A Typology of Dental Students According to Their Experience of Stress: A Qualitative Study

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Abstract: Dental students often report high levels of stress. Even though many studies have been conducted on this issue, we still lack a global understanding of how dental students experience and deal with stress, making it difficult for dental educators to improve this situation. Consequently, our study aimed to understand in a comprehensive manner how dental students experience stress. We conducted a qualitative research study based on in-depth one-on-one interviews with twelve recent graduates from a Canadian dental school. The interviews were recorded and transcribed verbatim. We then analyzed the transcripts in a process that included coding, displaying, and interpreting data. We identified three types of students: highly stressed, moderately stressed, and relaxed students. Relaxed students reported very low levels of stress, which they dealt with by using good coping skills. Moderately stressed students were more affected, but they considered stress as acceptable and even helpful as it pushed them to perform better and succeed. Finally, highly stressed students showed alarming levels of stress and described it as "crippling" and "unmanageable." They felt helpless and explained that stress had negative repercussions for their physical and mental health as well as their social life. They related stress to fear of failing, heavy workload, and difficulties in dealing with transitions in the curriculum and sometimes to difficult relationships with the academic staff. They dealt with stress by using poor coping skills. It is crucial to help highly stressed students by both reducing their sources of stress and helping them develop appropriate coping strategies.

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Keywords: dental education, dental students, stress, educational methodology

Submitted for publication 5/13/09; accepted 10/23/09

The term "stress" as it is currently used was defined in 1936 by Hans Selye as "the response of the body to any demand," while "stressors" are defined as the demands and pressures that lead to stress.[1] Dental students usually report very high levels of stress,[2,3] a phenomenon observed on all continents.[4-10] In Europe, for instance, a study conducted in seven dental schools observed that 36 percent of the students reported significant psychological distress.[10] The stressors encountered in dental school are well reported since much research has been done internationally identifying sources of stress.[5,7,8,10-17] The stressors in dental school are multifactorial, but are related to managing workload, developing positive relationships with faculty, and maintaining quality of life.[18] This situation creates a challenge for educators as stress experienced while studying has been observed to be detrimental to the educational process for dental students and other populations.[19-21] Also, stress has been linked to serious side effects such as emotional exhaustion, anxiety, or depression.[18] Furthermore, those side effects can lead to alcohol abuse, drug consumption, and even thoughts of suicide.[22-24] Consequently, providing a positive learning atmosphere for students and limiting the amount of stress they feel are increasingly aims for dental educators.[25] However, teachers and administrators in dental faculties lack information on how to achieve this goal. One of the reasons is that most research studies compartmentalize this phenomenon—whether focusing on the sources or the consequences of stress—and do not provide a holistic description of stressed students. In other words, stress is generally reduced to a series of variables that fail, providing a global understanding of dental students' experience of stress.

Qualitative methodologies, which seldom have been used to study dental student stress, are powerful means of understanding complex phenomena and perspectives on these phenomena.[26] These methodologies produce rich data to a depth that standardized questionnaires cannot reach. With respect to stress in dental school, qualitative methodologies could provide a deep understanding of students' experience of stress and give educators concrete and appropriate tools to help students cope with stress. Consequently, the objective of our qualitative research study was to understand in a comprehensive way how dental students experience and deal with stress.

Table 1. Demographic information on participants in study (N=12)

	Number
Gender	
Male	4
Female	8
Age (average 27 years)	
22–24 years	1
25–27 years	5
28–30 years	5
30+ years	1
Stress level (scale 1–10)	
Highly stressed (higher than 7)	5
Moderately stressed (between 4 and 7)	5
Not stressed/relaxed (less than 4)	2
Educational level (last level before entering dental school)	
College	5
College plus two years of university	1
Completed B.Sc.	6
Student status	
In province (Quebec)	6
Out of province	6
Living arrangements	
With parents	5
With roommate	3
Alone	4
Perceived academic performance	
Above average	4
Average	5
Below average	3
Expressed financial worries	
Yes	6
No	6

Methods

Between September 2006 and March 2007, one-on-one semistructured interviews were conducted with former dental students who had graduated from a Canadian dental school. The participants were not selected from the same cohort of graduating class, but ranged in graduation date from 2002 to 2006. The study was approved by the Institutional Review Board of the McGill University Faculty of Medicine.

This study was based on the principle of purposeful sampling strategy.[27] The participants had to 1) have graduated from a Canadian university with a dental degree, 2) have graduated between one and four years prior to the research, and 3) be in the region in which this university is situated. The principle of saturation was chosen to determine the sample size, which allows stopping new participant recruitment when the last interviews bring no new insight or information, suggesting that additional interviews will be unlikely to provide new information. We obtained saturation on the sources of stress and coping strategies with twelve participants (see Table 1).

The exploratory nature of this study made it possible to adopt numerous recruitment methods at various times for data collection. These methods included two emails sent out through class email lists, a snowball effect, and active enrollment of participants by phone calls. Interested graduates were initially informed about the study by email. Email addresses of past graduates were collected from previous class email lists collected by the principal investigator. Emails were sent out in September 2006 and January 2007. The first email received responses from three interested participants, while the second received another two responses. From these initial participants, the interviewees were asked to suggest fellow students to be interviewed. This process is called a snowball sampling, in which participants help find additional participants for the study.[28] The snowball sampling provided another three participants. At the end of the data collection, active enrollment was chosen to target more information-rich students by calling past students and asking them to join the study. From this approach, another four participants were enrolled, for a total of twelve.

All the interviews, which were semistructured and lasted between forty-five and ninety minutes, were conducted at the interviewee's home or a nearby coffee shop. At the beginning of each interview, the participant was briefed on the study's objectives, and

any questions or concerns were addressed. After the initial briefing, all participants were asked to sign the consent form approved by the Institutional Review Board.

The first draft of the interview guide was developed after two focus group interviews were conducted with fourth-year dental students. The aim of these focus group interviews was to explore ideas and develop hypotheses about students' perceptions of and experiences with stress and to prepare for the main data collection process. These focus groups allowed for the identification of the main stressors, various manifestations of stress, and coping strategies adopted by students. The individual interview guide, based on the results of the focus groups, was slightly modified during the interview process, as allowed by qualitative research methodologies.[26]

The final interview guide was divided into three themes: identifying stress, effects of stress, and dealing with stress. Each interview began with opening questions about stress in general, followed by more specific questions from the three themes in order to probe the participants for more information. For example, an opening question would be "Did you experience stress in dental school?" and a more probing question would be "What about the clinic caused you stress?" In addition, most follow-up questions were constructed during the interview in response to the answers and gestures of the participants by adapting to different response patterns. All interviews were audiotaped and transcribed verbatim. At the end of the interview, each participant was asked to fill out a confidential questionnaire soliciting demographic information. Finally, the participants' overall stress level while in school was rated by having them choose a number between 0 (no stress) and 10 (the most stress).

Content analysis of the interviews was performed using principles suggested by Denzin and Lincoln.[29,30] The analysis included debriefing reports, coding of the complete transcripts into themes and subthemes, and, finally, cross-analysis of the transcripts. Initially, short debriefing reports were completed after each interview in order to assess the overall effectiveness of the interview and to highlight the main themes mentioned.[31]

Following full transcription of the interviews, each transcript was coded using the computer software QSR NVivo 2.0. This coding process involved reading the text and classifying sections of the data into themes and categories. The categories and subcategories were linked by answering questions of the type "who, when, where, why, how, and with what consequences" conducted by deductive analysis.[32] Finally, relationships between the participants were cross-analyzed as recommended by Miles and Huberman for clustering by using matrices.[31] Using this technique, a typology of students at the program became apparent. Once the emerging relationships and patterns were observed, they were further tested through subsequent interviews and constant comparative analysis.[28]

Results

Three different types of students were identified in relation to how they experienced stress: five students were found to be highly stressed, another five students were moderately stressed, and two students were found to be relaxed and not stressed (see Table 2).

Highly Stressed Students

Highly stressed students all rated their stress 8 and above (on a 0–10 scale). The five participants in this group, however, were not homogeneous but fell into two categories: two struggling students and three perfectionists. The struggling students explained that they received academic or clinical marks below the class average and therefore were worried about their status in the program. The perfectionists consisted of students who seemed to be doing well but were highly critical of themselves. It did not matter whether these participants received average marks or even excelled in their studies; they wanted to do better and were not satisfied with their accomplishments.

All highly stressed students indicated that their experience studying dentistry was mostly a negative one as it was extremely stressful. They perceived the stress that they encountered as unmanageable, crippling, and excessive. As one said:

> HS8: The best way I can describe it is sort of like being in a pressure cooker. Like, you just feel like so much tension. You feel like you could just kind of like snap. And you just feel so much tension inside and you feel like it's just taking so much energy.

These students believed that symptoms of their stress manifested socially, physically, and even psychologically. Participants said that they stopped

Table 2. Typology of dental students according to their experience of stress

	Highly Stressed Students	Moderately Stressed Students	Relaxed Students
How they identify themselves	Two categories: • struggling students • perfectionists	Average students academically and clinically	Above average students clinically and academically
How they perceived stress in dental school	• crippling, distracting • unmanageable	• motivational • pushed them to succeed	• very little stress • caused no change in life
Manifestations of stress	• physical: gastric reflux, teeth grinding • mental: burnout, depression • social: no time for friends	• physical: fatigue • social: little time for friends and family	• none
Sources of stress (stressors)	• fear of failure • heavy workload • transition periods • difficult relations with academic staff (only for struggling students)	• workload • transition periods	• workload
How they cope with stress	• maladaptive coping skills: worrying, avoiding, wishful thinking	Mix of: • maladaptive coping skills: worrying, avoiding, wishful thinking • adaptive coping skills: extracurricular activities, support, control	• mostly adaptive: extracurricular activities, support, control

having a social life and had very little time for family and friends because they were afraid of their academic status and felt that they couldn't afford to "waste" time. Instead, they would spend their time studying. They also explained that they suffered more serious physical signs of stress, such as gastric reflux, graying of hair, and teeth grinding. One explained:

> HS4: But I'm not gonna forget that I was suffering from reflux and I almost had ulcers. You know, that's not normal for somebody who's been through other difficult times academically, nonacademically, and I've always been able to get through it. The effect that dentistry had on me and that fear that I always had—I don't think I imagined it. I think it was real.

Moreover, participants in this category thought that their stress had psychological repercussions, specifically burnout and, for one student, depression. The latter explained how depression runs in her family and how she was afraid to head towards depression, constantly worrying about her health and observing warning signs:

> HS8: At the same time you feel tired, you feel cranky, you feel whatever. And, you know, you don't really realize that all of that is to do with stress and you kind of look at that stuff and you think, "Oh, geez, am I going to end up getting depressed?" or something like that.

Both struggling and perfectionist students identified three important sources of stress while studying dentistry: fear of failure, workload pressure, and transition periods. Fear of failure was the most potent stressor for them: struggling students recalled how constantly afraid of failing they were and how vulnerable they felt. For instance, they thought that any mistake could cause them to fail the year. Although they were doing well, perfectionist students still had a fear of failure—more specifically, a fear of personal failure and not meeting their own expectations since they were critical of themselves and of their achievements.

Highly stressed students also identified workload as a major stressor—in particular, the need to finish their clinical requirements on time and do well on exams. They felt that they had too much to do

and that too much responsibility was on their shoulders. In addition to that, highly stressed participants mentioned that they were anxious during transition periods as they were unaware of what to expect. Their program, they explained, consisted of three distinct periods—medicine, preclinical dentistry, and clinical dentistry—and entering each new period brought stress and uncertainty. One said:

> HS4: Well, it wasn't really that you would fail, but they would just say that you had to meet these requirements. I never felt like, oh, if I don't meet my requirements, I'll pass. I always felt like I still have to do more. Until the last minute, I was still doing more, till the last days, you know?

A fourth stressor identified by struggling students but not by perfectionists was related to difficult relations with the academic staff. They thought that the academic staff was unresponsive and uncaring about their struggles and did not help them when they needed support. In the words of two students:

> HS8: And then in third year, you know, one of the things that I remember being so stressful about school was that there was a lot of things that we're responsible for. And so you had all of this weight on your shoulders but you sort of felt like your hands were tied as to what you could do about it. But yet the faculty was holding you accountable for it.

> HS5: I was probably very unlucky with the types of patients I got and that just, like, increased the stress level beyond belief. And there's times when you have to face stuff like this and you don't really know if somebody is listening to your complaints or actually kind of cares. You know, they're just looking at the numbers on those printouts and it's like, "Oh! You're in the lowest third as far as pullings, or for operatives. So can you please step up that?" And I think, "Yeah, sure, I'll start drilling my own teeth and I'll have the requirements."

Overall, highly stressed students felt powerless and consequently would worry about their problems instead of finding solutions to resolve them. Not only did they believe that nothing could be done to fix their problems, but they also showed poor coping skills in dealing with stress: they tended to use helplessness tactics like worrying, avoiding others, hiding from staff, and complaining. For example:

> HS8: It was the type of stress that, you know, if you could just go out and do something to fix your situation, then that would give you control and give you something productive to do. But it was the type of stress that there wasn't anything you could do about it and we tried not to think about it too much but that was basically the only thing you could do was just think about it.

> HS4: You know, I felt like I was being watched and I have to hide, I have to be a chameleon, I can't stand out, I have to just get out of here! Again, for me, I felt like what I had to do to sort of get through was to be invisible. That was sort of my ticket out. You know? Just try to be under the radar, get everything done, it's okay if they don't know your name.

Moderately Stressed Students

This group was comprised of participants who rated their stress level from 4 to 7 (on a 0–10 scale) and considered themselves as average or above average academically and clinically. All acknowledged that the program was stressful but manageable when the necessary focus was placed on studying and preparation. Respondents explained that the stress they encountered was not debilitating, but instead motivated them to excel. In the words of one:

> MS3: [Stress] pushed me to study when I didn't want to study. It drove—yeah, it pushed me to excel. I think that's one thing that was for me, that would help me. For other people, that same stress that said, "Well, maybe you're not good enough," then they'll actually, you know, give in.

The moderately stressed students identified workload pressure due to examinations and requirements as the most potent stressor, followed by transition periods. They explained that stress had an impact on their body and on their social life but, contrary to highly stressed students, none experienced serious psychological symptoms. For instance, they complained of having little time for family and friends, of physical fatigue, and of being unable to sleep because of stress. One explained:

MS5: Yeah. I [lived at home]. But it got to the point when you finished clinic, you were so drained both physically and emotionally, that you got home and you just didn't have the strength for it. So you just sat around for an hour or so, not necessarily being social with your family or anything like that, but just . . . you know? And then just go straight to bed.

Moderately stressed students exhibited a mixture of adaptive and maladaptive coping techniques. One of their potentially negative coping strategies was avoiding problems, especially when dealing with faculty. For instance, they explained that they were very reluctant to contact the academic staff when they needed help, but instead relied on their classmates. Among their positive coping techniques, they mentioned seeking support from family, friends, and classmates. They were also more optimistic and positive over things that they could not control and believed that, by working hard, they could successfully accomplish their goals. In the words of two students:

MS5: I tried to avoid dealing with faculty members as much as possible. I mean, I knew what they were gonna tell me, you know, "Go find more cases." So I did that on my own. If ever it got really to the point where I couldn't anymore and I needed their help, then, fine, I would go address that with them.

MS3: Well, for me, having good friendships with people in my class and the classes above me helped quite a bit. . . . Above me because that—they're all so, "Okay, expect that, don't worry about that, that will happen, or that person's—" [so] they put things more into perspective. And that was the biggest thing. When you were inside the situation, you tend to overblow things up. When someone comes and tells you, "Oh, he does that to everybody" or "She's mean to everybody," then you kind of go with the flow. So I think that's probably helped most.

Relaxed Students

Students identified as relaxed rated their stress level as 3 and below (on a 0–10 scale) and considered themselves to be average and above average academically and clinically. They explained experiencing very little stress while studying and considered their dental education as a fun and rewarding experience. They identified workload pressure as a stressor, but they believed that it was minimal and even a positive factor as it motivated them to excel. As one said:

NS6: I think if you put the time in, it wasn't anything overwhelming that someone couldn't do. As long as you put the time in, things were fine. The same with the requirement, as long as you kept up with the patients, made sure your patients were booked. You know, I didn't find any time constraint or anything like that.

Relaxed students had mostly adaptive coping skills when dealing with stress and reported lots of support from friends, family, and faculty. In comparison to the moderately stressed students, who received most of their support from peers, relaxed students had a large network of support from faculty. It should be noted that they had a great rapport with staff and would ask them for advice as colleagues. As well, participants in this category participated in many extracurricular activities: they were the only ones to consistently and regularly continue activities such as jogging or going to the gym. One explained:

NS9: And the other thing is that I felt that I had a lot of support around me with friends and students and . . . as well as faculty. And I think that there's some students that didn't have the faculty support that I had that made it easier for me and they felt more at risk and more targeted. And I didn't have those issues so I . . . so that would definitely have added stress.

Discussion

This study is highly original in that it addresses the issue of stress in a comprehensive manner. Our typology of students, which refers to Weber's notion of ideal type,[33] reveals that students from the same dental school experience stress in contrasting ways: whereas one group of relaxed students truly enjoy studying dentistry, another group shows alarming levels of stress and, furthermore, an inability to deal with it.

Before discussing the results in more detail, it is noteworthy to mention that this study reflects the views and perceptions of a small number of par-

ticipants, even though the sample size is appropriate considering our methodological approach.[26] Indeed, sampling strategies in qualitative research are based on the principle of "purposefully" selecting "information-rich" cases that will provide in-depth data. In our study, we selected participants according to their experience of stress and their ability to express their perspectives. This allowed us to identify three types of students and describe with much depth their experience of stress in dental school. We should also mention that generalizations from our data need to be drawn very carefully, as is the case for most qualitative studies, which are not based on random samples. The data were obtained from dental students in one Canadian city and may not apply to other educational or cultural contexts. For instance, the dental school that was studied offers a four-year program that is very dense and is divided into three parts: the first 1.5 years are devoted to the basis of medicine, followed by half a year of preclinical dentistry, and the last two years mainly focus on clinical dental work. In schools with longer programs (five or six years), the workload may be lighter and the stress experienced by students different.

Finally, our study was retrospective and relied on the participants' memory. Even though the participants had vivid recollections of their experiences and were eager to share them, especially in the highly stressed group, we cannot exclude the possibility that some might have forgotten certain events. This potential memory bias may have occurred in the non-stressed participants, who may have forgotten some stressful situations. Consequently, further research should adopt a prospective design in order to avoid this possible bias.

Out of the three groups of students identified, two had manageable stress levels and dealt with stress in a healthy way. The relaxed students believed they had control during their dental education and were not overwhelmed. Numerous studies have found that perceived personal control helps individuals cope during stressful situations.[1,34-36] In contrast, the moderately stressed students were able to cope by utilizing stress as a motivational tool to excel. Only the highly stressed students had stress levels that detrimentally affected their physical, social, and mental health. Although the proportion of students that fall into this category is unknown, since that was not the purpose of our study, our results found that there are enough students to warrant serious attention.

For any dental program to help its students with stress, academic and support staff must start by asking a few questions. First, who are the students who are unable to cope with dental school stress? This study indicates that highly stressed students are divided into two categories: struggling students and perfectionists. It is important to note that previous studies have shown a link between low class rank in dentistry and emotional and adjustment problems.[37] As well, data are available on the link between perfectionism and stress in other populations,[38-40] although there is none between dental school stress and perfectionism. Although it is relatively easy to identify students who are struggling, it is harder to identify perfectionist students as their marks may be average or above average.

The second question that dental faculty members need to ask is this: why are these students stressed? Our study identified several stressors related to dental school as well as poor coping skills of some students. Stresses due to workload, fear of failure, transition, and difficult relationship with academic staff have been identified in various contexts.[5,7,8,10-17] Previous research has also suggested that students with poorly developed coping strategies were inept in handling dental educational stress.[1,3,22]

The final and crucial question is how to help stressed students. Two main strategies could be used concurrently: 1) decrease the stressors and 2) help students to better cope with stress. The first strategy includes several actions, among which reducing fear of failure and workload pressure due to examinations and requirements would be of high importance. As it may be somewhat unrealistic to reduce the content of dental curricula, faculty members should question the way they are designed.[41] For instance, faculty members should consider lowering or even eliminating clinical requirements as a prerequisite to pass. A study conducted by Dodge et al. found that, in a clinical program driven by patient needs compared to a requirement-driven curriculum, students not only showed lower levels of stress but also higher productivity and academic performance.[42] Faculties may also consider increasing the length of their curricula so as to lower students' workload and reduce their fear of failure.

In regard to stress caused by uncertainty during transition periods, dental faculties should schedule information sessions between the students and their classmates from the year ahead, as it has been shown that upper-year classmates represent a good source of information to students.[37]

Improving the relationship between dental students and educators should also be a priority. Indeed,

struggling students in our study felt helpless in not knowing how to improve, and studies have shown that inconsistent feedback from instructors is stressful and may be linked with fear of failure.[19,43,44] Consequently, academic staff needs to provide regular and in-depth feedback to struggling students and work with them to define clear strategies and methods for how to improve. More generally, we believe that dental students need to be nurtured and considered as full members of the dental care team. Therefore, we recommend that dental educators make strong efforts to empathize with their students and make them feel appreciated. Engaging with them in social or sporting activities may be a good way to develop this team spirit.

The second strategy—helping students better cope with stress—is also very important as it may help them in their future professional activities as well. As Kay and Lowe suggest, dental faculties should implement stress management and wellness courses for their students.[45] Topics such as coping with stress, time management, and choosing realistic goals could be addressed. As well, overall wellness should be emphasized by discussing the importance of sleep, diet, exercise, and other stress relievers like yoga and meditation. Positive outcomes have been observed among dental and medical students in previous studies, and we believe that these could be replicated in different contexts.[22,46-48]

Conclusion

Highly stressed students represent an important problem for dental faculties. We urge dental schools to address this issue by both reducing the sources of stress and helping students to better manage stress.

Acknowledgments

The authors are very grateful to all of the participants who helped in this study. We would also like to thank some members of the faculty and students who helped shape this study, namely, Drs. Jeffrey Myers, Marie Dagenais, Tamara Finkelstein, Melanie Gilbert, Darcy Mclelland, Nicole Nicolas, Anthony Seminara, and James Tucci. We also want to thank the McGill University Faculty of Dentistry and the Canadian Institutes of Health Research Training Program in Applied Oral Health Research (CIHR-AOHR) for their generous financial support. Finally, we would like to dedicate this article to the loving memory of Dr. James Lund. Not only did Dr. Lund support and encourage this research project while he was Dean at the Faculty of Dentistry, but the project was, in fact, his idea. We at the Faculty miss him very much.

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