

# Canadian dental students' perceptions of stress and social support

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dental; education; psychological; social support; stress.

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## Abstract

This study explored the relationship between dental school stress and social support reported by undergraduate students in a Canadian dental school. Students completed questionnaires comprised of Dental Environment Scale stress items, social support measures evaluating perceived contact and two proxy measures of social support (marital status and living arrangement). Sixty-two per cent of undergraduate students in all four academic years participated in the study conducted in March–April 2005. Second-year students living with parents had significantly higher adjusted total stress scores ( $P < 0.001$ ), whilst fourth-year students living with roommates had significantly lower total adjusted stress scores ( $P = 0.008$ ). Social support systems utilised by students included teacher, parental, student and relationship support. Students who received more support from teachers and from students inside and outside dental school had lower adjusted total stress scores. Multiple regression analysis assessing the effect of social support on total adjusted stress scores identified two significant variables after adjustment: second-year students living with parents ( $P < 0.001$ ) and low teacher support ( $P = 0.032$ ). This study identified social support and proxy measures as significant predictors of dental school stress in Canadian dental students. Further studies are needed to elucidate the role of social support and proxy measures as potential dental school stress alleviators.

Dental schools are undoubtedly stress-ridden environments. A plethora of studies demonstrate the ubiquity of dental school stress using the widely used Dental Environment Scale (DES) (1–6). However, few studies have moved beyond identifying recognised stressors including academic pressures (6, 7), financial concerns (8) and social problems (2).

The salutogenic stress model marks a departure from stressor-focused research (9). This model emphasises health promoting and individual strengths that abate the harmful effects of stress. Salutary factors include coping style, sense of coherence and social support (10). Social support refers to interpersonal relationships, which provide material or psychological resources enhancing an individual's stress coping capacity (10). Examples of resources include emotional support (e.g. empathy and encouragement), informational support (e.g. advice) and instrumental support (e.g. financial aid). Researchers postulate that social support exerts a positive effect on health by acting as a buffer in already stressed individuals (11). A stressful event can become less threatening once an individual receives resources from others. An alternative thesis is that social support improves health regardless of stress status by providing networks that influence health behaviours such as exercising, healthy-eating or smoking cessation (12).

Few studies have evaluated social support as a dental school stress alleviator (13, 14). Stecker (13) investigated stress and social support in U.S. physical therapists, pharmacists, dental, medical and nursing students. Dental students had the highest mean stress scores and the second lowest social support scores amongst student professions. This study was limited, assessing general academic stress (e.g. coursework and school performance) rather than dental student-specific stressors. Stecker (13) also regarded social support as a single entity and made no distinction between different social support providers. However, a meta-analysis of the social support and health outcome literature showed that certain social support providers were more beneficial than others (15).

Goldstein (16) defined five social support spheres: the personal zone (close relations and intimate friends); the intimate zone (other persons of emotional import); the effective zone (instrumental work or school connections), the nominal zone (known but distant associates) and the extended zone (recognisable faces). Goldstein (16) used this conceptualisation to measure social support, academic performance and anxiety/depression in 63 first-year dental students. Male students' academic scores were positively correlated with emotional support provided by close family and confidants (personal zone) and

instrumental support (such as task assistance) from intimate zone members. Female students' academic scores were positively correlated with only personal zone instrumental support. Females reporting low emotional support from close relations and friends also have higher depression and anxiety scores.

Other studies have investigated social support indirectly using living arrangement and marital status as proxy measures of social support (17–19). These studies suggested that the home environment (Goldstein's (16) personal and intimate zones) offered some protection against dental school stress. Musser and Lloyd (18) found in a cross-sectional study of 298 U.S.-dental students that male-married students had the lowest reported total mean stress score whilst never married females had the highest stress scores. Similarly, students residing with parents had the lowest stress scores whilst students living with other students had the highest stress scores. These differences were not significant.

In relation to Goldstein's (16) effective zone, Burk and Bender (20) provided evidence of social support inside dental school. Their cross-sectional study of 97, first-year dental students showed that informal peer support was the most frequently used and most effective support system utilised by 80% of students. Interestingly, only 40% of students approached faculty advisors, who were also deemed the least effective support system.

We found no studies that evaluated dental school-specific stress and social support concurrently. The objectives of this study were (i) to measure dental school stress and social support and (ii) to assess the effect of social support and its proxy markers (marital status and living arrangement) on dental school stress.

## Methods

All two hundred and seventy-five enrolled undergraduate dental students were asked to complete an anonymous dental-year-specific questionnaire at the end of whole-year class lectures in March–April 2005. The researcher (VM) distributed the questionnaires with the agreement of the lecturer during the last 10 min of classes. The researcher addressed the whole class, explained the purpose of the survey and questionnaire, the research procedures, and risks and benefits. To avoid any coercion, students received questionnaires with envelopes. Students who chose to participate in the study completed the questionnaire and returned it to the Class President in the sealed envelope on leaving the class whilst students who opted not to participate returned the blank questionnaire in the sealed envelope. Neither the lecturer nor the researcher were present whilst students completed the questionnaires. Questionnaires were comprised of the following measures.

## Stressors

Stress questions included social, academic and patient-related stress items taken from the 37-item Dental Environment Scale (DES) (3) and 16-item DES (DES16) short form (17). First- and second-year questionnaires included the DES16. The DES16 short form is more applicable to first- and second-year

dental students excluding questions related to clinical practice. The original 37-item DES was used in third- and fourth-year students' questionnaires (3). Social stress DES items assessed marital, relationship, family roles and child-rearing stressors. We removed one-stress item from the 37-item DES related to male attitudes towards female students at the request of the University Research Ethics Board to avoid any gender bias.

Both DES and DES16 use a four-point likert response scale ranging from 1 (not stressful) to 4 (very stressful). The DES and DES16 have psychometric properties including excellent internal consistency (Cronbach's alpha = 0.92) (17).

## Social support

Social support questions were taken from a survey of first-year medical students' perceptions of social support (21). Students were asked to report on the amount of social support received from five sources: students during the course (internal student social support), students outside the course (external student social support), support from teachers (teacher support), support from their parents (parental support) and support from their relationship (relationship support). The five social support items were scored on a four-point likert scale (1 = not true at all, 2 = not quite true, 3 = fairly true and 4 = totally true).

## Living arrangement and marital status

Questionnaires also collected information about students' term-time living arrangements (parents, other family members, partners, roommates/friends, alone or other arrangement), marital status (single, married, separated/divorced/widowed or 'in a long-term relationship') and demographic data (age, gender and year of study).

The University Research Ethics Board and Faculty scientific review panel approved this study.

## Data analysis

Data were analysed using Statistical Package for Social Sciences (SPSS) version 12. Summing the 16- and 36-item DES scores produced a total stress score. We then adjusted total stress scores to control for the different number of items in pre-clinical (first and second year) and clinical (third and fourth year) student questionnaires. We analysed social support scores as five discrete social support variables. Data analyses included frequency distributions, *t*-tests, one-way ANOVA, Pearson's correlations and multiple linear regression analysis. Statistical significance was set at  $P < 0.05$ .

## Results

One hundred and seventy-one questionnaires were returned completed representing a 62% response rate. The response rates for first-, second-, third- and fourth-year students were 57%, 74%, 56% and 59% respectively. Fifty-eight per cent of responders were female which is consistent with faculty statistics, which showed that 53.6% of enrolled undergraduate dental students were female. The mean age of the sample was 24.6 years (SD = 2.1); ages ranged from 21 to 32 years.

Approximately 60% of students were single. Thirty-one per cent of students resided with their parents during term time.

Table 1 shows the mean stress scores for academic, social, patient-related and adjusted total stress scores by gender, academic year, marital status and living arrangement. One-way ANOVA analyses showed that adjusted total stress scores were significantly associated with academic year ( $P < 0.001$ ) and marginally non-significantly associated with living arrangement ( $P = 0.06$ ). Dichotomising the 'students living with parents' variable showed that students living with parents had statistically significantly higher stress scores than students living in other abodes ( $P = 0.005$ ).

We created new interaction variables to further explore the interaction between academic year and living arrangement. Univariate analyses of new variables identified two significant interaction variables. Fourth-year students living with roommates had significantly lower stress scores compared with other dental students and living abodes ( $n = 11$ ,  $P = 0.008$ ) whilst second-year students living with parents had significantly higher stress scores ( $n = 22$ ,  $P < 0.001$ ).

Table 2 shows the mean social support scores for the five support categories. Students reported that they received the most social support from their parents and the least from their teachers. Male and female social support scores were comparable. Pearson's correlations (not shown) showed that students who reported receiving more teacher support and support from students inside and outside dental school had statistically lower adjusted total stress scores (teacher support:  $r = -0.27$ ,

$P < 0.001$ ; internal student support:  $r = -0.18$ ,  $P = 0.02$ ; external student social support:  $r = -0.27$ ,  $P < 0.001$ ).

Multiple linear regression analysis identified adjusted total stress score predictors. We entered five variables into a multiple linear regression model, which included the statistically significant social support measures identified from Pearson's correlations and the two academic year  $\times$  living arrangement interaction variables (fourth-year students living with roommates and second-year students living with parents). The final adjusted model shown in Table 3 showed that two variables remained statistically significant predictors of dental school stress after controlling for other variables: second-year students living with parents ( $P < 0.001$ ) and low teacher support ( $P = 0.032$ ). This model explained 16.2% of the variance in adjusted total stress scores.

Further analysis of correlations between individual DES stress items and teacher support showed that teacher support was significantly correlated with DES stress items related to assigned classwork ( $r = -0.23$ ,  $P = 0.003$ ); lack of time for relaxation ( $r = -0.23$ ,  $P = 0.002$ ); course difficulty ( $r = -0.22$ ,  $P = 0.004$ ); course failure ( $r = -0.18$ ,  $P = 0.02$ ); personal physical health ( $r = -0.19$ ,  $P = 0.01$ ) and dental student rule breaking ( $r = -0.16$ ,  $P = 0.04$ ).

## Discussion

This study used the widely utilised DES, allowing comparison of these results with previous study findings. The highest rank-

TABLE 1. Mean stress scores by gender, academic year, marital status and living arrangement

	<i>n</i> (%)	Mean adjusted academic stress score (SD)	Mean patient-related stress score (SD)	Mean social stress score (SD)	Mean adjusted total stress score (SD)
<b>Gender</b>					
Females	99 (58.2)	68.1 (13.3)	25.8 (4.8)	4.5 (2.7)	127.9 (23.5)
Males	72 (41.8)	65.2 (16.6)	23.9 (5.0)	2.5 (0.3)	121.4 (30.1)
<i>P</i> -value		0.23	0.12	0.23	0.12
<b>Year of study</b>					
First	40 (23.4)	65.3 (16.6)	–	4.1 (2.5)	120.2 (30.2)
Second	50 (29.2)	72.6 (14.4)	–	4.0 (2.8)	131.8 (27.3)
Third	41 (24.0)	69.9 (11.9)	27.9 (3.8)	4.7 (3.2)	135.2 (20.8)
Fourth	40 (23.4)	58.4 (10.5)	22.9 (4.9)	4.7 (2.1)	114.4 (19.1)
<i>P</i> -value		<0.001	<0.001	0.51	0.001
<b>Marital status</b>					
Single	101 (59.1)	67.3 (15.1)	25.5 (4.9)	3.9 (2.4)	124.8 (26.4)
Married	19 (11.1)	62.2 (15.6)	23.1 (5.1)	6.0 (2.3)	123.3 (28.5)
'In a relationship'	51 (29.8)	67.9 (13.7)	25.0 (4.8)	4.4 (2.9)	126.7 (26.3)
<i>P</i> -value		0.33	0.44	0.006*	0.87
<b>Living arrangement</b>					
Parents	53 (31.0)	72.4 (14.7)	26.6 (3.8)	4.0 (2.5)	133.7 (24.5)
Other family members	6 (3.5)	60.6 (10.8)	23.0 (3.0)	5.8 (2.6)	121.0 (18.5)
Partner	24 (14.0)	64.5 (15.9)	23.6 (5.5)	5.7 (2.5)	125.4 (29.4)
Roommates/friends	52 (30.4)	64.9 (13.9)	24.0 (4.8)	4.4 (2.9)	121.9 (26.2)
Alone	36 (21.1)	64.2 (14.3)	25.9 (6.4)	3.4 (1.9)	118.0 (26.8)
<i>P</i> -value		0.03	0.31	0.007 <sup>†</sup>	0.06

\**Post hoc* Bonferroni test for social stress: married > single;  $P = 0.005$ .

<sup>†</sup>*Post hoc* Bonferroni test for social stress: roommates > alone;  $P = 0.008$ .

TABLE 2. Mean social support scores

Mean internal student support (SD)	2.31 (0.69)
Mean external student support (SD)	1.72 (0.89)
Mean teacher support (SD)	1.28 (0.86)
Mean parental support (SD)	2.41 (0.78)
Mean relationship support (SD)	1.53 (1.30)

ing stressors were academic stresses in concurrence with other studies (7, 19). However, the mean DES stress item scores for examination and grades in this study exceeded mean scores from previous studies (1, 4), suggesting that students in this sample were significantly burdened.

Students living with parents had higher stress scores compared with students in other living abodes. This contrasts with previous studies which showed students living with parents had non-significantly lower stress scores (17, 18). Our analysis of living arrangement and academic year interactions indicate that the effect of living abode on stress was dependent on academic year. Second-year students living with parents had higher stress scores whilst fourth-year students living with roommates had lower stress scores. One could surmise that students in the fourth and final year benefit from established supportive relationships provided by shared student living environments. The fact that fourth-year students living with roommates did not remain a significant predictor of total stress after controlling for social support variables adds further credence to this notion. This result also confirms the importance of social support from members in Goldstein's two proximal zones. The second-year students living in parental households interaction variable still remained in the model after adjustments. Second-year students living with parents may be a vulnerable group of students. Students could be academically isolated whilst living in parental households and further challenged by the transition into the clinical programme and the increasing workload. The total number of hours of instruction at this dental school increases from 814 h for first-year students to 1005 h for second-year students (22). Although the second-year students living in parental households variable were significant predictors of total stress, second-year students living with their parents represented only a small group of students. Conceivably, these students might have suffered from psychological disturbances not captured by our research instruments. The inclusion of a psychological well-being measure in the questionnaires such as the Brief Symptom Inventory or General Health Questionnaire

might have provided a psychological explanation for the stress vulnerability of this group of dental students.

Low teacher support was the only significant social support predictor of dental school stress after adjustments. Analysis of individual DES stress items showed that teacher support scores were associated academic DES stress items as expected. A more surprising finding was the significant association between high teacher support and less personal physical health stress. How teacher support affects student's physical health remains uncertain. Several studies show high smoking rates, alcohol excess and substance drug reported by European dental students (23–25). Perhaps teachers provide informal personal support to students, issuing guidance on how to avoid physically detrimental coping behaviours such as smoking and drug use. Some dental schools in the UK and USA have introduced personal tutor schemes in recognition of the importance of teacher support addressing pastoral issues and health-related problems. Personal tutors meet with students on a sessional basis to review student's progress and to discuss issues such as study skills, clinical difficulties, time management, personal relationships, financial problems, mental health issues, drug and alcohol problems and family crises (26). The benefits of staff support schemes included improved academic performance, increased student morale and motivation, reduced student drop-out rates and less psychological distress (27, 28). Further studies are needed to elucidate the relationship between teacher support and physical health and wellbeing.

This study had several shortcomings. First, one must be cautious about extrapolating the inferences about living arrangements to dental schools in other countries because the living conditions of Canadian students may be localised. Second, we used a relatively crude 'contact' social support measure unlike Burk and Bender (20) who measured the perceived effectiveness of social support. Furthermore, the five-item social support measure used in this study was previously used by Kiessling et al.'s (21) study of medical students with the items grouped into two categories representing social support inside and outside the university. We decided to retain the social support items as five distinct categories because of the low Cronbach's alphas reported in this study, which suggested five discrete social support items rather than a single social support scale. However, we recognise the limitations of using single-item measures rather than multi-item scales which preclude the assessment of internal consistency reliability (29). Moreover, we did not assess the validity of our five-

TABLE 3. Multiple linear regression model for predicting total adjusted stress scores

Variables	Unadjusted beta co-efficient	P-value	Adjusted beta co-efficient <sup>1</sup>	P-value
Internal student support	-0.175	<0.001	-0.059	0.46
External student support	-0.274	<0.001	-0.139	0.098
Teacher support	-0.270	<0.001	-0.169	0.032
Fourth-year students living with roommates (1)	-0.173	0.023	-0.124	0.082
Second-year students living with parents (1)	0.289	<0.001	0.248	<0.001

<sup>1</sup>R<sup>2</sup> for final multiple linear regression model = 0.162.

social support items. Future studies using this social support measure should include validated social support measures such as the Social Support at University Scale to assess its concurrent and convergent validity (30). A third shortcoming is that the social support measure used in this study did not assess social support from friends other than students which is an important source of social support in Goldstein's (16) personal and intimate zones. We did not adopt Goldstein's (16) approach and assess the different types (e.g. emotional, informational or instrumental support) offered by social support providers. Finally, one cannot conclude from this cross-sectional study that social support actually reduces stress amongst dental students. Longitudinal studies following students' progression through academic years and studies assessing different social support types could further elucidate the relationship between social support and dental school stress. In conclusion, this study identified social support and its proxy measures as significant predictors of student stress in Canadian dental students. Further research should include explicating the possible benefits of social support provided by teachers and exploring the role of students' home environments.

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