

Transition from preclinical to clinical dental education, a difficult change

A perspective from the perspective of the educational environment

INVESTIGATION

Transición de la educación odontológica preclínica a la clínica, un cambio difícil

Una perspectiva desde la percepción del ambiente educacional

Transição da educação odontológica pré-clínica para a clínica, uma mudança difícil

Uma perspectiva a partir da percepção do ambiente educacional

Abstract

» **Objectives.** The transition from preclinical to clinical education has been described as one of the most critical stages in undergraduate dental education. Therefore, this study aims to analyze the perception of the educational environment (PEE) among preclinical students (PS) and clinical students (CS).

» **Methodology.** The Dundee Ready Education Environment Measure (DREEM) questionnaire was administered to dental students at the University of Antofagasta to assess PEE. Descriptive and inferential statistics were then performed to compare PS and CS using Student's t-test and the Mann-Whitney *U* test.

» **Results.** The sample consisted of 62.96% women and 37.04% men, with a mean age of 22.5 years (SD: 2.4). Of the participants, 37.04% (*n* = 80) were PS and 62.96% (*n* = 136) were CS. Statistically significant differences were found between PS and CS in the overall questionnaire score (*p* = 0.001) and in the "learning" (*p* = 0.024), "teachers" (*p* = 0.000), "learning atmosphere" (*p* = 0.000), and "social self-perception" (*p* = 0.008) subscales, all of which showed lower perception among CS. However, "academic self-perception" (*p* = 0.189) was the only subscale that did not show statistically significant differences and increased in CS.

» **Conclusion.** Overall, PEE was more positive than negative. However, the score is very close to the cut-off point for an "educational environment with many problems" and is strongly influenced by the PEE values of CS.

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Resumen

» **Objetivos.** La transición de la educación pre-clínica a la clínica se ha descrito como una de las etapas más críticas en la formación odontológica de pregrado. Por lo tanto, el propósito de este estudio es analizar la percepción del ambiente educacional (PAE) entre estudiantes preclínicos (EP) y estudiantes clínicos (EC), respectivamente.

» **Metodología.** Se aplicó el cuestionario Dundee Ready Education Environment Measure (DREEM) en estudiantes de odontología de la Universidad de Antofagasta para evaluar la PAE. Posteriormente, se realizaron estadísticas descriptivas e inferenciales entre EP y EC mediante la prueba t de Student y la prueba U de Mann-Whitney.

» **Resultados.** La muestra estuvo compuesta por un 62,96% de mujeres y un 37,04% de hombres, con una edad media de 22,5 años (DE 2,4). El 37,04% (n=80) eran EP y el 62,96% (n=136) EC. Se encontraron diferencias estadísticamente significativas entre las percepciones de los EP y EC en la puntuación del cuestionario completo ($p = 0,001$) y en las subescalas «aprendizaje» ($p = 0,024$), «docentes» ($p = 0,000$), «atmosfera de aprendizaje» ($p = 0,000$) y «autopercepción social» ($p = 0,008$). Todas ellas mostraron una disminución en la percepción de los EC. Sin embargo, la «autopercepción académica» ($p = 0,189$) fue la única que no fue estadísticamente significativa y aumentó en los EC.

» **Conclusión.** La PAE general fue más positiva que negativa. No obstante, la puntuación se encuentra muy cerca al límite que lo separa de un «entorno con muchos problemas» y también está fuertemente influenciada por los valores de PAE de los EC.

Keywords: Dentistry, learning environment, dental student, DREEM questionnaire.

Resumo

» **Metas.** A transição da educação pré-clínica para a clínica tem sido descrita como uma das etapas mais críticas na formação em odontologia. Portanto, o objetivo deste estudo é analisar a percepção do ambiente educacional (PAE) entre alunos de pré-clínica (AP) e clínicos (AS), respectivamente.

» **Metodologia.** O questionário Dundee Ready Education Environment Measure (DREEM) foi aplicado a estudantes de odontologia da Universidade de Antofagasta para avaliar o PAE. Estatísticas descritivas e inferenciais foram então realizadas entre AP e CS, utilizando o teste t de Student e o teste U de Mann-Whitney.

» **Resultados.** A amostra foi composta por 62,96% mulheres e 37,04% homens, com média de idade de 22,5 anos (DP 2,4). 37,04% (n = 80) eram alunos de EF e 62,96% (n = 136) eram alunos de AC. Foram encontradas diferenças estatisticamente significativas entre as percepções dos AP e AC na pontuação total do questionário ($p=0,001$) e nas subescalas «aprendizagem» ($p=0,024$), «professores» ($p=0,000$), «atmosfera de aprendizagem» ($p=0,000$) e «autopercepção social» ($p=0,008$). Todas essas subescalas apresentaram diminuição nas percepções dos alunos de AC. No entanto, a «autopercepção acadêmica» ($p=0,189$) foi a única que não apresentou significância estatística e aumentou nos alunos de EC.

» **Conclusão.** O PAE geral foi «mais positivo do que negativo». No entanto, a pontuação está muito próxima do limite para um «ambiente de alta problemática» e também é fortemente influenciada pelos valores do PAE dos AC.

Palavras-chave: Odontologia, Ambiente de aprendizagem, Estudante de Odontologia, Questionário DREEM.

Introduction and background

Undergraduate dental education consists of three clearly defined stages. The first is related to the basic biomedical sciences, which are necessary for the acquisition of specific health competencies shared across all health professions, followed by the preclinical and clinical stages. The preclinical stage focuses on the acquisition of specific dental competencies, primarily associated with the development of psychomotor skills in simulation settings, as well as the acquisition of knowledge on dental biomaterials and oral physiology. In turn, the clinical stage focuses on the development of specific dental competencies related to oral surgery and rehabilitation, as well as periodontal treatments, in a clinical patient care setting under the guidance of clinical mentors.^(1,2) In addition, the educational environment—defined by Tackett et al. as “the broadest experience a student has of an academic institution, including the curriculum, facilities, and interactions with peers, teachers, and staff, as well as their perception of the educational environment or institutional ethos”⁽³⁾—can positively influence learning, contributing to both skill acquisition and student well-being.⁽⁴⁾ However, the literature describes dental education as a complex process that causes high stress levels for students and places them at risk of psychological problems such as anxiety, depression, and burnout syndrome.⁽⁵⁾ Similarly, the transition from preclinical to clinical education, in which students move “from being taught and not in charge of patient care to assuming such responsibility in addition to their regular academic obligations,” appears to be one of the most critical transitions in undergraduate dental education.⁽⁶⁾

The most widely used instrument for measuring the perception of the educational environment (PEE) among health students is the Dundee Ready Education Environment Measure (DREEM) questionnaire. Developed in 1997 by the University of Dundee in Scotland,⁽⁷⁾ it has been validated in Spanish.⁽⁸⁾ This questionnaire has been used to diagnose, compare, and monitor curricular improvements, providing feedback on problematic areas that require intervention and improvement.⁽⁹⁾ The DREEM questionnaire provides a total score that allows the educational environment to be classified as “very poor,” “many problem areas,” “more positive than negative,” and “excellent.” It consists of 50 questions on a 5-point Likert scale ranging from strongly disagree to strongly agree. The questions are grouped into five subscales, each of which can be interpreted according to the level of student perception. The subscales are “learning” (12 questions), “teachers” (11 questions), “academic self-perception” (8 questions), “learning atmosphere” (12 questions), and “social self-perception” (7 questions). Additionally, each question can be evaluated based on the average score obtained for positive aspects, areas for improvement, and problematic aspects.

Considering the complexity of the transition from preclinical to clinical training, Serrano et al., after administering the DREEM questionnaire, observed that

the overall score and the scores for the different subscales decreased as students progressed through the academic curriculum. They also found significant differences across all subscales between the second and third years, an academic period that coincides with the transition from preclinical to clinical training.^(8,10)

To the best of our knowledge, there are no published studies describing how the transition from preclinical to clinical courses influences the PEE of dental students at the University of Antofagasta (UA).⁽¹¹⁻¹⁴⁾ Therefore, this study aims to analyze the PEE in UA dental students and to compare the results between PS and CS.

Methodology

Participants and ethical considerations

The study was approved by the Ethics Committee of the University of Antofagasta (No. 208/2019). A quantitative, observational, descriptive, cross-sectional study was conducted. The study population consisted of all undergraduate dental students at UA. All students (N = 372) were invited to participate. First-year students who had not completed preclinical courses and those undertaking off-campus clinical rotations in their final year were excluded. The questionnaire was administered at the end of the second semester of 2019. Of the total number of students, 216 agreed to participate and confidentially completed the DREEM questionnaire, validated in Spanish in Chile.⁽¹⁵⁾ They also provided their age, sex, and academic level, depending on whether they were enrolled in a clinical patient care course. The questionnaire took approximately 30 minutes to complete, under adequate lighting conditions, with one of the researchers present at all times to answer questions.

Dundee Ready Education Environment Measure (DREEM) Questionnaire

The DREEM questionnaire consists of 50 questions grouped into five subscales of student perception: "learning" (12 questions), "teachers" (11 questions), "academic self-perception" (8 questions), "learning atmosphere" (12 questions), and "social self-perception" (7 questions). Responses are scored on a 5-point Likert scale coded from 0 to 4: "strongly agree" (4), "agree" (3), "not sure" (2), "disagree" (1), and "strongly disagree" (0). 9 of the 50 questions require reverse coding, as in these cases a higher score indicates a poorer perception of the educational environment. **Table 1** describes the interpretation of the total scores for the complete questionnaire and for each of its subscales, as well as the interpretation of the mean scores for each question, which allows for the identification of strengths and weaknesses in the educational environment.

Table 1. Interpretation of DREEM Questionnaire scores

Perception of the DREEM Questionnaire (overall and by subscale)	Score	Interpretation
Overall DREEM Questionnaire	0-50	Very poor educational environment
	51-100	Educational environment with many problems
	101-150	More positive than negative educational environment
	151-200	Excellent educational environment
Learning	0-12	Very poor
	13-24	Negative perception
	25-36	More positive perception
	37-48	Very positive perception of teaching
Teachers	0-11	Very poor
	12-22	In need of training
	23-33	Moving in the right direction
	34-44	Model teachers
Academic self-perception	0-8	Feeling of total failure
	9-16	Many negative aspects
	17-24	More positive perception
	25-32	Confident
Learning atmosphere	0-12	Very poor atmosphere
	13-24	Many aspects need to change
	25-36	More positive perception
	37-48	A good overall feeling
Social self-perception	0-7	Very poor
	8-14	Not a pleasant place
	15-21	Not bad
	22-28	Very good social perception
Average score for each item	≥ 3.00	Satisfactory score, positive educational environment
	2.00-3.00	Educational environment aspects that need improvement (neither strengths nor weaknesses)
	< 2.00	Problem areas, weaknesses of the educational environment

Statistical analysis

Data from the questionnaire were tabulated, coded, and analyzed using the statistical software STATA 14®. The results were presented in frequency tables, with summary measures including percentages, means, and standard deviations. Differences in PEE between the PS and CS were analyzed by comparing mean scores for the overall questionnaire and for each item, using a 95% confidence interval and applying Student's t-test or the Mann–Whitney U test, depending on the characteristics of the data distribution.

Results

Descriptive analysis

Of the 372 undergraduate students, 216 agreed to participate and completed the questionnaire, resulting in a response rate of 58.06%. The sample consisted of 62.96% women and 37.04% men, with a mean age of 22.5 years (SD: 2.4). Of the participants, 37.04% (n = 80) were PS and 62.96% (n = 136) were CS.

Percentage distribution by preclinical and clinical stage

Figure 1 shows the distribution of scores obtained on the overall questionnaire and on each of its subscales. Among PS, 1.25% and 27.5% perceived a “very poor educational environment” and an “educational environment with many problems,” respectively. Among CS, 0.7% and 47% reported a “very poor educational environment” and an “educational environment with many problems,” respectively. The proportion of students with a negative perception of the educational environment was higher among CS (47.07%) than among PS (28.75%).

Mean scores of the overall questionnaire and subscales

Table 2 shows the mean scores of the overall DREEM questionnaire and its subscales. The mean total score was 107.38 (SD: 26.07). A statistically significant decrease was observed in the mean total score and in the “learning,” “teachers,” “learning atmosphere,” and “social self-perception” subscales when comparing PS and CS. The “academic self-perception” subscale showed an increase when comparing PS and CS; however, this difference was not statistically significant. No significant differences were found in the total or subscale scores when analyzed by gender.

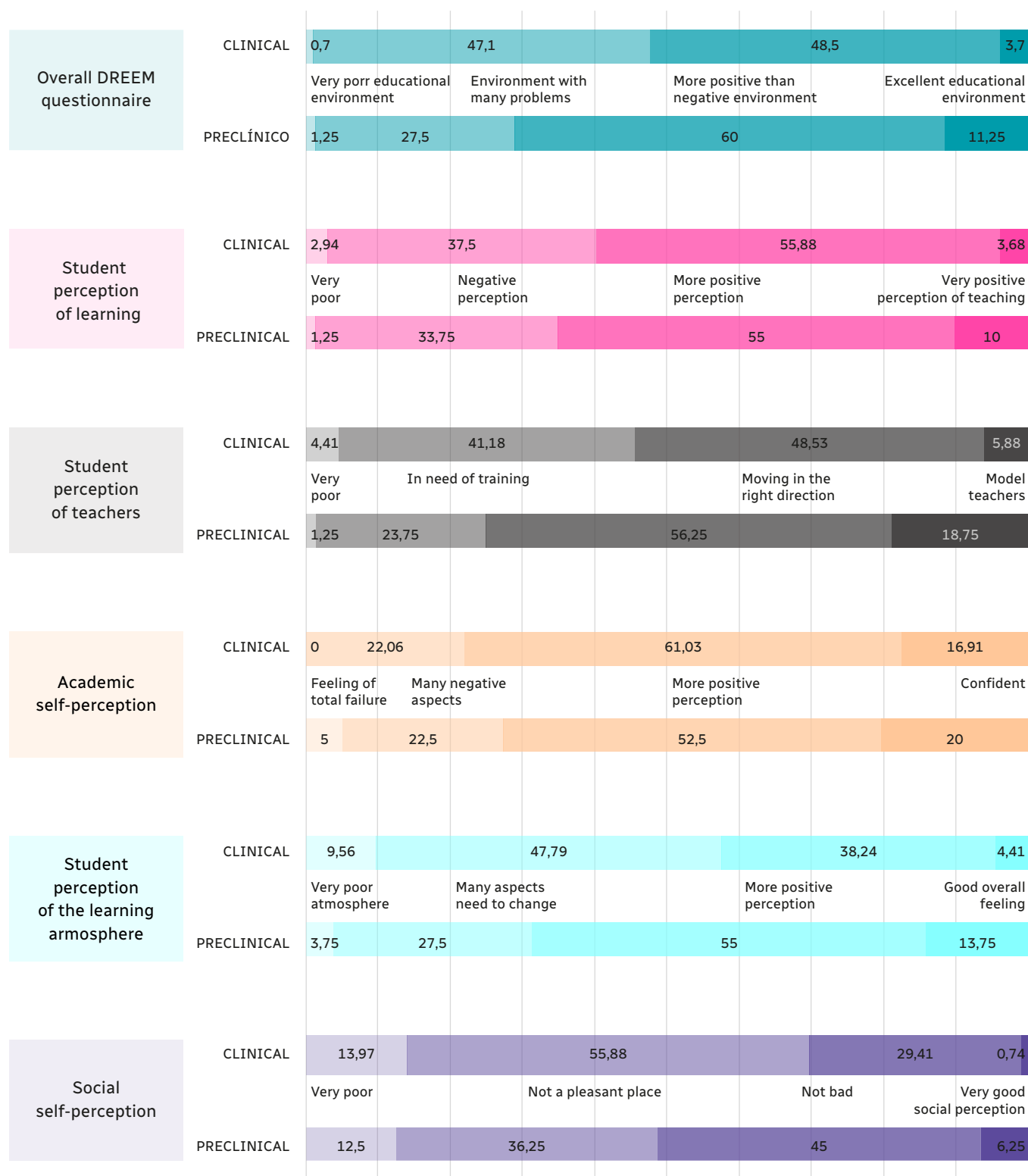


Figure 1. Percentage distribution of scores obtained on the overall questionnaire and each of its sub-scales, by academic level.

Table 2. Mean scores for the overall questionnaire and its subscales, by course type and gender (n = 216)

Perception of the overall DREEM questionnaire and by subscales	Maximum score	Mean (SD) total (n = 216)	Mean (SD) preclinical courses (n = 80)	Mean (SD) clinical courses (n = 136)	p-value	Mean (SD) men (n = 80)	Mean (SD) women (n = 136) **
Overall DREEM questionnaire	200	107.38 (26.07)	114.83 (27.74)	103.00 (24.08)*	0.001	106.63 (25.14)	107.83 (26.68)
Learning	48	25.66 (6.87)	27.03 (6.97)	24.85 (6.70)*	0.024	25.78 (6.52)	25.58 (7.08)
Teachers	44	24.41 (6.45)	26.63 (6.26)	23.11 (6.22)*	0.000	24.48 (6.47)	24.37 (6.46)
Academic self-perception	32	19.98 (5.12)	19.38 (5.87)	20.33 (4.62)	0.189	19.25 (5.10)	20.41 (5.10)
Learning atmosphere	48	24.31 (8.02)	27.68 (7.71)	22.33 (7.54)*	0.000	24.06 (7.49)	24.47 (8.33)
Social self-perception	28	13.00 (4.64)	14.08 (4.80)	12.36 (4.44)*	0.008	13.05 (4.67)	12.97 (4.64)

* Difference in mean between CS and PS ($p < 0.05$)

** Difference in mean between men and women ($p > 0.05$)

Mean scores per item on the DREEM questionnaire

Table 3 presents the mean scores for each item across the entire sample, identifying questions 2, 8, 11, 13, 19, 21, 23, 36, 37, 39, 40, 42, 45, 46, 47, and 48 as problem areas (mean scores below 2). Only two items yielded mean scores indicative of positive aspects of the educational environment (items 15 and 44). In these items, students perceived that teachers were knowledgeable about the subjects they taught and reported having good friends within their study environment. The remaining items showed mean scores indicating aspects of the educational environment that are neither strengths nor weaknesses, nor in need of improvement.

Analysis of differences between PS and CS by item shows that CS tend to have significantly lower mean scores than PS on a greater number of items, indicating a poorer PEE. In fact, CS identified more problem areas (items with mean scores below 2) than those identified by PS.

Table 3. Mean scores per item on the DREEM questionnaire (n=216)

Perception of learning	Mean (SD) total (n = 216)	Mean (SD) preclinical courses (n = 80)	Mean (SD) clinical courses (n = 136)	p-value
1. I am encouraged to participate in class	2.34 (0.94)	2.47 (0.89)	2.27 (0.96)	0.127
2. Teaching is adequately focused on developing my confidence	1.91 (1.04)	2.21 (0.97)	1.74 (1.05)**	0.001
3. Teaching encourages me to learn actively	2.23 (0.98)	2.5 (0.92)	2.07 (0.99)**	0.002
4. Teaching is well focused	2.25 (0.92)	2.4 (0.9)	2.16 (0.92)	0.066
5. Teaching helps me develop my competencies	2.66 (0.85)	2.76 (0.84)	2.61 (0.85)	0.206
6. I have clear learning objectives for my courses	2.81 (0.82)	2.76 (0.97)	2.85 (0.74)	0.658
7. Teaching is often stimulating	1.89 (0.94)	2.03 (0.93)	1.81 (0.95)	0.098
8. The time allocated to teaching is used effectively	2 (1.02)	2.26 (1.11)	1.84 (0.94)**	0.004
9. Teaching is student-centered	2.14 (1.04)	2.33 (1.05)	2.02 (1.03)**	0.037
10. Long-term learning is emphasized more than short-term learning	2.06 (1.07)	2.07 (1.14)	2.05 (1.04)	0.877
11. Teaching is too teacher-centered*	1.88 (1.02)	1.87 (0.95)	1.88 (1.06)	0.919
12. Teaching places too much emphasis on details*	1.44 (0.96)	1.33 (0.94)	1.50 (0.98)	0.238
PERCEPTION OF TEACHERS				
13. Teachers are good at providing feedback to students	1.93 (0.94)	2.08 (0.95)	1.84 (0.92)	0.069
14. Teachers have good communication skills with patients	2.35 (0.98)	2.46 (0.92)	2.29 (1.01)	0.227
15. Teachers know the subjects they teach	3.15 (0.72)	3.26 (0.72)	3.09 (0.71)	0.068
16. Teachers give clear examples	2.76 (0.82)	2.91 (0.88)	2.67 (0.76)**	0.024
17. Teachers are well prepared for their classes	2.86 (0.82)	2.96 (0.90)	2.80 (0.76)	0.078
18. Teachers provide constructive criticism	2.19 (1.01)	2.51 (0.95)	2.01 (1.01)**	0.000
19. Teachers ridicule their students*	1.57 (1.07)	2.03 (0.98)	1.30 (1.03)**	0.000
20. Teachers get angry and upset in class*	2.05 (1.16)	2.38 (1.10)	1.86 (1.16)**	0.001
21. Teachers are authoritarian*	1.23 (1.03)	1.48 (1.12)	1.08 (0.95)**	0.010
22. Teachers are patient with their patients	2.28 (0.90)	2.28 (0.69)	2.28 (1.00)	0.995
23. Students irritate teachers*	1.99 (0.98)	2.23 (0.90)	1.84 (1.01)**	0.005
ACADEMIC SELF-PERCEPTION				
24. I am able to memorize everything I need to	2.20 (1.06)	2.25 (1.13)	2.17 (1.02)	0.625
25. Much of what I have to learn seems relevant to my career	2.53 (1.00)	2.26 (1.09)	2.69 (0.90)**	0.004
26. I feel I am being well prepared for my profession	2.94 (0.78)	2.96 (0.81)	2.93 (0.76)	0.760
27. What I learned last year provides a good foundation for this year's work	2.61 (1.05)	2.27 (1.19)	2.81 (0.90)**	0.001
28. The school helps me develop my problem-solving skills	2.08 (1.00)	2.16 (0.98)	2.03 (1.01)	0.375

29. I am confident that I will pass this year	2.69 (1.09)	2.73 (1.17)	2.66 (1.05)	0.443
30. I have learned a lot about empathy in my profession	2.62 (1.29)	2.48 (1.31)	2.70 (1.27)	0.186
31. My previous study methods still work for me	2.28 (1.30)	2.25 (1.32)	2.30 (1.28)	0.780
PERCEPTION OF THE LEARNING ATMOSPHERE				
32. There is a relaxed atmosphere during lectures	2.62 (0.95)	2.7 (0.98)	2.58 (0.93)	0.178
33. I feel I can ask as many questions as I want	2.36 (1.10)	2.53 (1.10)	2.25 (1.09)	0.072
34. I feel socially comfortable in class	2.77 (1.00)	2.86 (1.02)	2.72 (0.98)	0.258
35. I have opportunities to develop my interpersonal skills	2.26 (1.10)	2.46 (1.05)	2.14 (1.11)**	0.042
36. The enjoyment I get from my studies outweighs the stress they cause	1.05 (1.12)	1.35 (1.19)	0.87 (1.04)**	0.003
37. The atmosphere in the Department of Dentistry motivates me to learn	1.80 (1.12)	2.22 (1.05)	1.55 (1.09)**	0.000
38. I am able to concentrate well	2.29 (1.13)	2.47 (1.05)	2.19 (1.16)	0.075
39. The atmosphere is relaxed in clinical settings	1.60 (1.20)	2.32 (1.15)	1.17 (1.01)**	0.000
40. The schedules in the Department of Dentistry are well planned	1.31 (1.13)	1.92 (1.14)	0.95 (0.97)**	0.000
41. My experience in the Department of Dentistry has been discouraging*	2.06 (1.18)	2.41 (1.08)	1.86 (1.19)**	0.001
42. Cheating is a problem in the Department of Dentistry*	1.87 (1.15)	1.82 (1.16)	1.91 (1.15)	0.596
43. There is a relaxed atmosphere during seminars, lectures, and tutorial sessions	2.27 (0.97)	2.58 (0.97)	2.08 (0.93)**	0.000
STUDENTS' SOCIAL SELF-PERCEPTION				
44. I have good friends in the Department of Dentistry	3.24 (0.89)	3.3 (0.90)	3.20 (0.89)	0.363
45. There is a good support system for students experiencing stress	0.64 (0.93)	0.91 (1.05)	0.49 (0.82)**	0.002
46. I am too tired to enjoy the courses*	1.09 (1.14)	1.18 (1.03)	1.04 (1.21)	0.120
47. I rarely get bored in the courses	1.75 (1.02)	1.78 (1.09)	1.73 (0.97)	0.718
48. The physical environment of the Department of Dentistry is pleasant	1.65 (1.20)	2.26 (1.16)	1.30 (1.09)**	0.000
49. My social life is good	2.40 (1.29)	2.46 (1.20)	2.36 (1.35)	0.805
50. I rarely feel lonely	2.20 (1.31)	2.17 (1.24)	2.22 (1.36)	0.807

Items with a mean score below 2.00 are in **bold**.

Items with a mean score of 3.00 or higher are in *italics*.

* Items reverse-coded for analysis

** Significant difference in mean scores between PS and CS

Discussion

Chilean and global context of low perception in the transition from preclinical to clinical training

This study aimed to analyze PEE among dental students at the preclinical and clinical academic levels. The total questionnaire score was 107.38, indicating an environment that is “more positive than negative.” However, this value is very close to the cut-off point separating it from an “educational environment with many problems” (100). Therefore, this result should be interpreted with caution rather than categorically. A more detailed analysis of the scores shows that the mean total score for CS was 103.00, compared with 114.83 for PS. This indicates that the overall score’s proximity to 100 is largely influenced by the perceptions of CS. Moreover, statistically significant differences were observed between the mean scores of preclinical and clinical courses. In this regard, Serrano et al.⁽¹¹⁾ describe a similar situation in their study of dental students in Concepción, Chile. Students who began their clinical training in the fourth year reported a mean total questionnaire score of 91.45, classifying the educational environment as “with many problems.” In contrast, third-year preclinical students in the same study perceived the environment as “more positive than negative,” with a mean score of 126.16. Although, in this study, mean scores for fifth- and sixth-year students continued to decline (117.69 and 114.52, respectively), they did not reach the classification of an environment “with many problems.” A similar pattern was observed in the study by Rodríguez-Hopp et al.,¹³ conducted among dental students at the University of San Sebastián in Santiago, Chile, where CS in the fourth and fifth years reported a mean score of 116.10, lower than that of PS (120.42). However, both values were classified as a “more positive than negative” educational environment. In turn, Tisi-Lanchares et al.¹², in their analysis of dental students across basic, preclinical, and clinical courses, found that first-year clinical students (i.e., fourth-year students) had the lowest perception of the educational environment, classifying it as “more positive than negative,” with a mean score of 100.88, very close to the cut-off point for the “educational environment with many problems” category.

The findings of Serrano et al., Rodríguez-Hopp et al., Tisi-Lanchares et al., and this study support the notion that the transition from a preclinical to a clinical setting negatively affects PEE among dental students in Chile. A downward trend in PEE as students progress from basic to preclinical and finally to clinical courses has also been documented in Korean dental schools. Gil et al.⁽¹⁶⁾ studied 539 students from 11 Korean dental schools and found that students in clinical courses generally had lower mean scores on the overall DREEM and on all subscales. Similarly, Alfakhry et al.,⁽¹⁷⁾ in their study of dental students at the universities of

Damascus, Hama, and Tartus in Syria, found significant differences between PS and CS, with mean total questionnaire scores of 113.8 and 103.6, respectively. Notably, the fourth-year mean score—marking the beginning of clinical training—was the lowest observed (103.1), very close to the cut-off point separating the “more positive than negative” category from “educational environment with many problems.” That said, the complexity of the transition from the preclinical to the clinical setting has been studied by Serrano et al.,⁽¹⁸⁾ who found that PEE declines as students progress through the curriculum. They also reported significant differences in the overall DREEM mean score and across all subscales when comparing PS and CS, with perception being significantly lower among CS.

Factors that hinder the transition from the preclinical to the clinical level

The decline in PEE as students progress through the curriculum is consistent with the findings of this study, in which the overall mean score, as well as four subscale scores, were statistically lower in CS than in PS. The “academic self-perception” subscale was the only one without significant differences; notably, it showed a slight improvement when moving from the preclinical to the clinical setting. Botelho et al.⁽¹⁹⁾ classified the factors that hinder the transition from the preclinical to the clinical level into two broad areas. The first, the “transition gap,” encompasses problems related to knowledge and skills. The knowledge-related issue—specifically, lack of knowledge—was reported by students, who described entering clinical practice with knowledge gaps that hinder their ability to treat patients. In terms of skills, these are divided into soft and hard skills. Difficulties in soft skills include lack of experience in diagnosis and treatment planning, as well as difficulty communicating with patients, mainly because this represents a new experience for students. Regarding hard skills, insufficient practice as preparation for patient care has been reported, particularly in the area of clinical simulation. In addition, a lack of realism in simulation has been noted. Students reported that, although in earlier courses they practiced anesthetic techniques and periodontal probing on one another, when performing these procedures on real patients they perceived the prior practice as unrealistic, since the conditions of real patients differ considerably from the students’ own oral health conditions used for simulation. The second area is divided into external and internal stress. External stress is related to the complexity and differences in curriculum design during the clinical period, including a greater number of clinical hours, a higher patient load, and the need for frequent theoretical examinations. It is also associated with differences in teaching styles and therapeutic approaches among clinical instructors, as well as with the clinical environment and patient-related factors. Regarding patients, students reported that patients tend to distrust them but place their trust in clinical mentors. Internal stress refers to a lack of

knowledge about the situations patients may present, for which students feel unprepared, as well as to low self-confidence and expectations that they are generally unable to meet. All of the above supports and helps explain the findings of this study.

Analysis of subscales

Analysis of the DREEM subscales shows that, in this study, the “learning,” “teachers,” “learning atmosphere,” and “academic self-perception” subscales exhibited statistically significant decreases when transitioning to the clinical setting. The “learning” and “teachers” subscales showed the greatest declines, at 11.15% and 8%, respectively. Regarding teachers, Frese et al.⁽²⁰⁾ found that teachers are the factor that most positively influences students’ psychosocial interactions at the start of their clinical training. Teacher–student collegiality shows a directly proportional and statistically significant relationship with variables such as team spirit (among students), team spirit (student–teacher), kindness (among students), camaraderie (among students), good leadership, enjoyment of clinical care, enjoyment of contact with patients, and pleasure in studying. Moreover, this teacher–student relationship decreases significantly and inversely in areas such as sanctions, helplessness, excessive demands, and punishments. In the same study, increased stress was found to significantly reduce pleasure in studying, student relationships, team spirit (student–teacher), kindness, good leadership, and enjoyment of clinical care. Therefore, faculty training in active teaching methodologies, as well as in areas related to the management and support of students, is important and should be considered in academic development.

Regarding the “learning atmosphere,” which showed the greatest decline from the preclinical to the clinical setting, the results indicate that this area includes the second-lowest scoring item in the questionnaire: “The enjoyment of my studies outweighs the stress they generate,” a finding also reported by Frese et al.⁽²⁰⁾ In that study, stress was the main factor affecting students at the start of their clinical academic period, negatively influencing primarily the pleasure of studying and increasing feelings of helplessness. Therefore, it is essential to implement strategies that facilitate the transition from the preclinical to the clinical setting, such as beginning with low-complexity clinical courses covering topics such as “clinical introduction,” “preventive oral care,” and “initial stages of periodontal treatment,” and then progressing to more complex courses such as “restorative dentistry,” “surgery,” and “endodontic treatments,” considering that the latter are those that generate the greatest stress among students.²⁰ Similarly, Guthardt et al.,⁽²¹⁾ in an in-depth qualitative analysis of stress among dental students, found that the following stressors are present in the study–work environment: broken equipment, the cost of studies, the requirement to purchase specific brands, and poor posture, among others. An interesting aspect of the study is that students

themselves were consulted to propose suggestions for improvement to address these stress factors, including measures such as an organized and clean work-space, ensuring functional workstations, providing break rooms, implementing physiotherapy, and offering education on spinal ergonomics.

Analysis of items with “satisfactory score: positive educational environment” (≥ 3.00) and “problem areas: weaknesses of the educational environment” (< 2.00)

The above findings are consistent with the three lowest mean-scoring items: “There is a good support system for students who experience stress” (0.64), “The enjoyment I get from my studies outweighs the stress they generate” (1.05), and “I am too tired to enjoy the classes” (1.09). All of these values indicate that these aspects are weaknesses of the educational environment. In addition, a statistically significant decrease was observed when comparing PS and CS for the first and third items. Conversely, only two items were identified as strengths of the educational environment, compared with 17 identified as weaknesses. The two main strengths were “I have good friends in the Dentistry Department” (3.24) and “The teachers know the subjects they teach” (3.15). Thus, from the students’ perspective, although teachers are knowledgeable about the subjects they teach, the main issues appear to be related to insufficient faculty training in active teaching methodologies, effective feedback, and respectful and appropriate treatment of students.

Conclusion

Based on the reported results, PEE among dental students at the University of Antofagasta, both overall and across the “learning,” “teachers,” “academic self-perception,” and “social self-perception” subscales, decreases significantly when transitioning from the preclinical to the clinical setting. Although the overall perception of the educational environment remains “more positive than negative” (107.38), this value is close to the cut-off point for an “educational environment with many problems” (100). Therefore, it is necessary to implement methodological strategies and faculty training in active teaching, effective feedback, and respectful treatment of students, among others. Students also identify as a strength the teachers’ knowledge of the subjects they teach.

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Data availability

The complete data set supporting this study's results is published within the article itself.

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