory)</b> (SPL) 29.3/48 (SPT) 28.5/44 (SASP) 19.2/32 (SPA) 32.0/48 (SSSP) 17.4/28	<b>NSD ↔ Gender</b> <b>NSD ↔ Domines</b>  <b>Strong items; (SPT) Q3; (SPA), Q49; (SSSP) Q15</b> <b>Weak items; (SPL) Q25; (SPT) Q9, (SASP) Q27; (SSSP) Q14</b>
<b>20. Soliman et al./ 2017</b>  MC, KSU, Riyadh	62/ RR; 40%  Males 53% Females 47%	<b>137.3 (More Positive than Negative)</b>  (SPL) 32.1/48 (SPT) 29.8/44 (SASP) 22.8/32 (SPA) 33.1/48 (SSSP) 19.5/28	<b>NSD ↔ Gender</b> <b>NSD ↔ Domines Items Scores ≥ 3.5**</b> <b>Strong items; (SPL) Q1, Q7, Q13, Q16, Q20, Q22, Q24, Q25, Q38, Q44, Q47; (SPT) Q2, Q6, Q9, Q18, Q29, Q32, Q37, Q39, Q40, Q50; (SASP) Q5, Q10, Q21, Q26, Q27, Q31, Q41, Q45; (SASP) Q11, Q12, Q17, Q23, Q30, Q33, Q34, Q36, Q42, Q43, Q49; (SSSP) Q4, 14, Q15, 19, Q28, Q46.</b> <b>Weak items; NO</b>
<b>21. Altemani &amp; Merghani/ 2017</b>  MC, Ta U, Tabuk	221/ RR; 69%  Males 43% Females 57%	<b>101.5 (Border of More Positive &amp; Satisfactory than Negative)</b> <b><u>98.3 Males &amp; 105.0 Female</u></b>  (SPL) 23.5 ±6.4 ---24.7±5.9 (SPT) 22.0±6.7 ---26.6±5.9 (SASP) 15.4±5.5 ---14.9±5.3 (SPA) 22.1±7.9 ---23.7±7.9 (SSSP) 15.4±4.1--- 15.2±3.8	<b>SD ↔ Gender</b> <b>NSD ↔ SPA, SPT, SSSP.....</b> <b>SD ↔ SASP, SPA</b> <b>Strong items; (SPL) Q48; (S SSP) Q15. Q46</b> <b>Weak items; (SPL) Q7, Q16, Q22, Q24, Q38, Q44, Q47; (SPT) Q9, Q18, Q29, Q32, Q39; (SASP) Q5, Q10, Q21, Q26, Q27, Q31, Q41, Q45; (SASP) Q11, Q12, Q17, Q23, Q30, Q33, Q34, Q36, Q42, Q43, Q49; (SSSP) Q3, Q4, 14, Q15, 19, Q28, Q46.</b>
<b>22. Al-Faris et al./ 2014</b>  MC, KSU, Riyadh	1132/ RR; 75%  Males 50% Females 50%	<b>94.7 (More Negative than Positive, Plenty of Problems)</b> <b><u>94.2 Male &amp; 96.0 Females</u></b> (SPL) 23.7/48 (SPT) 21.0/44 (SASP) 15.7/32 (SPA) 23.7/48 (SSSP) 13.2/28	<b>SD ↔ Gender</b> <b>NSD ↔ SPT, SPA, SSSP.....SD ↔ SPL, SASP</b>  <b>Strong items; NO</b> <b>Weak items; (SPL) Q7, Q16, Q 22, Q24, Q38, Q44, Q47; (SPT) Q9, Q29, Q32; (SPA) Q5, Q10, Q21, Q26, Q27, Q31, Q41, Q45; (SASP) Q5, Q10, Q21, Q26, Q27; (SSSP) Q3, Q4, Q14.</b>

<p><b>23. Mojaddaid et al./ 2013</b></p> <p>MC, T U, Maddinah Al Manwareh</p>	<p>845/ RR; 56%</p> <p>Males 43% Females 57%</p>	<p><b>114.8 (More Positive than Negative)</b> <b><u>109.1 (2008) &amp; 120.6 (2012)</u></b> (SPL) 27.9/ 48 (SPT) 28.9/ 44 (SASP) 20.0/ 32 (SPA) 32.3/ 48 (SSSP) 13.0/ 28</p>	<p>NSD ↔ Genders SD ↔ Domains and ↔ Two academic years <b>Strong items; (SSSP) Q3, Q19, Q46</b> <b>Weak items <u>2007-2008</u>; (SPL) Q25, Q48; (SPT) Q8, Q9, Q39, Q50; (SASP) Q27; (SPA) Q11, Q12; Q17, Q35; (SSSP) Q3, Q4</b></p>
<p><b>24. Al-Mohaimed/ 2013</b></p> <p>MC, QU, Buraydah</p>	<p>454/ RR; 97%</p> <p>Males 61% Females 39%</p>	<p><b>112.0 (More Positive than Negative)</b> <b><u>111 Males &amp; 112 Females</u></b> (SPL) 24.9/48 26.3/48 (SPT) 25.0/44 25.9/44 (SASP) 19.4/32 19.5/32 (SPA) 25.9/48 25.7/48 (SSSP) 15.3/28 15.7/28</p>	<p>NSD ↔ Genders NSD ↔ SPL, SPT, SPA, SSSP..... SD ↔ SASP</p> <p><b>Strong items (SSSP) Q15,46</b> <b>Weak items; (SPL) Q7, Q25, Q 48 (SPA) Q11, Q12, Q23, Q42, Q43 (SSSP) Q3, Q4, Q14</b></p>
<p><b>25. Zawawi &amp; Elzubeir/ 2012</b></p> <p>MC, KSBA-HS &amp; MC, KSU, Riyadh</p>	<p>101/ RR; 73% (KSAU-HS) 101/ RR; 23% (KSU)</p> <p>Males 87% Females 13%</p>	<p><b>115.5 (More Positive in KSAU-HS &amp; Border in KSU)</b> <b><u>131.0 KSAU-HS &amp; 100.0 KSU</u></b> (SPL) 36.4±6.28/48 23.18±5.59/48 (SPT) 25.5±5.96/44 23.79±4.35/44 (SASP) 19.8±4.79/32 13.59±3.81/32 (SPA) 32.8±7.92/48 24.66±5.84/48 (SSSP) 16.8±3.31/28 15.37±3.85/28</p>	<p>SD ↔ Genders NSD ↔ SPT, SSSP .....SD ↔ SPL, SASP, SPA</p> <p><b>Strong items/KSAUHS; (SPL) Q4, Q7, Q9, Q10; (SASP) Q28; (SPA) Q38</b> <b>Weak items/KSU; (SPL) Q4, Q7, Q9, Q10; (SASP) Q28; (SPA) Q38.</b></p>
<p><b>26. Al-Kabbaa et al./ 2012</b></p> <p>MC, KFMC, Riyadh</p>	<p>237/ RR; 85%</p> <p>Male 73% Female 27%</p>	<p><b>111.5 (More Positive than Negative)</b> (SPL) 26.6/48 (SPT) 23.7/44 (SASP) 20.6/32 (SPA) 23.5/48 (SSSP) 17.2/28</p>	<p>SD ↔ Gender NSD ↔ SPT .....SD ↔ SPL, SASP, SPA, SSSP</p> <p><b>Strong items; NO</b> <b>Weak items; (SPL) Q25, Q44, Q47, Q 48; (SPT) Q8, Q9, (SPA) Q11, Q36, (SSSP) Q4</b></p>
<p><b>27. Al-Ayed &amp; Sheik/ 2011</b></p> <p>MC, KSU, Riyadh</p>	<p>222/ RR; 45%</p> <p>Males 70% Female 30%</p>	<p><b>89.9 (More Negative than Positive, Plenty of Problems)</b>  (SPL) 21.0/48 (SPT) 22.2/44 (SASP) 15.8/32 (SPA) 21.4/48 (SSSP) 13.4/28</p>	<p>NSD ↔ Gender NSD ↔ Domines</p> <p><b>Strong items; NO</b> <b>Weak items; (SPL) Q1,Q7,Q13,Q16,Q20, Q22, Q24, Q25, Q38, Q44, Q47, Q48; (SPT) Q2, Q6, Q8, Q9, Q18, Q29, Q32, Q37, Q39, Q40, Q50; (SPA) Q5, Q10, Q21, Q26, Q27, Q31, Q41, Q45; (SASP) Q11, Q12, Q17, Q23, Q30, Q33, Q34, Q35, Q36, Q42, Q43, Q49; (SSSP) Q3, Q4, 14, Q15, 19, Q28, Q46.</b></p>

DC- Dental Colleges; MU- Mustaqbal University; RR- Response Rate; NSD- Non- Significant difference; SD- Significant difference; ↔- Between; Strong items; Scoring ≥ 3.0 Points; Q- Question; JU- Jazan University;

KABU- King Abdulaziz University; KSU- King Saud University; TU- Taibah University; DU- Dammam University; MC- Medical College; KSB-AUHS- King Saud Bin-Abulaziz University for Health Science; NGHHA- National Guard Health Affairs; IA-RBFU- Imam Abdulrahman Bin Faisal University; Ta U- Tabuk University; QU- Qassim university; KFMC- King Fahad Medical City.

**Table 2 DREEM Domines (5) and Items (N = 50).**

**Dental students' perception of learning (12 items)**

1. I am encouraged to participate in the class.
7. The teaching is often stimulating.
13. The teaching is student-centered.
16. The teaching helps develop my competence.
20. The teaching is well focused.
22. The teaching helps develop my confidence.
24. The teaching time is put to good use.
25. The teaching over-emphasizes factual learning.
38. I am clear about the learning objectives of the course.
44. Teaching encourages me to be an active learner.
47. Long-term learning is emphasized over the short term.
48. The teaching is too teacher-centered<sup>+</sup>.

**Dental students' perception of teachers (11 items)**

2. The teachers are knowledgeable.
6. The teachers espouse centered approach to consulting.
8. The teachers ridicule the students<sup>†</sup>.
9. The teachers are authoritarian<sup>†</sup>.
18. The teachers have good communication skills.
29. The teachers provide good student feedback.
32. The teachers provide constructive criticism.
37. The teachers give clear example.
39. The teachers get angry in class<sup>+</sup>.
40. The teachers are well prepared for their class.
50. The students irritate the teachers<sup>+</sup>.

**Dental students' academic self-perception (8 items)**

5. Learning strategies which worked before work now.
10. I am confident about my passing this year.
21. I feel I am being well prepared for my profession.
26. Last year's work has been a good preparation for this year.
27. I am able to memorize all I need.

31. I have learned a lot about empathy in my profession.  
 41. My problem-solving skills are being well developed.  
 45. Much of what I learn seems relevant to dentistry.

**Dental students' perception of the atmosphere  
(12 items)**

11. The atmosphere is relaxed during the lectures.  
 12. This college is well time-tabled.  
 17. Cheating is a problem in this college.  
 23. The atmosphere is relaxed during lectures.  
 30. There are opportunities to develop interpersonal skills.  
 33. I feel comfortable in class socially.  
 34. Atmosphere is relaxed during seminars/tutorials.  
 35. I find the experience disappointing. †  
 36. I am able to concentrate well.  
 42. The enjoyment outweighs the stress of studying dentistry.  
 43. The atmosphere motivates me as a learner.  
 49. I feel able to ask the questions I want.

**Dental students' social self-perception (7 items)**

3. There is good support for students who get stressed.  
 4. I am too tired to enjoy this course †.  
 14. I am really bored on this course †.  
 15. I have good friends in this college.  
 19. My social life is good.  
 28. I seldom feel lonely.  
 46. My accommodation is pleasant.

**Table 3 Guide for the interpretation of DREEM, domines, Items, and indivial item scores (3,5,8,10, 33)**

Parameter and Questions #	Values of Domines and Items (Scores)	Interpretation
<b>Guide to interpret the total overall DREEM scores</b>		
Total DREEM Score (50)	0–50	Very poor
	51–100	Plenty of problems
	101–150	More positive than negative
	151–200	Excellent
<b>Guide to interpret DREEM domines scores</b>		

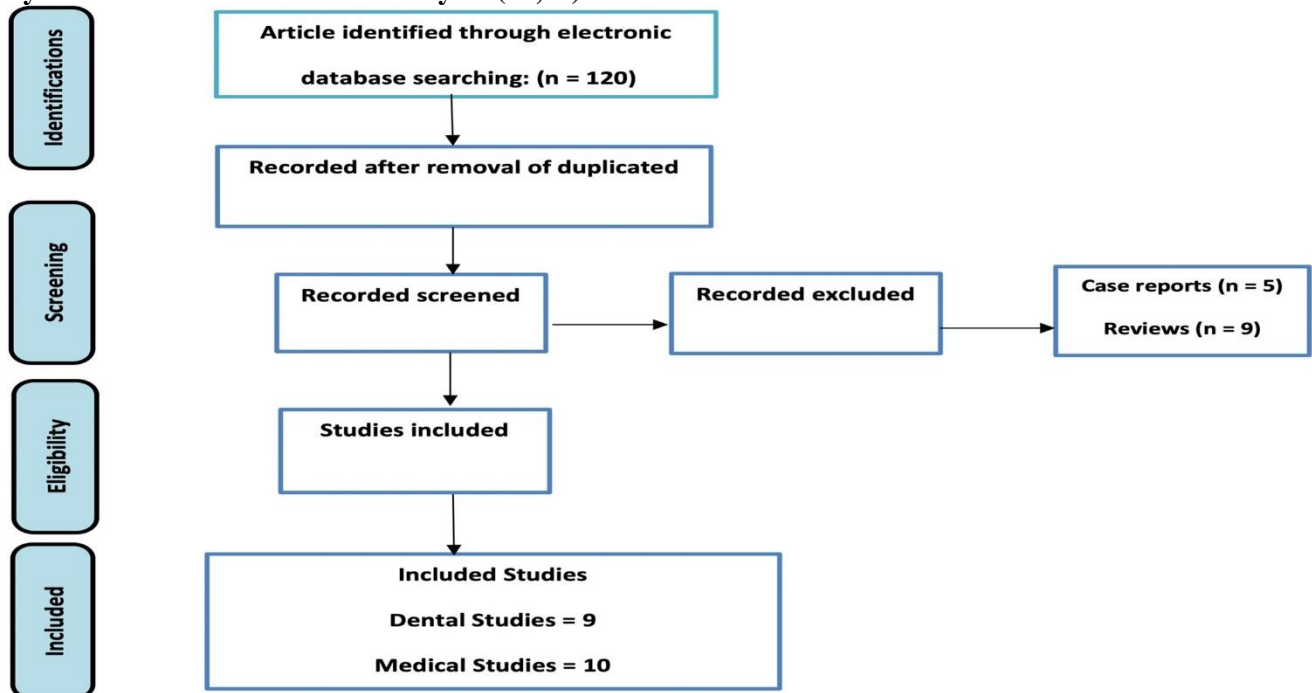
SPL Domine (12)	0–12	Very poor
	13–24	Teaching is viewed negatively
	25–36	A more positive approach
	37–48	Teaching highly thought of
SPT Domine (11)	0–11	Abysmal
	12–22	In need of some retraining
	23–33	Moving in the right direction
	34–44	Model course organizers
SASP Domine (8)	0–8	Feeling of total failure
	9–16	Many negative aspects
	17–24	Feeling more on the positive side
	25–32	Confident
SPA Domine (12)	0–12	A terrible environment
	13–24	There are many issues that need to be changed
	25–36	A more positive atmosphere
	37–48	A good feeling overall
SSSP (7)	0–7	Miserable
	8–14	Not a nice place
	15–21	Not very bad
	22–28	Very good socially
<b>Guide to interpret DREEM-item</b>		
Indivial items score	$\leq 2.00$	Educational problematic areas, which should be examined more exhaustively later
	2.01–3.00	Educational aspects that could be improved
	3.01–3.49	Positive educational aspects
	$\geq 3.50$	Educational aspects of excellence

**Table 4 Specific Preferred Reporting Items from Cross-sectional Studies on Dental Anxiety (N = 19)**

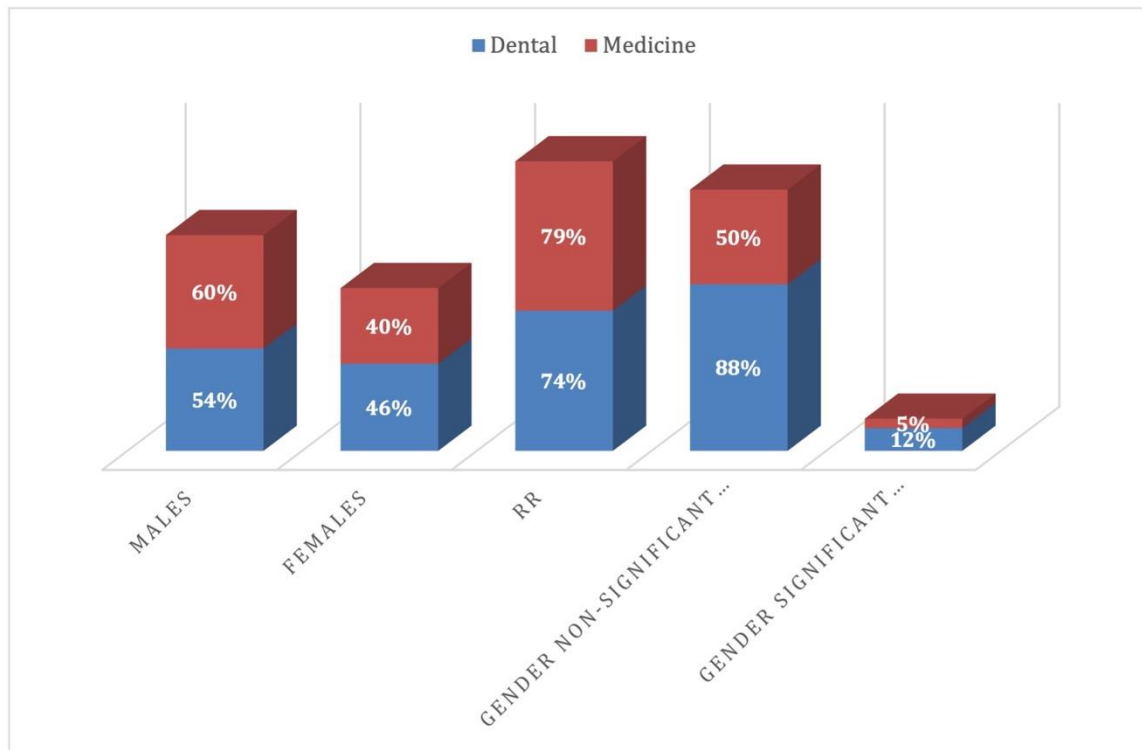
Section and Item from the Study	Dental Studies	Medical Studies	# and %
Title	√√√√√√√√	√√√√√√√√	<b>19 (100)</b>
Keywords	√√√√√√√√	√√√√√√√√	<b>19 (100)</b>
Aim	√√√√√√√√	√√√√√√√√	<b>19 (100)</b>
Ethics Committee	√√√√√xxx	√√√√√xxxxx	<b>11 (58)</b>
Hand to Hand & Interview (closed-ended question) (in vivo assessment)	√√√√√√xx	√√√√√xxxxx	<b>12 (63)</b>
Index or Scale Used	√√√√√√√√	√√√√√√√√	<b>19 (100)</b>

Assessment	√√√√√√xx	√√√√√√xxx	14 (74)
Observers	√√√√√√xx	√√√√√√xxx	14 (74)
Potential Sources of Bias	√√√√√xxx	√√√√√xxxxx	11 (58)
Calculation of the Final Sample Size (Pilot Study)	√√√√xxxxx	√√√xxxxxxx	8 (42)
Response Rate	√√√√√√√x	√√√√√√√xx	16 (84)
Reliability	√√√√√√xx	√√√√√xxxxx	12 (63)
Statistical Analysis	√√√√√√√√	√√√√√√√xx	17 (98)
Primary Outcomes	√√√√√√xx	√√√√√√√xx	14 (74)
Using Statistical Test	√√√√√xxx	√√√√√√√xx	14 (74)
Outcomes Interpretation	√√√√√√√xx	√√√√√√√xx	15 (79)
Strength and Limitations	√√√√xxxxx	√√√√√xxxxx	10 (53)
Generalizability	√√√√xxxxx	√√√√√xxxxx	10 (53)
Recommendations for Future Studies	√√√√√xxxx	√√√√√xxxxx	10 (53)
Represent the Actual Outcome	√√√√√xxx	√√√√√√√xx	14 (74)
<b>TOTAL (Number and Percentage)</b>	<b>9 (100)</b>	<b>10 (100)</b>	

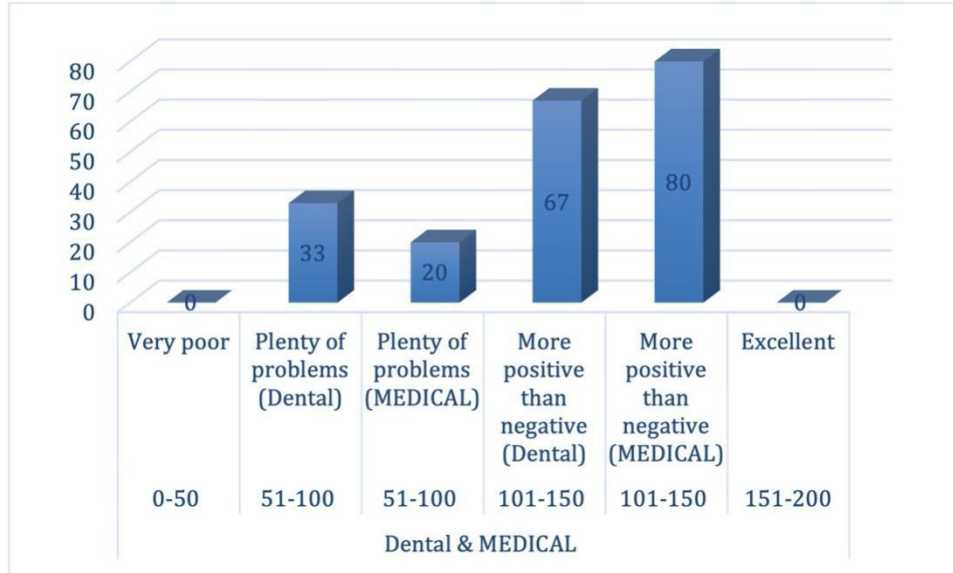
Figure/Graph 1. Flowchart of the study selection process. PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analyses (28,29)



**Figure/Graph 2 Percentage of gender and response rate and percentage of gender with DOMINE significant and non-significant differences among the medical and dental studies**



**Figure/Graph 3. DREEM Overall scores recorded in the dental and medical colleges**



**Figure/Graph 4. Domine Scores recorded in the different dental and medical colleges**



