

# Comparisons Between Preclinical and Clinical Dental Students' Perceptions of the Educational Climate at the College of Dentistry, Jazan University

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**Purpose:** The aim of this study was to compare the preclinical and clinical undergraduate dental students' perceptions of their educational climate (EC). In addition it will be compared with other local and international studies.

**Materials and Methods:** Students enrolled in their third and fourth years (preclinical phase) and students in their fifth and sixth years (clinical phase) of the Bachelor of Dental Science at the University of Jazan, Saudi Arabia, were invited to complete a WhatsApp media survey, which included demographics and the Dundee Ready Education Environment Measure (DREEM). This scale measured students' overall perceptions of the EC in five domains: learning, teaching, academic self-perception, atmosphere, and social self-perception. Data were analyzed with Student's *t*-tests and ANOVA to compare between and within groups.

**Results:** A total of 272 participants, 140 (51.5%) preclinical and 132 (48.5%) clinical students, took part in the study. Students were generally positive about their learning climate, with overall DREEM scores of 125.19 and 126.21 (preclinical) to 124.10 (clinical) out of a possible score of 200 phases. Student's perceptions of teaching (26.18±3.24/72.72%) and atmosphere (28.08±5.29/63.82%) were the highest and lowest scores, respectively, and both scores were positive.

**Conclusion:** No differences between the preclinical and clinical phases of the curriculum point to the structure of learning, teaching, academic, social self-perception in health professional degrees. Further research should investigate the weak points in the social and atmospheric climate.

**Keywords:** educational climate, teaching, DREEM, student perception, education programs

## Background

Educational climate (EC) is a broad concept. Here, education encompasses teaching and learning, whereas the environment encompasses everything that surrounds these factors. EC can be described as anything involved with educational institutions.<sup>1</sup> In 1998, the World Federation of Medical Education highlighted EC as a target area for the evaluation of health and dental education programs.<sup>2</sup>

In 1997 Roff et al developed the Dundee Ready Education Environment Measure (DREEM). It is a multidimensional and multicultural instrument that can measure the five separate fundamentals of EC, namely, students' perceptions of

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learning (SPL), students' perceptions of teachers (SPT), students' perceptions of atmosphere (SPA), students' academic self-perception (SASP), and students' social self-perception (SSSP).<sup>3,4</sup> DREEM can be used to highlight the weaknesses and strengths of an educational institution, compare the performance and success of dental schools, and contrast the different levels of study and gender among students.<sup>2,4</sup> In addition, this tool can be used to help amend the curriculum, compare present and past programs, and evaluate the effectiveness of college curriculums.<sup>5,6</sup> Furthermore, DREEM can help health and dental schools to distinguish their priorities,<sup>4-8</sup> while comparing their performance and productivities against their peers. The results of this comparison can be educationally insightful.<sup>7,9</sup>

The College of Dentistry in Jazan University was established in 2006. It is one of three governmental dental schools in the southern part of the KSA. The Bachelor of Dental Science (BDS) program consists of six years, which are divided into the following: two years of pre-medical/dental preparatory and basic medical subjects and four additional years consisting of two years for preclinical subjects, and two years related to the clinical subjects. The total credit hours for the BDS program is 197, divided into three parts, 59 credit for the first two years, and the remaining credit hours are divided into 72 credit hours for the preclinical phase, and the residual 66 credit hours are for the clinical phase subjects. Most of those subjects consist of theory lectures, seminars, practical, clinical simulation, and clinical subjects.<sup>10</sup> In addition, all dental students must complete a full year in an internship program, in which the graduated dentist will practice the different dental specialties as a general practitioner.

The use of DREEM is important in providing a consistent method for global comparisons among dental schools, thereby leading to the standardization of ECs.<sup>3,8</sup> DREEM has been successfully used in studies of health science institutes throughout the world. It carried out studies of the EC in dental colleges in Saudi Arabia,<sup>9,11-17</sup> Europe,<sup>18-23</sup> Asia,<sup>24-31</sup> Africa,<sup>32</sup> North America, and the Caribbean.<sup>33-35</sup> Previous dental local and worldwide studies are presented in (Table 1).

A major drawback has always been insufficient knowledge of students' perceptions about their academic learning and instruction in the BDS program as well as the overall educational atmosphere of the institution. The objectives of the current study were to build a reference point of information of the student's perceptions of their

educational climate by using DREEM inventory in the College of Dentistry, Jazan University. Another goal was to identify whether there were any differences between preclinical and clinical phases in students' perceptions in EC. In addition, this study sought to understand the association between variables, such as age, secondary school type, gender, total cumulative grade point average (CGPA), and family monthly income of the students. Finally, we aimed to assess the strengths and weaknesses of the institution's EC and compare our results with local and international studies.

## Materials and Methods

### Study Design and Participants

All dental students at the College of Dentistry, Jazan University from the third to sixth (final) year in the BDS programs were the target of the study population and participated in this cross-sectional descriptive study. The DREEM questionnaires were distributed via WhatsApp to the study subjects who had been enrolled at the end of the 2019–2020 academic year. Consent forms were signed by all students at the beginning of the questionnaire. Ethical approval was gained from the Ethical Committee of the College of Dentistry, Jazan University (CODJU, 19,211). This study is in accordance with the guidelines of the World Medical Association Declaration of Helsinki.<sup>36</sup>

### Inclusion Criteria and Participant Collection

The inclusion criteria for this study included participants over 18 years of age, in the third year or above in the BDS program, and present at the time of the study. The participants were asked to evaluate the EC. The DREEM questionnaires were distributed to all participating students via WhatsApp through group leaders of both the male and female students.

### Instruments and Outcome Measures

The validated Arabic version of the DREEM questionnaire was used as recommended by Al-Namankany et al,<sup>37</sup> and Al-Nasser et al.<sup>38</sup> The Arabic translation of the 50-item DREEM questionnaire was used to measure students' perceptions of the educational climate in this study.<sup>9,12-16</sup> The DREEM contains 50 questions relating to a range of topics directly relevant to EC.<sup>3-6</sup> The inventory was delivered through student's WhatsApp media. Students were asked to read each statement carefully and to respond using a

**Table 1** Summary of Dental Student's Perception Using DREEM Inventory for EC at Different Local and Worldwide Studies

Researchers/ Publication Year	College, University City, Country	Students Levels and Response Rate	Sample Size, Male and Female	DREEM Total Score/200 and Subscale and Domains	Overall Score, Subscales and Weak Items, Gender Significances
Dental studies conducted in dental colleges in SA					
Current study Aldowsari et al. 2020	Dental College, Jazan University, SA DC, JU	3rd to 6th year RR: 91%	272 M 57.4% F 42.6% Preclinical 51.5% Clinical 48.5%	125.19±15.11 Preclinical: 126.21±16.02 (mean) Clinical: 124.1±14.04 (SPL) 31.88±4.99 (31.36±4.69) 30.82±4.29 (SPT) 26.26±3.44 (26.18±3.24) 26.09±3.03 (SASP) 21.98±3.07 (21.92±3.52) 21.86±3.05 (SPA) 28.26±5.4 (28.08±5.29) 27.89±5.18 (SSSP) 17.83±3.08 (17.64±3.03) 17.45±2.97	More positive than negative Nonsignificant differences ween preclinical and clinical phases Nonsignificant differences between gender Items scored ≤2 were teaching overemphasizes factual learning, too teacher-centered. Teachers ridicule students, are authoritarian, get angry in teaching sessions. Students irritate teachers, cheating is problem in this course, experience disappointing, and good support for students who get stressed.
Al-Saleh et al, 2018 <sup>9</sup>	Dental College, King Saud University, SA DC, KSU	All students and intern RR: 60.73%	302 M 44% F 56%	108.42 (18.92) 2nd year: 118.36±15.8 (mean) Interns: 105 ±21.3 (SPL) 27.88±4.96 (25.30) 23.91±5.62 (SPT) 26.06±4.81 (24.42) 22.28±4.90 (SASP) 20.06±3.92 (19.80) 18.43±2.85 (SPA) 29.87±4.52 (25.16) 24.21±6.86 (SSSP) 16.47±4.54 (14.47) 13.02±0.54	More positive than negative NS among four subscales, SAP was significant Nonsignificant differences in CGPA and marital status Items scored ≤2 were teaching overemphasize factual learning, too teacher-centered. Teachers ridicule students, authoritarian, get angry in teaching sessions. Able to memorize everything I need. Atmosphere is relaxing during clinical teaching. Cheating is a problem on this course, atmosphere motivates me as a learner, good support for students who get stressed, and I am too tired to enjoy course
Halawany et al. 2016 <sup>11</sup>	Dental College, King Saud University, SA DC, KSU	All students RR 52%	613 M 49.3% F 50.7%	DECLEI 64.1/100 Dental Clinical Learning Environment Inventory 4th–5th year, 3rd year: clinical experience	More positive than negative Significant difference in commutation grade point average among participants
Al-Samadani et al. 2016 <sup>12</sup>	Dental College, University of Taibah, SA DC, TU	3rd–5th year RR: 91%	110 M 53% F 47% 3rd year: 98 (49%) and 4th year 84 (42%)	90 (45%) Study level: gender (SPL) 19.38 (7.43) 19.38 (7.43) (SPT) 19.39 (6.77) 19.39 (6.77) (SASP) 17.15 (5.60) 17.15 (5.60) (SPA) 18.35 (7.93) 18.35 (7.93) (SSSP) 13.8 (3.85) 13.8 (3.85)	Plenty of problems Low SP, nonsignificant differences among gender in DREEM items. Females much more dissatisfied compared to males, and 4th year was most problematic Females were more stressed Most items in the five subscales scored ≤2

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Table 1 (Continued).

Researchers/ Publication Year	College, University City, Country	Students Levels and Response Rate	Sample Size, Male and Female	DREEM Total Score/200 and Subscale and Domains	Overall Score, Subscales and Weak Items, Gender Significances
Farooqi et al, 2015 <sup>13</sup>	College of Dentistry, Dammam University, SA DC, DU	Different level RR: 72%	55 M 45.5% F 54.5%	Expected (114.7) and (105.5) actual Expected actual DREEM (SPL) 28.16±25.95 (SPT) 25.05±23.89 (SASP) 19.71±16.09 (SPA) 26.26±24.64 (SSSP) 15.29±14.94	More positive than negative Nonsignificant differences between males and females Nonsignificant differences between expected and actual in all subscales Items scored ≤2 were teaching overemphasize factual learning, too teacher-centered, teachers ridicule students, authoritarian, get angry in teaching sessions. I feel able to ask questions I want Cheating is problem on this course. I find experience disappointing, I am too tired to enjoy course
Ahmed et al, 2015 <sup>14</sup>	Dental College, Taibah University, Al-Madinah Al- Munawara, SA DC, TU	1st-6th year RR: 97% for 2009 RR: 100% for 2014	64 34 (2009) and 30 (2014)	90.4 92.3 (2009) and 88.4 (2014) Academic year (2009) (2014) (SPL) 21.62±5.82 19.43±6.27 (SPT) 21.26±6.55 21.03±5.28 (SASP) 17.74±5.59 16.87±5.48 (SPA) 21.53±6.19 21.30±5.84 (SSSP) 10.15±2.40 9.77±3.00	Plenty of problems SPs were relatively low from beginning throughout study Nonsignificant changes in mean domain, total scores, some improvement, most lower over study period. Less than 1 good support for students who get stressed, and ≤2 were I am encouraged to participate in the class, teaching is often stimulating, helps to develop my confidence, encourages me to be an active learner, too teacher-centered. Teachers well prepared for their class, I am able to memorize all I need, college is well timetabled, enjoyment outweighs stress of studying dentistry, atmosphere motivates me as learner, too tired to enjoy this course, really bored on this course.
Al-Ansari et al, 2015 <sup>15</sup>	Dental College, Dammam University, SA DC, DU	All students Years 2-6 year RR: 81.7%	162 84.6% M 15.4% F For 2nd-6th year 33.3%, 24.1%, 16.0%, 11.1% and 15.4%	97.7 <sup>b</sup> Assessed predictability of DS <sup>a</sup> grades as indicator of academic performance through their perceptions of EE (SPL) 23.7/48 (SPT) 22.1/44 (SASP) 14.8/32 (SPA) 22.8/48 (SSSP) 14.3/28	Plenty of problems Improved SPL higher number high achievers, whereas higher perception of problems in SPA and SSSP higher number of low achievers and failing students. Nonsignificant difference between genders, and CGPA No relation between DREEM domains and past academic performances as measured by GPA Less than 1 <sup>a</sup> enjoyment outweighs the stress of the course and 42 items scored less ≤2.
Mahrous et al, 2013 <sup>16</sup>	Dental College, Taibah University, Al-Madinah Al- Munawara, SA DC, TU	1st and 2nd years RR: 97%	34 male students	101.4 1st 112.8±19.6 (101.4±26.3) 2nd (89.1±23.5) First year (mean) second year (SPL) 23.71 (21.62) 19.53 (SPT) 28.40 (24.45) 20.58 (SASP) 21.00 (17.74) 14.47 (SPA) 25.15 (23.49) 21.83 (SSSP) 15.74 (14.21) 12.69	At margin of positive EE. SPL, SPT, SPSSA, SSSP were SH among 1st compared to 2nd year students. Less than 1 <sup>a</sup> , good support system for students who get stressed. Scores ≤2 were daily studying load causes them heavy course, examination and assessment style is very difficult, improving effectiveness of role of academic advisors to students to prepare them for clinical phase.

Al-Shamrani, 2002 <sup>17</sup>	Dental College, King Saud University, SA DC, KSU	4th, 5th years Dental students and Interns RR: 100%	154 M 43.6% 4th 62.5% 5th and 47.1% interns F 56.4% 4th, 38% 5th and 52.9% intern	Importance of unified pre-health program in response to learning outcomes	Two thirds of interns and students said that program is important and necessary Nonsignificant difference between interns and students Significant difference between males and females
Dental studies conducted worldwide					
Alraweei et al, 2020 <sup>18</sup>	Private Dental College, Turkey	3rd-5th year RR: 96.69%	185 M 53.8% F 46.2%	100.61±19.81 M 100.97±22.18; F100.19±16.77 (SPL) 23.52±5.85 23.34±5.25 (SPT) 22.78±4.67 22.63±4.46 (SASP) 17.73±4.43 17.20±3.67 (SPA) 22.14±7.51 21.91±5.59 (SSSP) 14.79±3.72 15.10±3.39 3rd, 95.36±18.67 4th 103.02±20.75 5th 103.31±19.31	At border of positive direction. Nonsignificant difference in gender, age, monthly family income, housing type SASP significant graduated school type SPT and SPA significant in 0000. Items scores ≤2 two were teaching is registrar-centered, overemphasizes factual learning, too teacher-centered. Teachers ridicule their registrars, authoritarian. I can memorize important facts, course is well timetabled, enjoyment outweighs stress of studying medicine. Good support for registrars who get stressed and I am too tired to enjoy this course.
Sratuliat et al, 2019 <sup>19</sup>	Faculty of Dental Medicine, Romanian Eastern University, Romania	6th year	259 Romanian=111 (M 51 and F 60), International=148 English (M 19 and F 24) and French (M 46 and F 59)	117.82 Total 117.82±18.78; Romanian 128.91±17.26 (SPL) 29.61±6.17 32.52±6.17 (SPT) 25.43±4.73 27.97±4.48 (SASP) 18.37±3.80 18.93±3.82 (SPA) 27.39±5.17 29.97±5.11 (SSSP) 17.02±3.76 19.51±2.51 English 116.91±13.04; French 106.47±15.16 (SPL) 29.63±5.35 26.52±4.90 (SPT) 25.16±3.55 22.85±3.95 (SASP) 17.81±3.02 18.00±4.01 (SPA) 27.19±3.79 24.75±4.34 (SSSP) 17.12±3.39 14.34±3.13	More positive than negative Lower score in SPA and SSSP. Significant difference between subscales in different nationalities. International students were negative SPs in EC. Needing social support for satisfying EC.
Batra et al, 2018 <sup>20</sup>	Dental Medicine School, Zagreb, Surendera, Croatia Dental College & Research Institute, Sri Ganganagar, India, and People's Dental College, Nepal	All students RR: 29.6%	849 188; Croatia (M 18.1%; F 81.9%), 373; India (M 43.2%; F 56.8%), 288; Nepal (M 27.4%; F 72.6%)	Dental Student Learning Environment Survey (DSLES) Flexibility, "Student-to-Student Interactions, Emotional Climate, Supportiveness, Meaningful Experience, Organization & Breadth of Interest."	"Flexibility" was identified as area of weakness in all three educational systems. Students in Croatia rated their school only with grades excellent and good, while their colleagues in India and Nepal were more critical Highest mean scales were "Student-to-student interactions" in India and Nepal, and "Emotional Climate" in Croatia

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Table 1 (Continued).

Researchers/ Publication Year	College, University City, Country	Students Levels and Response Rate	Sample Size, Male and Female	DREEM Total Score/200 and Subscale and Domains	Overall Score, Subscales and Weak Items, Gender Significances
Tomas et al, 2013 <sup>21</sup>	Nine Public Schools of Dentistry, Spain	All students RR: 80%	1391 M 29.0% F 71.0% 3rd 35.0% 4th 33.6% 5th 31.4%	124.0 One 123.1 two 130.6 three 140.0 SPL 28.0 29.7 32.7 SPT 26.8 28.5 30.1 SASP 20.8 21.6 24.5 SPA 29.7 31.9 33.5 SSSP 17.7 18.7 19.0	More positive than negative, Items scored $\leq 2$ were teaching is too teacher-centered, teachers are authoritarian, good timetable, course is well timetabled, teaching will over-emphasize factual learning. Enjoyment outweighs stress of studying medicine. Good support system for registrars who get stressed, I am too tired to enjoy this course.
Kossioni et al, 2012 <sup>22</sup>	Athens University, Dental School, Athens, Greece	2nd-final year RR: 69.2% 2nd RR: 89% 3rd RR: 66.9% 4th RR: 52.8% 5th RR: 63.8%	323 M 31.7% F 55.8% Non 12.4% 2nd 83 3rd 89 4th 84 5th 67 Final	111.6 <sup>c</sup> Preclinical 2nd-3rd 116.4% clinical 4th-5th 106.2 SPL 27.0 24.6 SPT 25.0 23.0 SASP 18.5 18.0 SPA 28.0 25.0 SSSP 17.9 15.6	More positive than negative, Clinical phase SH than preclinical Nonsignificant difference between genders. Most SP for EC are positive for preclinical years except SASP. SD were revealed only for SPL subscale between 3rd and 4th year students. Items scores $\leq 2$ were teaching will overemphasize factual learning. Teacher-centered, good providing feedback from students, provide constructive criticism here. Able to memorize what I need. Enjoyment outweighs the stress of studying medicine. Cheating is problem in this course, good timetable. Good support system for registrars who get stressed, I am too tired to enjoy this course, and rarely bored on this course.
Ostapczuk et al, 2011 <sup>23</sup>	Medical College, Heinrich- Heine, Düsseldorf University Moorenstr, Düsseldorf, GERMANY	All students RR: 66% for all and 74% for F	205 M 29.8% F 70.2%	122.95 $\pm$ 15.52 SPL 28.58 $\pm$ 4.67 SPT 27.14 $\pm$ 3.71 SASP 19.94 $\pm$ 3.80 SPA 28.84 $\pm$ 5.09 SSSP 18.45 $\pm$ 2.98	More positive than negative Small and early clinically oriented classes, traditional curricula can generate positive EC. SPA more negatively among clinical phase, but SASP among clinical phase more positively than preclinical. Items scored $\leq 2$ were teaching overemphasize factual learning. Teachers authoritarian, well timetabled, good support for students who get stressed, and am too tired to enjoy this course
Vakil and Singh 2019 <sup>24</sup>	Government Dental College of Jammu, Nepal	All students RR: 100	224 M 81.2% F 18.2%	127.70/200 (SPL) 30.22/48 (SPT) 27.18/44 (SASP) 21.34/32 (SPA) 32.05/48 (SSSP) 16.91/28	More positive than negative Implementation of PBL sessions and integrated teaching are endorsed to create better EC. Items scored $\leq 2$ were teaching overemphasized factual learning, teachers ridicule them and good support system for stressed students.



Zafar et al, 2017 <sup>25</sup>	Lahore Medical and Dental College, Lahore, Pakistan	All students RR:70%	533 M 39% F 61%	120.27±20.56 M 121.50±32 (mean) F 123±22 (SPL) 28±11 (28.31±7.18) 29±8 (SPT) 26±7 (26.92±5.75) 27±6 (SASP) 22±7 (21.37±5.16) 22±6 (SPA) 28±9 (27.72±6.58) 29±8 (SSSP) 16±6 (16.4±4.23) 17±5	More positive than negative Remained step below highest rank. Nonsignificant difference between gender, age in all domains or subscales.
Morghare et al, 2019 <sup>26</sup>	Private Chhattisgarh Dental College, AYUSH University, India	One-year follow-up RR: 96%	84 M 34.5% F 65.5%	147.8 (Beginning) and 124.6 (After year) At beginning and after year (SPL) 36.9±8.35 27.4±0.0 (SPT) 32.02±0.35 20±6.90 (SASP) 20.12±6.7 33.9±9.70 (SPA) 34.8±8.40 15.31±5.30 (SSSP) 21.02±3.20 26.33±0.24	More positive than negative at time of joining institute and after completion of year on both occasions. Significant differences were obtained for all subscales and overall DREEM scores Items scored ≤2 were cheating problem and students would irritate teachers.
Methre et al, 2016 <sup>27</sup>	Dr. D. Y. Patil Medical college, Pimpri, Pune, India	All students RR: 87% BDS RR: 57% BPT	160 (100 BDS) (60 BPT)	133.39±15.96 (BDS) and 119.35±23.18 (BPT) BDS and BPT (SPL) 31.25±4.06 28.46±6.73 (SPT) 27.88±4.31 25±4.36 (SASP) 23.65±4.75 20.67±5.6 (SPA) 32.62±5.72 29.09±8.01 (SSSP) 17.98±3.85 16.11±4.06	More positive than negative, More in BDS compared to BPT college. Significant difference between all subscales Items scores ≤2 in both BDS and BPT; teacher being authoritarian, centered teaching, students irritating teachers, get angry in class. Cheating problem, good support for student who get stressed, and too tired to enjoy course
Jhaneswar et al, 2016 <sup>28</sup>	Private Dental School, Bhubaneswar City, India	3rd 48% and 5th 52% 27% under academic achiever and 53% academic achiever RR: 88.14	171 M 38% F 62%	119.65±19.68 M 118.29±21.27 and F120.48±18.70 3rd 119.93±20.4 (mean) 5th 119.39±19.1 SPL 29.23±5.189 (32.56±5.90) 30.03±5.08 SPT 26.59±5.61 (29.61±5.53) 27.13±4.64 SASP 20.02±4.25 (22.02±4.54) 19.93±4.27 SPA 27.94±5.82 (30.22±6.14) 27.04±5.48 SSSP 16.15±3.14 (17.49±3.83) 15.25±3.80	More positive than negative Female higher than male without significance SPT significant differences between subjects Nonsignificant differences between 3rd and 5th years Nonsignificant differences between achiever and non-achiever
Chandran and Ranjan, 2015 <sup>29</sup>	Tagore Dental College, Tamil Nadu, India	All student RR:83.7%	257 M 19.8% F 80.2%	124 1st, 123.13 (0.45), 2nd 136.04 (0.58), 3rd 122.18 (0.44), 4th 114.48 (0.44) (SPL) 30.11/48 (SPT) 26.69/44 (SASP) 21.48/32 (SPA) 28.23/48 (SSSP) 16.52/28	More positive and moving in right direction Females were significantly greater 2nd year was the highest. Significant difference between 1st and 5th year Items scored ≤2 were teaching overemphasizes factual learning, is too teacher oriented. Lecturers are authoritarian, I feel able to ask questions I want, cheating is rampant in this course, students irritate lecturers, I am too tired to enjoy the course.

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Table 1 (Continued).

Researchers/ Publication Year	College, University City, Country	Students Levels and Response Rate	Sample Size, Male and Female	DREEM Total Score/200 and Subscale and Domains	Overall Score, Subscales and Weak Items, Gender Significances
Thomas et al, 2009 <sup>30</sup>	Manipal College of Dental Sciences, Manipal, INDIA	1st and final year RR: 100%	126 M 50% F 50%	109 <sup>c</sup> 1st year (122) final year (96) SPL 31 (2.73±0.38) 24 (2.10±0.56) SPT 27 (2.66±0.41) 22 (2.28±0.56) SPSP 19 (2.74±0.50) 15 (2.10±0.60) SPA 31 (3.92±0.47) 23 (2.11±0.61) SSSP 14 (2.69±0.39) 12 (2.11±0.64)	More positive than negative, HSD between 1st and final year in most subscales and items Items scores S2 were teaching overemphasizes factual learning, too centered, course organizer authoritarian. Cheating is a problem in this course, enjoyment outweighs stress of studying medicine, good support system for registrars who get stressed, rarely bored on this course.
Babar et al, 2015 <sup>31</sup>	Dental Private Colleges and public Universities, Malaysia	All students 1st to 5th year	529 M 23.6% F 76.4% 68.6% Malays 28.8% Chinese 2.9% others	Dental Environment Stress (MSL) Fear of failing exams (MSL=5.57); Completion clinical work (MLS=5.30); Final examination results and grades (MSL=5.27) were found as top stressors among dental students	Female students had higher stress scores than males with respect to personal issues, academic performance, EC and learning of clinical skills. Students from public had higher stress scores than from private universities
Idon et al, 2015 <sup>32</sup>	Faculty of Dentistry, Maiduguri University, Nigeria	All Students RR 95% and 100% F	134 M 66.4% F 33.6%	138.2 2nd 145.6 and 5th 127.7 SPL 34.4 SPT 30.8 SASP 23.5 SPA 32.1 SSSP 17.5	More positive than negative, Preclinical is lesser than clinical in SP Problem areas: S2 were school timetabling, teaching overemphasis on factual learning, boredom and stress, am rarely bored on this course.
Stormon et al, 2018 <sup>33</sup>	Dental Science (Honours) Program, Queensland University, Australia	1-4th Year RR: 90%	192 Males 43.2% Females 56.8%	127.2 Preclinical 130.5±17.9 (mean) Clinical 121.0 21 0.1 (SPL) 32.1±5.4 (31.2±5.7) 29.3±5.8 (SPT) 29.7±4.6 (28.6±5.2) 26.4±5.6 (SASP) 20.2±4.0 (19.6±4.2) 18.5±4.4 (SPA) 31.8±6.4 (31.0±6.4) 29.4±6.1 (SSSP) 17.3±3.1 (17.3±3.0) 17.5±2.8	More positive in their EC Preclinical more positive than clinical students in all domains of EC. Males reported SH in learning perception SSSP was at the margin of EC among preclinical students.



Tisi-Lanchares et al, 2017 <sup>34</sup>	Dental Career, Arturo Prat University in Iquique, Chile	All levels RR: 91.1% Basic 27.2% Preclinical 49.5% Clinical 23.3%	103	117.8 Basic 131.78 preclinical 120.80 Clinical 100.87 SPL 32.52 29.06 24.35 SPT 30.39 28.52 22.64 SASP 22.96 21.96 19.25 SPA 29.39 26.56 20.75 SSSP 16.21 14.76 14.68	More positive than negative Significant difference between basic and preclinical with clinical phases Items scored ≤2 were teaching overemphasizes factual learning, too teacher-centered. Teachers are authoritarian. Well timetable, cheating is problem in this school, enjoyment outweighs stress of the course. There is a good support for students who get stressed, am too tired to enjoy course, I am rarely bored in this course
Kang and Foster 2015 <sup>35</sup>	Faculty of Dentistry, University of Otago, New Zealand	All students from 1st to final year RR: 82-94%	66 M 50% F 50%	Expected 145±15.4/2009 and actual; 143 ±16.8/2009, 132±17.0/2010, 134±15.0/2011 and 134±16.5/2012 SPL 36±4.4 and 34±5.1; 31±5.4; 31± 6.3; 32 ± 6.1 SPT 32±4.7and 33±4.5; 30±4.2; 28±4.3; 29 ±5.2 SASP 24±3.4 and 21±3.9; 21±3.2; 22±3.2; 22 ±3.4 SPA 33±4.6 and 35±4.8; 31±4.9; 31±4.7; 32 ±4.4 SSSP 20±2.9 and 20±3.6; 18±3.5; 20±3.1; 20 ±3.6	More positive than negative, Significant differences between 1st and 2nd year and between expected and actual Significant difference between genders. Significant differences at SPL and SASP Items scored ≤2 were teaching overemphasizes factual learning. Teachers will be authoritarian; school is well timetable. Cheating is a problem in this school. Good support for students who get stressed, Able to memorize all I need.

**Abbreviations:** M, males; F, females; RR, response rate; SH, slightly higher; SP, student's perceptions; LE, learning environment; PBL, problem-based learning; AP, academic performance; DECLEI, Dental Clinical Learning Environment Inventory; SA, Saudi Arabia; DS, dental students; MSL, mean stress level; BDS, Bachelor of Dental Surgery; BPT, Bachelor of Physiotherapy; CGPA, cumulative grade point average.

**Table 2** Guide for the Interpretation of the Total DREEM and the Five DREEM Subscales and 50 Items.<sup>3,4,38,39</sup>

DREEM, Subscales and Items	Score	Interpretation
<b>Guide to interpret total overall DREEM scores</b>		
DREEM	0–50 51–100 101–150 151–200	Very poor Plenty of problems More positive than negative Excellent
<b>Guide to interpret DREEM subscale scores</b>		
SPL/12	0–12 13–24 25–36 37–48	Very poor Teaching is viewed negatively More positive perception Teaching is highly thorough
SPT/11	0–11 12–22 23–33 34–44	Abysmal In need of some retraining Moving in the right direction Model course organizers
SASP/8	0–8 9–16 17–24 25–32	Feeling of total failure Many negative aspects Feeling more on the positive side Confident
SPA/12	0–12 13–24 25–36 37–48	A terrible environment There are many issues that need changing A more positive attitude A good feeling overall
SSSP/7	0–7 8–14 15–21 22–28	Miserable Not a nice place Not too bad Very good socially
<b>Guide to interpret DREEM-item</b>		
Individual items score	≤2 Between 2 and 3 ≥3	Problem areas Aspect of climate that could be enhanced Real positive point

**Abbreviations:** SPL, students' perceptions of learning; SPT, students' perceptions of course organizers; SASP, students' academic self-perceptions; SPA, students' perceptions of atmosphere; SSSP, students' social self-perception. .

**Notes:** <sup>a</sup>Scored <1. <sup>b</sup>Estimated from bar chart. <sup>c</sup>Converted from percentage.

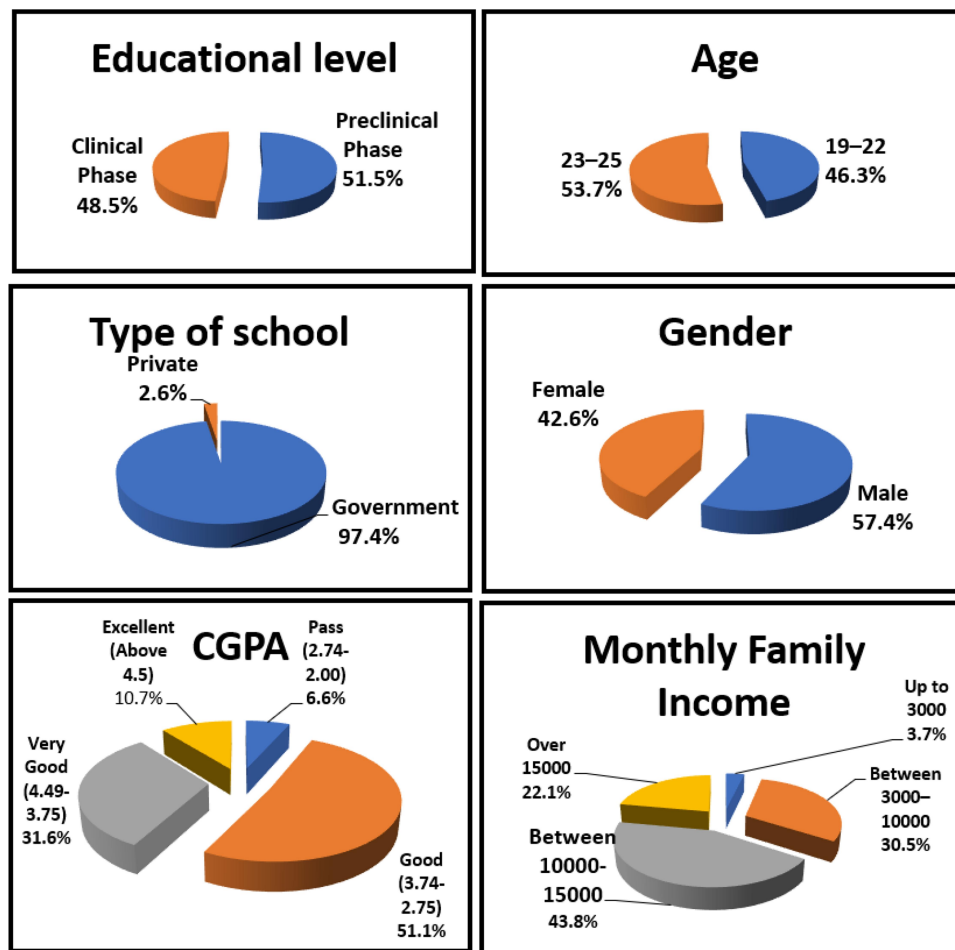
five-point Likert-type scale ranging from “strongly agree” to “strongly disagree.” It was emphasized that each participant should apply the items to their current learning situation and respond to all 50 questions.

Items were scored as follows: 4 for “strongly agree”; 3 for “agree”; 2 for “uncertain”; 1 for “disagree”; and 0 for “strongly disagree”. However, nine of the 50 items (numbers 4, 8, 9, 17, 25, 35, 39, 48, and 50) were negative statements and should be scored as (0 for strongly agree), (1 for agree), (2 for uncertain), (3 for disagree), (4 for strongly disagree). The 50-item DREEM has a maximum score of 200 indicating the ideal EC as perceived by the registrar.<sup>3,4</sup> The total or overall

DREEM score (Table 2) consisted of five subscales (Table 2) and items (Table 2), which provides an approximate guide for interpreting the subscales below the [appendix](#).

## Data Statistical Evaluations

The completed questionnaires were collated from the WhatsApp social program via the phone for both preclinical and clinical students. The answers to each question were entered using codes 0 to 4. The responses of the nine negative items were reverse coded to analyze the results appropriately.<sup>3,4,6,33</sup> We used the IBM Statistical Package for also the Social Sciences (SPSS) Statistics version 22



**Figure 1** Demographic profiles of respondents (n=272).

(IBM Corporation, Armonk, NY, USA) program for statistical analysis. The parameters were assessed via the Shapiro-Wilks test, and the results showed that the parameters conformed to the normal distribution. During the evaluation of the study data, the comparisons of quantitative data, descriptive statistical methods (mean, standard deviation), and categorical variables were presented in frequencies and percentages. One-way ANOVA was used in the intergroup comparisons of parameters, and the Tukey's HSD test was used to determine the differences among the group parameters (CGPA and monthly income). Student's *t*-test was used in the intergroup comparisons of parameters (gender, age, type of school, level of education). The Fisher-Freeman-Halton test and the chi-squared test were used to compare the qualitative data, and the statistical significance was evaluated at the level of  $p < 0.05$ .

## Results

Out of 300 questionnaires that were disseminated by WhatsApp, only 272 completed questionnaires were

collected from the students with a total response rate of 91%. The highest response rate was among the clinical phase students at 94%. Demographic data are presented in (Figure 1). There were 140 (51.5%) preclinical respondents and 132 (48.5%) clinical phase students. The age of participants ranged from 19 to 25 years. The average age was  $22.4 \pm 1.4$ , with 46.3% between 19 and 22 years of age, and 53.7% between 23 and 25 years of age. Based on the type of high school, 97.4% and 2.6% of the students graduated from government and private high schools, respectively. As for gender, 156 (57.4%) were male, and 116 (42.6%) were female. The response rates based on CGPA were 18 (6.6%); 139 (51.1%); 86 (31.6%), and 29 (10.7%) for pass, good, very good and excellent, respectively. Based on monthly family income, 3.7% were below SAR 3000; 30.5% were from SAR 3000 to 10,000; 43.8% were from SAR 10,000 to 15,000; and 22.1% of the participants were over SAR 15,000.

The total mean and SD of the DREEM items was  $125.19 \pm 15.11$ , although it was slightly higher among

**Table 3** Mean Scores of the Total DREEM, Preclinical and Clinical Phases and Its Subscales

Variables	Min–Max	Mean $\pm$ SD Overall DREEM	Mean $\pm$ SD Preclinical	Mean $\pm$ SD Clinical	Percentage of maximum score
Total DREEM	84–169	125.19 $\pm$ 15.1	126.21 $\pm$ 16.02	124.1 $\pm$ 14.04	74.08%
SPL	18–44	31.36 $\pm$ 4.69	31.88 $\pm$ 4.99	30.82 $\pm$ 4.29	71.27%
SPT	17–36	26.18 $\pm$ 3.24	26.26 $\pm$ 3.44	26.09 $\pm$ 3.03	72.72%
SASP	11–32	21.92 $\pm$ 3.52	21.98 $\pm$ 3.77	21.86 $\pm$ 3.25	65.80%
SPA	9–44	28.08 $\pm$ 5.29	28.26 $\pm$ 5.4	27.89 $\pm$ 5.18	63.82%
SSSP	9–25	17.64 $\pm$ 3.03	17.83 $\pm$ 3.08	17.45 $\pm$ 2.97	70.56%

**Table 4** Dental Students' Mean Item DREEM Scores (n=272)

DREEM Subscale	Question No.	Items	Mean $\pm$ SD	Median
SPL	25	The teaching overemphasizes factual learning <sup>a,b</sup>	1.86 $\pm$ 0.76	2
	47	Long-term learning is emphasized over short-term learning	3.06 $\pm$ 0.94	3
	48	The teaching is too teacher-centered <sup>a,b</sup>	1.72 $\pm$ 1.01	2
SPT	2	The teachers are knowledgeable. <sup>b</sup>	3.17 $\pm$ 0.57	3
	8	The teachers ridicule their registrars <sup>a,b</sup>	1.5 $\pm$ 0.98	1
	9	The teachers are authoritarian <sup>a,b</sup>	1.93 $\pm$ 0.9	2
	39	The teachers get angry during teaching sessions <sup>a,b</sup>	1.53 $\pm$ 0.91	2
	50	The registrars irritate the course organizers <sup>a,b</sup>	1.51 $\pm$ 1.03	1
SASP	5	I am confident about passing this year.	3.04 $\pm$ 0.72	3
SPA	17	Cheating is a problem in this course <sup>a,b</sup>	1.55 $\pm$ 1.0	2
	35	I find the experience disappointing <sup>a,b</sup>	1.35 $\pm$ 0.92	1
SSSP	3	There is a good support system for registrars who get stressed <sup>b</sup>	1.87 $\pm$ 0.98	2
	15	I have good friends in this course/school	3.10 $\pm$ 0.94	3
	46	I have a pleasant accommodation	3.04 $\pm$ 0.94	3

Notes: <sup>a</sup>Negative statements are scored in reverse. <sup>b</sup>Items scored <2.

preclinical 126, 21 $\pm$ 16, 02 than the clinical phase 124, 1 $\pm$ 14, 0. The mean and SD of subscales based on the original values of the overall DREEM, preclinical and clinical subscales ranged between 63.82% and 74.08% (Table 3).

Table 4 shows the mean and SD of the DREEM items and subscales for items scoring the highest and <2. The highest recorded value was 3.17 $\pm$ 0.57 for question number two regarding SPT (“The teachers are knowledgeable”). The minimum registered value was 1.35 $\pm$ 0.92 for question number 35 in the SPA subscale (“I find the experience disappointing”). Other item scores ranged between two and three.

The results of Student's *t*-test showed that the overall mean of DREEM items and subscales SPL, SPT, SASP, SPA, and SSSP had no statistically significant differences in terms of gender, age groups (19–22 and 23–25), type of high school (government or private) and educational level (preclinical or clinical phase), and the *p*-values were >0.05 (Table 5). Moreover, no statistically significant difference

was observed between the total mean of DREEM items and subscale scores of SPL, SPT, SPA, and SSSP in relation to the UGPA (*p*>0.05). A significant difference was observed between the UGPA of SASP scores (*p*:0.021; *p*<0.05). Post hoc comparisons were conducted to determine the origin of significance. The SASP mean scores of “pass” were statistically significantly lower than those of “very good” and excellent (*p*<sub>1</sub>:0.048; *p*<sub>2</sub>:0.016; *p*<0.05) (Table 5). Regarding the family's monthly income level, the results of the ANOVA test showed that the total mean score of DREEM items was significant at (*p*:0.032; *p*<0.05). Post hoc comparisons were conducted to determine the origin of significance. The overall DREEM score of families with monthly income of over SAR 15,000 was significantly higher than families with incomes of SAR 10,000–15,000 (*p*:0.024; *p*<0.05). There was no significant difference between other income levels in terms of overall DREEM scores (*p*>0.05) (Table 5). A significant difference was observed between the family's monthly income

**Table 5** Mean Score of DREEM Based on the Demographic and Education Characteristics of Dental Students (n=272)

	Total DREEM	SPL		SPT		SASP		SPA		SSSP	
		Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD	
Educational level	Preclinical phase	126,21±16,02	31,88±4,99	26,26±3,44	21,98±3,77	28,26±5,4	17,83±3,08				
	Clinical phase <i>p</i> <sup>a</sup>	124,1±14,04 0249	30,82±4,29 0062	26,09±3,03 0660	21,86±3,25 0775	27,89±5,18 0557	17,45±2,97 0300				
Age	19-22	125,4±15,34	31,77±4,79	26,04±3,23	21,82±3,82	28,08±5,4	17,7±2,98				
	23-25 <i>p</i> <sup>a</sup>	125±14,94 0826	31,01±4,59 0185	26,3±3,25 0507	22,01±3,26 0659	28,08±5,21 0997	17,6±3,08 0781				
Type of school	Government	125,08±15,05	31,37±4,67	26,14±3,26	21,88±3,54	28,08±5,23	17,61±3				
	Private <i>p</i> <sup>a</sup>	129,43±17,48 0453	31±5,6 0836	27,71±2,14 0205	23,57±2,23 0209	28,14±7,65 0975	19±3,92 0230				
Gender	Male	125,12±15,19	31,17±4,62	26,24±3,4	22,04±3,46	27,97±5,22	17,69±2,67				
	Female <i>p</i> <sup>a</sup>	125,28±15,03 0927	31,62±4,79 0437	26,1±3,03 0737	21,75±3,61 0496	28,23±5,39 0684	17,58±3,46 0767				
UGPA	Pass	122,33±23,42	31,11±7,06	26,44±3,91	19,89±5	28,22±7,72	16,67±3,07				
	Good Very Good Excellent <i>p</i> <sup>b</sup>	123,75±15,12 127,55±13,3 126,86±13,2 0225	30,78±4,59 32,08±4,27 32,21±4,4 0159	25,96±3,17 26,43±3,24 26,31±3,21 0732	21,76±3,41 22,23±3,07 23±3,85 0021*	27,59±5,27 28,99±4,65 27,66±5,29 0270	17,65±3,04 17,81±3,08 17,69±2,83 0543				
Monthly family income	Up to 3000	128,3±12,62	32±4,85	25,9±3,03	23,4±1,58	28,6±3,86	18,4±2,32				
	Between 3 and 10,000 Between 10 and 15,000 Over 15,000 <i>p</i> <sup>b</sup>	124,28±15,81 123,18±14,05 129,92±15,71 0032*	31,23±4,51 30,82±4,75 32,53±4,67 0131	25,83±3,44 26,04±3 26,98±3,37 0176	21,3±3,65 21,58±3,22 23,2±3,81 0004*	28,41±5,18 27,1±5,16 29,48±5,62 0032*	17,51±2,9 17,64±3,06 17,72±3,27 0844				

Notes: <sup>a</sup>Student's t-test. <sup>b</sup>One-way ANOVA test. \**p*<0.05.

**Table 6** Association Between Preclinical and Clinical Phase Students and Educational Characteristics (DOMINE) with the Mean Overall Score of DREEM and Subscale of Dental Students (n=272)

Level of Score Based on Domain	Educational Level n (%)			p-value
	Preclinical Phase	Clinical Phase	Overall	
<b>Total DREEM</b>				
Many problems	6 (4,3%)	7 (5,3%)	13 (4,8%)	0345 <sup>a</sup>
More positive than negative	123 (87,9%)	120 (90,9%)	243 (89,3%)	
Excellent	11 (7,9%)	5 (3,8%)	16 (5,9%)	
<b>SPL</b>				
Teaching is viewed negatively	14 (10%)	9 (6,8%)	23 (8,5%)	0180 <sup>a</sup>
More positive perception	109 (77,9%)	114 (86,4%)	223 (82%)	
Teaching highly through of	17 (12,1%)	9 (6,8%)	26 (9,6%)	
<b>SPT</b>				
In need of some retraining	20 (14,3%)	13 (9,8%)	33 (12,1%)	0072 <sup>b</sup>
Moving in the right direction	116 (82,9%)	119 (90,2%)	235 (86,4%)	
Model course organizers	4 (2,9%)	0 (0%)	4 (1,5%)	
<b>SASP</b>				
Many negative aspects	11 (7,9%)	6 (4,5%)	17 (6,3%)	0468 <sup>a</sup>
Feeling more in positive side	98 (70%)	99 (75%)	197 (72,4%)	
Confident	31 (22,1%)	27 (20,5%)	58 (21,3%)	
<b>SPA</b>				
A terrible environment	1 (0,7%)	1 (0,8%)	2 (0,7%)	0865 <sup>b</sup>
There are many issues that need changing	24 (17,1%)	26 (19,7%)	50 (18,4%)	
A more positive attitude	106 (75,7%)	99 (75%)	205 (75,4%)	
A good feeling overall	9 (6,4%)	6 (4,5%)	15 (5,5%)	
<b>SSSP</b>				
Not a nice place	23 (16,4%)	22 (16,7%)	45 (16,5%)	0800 <sup>a</sup>
Not too bad	102 (72,9%)	99 (75%)	201 (73,9%)	
Very good socially	15 (10,7%)	11 (8,3%)	26 (9,6%)	

Notes: <sup>a</sup>Chi-squared test, <sup>b</sup>Fisher–Freeman–Halton test.

level in terms of SASP scores ( $p:0.004$ ;  $p<0.05$ ). The average SASP score of students whose family's monthly income was above SAR 15,000 was significantly higher than the students whose family's monthly income was between SAR 3000 and 10,000, and SAR 10,000 and 15,000 ( $p_1:0.007$ ;  $p_2:0.017$ ;  $p<0.05$ ). There was no significant difference between other income levels in terms of SASP scores ( $p>0.05$ ) (Table 5). According to the family's monthly income level, the SPA score was significant at ( $p:0.032$ ;  $p<0.05$ ). Post hoc comparisons were conducted to determine the origin of significance. The SPA score of families with monthly income of over SAR 15,000 was significantly higher than families with income of SAR 10,000–15,000 ( $p:0.022$ ;  $p<0.05$ ). There was no significant

difference between other income levels in SPA scores ( $p>0.05$ ) (Table 5), nor any statistically significant difference were detected between SPL, SPT and SSSP scores according to the family's monthly income level ( $p>0.05$ ) (Table 5).

No statistically significant differences were observed between the preclinical and clinical phase (Table 6) and between genders in terms of total DREEM score and all the subscale scores of the SPL, SPT, SASP, SPA, and SSSP distributions with ( $p>0.05$ ).

## Discussion

The DREEM is a multidimensional and multicultural tool that can measure the five separate basics of EC namely,

learning, teachers, atmosphere, academic, and social self-perception.<sup>3</sup> DREEM has been used to highlight the weaknesses and strengths of an EC in several countries, and it has been translated and copied to many languages, such as Arabic,<sup>9,12–16</sup> Turkish,<sup>18</sup> Romanian,<sup>19</sup> Spanish,<sup>21</sup> Greek,<sup>22</sup> Dutch<sup>23</sup> and Urdu.<sup>24–30</sup> The current study measured the perceptions of the learning climate among a sample of Saudi dental students from the University of Jazan. Overall, students across preclinical and clinical phases of the BDS program were more positive than negative about the domains of their EC as measured by the DREEM (Table 3). The mean value of DREEM for all dental students (125.19±15.11) was higher than their counterparts in other local dental colleges in Saudi Arabia,<sup>9,12–16</sup> in the college of medicine and medical science at Umm Al-Qura University, Saudi Arabia,<sup>39</sup> and in other colleges in Turkey, Greece, and India.<sup>18,22,30</sup> However, it was equal to other countries using the same instrument's rating scale in Romania, Spain, Germany, Nepal, Pakistan, India, and Australia.<sup>19,21,23–25,28,29,</sup>

The mean DREEM values for preclinical and clinical phases were 126.21±16.02 and 124.1±14.0 (Table 3), which are lesser values than those recorded among similar phases in studies conducted by Al-Saleh et al,<sup>9</sup> in King Saud University (KSU) Riyadh. It was, however, near to the scores obtained among preclinical dental students by Kossioni et al,<sup>22</sup> in Greece, Chandran and Ranjan<sup>29</sup> in India, Stormon et al,<sup>30</sup> in Australia, and by Tisi Lanchares et al,<sup>34</sup> in Chile. Higher DREEM scores were registered in preclinical and clinical dental students in Spain by Tomas et al,<sup>21</sup> 130.6 and 140.0, and New Zealand 143±15.4 and 134±16.5. All the previous studies conducted among dental students, which have used the DREEM scales, found students' perceptions of the EC were more positive than negative, except for some studies in SA.<sup>12,14,15</sup> Those scores were less than 100 and indicated a considerable number of problems.

All students were recruited in this study, except first and second year students and the response rate was 91%, which was significantly higher than some of the earlier studies conducted in SA, KSU-Riyadh which recorded response rates of 60.73% and 52%,<sup>9,11</sup> Damman University reported 72% and 81.7%,<sup>13,15</sup> but equal or slightly lower than studies conducted at Taibah University Al Madinah, and Al Munawara with 91%, 97–100% and 97%.<sup>12,14,16</sup> A high response rate was also recorded in dental schools worldwide (Turkey 96.69%;<sup>18</sup> Spain 80%;<sup>21</sup> Nepal 100%;<sup>24</sup> Pakistan 70%;<sup>25</sup> India

96%,<sup>26</sup> 87%<sup>28</sup> and 83.7%,<sup>29</sup> Nigeria 95%,<sup>28</sup> Australia 90%,<sup>33</sup> Chile 91.1%,<sup>34</sup> and New Zealand 82–94%).<sup>35</sup>

Figure 1 and Table 5 show that there were no significant differences between the two phases of the dentistry curriculum, ie, the preclinical phase (years 3 and 4) and the clinical phases (years 5 and 6). The DREEM values for the preclinical students' scores were higher (more positive) in the domains of the learning and atmospheric climate. This parallels with the research findings reported among dental professions previously in Greece, Germany, India, Australia, and Chile.<sup>22,23,30,33,34</sup> This is an important finding because of the association between students' perceptions of their learning climate and their well-being as they transition to the clinical years of the program.

Changes in perceptions between the preclinical and clinical phases are not surprising as learning, teaching, atmosphere, and social climate in dentistry shift from mostly lecturing and tutoring modalities in preclinical years (years 3 and 4) to the addition of clinical teachers in a clinical patient-based setting in later clinical years (years 5 and 6) of the BDS program. These are very different learning environments with different requirements and expectations for students compared with other nonclinical degrees. Clinical-based requirements, working hours, and examinations are more in the clinical years and may influence the student's perceptions of their EC as well as their stress levels. Previous literature has found that both academic and clinical requirements and workload were a significant source of stress for students.<sup>31</sup> The addition of clinical-based learning, which mainly depends on more patient contact, responsibility, and requirements may introduce stressors for dental students and could result in a more negative perception of the climate.<sup>33</sup>

The relation of different demographic parameters of our participants regarding the total DREEM scores, EC subscales, and specific items and are presented in Figure 1 and Table 5. No significant differences existed in terms of secondary school type, different age groups, CGPA, and family monthly income. This finding is consistent with those of previous studies.<sup>13,18</sup> However, significant differences ( $p=0.021$ ) were observed between CGPA students in SASP between the different levels of family monthly incomes in the overall total DREEM and SASP and SPA scores. A similar finding was detected by Jneswar et al,<sup>28</sup> in relation to the SPT subscale. Al-Ansarie et al,<sup>15</sup> stated that improved SPL increased the number of high achievers, whereas increased perception of problems in SPA



and SSSP, resulted in a greater number of low achievers and failing students.

Regarding gender, no significant differences affecting the EC of students' self-perceptions in this college. Similar findings were obtained among dental students in SA,<sup>9,12,15</sup> and worldwide in Turkey,<sup>18</sup> Greece,<sup>22</sup> and Pakistan.<sup>25</sup> However, gender differences were found in other dental studies using DREEM scales and carried-out in India,<sup>28,29</sup> Australia,<sup>33</sup> and New Zealand.<sup>35</sup>

The scores recorded for the DREEM subscales were  $31.36 \pm 4.69$ ;  $26.18 \pm 3.24$ ;  $21.92 \pm 3.52$ ;  $28.08 \pm 5.29$ ; and  $17.64 \pm 3.03$  for SPL, SPT, SASP, SPA, and SSSP, respectively. Those values were slightly higher than the values recorded in studies carried out in SA,<sup>12-16</sup> and equal or parallel with the values recorded by Al-Saleh et al,<sup>9</sup> in Riyadh, SA and outside SA in the European countries of Romania,<sup>19</sup> Spain,<sup>21</sup> Greece,<sup>23</sup> Germany,<sup>23</sup> in Pakistan,<sup>25</sup> in India,<sup>27,30</sup> and in Chile.<sup>34</sup> The DREEM subscales scores of the current study were lesser than that values documented in Nepal, India, Nigeria, Australia, and in New Zealand.<sup>24,26,29,32</sup>

In the preclinical phase, the student perception for their DREEM subscales values were  $31.88 \pm 4.99$ ;  $26.26 \pm 3.44$ ;  $21.98 \pm 3.77$ ;  $28.26 \pm 5.40$ ;  $17.83 \pm 3.08$  for SPL, SPT, SASP, SPA, and SSSP, respectively Table 5. Those values are equal or in the same range of values recorded in Greece, India, Australia, Chile,<sup>22,30,33,34</sup> and lesser than values in Nigeria.<sup>32</sup> Values of SPL/ $30.82 \pm 4.29$ ; SPT/ $26.09 \pm 3.03$ ; SASP/ $21.86 \pm 3.25$ ; SPA/ $27.89 \pm 5.18$ ; and SSSP/ $17.45 \pm 2.97$  of the DREEM subscales for the clinical phase students were close to or the same as in studies conducted in Spain,<sup>21</sup> India,<sup>30</sup> and Chile,<sup>34</sup> but higher than in Greece,<sup>22</sup> India,<sup>27</sup> and lesser than values recorded in Nigeria.<sup>32</sup> The interpretation of all the abovementioned values or scores for DREEM subscales are in the more positive perception. These values were moving in the right direction; feeling on the positive side; a more positive attitude; and not too bad for SPL, SPT, SASP, SPA and SSSP, respectively.

Among the 50 DREEM questions, only a few items received scores under two, and the lowest scored questions was related to SPA Table 4, in which the student's experiences were disappointing. One possible reason for this is that our students are studying separately; it may also be related to the social habits of the country. Other items were related to the SPT. This is not surprising since most of the teachers are not Arabic speakers. The teaching methodology is completely in English and most of our students

(97.4%) graduated from governmental high schools. The important point is in that most of the previous local,<sup>12-15</sup> and international,<sup>18,21,23,24,27,30,32,34,35</sup> studies concluded that preclinical and clinical dental students face stress during their studies. This is in total agreement with the results of this study, since the score of the question in relation to the support of stressed students was 1.87 to 0.98, which is considered problematic. Studies published in SA by Ahmed et al,<sup>14</sup> and Mahrous et al,<sup>16</sup> recorded a score of  $<1$  for the same question. In addition, a single study in SA by Al-Ansari et al,<sup>15</sup> recorded less than  $<1$  in a question related to the same issue, which was "“Enjoyment outweighs the stress of the courses in the college““.

In the current cross-sectional questionnaire-based study, we compared the EC between preclinical and clinical dental students. The DREEM scale and its subscales did not contain questions directly related to the dental educational program and climate, such as items including such clinical requirements as "“filling of carious teeth, removable and fixed prostheses, extraction of badly broken down teeth, root canal treatments, and a community program of services, and preventive programs of oral hygiene.““ The lack of these items was considered a limitation in this study and in the design of DREEM items and subscales.

## Conclusion

The following conclusions can be drawn from this cross-sectional study:

The overall, preclinical and clinical students DREEM scores for dental students perceived the EC to be positive and without any significant differences between gender and phases of study.

Our scored values were equal or higher than those of local and international dental studies.

No association between variables such as age, secondary school type, gender, total CGPA, and family monthly income of the students was determined for SPs.

Future studies should focus on Items that revealed negative aspects, such as the experiences with the registrar, irritation with course organizers and the level of students' stress. It was indicated by participants that teachers ridiculed the registrars, they were authoritarian, and became angry during teaching sessions.

A change in attitude and style is necessary to make the EC congenial for the students and to mold them into competent authorities. Furthermore, improved support

systems for staff and preclinical/clinical students would help to overcome most of the deficiencies in the institution.

## Disclosure

The authors report no conflicts of interest in this work.

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