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Contrasting student and staff perceptions of preclinical-to-clinical transition at a Chilean dental school

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Abstract

Introduction: Dental education is a challenging and demanding field of study as students are expected to acquire various competencies to fulfil their professional requirements after graduation. The objective of this study was to investigate and compare dental students' and clinical staff instructors' perceptions of the preclinical-to-clinical transition training at a Dental School in Santiago, Chile.

Material and Methods: Two questionnaires containing 11 quantitative and one qualitative item were developed to assess our year three, four and five ($n = 244$) dental undergraduate students' challenges when they begin treating patients, and clinical staff ($n = 78$) perceptions of the preparedness to treat patients of the same students. Both questionnaires were voluntarily and anonymously implemented eight weeks after the beginning of the 2019 academic year. Responses were analysed using a Chi-squared test for each quantitative question, while qualitative comments were studied to form themes and dimensions.

RESULTS: A total of 234 (96%) students and 60 (77%) instructors completed their respective questionnaire. There were considerable variations between students in the different years of the programme, as well as between students and staff members. Students and instructors felt the former had enough knowledge to treat patients though it was difficult for them to apply it in clinical practice. Again, both believed they could communicate with patients, but third year students asked for more training on this. Regarding practical skills, fourth- and fifth-year students felt prepared but not third year students, who preferred to work in pairs with senior students, a preference that was shared by the instructors. All student groups asked clinical staff to provide more frequent, constructive and consistent feedback and felt that the difference between simulation and clinical environments and the amount of clinical work to fulfil clinical requirements made them feel stressed. Another mentioned stressor was students' low self-confidence when working with patients. Among the requested improvements, students requested better training on how the dental clinic works to save time.

Conclusions: Preclinical-to-clinical transition training presents several challenges. Some of the problems highlighted by both students and clinical staff members

persisted with the transition after three, four and even five years of training, which needs to be addressed.

KEYWORDS
dental education, preclinical-to-clinical transition, student-staff perceptions

1 | INTRODUCTION

Dental education is a challenging and demanding field of study as students are expected to acquire various competencies, including academic, clinical and interpersonal skills, to fulfil their professional requirements after graduation.[1–3]

The curricular integration of these skills has been advocated to allow future dental professionals to independently solve a series of clinical conditions and deliver high-quality care to patients.[4] In the last few decades, dental education has moved from a traditional siloed curriculum and discipline to a more integrated multidisciplinary learning environment[5] where basic science and clinically relevant preclinical training provide knowledge continuity.[6] However, the transition from preclinical-to-clinical training is complex and remains challenging for students, teachers and dental schools.[7,8]

Thus, a preclinical-to-clinical transition barrier to integration remains, hindering students from applying their knowledge to real clinical practice; this has been called 'the shock of practice'.[6] This transition implies a great challenge for students, as within a few weeks they change their roles from being taught to being responsible for patient care while at the same time maintaining their regular academic obligations and adapting to working in cooperation with clinical instructors.[3,9,10] In addition, students must convert the practical skills learnt during preclinical training to work successfully in real situations with the associated complexities of actual patient care, such as performing irreversible procedures and additional challenges related to professional behaviour, ethics, self-confidence and motivation.[7,11–13]

At this stage of their training, psychological distress, emotional exhaustion and burnout-related symptoms can occur in these students.[1,14–16] Hence, they report an abrupt transition from preclinical-to-clinical training because of an increase in the number of sessions and patient load,[17] along with a perceived inadequacy in treating patients when beginning clinical treatment(s).[6]

Students also become confused because various instructors have different treatment approaches; thus, treatment sequences simulated in the lab are not sufficiently followed in real-world clinical scenarios[18] and the feedback received for their work from multiple instructors remains inconsistent.[15] They also report being hesitant and uncomfortable because of the patients' lack of trust, missed appointments, high expectations, hygiene guidelines and documentation of patient records.[3,16,19] These issues are exacerbated by a lack of sleep, health and financial concerns, time required to pursue hobbies and social interactions.[20]

While available literature thoroughly describes the challenges confronted by students when starting their clinical training from their perspective, that of their instructors have received less attention. Thus, the aim of this cross-sectional study was to investigate and contrast dental students' and clinical staff instructors' perceptions of the preclinical-to-clinical transition training at the University of the Andes Dental School in Santiago, Chile.

2 | MATERIALS AND METHODS

2.1 | Ethics statement

The Faculty of Medicine Scientific Ethical Committee of the University of the Andes reviewed and gave the study its full approval (reference number CEC202021).

2.2 | The questionnaires

Based on previous studies, two draft questionnaires were developed to assess the dental undergraduate students' challenges when they begin treating patients, which occurs between years three and four of dental training. One questionnaire assessed the students' perceptions of their preclinical-to-clinical transition, and the others evaluated the clinical staffs' perceptions of the preparedness of the same students to treat patients.

The students' questionnaire (SQ), containing quantitative and qualitative items that referred to the skills gap, stress and preparedness to treat patients, was validated through three successive focus groups with year six students who had finished their training at the university campus and were in their final outreach clinical practice. The final-year students were asked to validate the questionnaires using their experience of being trained in years three, four and five of the curricular programme.

Furthermore, 15 staff instructors (five instructors each for year three, four and five courses) were asked to ensure the face validity of the draft SQ. Finally, a pretest of the SQ was performed twice on 15-year six students with an interval of 14 days, and the outcome of these resulted in a Cohen's kappa intrarater reliability score of 0.77, which was considered substantial.[21]

Eventually, the SQ included the following five domains with 11 quantitative Likert-style questions for the students to express their perceptions (Table 1): Domain I, theoretical knowledge with two questions; Domain II, communication skills with three questions;

TABLE 1 Student and clinical staff answers to the Students' and Trainers' Questionnaires, respectively, by the percentage of total respondents and the statistical significance for each question (Student numbers: 84 third year; 75 fourth year; 75 fifth year. Clinical staff numbers: 18 third year; 25 fourth year; 17 fifth year.)

	Statement: students…		Strongly agree + Agree		Neither agree nor disagree		Disagree + Strongly disagree		
Q	Theoretical knowledge	Year	Students	Clinical staff	Students	Clinical staff	Students	Clinical staff	*p*-value*
1	Have the knowledge to start treating patients	3rd	43%	54%	35%	31%	22%	15%	.810
		4th	56%	77%	26%	18%	18%	5%	.139
		5th	67%	72%	20%	22%	13%	6%	.684
2	Find it difficult to apply knowledge to clinical practice	3rd	52%	72%	33%	23%	16%	5%	.274
		4th	56%	55%	28%	32%	16%	13%	.859
		5th	61%	50%	25%	33%	14%	17%	.630
	Communication skills								
3	Feel prepared to communicate with patients	3rd	89%	40%	7%	48%	5%	12%	≤.0001
		4th	76%	64%	19%	30%	5%	6%	.377
		5th	85%	72%	10%	22%	3%	6%	.327
4	Feel prepared to communicate with peers using professional language	3rd	95%	23%	5%	69%	0%	8%	≤.0001
		4th	100%	41%	0%	55%	0%	4%	≤.0001
		5th	99%	94%	1%	6%	0%	0%	.246
5	Find it difficult to communicate with clinical trainers using professional language	3rd	100%	84%	0%	16%	0%	0%	.002
		4th	99%	23%	1%	9%	0%	68%	≤.0001
		5th	100%	6%	0%	11%	0%	83%	≤.0001
	Practical skills								
6	Feel prepared to start treating patients	3rd	44%	31%	32%	46%	24%	23%	.976
		4th	74%	69%	20%	27%	6%	4%	.656
		5th	79%	72%	18%	17%	3%	11%	.251
7	Feel safer working in pairs with senior peers	3rd	88%	84%	6%	10%	6%	6%	.734
		4th	80%	75%	12%	20%	8%	5%	.516
		5th	83%	78%	11%	21%	6%	1%	.725
	External stress								
8	Feel stressed because of the difference between simulation and clinical environments	3rd	58%	85%	26%	15%	16%	0%	.029
		4th	78%	100%	15%	0%	7%	0%	.071
		5th	82%	100%	13%	0%	5%	0%	.154
9	Do not feel stressed when receiving different feedback from different trainers about the same work	3rd	8%	70%	14%	8%	77%	22%	≤.0001
		4th	5%	78%	13%	14%	82%	8%	≤.0001
		5th	11%	72%	12%	17%	77%	11%	≤.0001

(Continues)

TABLE 1 (Continued)

Q	Statement: students...	Year	Strongly agree + Agree		Neither agree nor disagree		Disagree + Strongly disagree		p-value*
	Theoretical knowledge		Students	Clinical staff	Students	Clinical staff	Students	Clinical staff	
	Internal stress								
10	Do not feel stressed because of the amount of clinical work	3rd	13%	0%	22%	8%	65%	92%	.037
		4th	5%	9%	10%	5%	85%	86%	.608
		5th	10%	11%	12%	6%	78%	83%	.671
11	Feel stressed because of low self-confidence when working with patients	3rd	64%	85%	18%	16%	18%	0%	.134
		4th	60%	81%	22%	14%	19%	5%	.075
		5th	40%	77%	19%	11%	41%	11%	.012

*p-value of Chi-squared test.

Domain III, practical skills with two questions; Domain IV, external stress with two questions; and Domain V, internal stress with two questions. At the end of the questionnaire, there was an open-ended question for the students to express their views freely, 'is there anything you would suggest to improve the preclinical-to-clinical transition?'

To gain a different perspective on the students' preparedness to treat patients, a modified version of the SQ was developed to ask clinical staff instructors to judge the readiness of year three to year five students in entering clinical work. A similar protocol of validation as that for the SQ was followed for the trainers' questionnaire (TQ). Thus, after several drafts, the TQ was validated by 11 staff instructors who completed it within 2 weeks, attaining a Cohen's kappa score of 0.71.

Similarly to the SQ, the TQ included the same five domains with 11 quantitative Likert-style questions plus the opened-ended question, 'is there anything you would like to comment on the students' preclinical-to-clinical transition?'

2.3 | Participants and data collection

The final version of the pen-and-paper SQ was implemented 8 weeks after the beginning of the 2019 academic year. Students in year three-, four- and five-course programmes ($N = 244$; 159 females, 85 males, an average of 20.9 years old) were invited to voluntarily and anonymously complete the SQ. At this time, year three students were entering clinical work in semiology and oral surgery by working in pairs with year five students. Year four students were starting their clinical work on oral surgery, in adult- and child-integrated clinics in pairs with students of the same year. Lastly, year five students began working independently in adult- and child-integrated clinics and in pairs with year three students in semiology and oral surgery. These year five students were asked to complete the SQ despite having some clinical experience already for their potential retrospective insight into their preclinical-to-clinical transition.

Similarly, 8 weeks after the beginning of the 2019 academic year, all 78 clinical instructors were invited to voluntarily and anonymously answer an online version of the TQ about their respective learners; year three, four and five students.

2.4 | Data analysis

The completed questionnaires (both SQ and TQ) were statistically analysed for their reliability using the Cronbach's alpha coefficient.

First, the SQ Likert-style answers from different groups (year three, four and five students) were descriptively analysed separately to determine the students' perceptions in terms of their preclinical-to-clinical transition. Second, the SQ was compared among the three groups to determine whether they all had the same opinions. Following the same procedure, TQ perceptions were first studied by

group and then compared among trainers of different groups (year three, four and five instructors).

To compare responses, the SQ and TQ quantitative Likert-style items were analysed using a Chi-squared test for each question to produce a *p*-value to state whether there was a statistically significant difference ($p < .05$) between students in different years of the programme and between them and their clinical instructors.

The data were organised into Microsoft® Excel spreadsheets (Microsoft Excel, Microsoft Inc.) and statistically processed using the Statistical Package for Social Sciences Windows® version 27 (SPSS IBM Inc.).

The same investigator repeatedly read and evaluated all open-ended questions and comments from SQs and TQs to become familiar with their content. Then, using an 'open-coding' interpretative process, the most significant elements were identified, analysed and compared, and those that were conceptually similar were labelled and grouped together to form themes.

3 | RESULTS

Overall, 234 (96%) students completed the pen-and-paper SQ; of these, 84 were in the third year, 75 were in the fourth year and 75 were in the fifth year of their studies. The Cronbach's alpha coefficients for the SQ were 0.841, 0.811 and 0.768, respectively. Furthermore, 60 (77%) clinical trainers (18 from the third year, 25 from the fourth year and 17 from the fifth year) answered the online TQ, characterised by a Cronbach's alpha coefficient of 0.847.

The results obtained from the third-, fourth- and fifth-year students as well as those obtained from the clinical staff responses to the SQ's and to the TQ's quantitative questions, are presented in Table 1.

Most students in all three groups felt adequately prepared to start treating patients based on the theoretical knowledge gained, and this confidence increased as their studies progressed (Table 1 Q1). However, they also thought it was difficult for them to apply this knowledge in the clinic (Table 1 Q2). Interestingly, both these findings were also noticed by the clinical instructors (Table 1 Q1 & Q2). The difference between students and staff members of all cohorts regarding their responses to Q1 was not statistically significant ($p \geq .139$) and neither was to Q2 ($p \geq .274$).

As far as the communication skills are concerned, while most students believed they were prepared to communicate with patients (Table 1 Q3), the instructors recorded a lower competence level among Year 3 students when compared to their senior peers (Table 1 Q3). The difference in the responses between third-year students and third-year clinical staff regarding this competence was statistically significant ($p \leq .0001$).

Most students (≥95%) felt prepared to communicate with their peers in a professional language; however, this was not reflected in the responses of their instructors, except for the fifth-year students (Table 1 Q4). The differences between the responses of the third- and fourth-year students and those of their clinical instructors regarding this competence were identified as statistically significant ($p \leq .0001$ in both cases).

Students found it difficult to communicate with instructors; in contrast, the clinical staff thought the opposite, though to a lesser degree for fourth- and fifth-year students, who were deemed as having fewer difficulties in communicating with their instructors (Table 1 Q5). However, the differences between the responses of all cohorts of students and of their clinical instructors regarding the communication between them were found to be statistically significant ($p \leq .002$).

As far as the students' preparedness for treating patients is concerned, this was quite different among third- (44%), fourth- (74%) and fifth-year (79%) students, while the responses of their instructors concurred (Table 1 Q6). Thus, the difference in the responses between students and clinical staff regarding this matter was not statistically significant ($p \geq .251$). Interestingly, most students from all 3 years felt safer when working in pairs with seniors (Table 1 Q7), and this view was shared by their instructors (Table 1 Q7); the difference in the responses regarding this view was also found to be nonsignificant ($p \geq .516$).

Most students (≥58%) and their clinical staff (≥85%) felt that the differences between the simulation and the clinical environments were a source of stress (Table 1 Q8). The difference in opinion regarding this issue was found to be significant between third-year students and their clinical instructors ($p = .029$), but not in the case of senior students (both fourth- and fifth-years students) and their instructors ($p \geq .071$).

The students and the clinical staff questioned were not in agreement regarding the differences in feedback provided by the various instructors as a source of external stress. In fact, while over 77% of the students thought that such feedback added to their stress, over 70% of the instructors thought the exact opposite (Table 1 Q9); this difference was found to be statistically significant ($p \leq .0001$). Most of the students (≥65%) and the instructors (≥83%) listed the amount of clinical work as an internal stressor (Table 1 Q10); the difference between the perceptions of students and staff regarding this issue was not statistically significant in the case of fourth- and fifth-year students ($p \geq .608$), while it was statistically significant in the case of third-year students ($p = .037$). A similar opinion was expressed with respect to the students' low self-confidence when working with patients as a source of stress, with the exception of fifth-year students (Table 1 Q11). The difference between the perceptions of students and staff about this matter was found to be statistically significant for Year 5 students ($p = .012$), but not for Year 3 ($p = .134$) and Year 4 students ($p = .075$).

For the open-ended question in SQ (Table 2), a number of third-year ($n = 48$; 57%), fourth-year ($n = 41$; 55%) and fifth-year ($n = 40$; 53%) students provided useful comments; however, three respondents answered no. Five themes were identified and were the same among the students of all 3 years. These themes were (i) practical and soft skills development, (ii) clinical environment, (iii) teaching and learning, (iv) stress management and (v) dental clinic management. Two additional themes were identified from the comments

TABLE 2 Themes and dimensions identified in third- (N. 48–57%), fourth- (N. 41–55%) and fifth-year (N. 40–53%) students' answers to the open-ended question, 'is there anything you would suggest to improve the preclinical-to-clinical transition?'

	Data coding (dimensions)		
Emerged themes	**3rd year**	**4th year**	**5th year**
Practical and soft skills development	• Transition is difficult; we should have more time to practice motor skills and feel better prepared to treat patients • Better training on indirect vision and ergonomics • More training on how to communicate with patients	• Improve training in psychology and soft skills when dealing with patients • More training on Cerec prepCheck®	• Reinforce soft skills teaching like teamwork, and the relationships and communication one should involve the patient and technician • Surgery and dental extractions should have more realistic simulation training, though it is never enough • It is good to have a demanding programme to develop skills, but there need to be more clinical hours to practice as well as a more flexible timetable to treat patients
Clinical environment	• Generating a better and enjoyable environment; instructors should be more empathic • Instructors could be less intimidating so that we feel more confident and do not do everything nervously and rushing	• Instructors should be more empathic and provide constructive and regular feedback • Instructors should not correct mistakes in front of patients; they should be more accessible to answer questions	• Instructors–student relationships and environments should be reinforced; they need to be gentler, supportive, calibrated and have the same assessment and exigency criteria
Teaching and learning	• Having prebriefings before starting treatments in the clinic • Clinical instructors should use the same assessment criteria and clinical demands • Keep pairing us with senior students to receive advice and explanations on what is not said by instructors • Provide more and better feedback • Get organised and study more to put everything together to be able to apply knowledge to the clinical case • Use the same dental materials in simulations as in the clinic • More visits to the clinic during simulation training; patients are different from phantom heads	• To have a comprehensive vision of the patient; in simulations, we only work with mouths • Improve teaching on clinical reasoning, diagnosis, treatment planning and sequence of treatments in comprehensive clinical cases • Improve coordination between preclinical and clinical courses; protocols used in the clinic are different from those seen in simulations • Teach all dental materials used in the clinic; trademarks, properties and indications, as they are different from those in simulations • Better training on medical emergencies in the dental environment • Clinical instructors should be better prepared on pedagogy and use the same criteria and standards for a fair and acceptable assessment	• Improve training of odontogeriatrics, bleaching, occlusal splints, root canal treatments, crowns in molars, implants and full prostheses • We need to know more about other materials' trademarks of those used at the University • To have more simulations in medical emergencies • To have better positive and more frequent feedback from instructors; it would also be useful to receive feedback from patients • Instructors should be more present chairside, especially when one is performing an activity for the first time • To improve the implementation and integration of knowledge into clinical practice
Stress management	• Teach us how to manage stress and maintain emotional balance • Tell us what is expected of us to reduce stress • Patients should comply with appointments; it increases stress when they do not • To be able to have more hours of sleep and less stress	• Reduce external stress in the clinic • Teach us how to manage internal stress and tolerance to frustration	• Psychology courses on how to manage difficult clinical cases and how to cope with stress, frustration and anxiety should be given earlier • Commitment from patients to attend should be emphasised as it generates stress

TABLE 2 (Continued)

Emerged themes	Data coding (dimensions)		
	3rd year	4th year	5th year
Dental clinic management	• Teach us how the clinic works and its protocols beforehand • Help us more with clinical record-keeping and diagnosis • Better training on biosecurity protocols in the clinic	• Knowing how the appointments and management of the dental clinic work in general, not through word-of-mouth • Patients should be encouraged to attend; it is out of our control • Improve teaching on clinical records in Salud® before working clinically	• Better training on clinical management as there is much time wasted learning IT; e.g. clinical record-keeping software Salud® and radiographs in Sidexis®, especially cone-beam
Clinical requirements	–	• Clinical requirements should be reduced to pass courses; it is too demanding	• The number of clinical requirements to complete is too high and demanding and makes us stressed
Free time	–	–	• To have more time for sports, be able to 'breath'; there is no time for anything

of the fourth- and fifth-year students: (i) clinical requirements and (ii) free time. Soft skills training was recurrently mentioned by all three cohorts, as it reflected the need for the instructors to be more empathic and gentler, and to use the same assessment criteria and clinical demands. Teaching how to manage stress and knowing how the clinic works (in terms of its protocols) were also regularly cited. Senior students in the fourth and the fifth year of their studies mentioned that clinical requirements were too demanding; a claim that acted as an extra stressor. Finally, fifth-year students requested more free time.

Valuable comments were also obtained from 49 instructors (82%) in response to the open-ended question. These comments covered the following four themes: (i) student application of knowledge, (ii) students' soft skills, (iii) practical skills' development and (iv) stress management (Table 3). Students' difficulty to transfer and apply knowledge to their clinical work, along with the need for them to improve their communication skills, was mentioned by several clinical instructors. The benefits of pairing junior to senior students during clinical work were highlighted as particularly helpful in reducing the insecurity of the junior students. As far as the stress management is concerned, some instructors claimed that a degree of stress when facing new clinical procedures should be considered as normal, while others thought that this stress ought to be prevented by helping the students to manage and control it before it led to an emotional imbalance.

4 | DISCUSSION

This cross-sectional study explored and compared dental students' and clinical staff instructors' perceptions of the preclinical-to-clinical transition training. As expected, there were considerable differences between different years of the programme, as well as between the students' and the staff members' responses.

Most students and instructors felt that the former had the theoretical knowledge required to start treating patients (Table 1 Q1). Notwithstanding, both groups thought that it was difficult to apply this knowledge to their clinical practice (Table 1 Q2); a condition known as a theory–practice gap, that has been previously described in dental education.[6,8,22,23] This condition may cause difficulties for students during the initial stages of their clinical training, and it can be a common source of stress.[14,23] Furthermore, this theory–practice gap entails a challenge related to student self-confidence,[6] as expressed by our third- and fourth-year students (Table 1 Q11). This difficulty in integrating knowledge and clinical practice was also expressed by our students in their qualitative comments (Table 2). This was especially noticeable among third-year students (Table 1 Q2), and it was not something that was unexpected considering that these students had just started clinical work. As stated by Frese et al.,[3] dental students have a very short period of time to successfully convert practical skills learnt in simulations into applicable skills in clinical settings.

Third-year students felt as prepared to communicate with patients (89%) like their fourth-year (76%) and fifth-year (85%) peers did. However, the instructors felt that third-year students were much less ready to communicate with patients (40%) when compared to senior students (64% and 72% for fourth- and fifth-year students, respectively). In line with the instructors' opinions, some third-year students expressed (in their qualitative comments) the need for more training on how to communicate with patients (Table 2). Interestingly, and despite the above, a previous study on Chilean and Argentinian dental students has reported that the lack of communication or cooperation with patients was a source of stress for students.[24]

When considering practical skills, the majority of fourth- and fifth-year students felt prepared to start treating patients (74% and 79%, respectively). In contrast, students from the third year did not think the same (Table 1 Q6), as only 44% of them felt prepared, while a large proportion of them (88%) felt safer by working in pairs with senior students. Both these perceptions were shared by the instructors (Table 1 Q6 & Q7). Interestingly, in their qualitative comments,

TABLE 3 Themes and dimensions identified in clinical staff answers to the open-ended question 'is there anything you would like to comment on the students' preclinical-to-clinical transition?'

Emerged themes	Data coding (dimensions)
Student application of knowledge	• Difficult for them to transfer and apply knowledge to clinical work • They only know how to apply knowledge in classic clinical cases • Integration of knowledge can only be acquired in the clinic • Junior students are not yet totally capable of clinical work • There is a big difference between year four and five students in clinical reasoning • There is a big difference among students of the same class
Student soft skills	• They are respectful, kind and ethical • They need to improve patient–dentist communication • Written communication is a deficit • There is a lack of teamwork
Practical skills development	• Students feel safer working in pairs • Self-confidence is higher in year five students • Skills for caries removal are poor • Juniors are not yet fully prepared for clinical work • Insecurity hinders their practical skills • They are afraid of making mistakes • The more they practice, the better they get • To improve practical skills, junior students should be paired in the clinic with senior students more often • They should review a more significant number of clinical cases and prerecorded demonstrations • Preclinical training in parallel with early clinical training might help them improve
Stress management	• In front of new clinical procedures, some degree of stress is normal, unavoidable and implicit at this stage of training • Stress should decrease as they progress in their training • Students' internal stress is not normal and needs to be prevented before it grows into emotional imbalance • They need help to manage and control stress • Not all students have the same resilience to stress and tolerance to frustration • Feedback helps to reduce stress • Teachers should be attentive to anxious and shy students and provide them with confidence and support

junior third-year students asked to continue to work in pairs with senior students so that they would receive advice and clarifications on issues that were not clarified or taught by instructors, thereby recognising that the transition between simulation and clinical work is difficult (Table 2). The advantages of this pairing system should also be considered for the seniors, as it has been reported that this scheme helps the treatments to take place faster, thereby facilitating a quicker transfer of instruments and materials, improving diagnostics skills and treatment planning,[25] enhancing the learning experience,[26] and adding a level of motivation for learning for both the mentee and the mentor.[27]

All student groups asked instructors to provide more frequent, more constructive and better feedback (Table 2). This is not a new finding to the field; some students request continuous affirmation of their performance,[28] and feel stressed when receiving criticism about their work.[19] Furthermore, students need to feel respected to value the feedback[29]; something that did not always seem to happen in our study, as fourth-year students asked instructors to be more empathic, accessible and not to correct mistakes in front of patients (Table 2). This result is in agreement with those of Elani et al.,[19] who have reported that the atmosphere created by the clinical faculty, as well as the relationship with professors and staff, was among the highest-ranked stressors for dental students.

In accordance with the results of previous studies and the expected preclinical-to-clinical transition 'shock of practice',[7] dental students tend to feel stressed.[3,6,14,19,30] Thus, the majority of the participating students in our study (≥58%) stated that the difference between simulation and clinical environments was a stressor in its own right. Instructors were also of the opinion that the differences between the two environments were stressful for the students, as expressed in their quantitative (Table 1 Q8) and qualitative responses (Table 3). Accordingly, the feeling of stress appears to be ever-present in dental education,[3] and inherent in the dental curriculum.[16,31]

In contrast to what most instructors thought, another source of external stress (as expressed by the students) was that sometimes the clinical staff provided conflicting feedback about the same work. In fact, most students (≥77%) believed this (Table 1 Q9), and it is in agreement with both the findings of a review by Elani et al.[15] and of a study by Collin et al.[16] that have stated that the inconsistency in the feedback delivered by the staff was faculty-related and acted as academic stressors, respectively.

In their qualitative comments, students also described other sources of external stress that were out of their control, such as the patients not complying with appointments for example. Similarly, other studies have previously reported that patients being late or missing their appointments were one of the top stressors for students.[16,24]

Regarding internal stress, most students (≥65%) claimed that the amount of clinical work affected them and that their low self-confidence also contributed to their stress. The latter claim was predominantly expressed by third-year (64%) and fourth-year (60%) students, when compared to fifth-year students (40%). This might indicate that seniors gain more confidence as they go through training, which is in agreement with the results of a previous study that has found that a lack of self-confidence occurred in a higher number of junior students, as compared to senior students,[32] and that the lack of self-confidence was among the highest stressors for them.[16,24] Similarly, instructors indicated that both issues (amount of clinical work and low self-confidence) contributed to all student groups' internal stress.

Interestingly, the individual student group qualitative comment analyses led to the identification of similar themes (Table 2). This indicates that the students' answers to the question 'Is there anything you would suggest to improve the preclinical-to-clinical transition?' revealed similar views about the issues they experienced in their training environments.

As in their questionnaire (Table 1 Q10), the fourth- and fifth-year students' qualitative comments expressed concerns regarding the high clinical requirements for them to pass courses. Similarly, a study by Polychronopoulou and Divaris[32] has found that the stress linked to the workload and the clinical training increased at higher level courses. Naidu et al.[33] and Collin et al.[16] have also reported that the completion of the clinical requirements acts as an important stressor for dental students. Furthermore, our fifth-year students requested to have free time for sports to be able to 'breathe"' which is in agreement with findings of previous studies reporting the students' lack of time for relaxation.[1,16,24]

The current study highlighted some key differences between the students' and the instructors' perspectives. Among the most surprising contrasts were those regarding the communication domain. Third-year students believed they were prepared to communicate with patients and their peers by using professional language; the latter being shared by their fourth-year peers. Furthermore, fourth- and fifth-year dental students found it difficult to communicate with their trainers by using professional language. However, their instructors reported the opposite in all these cases. Another significant contrast between the beliefs of the students and of their instructors was revealed on the issue of the students feeling stress when receiving different feedback from different trainers about the same work; students thought that this was stressful, while the clinical staff thought that it was not.

Our findings showed that many issues need to be addressed by the Dental School; thus, some interventions are being applied. Accordingly, and among other measures, the school has now implemented a compulsory stress management course focussed on how to deal and cope with stress, delivered for third-, fourth- and fifth-year students. In addition, the university provides counselling support for all students from Year 1 onwards.

Regarding students' difficulty in integrating knowledge and clinical practice, preclinical and clinical courses are currently including integrated clinical problem-solving cases, such as those presented by Banerjee and Thavaraj[34]; these clinical cases have now been uploaded to the university learning management system Canvas® (Instructure Inc., Salt Lake City, Utah, USA). Thus, students can now practice their diagnostic skills by solving the uploaded clinical cases. Furthermore, interactive preclinical and clinical videos of the most frequently performed procedures are being developed and uploaded to Canvas®. Video scripts developed by the same preclinical and clinical staff are serving as a basis to standardise the teaching and the assessment criteria, as suggested by our students. Additionally, we have initiated a pilot programme for third-year students within their semiology course, consisting of simulated patients that have been especially designed to foster students' communication skills. Likewise, another pilot protocol is being implemented to allow the students to practice their patients' clinical procedures beforehand, by using virtual and 3D-printed models mounted on phantom heads.[35] We believe that these and other interventions during and after the preclinical-to-clinical transition will improve the learning environment.

The current study has several limitations. Firstly, it was not possible to differentiate between male and female viewpoints due to the anonymous nature of the questionnaires; such an analysis could have provided a different perspective to our results, as a recent study has reported sex-based differences in stress and burnout among dental students.[16] Secondly, due to the same anonymity reasons, we do not know how the high-performing students have responded to the study's variables. Finally, the cross-sectional study design did not allow for an assessment of the implementation and of the effect of any possible intervention undertaken to improve the highlighted issues.

5 | CONCLUSIONS

The preclinical-to-clinical transition training at our school presents several challenges. Some of the problems highlighted by both students and clinical staff members persist along with the transition from third to fourth and even to fifth-year training and need to be addressed to improve the clinical environment student experience. Areas of improvement include the integration of knowledge into clinical practice, the gap between simulation and clinical practice, inconsistent feedback on student work among different instructors, the amount of clinical work to fulfil clinical

requirements and the students' low self-confidence when working with patients.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest. The data that support the findings of this study are available upon request.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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