EDUCATION
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ORIGINAL ARTICLE

Coping strategies and chiropractic student perceived stress

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Objective: To investigate coping strategies adopted by chiropractic college students and how these strategies affect student-perceived stress levels.
Methods: Four hundred seven (407) 1st-quarter students were recruited during 2014 and 2015. The validated Brief COPE inventory was used to assess coping strategies during the 1st week of classes. Perceived Chiropractic College Stress (PCCS) was assessed via a modification of Vitaliano Perceived Medical School Stress survey instrument. The modified coping instrument was administered during the 1st quarter (PCCS1) and 6 months later during the 3rd quarter (PCCS2).
Results: Mean perceived stress levels were greater after 6 months. Although perceived stress increased more for females than for males over that period, it was not statistically significant. Male and female coping strategies differed only in the preferential use of emotional support by females. Students generally adopted active coping strategies (eg, active coping and planning) rather than avoidant strategies (eg, substance abuse). Regression analysis revealed a moderate positive relationship between avoidant-emotion coping and PCCS1 with a weaker positive correlation between problem-focused coping, sex, and PCCS1. Avoidant-emotion coping also demonstrated a moderate positive correlation with PCCS2. Neither sex nor the 3 coping strategies were predictors of PCCS change (PCCS2 – PCCS1).
Conclusion: This study is a starting point for exploring the relationship between perceived stress and coping behaviors in a chiropractic training institution. Students generally used healthy adaptive coping strategies with minimal sex differences. Avoidant-emotion coping appears to be a reliable predictor of PCCS, with sex being a poor predictor.

Key Indexing Terms: Stress; Coping; Chiropractic; Education

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INTRODUCTION

Stress is considered to be "any factor, acting internally or externally, which makes adaptation to the environment difficult, and which requires increased effort on the part of the individual to maintain a state of equilibrium between himself and the external environment."[1] According to Phillips,[2] "Perceived stress is the feelings or thoughts that an individual has about how much stress they are under at a given point in time or over a given time period. . . . It is not measuring the types or frequencies of stressful events which have happened to a person, but rather how individuals feel about the general stressfulness of their life and their ability to handle such stress."

Stress in health-profession training has been the subject of many studies. High stress levels have been reported in students of medicine,[3] dentistry,[4] pharmacy,[5] and chiropractic.[6] It has been suggested that psychological distress among students may adversely influence their academic performance,[7] contribute to academic dishonesty,[8] and play a role in alcohol and substance abuse.[9] Students' stressors may include the pressure of expectation to succeed, an uncertain future, difficulties integrating into the system, social, emotional, and physical problems, family problems,[10,11] and college examinations.[12] Student stressors are commonly grouped into 3 broad categories: academic pressures, social issues, and financial problems.[13,14]

When experiencing stress, individuals often develop behavior patterns intended to reduce the impact of stressors.[15] These behavior patterns are referred to as coping strategies, and these have also been the subject of extensive psychological research.[16] Students may develop positive coping strategies such as positive reframing, planning, and seeking support, but they may also develop destructive strategies such as self-blame, denial, the consumption of alcohol, tobacco use, or illicit drugs.[3,17–19] Although coping response specifics vary across individuals, researchers attempt to group similar strategy types into categories. An influential and widely used coping taxonomy proposed by Lazarus and Folkman[20] contrasts coping strategies within 2 dimensions: problem-focused

and emotion-focused. Strategies in the problem-focused dimension are efforts that are intended to modify or reduce the stressors. Consequently, the problem-focused coping dimension requires that the stressor can be managed. Carver[21] reported that problem-focused coping had a beneficial biological effect on the individual's stress response, lowering cortisol levels and promoting recovery from the stress.

Coping strategies in the emotion-focused dimension attempt to regulate emotional impact by either active or avoidant behaviors.[22] Active-emotion strategies attempt to manage the emotional response when confronting unpleasant stressors. This coping strategy is particularly useful when the stressor is beyond an individual's control, such as the death of a loved one or when confronted by terminal illness.[23–25] Avoidant-emotion (escape) strategies involve avoiding thoughts and emotions associated with unpleasant stressors rather than managing the emotional response. This strategy is also used when the stressor is beyond an individual's control.

It is frequently concluded that problem-based coping is good and emotion-based coping is bad. But this distinction can be misleading. Emotion-focused coping strategies may not be maladaptive.[21] As noted, they can be uniquely effective in the management of stress associated with unchangeable stressors, particularly when they facilitate expressing and processing emotions.[25–27] Although avoidant-emotion strategies are maladaptive if they magnify the initial stress and produce additional stressors, they can also be adaptive by allowing manageable threat recognition, understanding, and response preparation.[28,29]

Investigators have reported that students enrolled in chiropractic training programs experience elevated levels of stress,[6,30] depression,[6,31,32] and test anxiety.[33] In an earlier publication from this same data set, we reported that students' Perceived Chiropractic College Stress (PCCS) increased 18% after 6 months in the training program, but sex was not a statistically significant predictor.[6]

To our knowledge, only 1 study has examined the coping strategies used by chiropractic students.[34] We believe that an understanding of the various coping strategies used by students in response to PCCS is needed to determine appropriate curriculum modifications and to inform efforts to help them manage stress, enhance their sense of wellbeing, and facilitate learning. Therefore, at our college, we examined students' PCCS, the coping strategies used, and how these strategies might correlate with PCCS. In this report, we evaluate 3 hypotheses. Coping strategies identified at the beginning of the chiropractic training program will predict student PCCS:

(1) at the beginning of the training program (PCCS1),

(2) after 6 months in the program (PCCS2), and

(3) change after 6 months in the program (PCCS2 – PCCS1).

In addition, we explore possible sex-dependent effects for these hypotheses.

METHODS

Study Participants

Prior to implementation, the study protocol was reviewed and approved by the Palmer College of Chiropractic, Institutional Review Board (assurance # X2014-1-8-Z). Four hundred sixty-one students in our quarter-based system, 4 quarters/academic year, all 1st-quarter students across 8 consecutive classes were invited to participate during the 2014 and 2015 academic years. Invited student participants were provided with a verbal explanation of the investigation, including the aims and objectives, and were informed that they could withdraw from the study at any time without punitive consequences. Data from fully completed surveys were entered into an Excel (Microsoft Corp, Redmond, WA) spreadsheet using a double-data-entry method.

Perceived Stress Assessment

As reported previously,[6] perceived stress in the chiropractic training program was assessed via a modification of Vitaliano Perceived Medical School Stress (PMSS) survey.[35,36] The PMSS is the most widely used, validated assessor of perceived stress in medical educational programs.[37–39] It consists of 11 items focusing on 4 areas[36]: (1) Medical school curriculum and environment, 5 items; (2) Personal competence/endurance, 4 items; (3) Social/recreational life, 1 item; and (4) Finances, 1 item. All items are rated on 5-point Likert scales (0 = strongly disagree, 1 = disagree, 2 = neutral, 3 = agree, and 4 = strongly agree) with total instrument scores ranging from 0 to 44. The mean instrument score (0 to 4) is calculated by summing all items and then dividing by 11. Higher scores indicate higher level of stress. We modified the PMSS by replacing the word "medical" in all survey items with the word "chiropractic" to produce a PCCS survey. All 1st and 3rd quarter chiropractic students received this modified stress assessment via unmarked envelopes that were distributed during the 1st week of their respective quarters in the 2014 and 2015 academic years. Students completed the surveys and returned them to the course instructor during subsequent class meetings. Observed PCCS levels for students in this study have been reported previously.[6]

Coping Strategy Assessment

In the 1st week of the 1st quarter of 2014 and 2015, the Brief COPE survey (B-COPE) was distributed to the same students in unmarked envelopes and returned as above.[22] The B-COPE is a validated inventory that is widely used to identify the behavioral strategy individuals use to cope with stress. Individuals indicate their typical response for each of 28 behaviors in a questionnaire via a 4-point scale: 1 = "I haven't been doing this at all," 2 = "I've been doing this a little bit," 3 = "I've been doing this a medium amount," and 4 = "I've been doing this a lot." These 28 B-COPE items are collapsed into 14 coping behavior subscales (2 items per behavior) and are then grouped into 2 broad coping categories (problem-focused coping and emotion-focused coping). Emotion-focused coping is further subdivided into active-emotion, and avoidant-

Table 1 - Study Demographics, $n = 461$ (sum of participating + nonparticipating)

	Participating Student Count, n = 407 (%)	Nonparticipating Student[a] Count, n = 54 (%)
Sex		
Male	248 (61)	36 (66)
Female	159 (39)	18 (34)
Race/ethnicity		
Caucasian	305 (75)	40 (74)
Black	60 (15)	7 (13)
Hispanic	12 (3)	6 (11)
Other	30 (7)	1 (2)
Age, y		
<30	353 (87)	45 (83)
30–40	47 (11)	7 (13)
>40	7 (2)	2 (4)
Degree		
Bachelor	386 (95)	49 (91)
Graduate	21 (5)	5 (9)

[a] Nonparticipating students are those who did not consent to participate in this study. Only aggregate demographic data were obtained for these students.

emotion substrategies. Problem-focused coping is expressed by 4 behaviors: active coping, planning, instrumental support, and religion. Emotion-focused coping is expressed by 10 behaviors: 5 active-emotion behaviors: acceptance, emotional support, positive reframing, venting, and humor; and 5 avoidant-emotion behaviors: self-distraction, denial, behavioral disengagement, self-blame, and substance use.[22] The problem-focused and emotion-focused substrategies are generally used in combination.

Usage ranking across the 14 coping behavior subscales was determined by ordering them according to the mean reported usage points across all participants (8 points maximum per subscale). The highest use rank (rank 1) was given to the highest usage score for the given coping behavior. The mean reported usage score was obtained by summing the reported points for each of the 14 behavior subscales across all participants and dividing each of these sums by $n = 407$.[19,40]

Data Analysis

Data were plotted to reveal underlying distribution patterns and identify outliers. We then summarized and analyzed our data using the statistical computing environment R (version 3.4.1, Vienna, Austria). Both zero-order correlation and linear regression analyses were performed. Statistical test assumptions were evaluated, standardized effect sizes and 95% confidence levels were calculated. Study hypotheses were evaluated at a .05 family-wise α level.

RESULTS

Demographic Information

Out of 461 students, 407 completed and returned the questionnaire, giving an overall response rate of 88.3%. The demographic distributions of participating and nonparticipating students were similar (Table 1). For participating students: Males ($n = 248$, 61%) were more prevalent than females. Sex, academic degree, age, and ethnicity substantially favored the bachelor's degree, the age group "less than 30 years of age" (87%), and Caucasians (75%).

Perceived Stress and Coping Assessments

Stress and coping category assessments are summarized in Table 2. Student-PCCS was greater in males than females at the beginning of the academic term and 6 months into the training program (PCCS1 and PCCS2, respectively). This sex difference was statistically significant for PCCS1 ($p = .023$), but not for PCCS2 ($p = .408$). As reported previously,[6] perceived stress increased over the term (PCCS 2 – PCCS 1, $p < .001$), with a greater increase in female students, but the sex difference was not statistically significant ($p = .230$).

Similarly, usage of problem-focused and active-emotion behaviors were slightly higher in female students, but these differences also were not statistically significant ($p = .364$ and $p = .117$, respectively). The avoidant-emotional coping category was essentially equivalent across both sexes ($p = .891$).

Ranked Usage of Coping Behaviors

The 14 coping behaviors assessed by the B-COPE survey instrument were ranked by mean usage scores

Table 2 - Stress and Coping Assessments Summary ($n = 407$)[a]

	Mean Score (SD)		95% Confidence Intervals			
			Male		Female	
Assessment	Male	Female	Lower	Upper	Lower	Upper
PCCS 1	1.05 (0.544)	0.92 (0.522)	0.98	1.11	0.84	1.01
PCCS 2	1.20 (0.626)	1.15 (0.609)	1.12	1.28	1.05	1.24
PCCS change (PCCS 2 – PCCS 1)	0.15 (0.572)	0.22 (0.587)	0.08	0.22	0.13	0.32
Coping – problem focused	18.88 (5.740)	19.43 (6.135)	18.16	19.60	18.47	20.39
Coping – active emotion	20.63 (6.182)	21.66 (6.817)	19.86	21.41	20.59	22.73
Coping – avoid emotion	14.27 (3.375)	14.23 (3.478)	13.85	14.70	13.68	14.77

PCCS 1: Perceived Chiropractic College Stress at the beginning of the training program (possible score: 0 to 4); PCCS 2: Perceived Chiropractic College Stress at 6 months into the training program (possible score: 0 to 4).

[a] These are unstandardized effect sizes. Standardized effects are reported in Table 4.

Table 3 - B-COPE Subscale – Usage Rank (Most Used = 1, Least Used = 14)

Coping Strategy Subscale	Rt	Total, n = 407	Rm	Male, n = 248	Rf	Female, n = 159	*p*	*p*[a]
Active coping	1	5.3 (1.85)	1	5.2 (1.82)	1	5.3 (1.90)	.681	1.00
Acceptance	2	5.2 (2.01)	2	5.1 (2.03)	2	5.2 (1.98)	.830	1.00
Planning	3	5.1 (1.92)	***3***	5.1 (1.86)	***4***	5.0 (2.01)	.609	1.00
Positive reframing	4	5.0 (2.01)	***4***	4.9 (2.01)	***3***	5.1 (2.01)	.249	1.00
Using instrumental support	5	4.8 (1.93)	5	4.7 (1.95)	5	4.9 (1.91)	.274	1.00
Using emotional support	6	4.4 (1.89)	***7***	4.1 (1.71)	***6***	4.9 (2.07)	.000	***.004***
Self-distraction	7	4.3 (1.51)	***6***	4.3 (1.52)	***7***	4.4 (1.51)	.625	1.00
Religion	8	4.0 (2.10)	8	3.8 (2.07)	8	4.2 (2.14)	.070	.770
Humor	9	3.6 (1.68)	9	3.8 (1.69)	9	3.3 (1.63)	.010	.120
Self-blame	10	3.0 (1.40)	10	3.0 (1.39)	10	3.2 (1.38)	.826	1.00
Venting	11	2.9 (1.24)	11	2.8 (1.13)	11	3.0 (1.42)	.007	.091
Denial	12	2.4 (0.82)	12	2.4 (0.79)	12	2.4 (0.87)	.634	1.00
Behavioral engagement	13	2.3 (0.82)	13	2.3 (0.76)	13	2.3 (0.90)	.957	1.00
Substance use	14	2.3 (0.79)	14	2.3 (0.81)	14	2.2 (0.76)	.163	1.00

R: B-COPE subscale usage rank, the rank 1 reflects the highest use score. See Method/Brief COPE Instrument; Rt: ranked total; Rm: ranked male; Rf: ranked female; p: p-value for male/female comparisons with the null hypothesis, "no difference between male and female usage scores for a given B-COPE subscale."

[a] *P*-value with Holm-Bonferroni sequential correction for multiple comparisons.[41]

(Table 3). The 2nd column (Rt) ranks the coping behavior subscales for all study participants by usage, whereas the 4th and 6th columns report rank by males and females, (Rm and Rf, respectively). For total behaviors (Rt), "active coping," "acceptance," "planning," and "positive reframing" were the 4 most-used behaviors. The "venting," "denial," "behavioral engagement," and "substance use" behaviors were the 4 least-used. Mean usage scores and their standard deviations are reported in columns 3, 5, and 7. Both males and females (Rm and Rf, respectively) reported similar coping usage, but differed with "Planning" and "Positive reframing," and with "Using emotional support" and "Self-distraction," in which the ranks were reversed (bold-italicized ranks). The 8th column in the table reports the uncorrected *p*-value for male/female comparisons with the null hypothesis, "no difference between male and female usage scores for a given coping behavior." After the Holm-Bonferroni Sequential Correction for Multiple Comparisons was applied (last column)[41] to maintain the family wise error rate at .05, only the greater usage by females of "Using emotional support" was statistically significant ($p = .004$).

Perceived Stress and Coping Correlations

Both unstandardized and standardized regression coefficients are reported for each of the 3 study hypotheses in Table 4 and then explained below.

Hypothesis 1: Coping strategies (problem-focused, active-emotion, and avoidant-emotion) identified at the beginning of the chiropractic training program will correlate with student PCCS assessed at the beginning of the

Table 4 - Hypotheses Regression

Variables	Outcome	B	SE B	β	*t*	*p*
Hypothesis 1	PCCS1					
Problem-focused		0.010	0.004	0.112	2.36	.019
Avoidant-emotion		0.063	0.008	0.399	8.37	<.001
Sex (male)		0.125	0.048	0.232	2.57	.011
Hypothesis 2	PCCS2					
Avoidant-emotion		0.059	0.008	0.327	6.95	<.001
Sex (male)		0.049	0.060	0.080	0.82	0.411
Hypothesis 3	PCCS2 – PCCS1					
Problem-focused		−0.012	0.008	−0.121	−1.50	.135
Active-emotion		−0.000	0.008	−0.001	−0.01	.995
Avoidant-emotion		−0.002	0.010	−0.015	−0.26	.799
Sex (male)		−0.077	0.059	−0.133	−1.31	.191

B: unstandardized regression coefficient; β: standardized regression coefficient;
SE B: standard error for the unstandardized regression coefficient; t: t test statistic; p: Probability value.
Hypothesis 1: $F_{3, 403} = 37.48$, $p < .001$, Residual SE: 0.888, DF = 403, Adjusted $R^2 = 0.212$;
Hypothesis 2: $F_{2, 402} = 24.56$, $p < .001$, Residual SE: 0.586, DF = 404, Adjusted $R^2 = 0.104$;
Hypothesis 3: $F_{4, 402} = 2.032$, $p = .089$, Residual SE: 0.995, DF = 402, Adjusted $R^2 = 0.010$.

chiropractic training program (PCCS1), with possible sex interaction.

A regression model with 2 of the 3 coping categories (problem-focused and avoidant-emotion) and sex explained 21% of the PCCS1 variance. Active-emotion coping was removed from the model because it did not make a statistically significant contribution. A single-unit increase in avoidant-emotion coping was associated with a 0.06-unit increase in PCCS1, whereas being male was associated with a 0.12-unit increase in perceived stress. Standardized effect sizes (β in Table 4) demonstrate that, in this model, the avoidant-emotion strategy influence on perceived stress was more than 3-times that of problem-focused. Although sex was a predictor of perceived stress at the beginning of the training program, neither the problem-focused nor the avoidant-emotion influences were moderated by sex. Sex interactions with problem-focused and avoidant-emotion were $p = .579$ and $p = .764$, respectively.

Hypothesis 2: Coping strategies (problem-focused, active-emotion, and avoidant-emotion) identified at the beginning of the chiropractic training program will predict student PCCS after 6 months in the program (PCCS2).

Only the avoidant-emotion coping strategy predicted PCCS2, explaining 10% of PCCS2 variance. A single-unit increase in the avoidant-emotion coping strategy was associated with a 0.06-unit increase in PCCS2. Sex was not a statistically significant PCCS2 predictor ($p = .411$).

Hypothesis 3: Coping strategies (problem-focused, active-emotion, and avoidant-emotion) identified at the beginning of the chiropractic training program will predict student PCCS change after 6 months in the program (PCCS2 – PCCS1).

Perceived stress in both males and females increased over the 6-month study period (PCCS Change, Table 2). This increase was statistically significant within each sex (males: $t_{247} = 4.2$, $p < .001$ and females: $t_{158} = 4.8$, $p < .001$), but the magnitude of change was not significantly different across sexes ($p = .191$). In addition, none of the 3 coping strategies were statistically significant predictors of PCCS change (PCCS2 – PCCS1: Table 4).

DISCUSSION

The objective of this study was to investigate coping strategies used by students at our chiropractic college and how these strategies might correlate with student-PCCS.

Student-Perceived Stress

Conflicting observations have been reported by researchers concerning sex-related levels of stress in academic environments. Chen et al[42] found that male students reported higher levels of stress. However, Ng and Jeffery,[43] Shaw et al,[44] and Kneavel[45] reported that females were more likely to be stressed than males. Most recently, we reported that student-perceived stress levels increased substantially (18%) after 6 months in our institution's chiropractic training program compared with the 1st week of the program ($t_{406} = 6.32$, $p < .001$, $d = .33$). Although this increase was greater for women than for men, the sex effect was not statistically significant ($d_{men} = 0.28$, $d_{women} = 0.43$, $p = .233$).

Our previous paper reported PCCS but did not closely examine sex differences.[6] We also reported the top 4 stressors identified by students in our chiropractic training program. In this paper, we explored students' self-reported coping behaviors when responding to those stressors and how associated PCCS and behavioral strategies might differ between sexes.

We report that PCCS amongst 1st term students (PCCS1) was greater in males than females and this observation was also observed at a 2nd assessment, 6 months into the training program (Table 2, PCCS2). Although this sex-related difference was statistically significant for PCCS1, it was not statistically significant for PCCS2. In addition, student-perceived stress increased as students progressed 6 months into the chiropractic training program (PCCS 2 – PCCS 1), with a greater increase in female students. Although this increase was statistically significant within each sex, the cross-sex increased-stress difference was very small and not statistically significant. We conclude that the conflicting sex-related differences in perceived stress reported in the literature may reflect a small and labile correlation between sex and perceived stress.

Student Coping Strategies

It is important for educators to appreciate both the stress sources and the coping strategies used by students as they help students navigate challenging training programs. In the present study, students reported using more healthy than unhealthy coping strategies (Table 3, B-COPE Subscale Usage Rank). Among all study participants, "active coping" was the most common and "substance use" was the least common self-reported coping strategy. Males and females reported substantially similar ranking of the 14 coping strategies, with just 2 reversals of adjacent ranks. Females ranked "positive reframing" ahead of "planning" whereas males ranked "self-distraction" ahead of "using emotional support." This difference in rank can be explained, in part, by the statistically significant, greater usage by females of "using emotional support." Both males and females gave "venting" a rank of "11," with females reporting greater, but not statistically significant, use of venting. In a related study, Garcia et al[40] ranked coping strategies use by 1847 adults recruited from the Chilean general population. They reported the same 4 most-used coping behaviors, although they ranked them as follows: (1) acceptance, (2) active coping, (3) planning, and (4) positive reframing. Out of the 14 coping strategies, the 4 least-used in their study were as follows: (11) humor, (12) denial, (13) behavioral engagement, and (14) substance use. This usage was similar to our findings, although venting, not humor, occupied position 11 in our study. Interestingly, the mean coping scores reported in the Chilean population study for the top 4 coping behaviors that we reported were 24% to 35% less than our scores. This may be due to higher stress typically experienced by chiropractic students compared with the general population[6] or it may reflect cultural differences in coping usage

between the US and Chilean populations. The possibility that the difference in reported coping scores might reflect higher stress experienced by chiropractic students is supported by a recent study of coping strategies and stress in 407 Nepal undergraduate medical students.[19] The authors of that study reported student coping scores that were substantially closer to our reported values (7%–17% greater, for our top 4 coping behaviors). Although those authors did not rank order the reported coping score usage, their tabulated usage scores could be readily placed in rank order. When we rank ordered their tabulated data, we found that their top 4 coping behaviors were the same behaviors we observed, although the order within that "top 4" group differed from the within-group order that we observed. The bottom 4 behaviors were the same ordered coping strategies that were reported in the Chilean study, which were similar to our findings, as discussed above. Additional studies are needed to clarify cultural/ethnic versus academic rigor as explanatory factors for the magnitude differences in perceived stress noted above.

Stress and Coping Strategy Correlations

Our data demonstrated correlation at the beginning of the chiropractic-training program between 1st-term student perceived stress (PCCS1) and 2 coping strategies, problem-focused and avoidant-emotion (Hypothesis 1). Problem-focused strategies (active coping, planning, and instrumental support) and avoidant-emotion strategies (self-blame, denial, substance use, and behavioral disengagement) correlated moderately with PCCS1, sharing 21% of the PCCS1 variation, whereas active-emotion did not contribute. PCCS1 was slightly greater for males, but regression analysis revealed that sex did not modify the 2 coping strategy effects on student stress. Not surprisingly, avoidant strategies were positively correlated with perceived stress 6 months into the program (PCCS 2, Hypothesis 2). Sex did not predict perceived stress levels 6 months into the program and was not a statistically significant modifier of avoidant-emotion influence. Positive correlation between avoidant coping and student-perceived stress is consistent with a study by Fitzsimmons and Bardone-Cone.[46] Although use of avoidant strategies was a positive predictor of perceived stress at both the 1st term (PCCS1) and 6 months into the program (PCCS2), it was not a statistically significant predictor of the increased perceived stress observed in our study (Table 4, Hypothesis 3).

Of the 2 broad coping dimensions identified by Lazarus and Folkman,[20] the problem-focused dimension is generally viewed as an adaptive mode of coping involving active planning or engagement in a specific behavior to overcome the problem causing distress.[28,47,48] Previous studies reported that adopting a problem-focused style was generally associated with successful adapting to stressful situations with improved psychological functioning,[49] perceived effectiveness,[50] and improved health outcomes.[51]

The emotion-focused coping dimension involves attempts to self-regulate emotions and takes either active or avoidant forms, which are often considered adaptive and maladaptive, respectively. The active form includes behaviors such as venting emotional distress or cognitively reframing a stressor's impact, typically viewed as an adaptive emotion-regulating form of emotion-focused coping. By contrast, the avoidant form of emotion-focused coping uses denial or self-distraction to avoid the source of distress without engaging in problem-focused behavior and is frequently maladaptive.[28,52] Reliance on avoidance coping has been linked to increased depressive symptoms among general community adults and college students.[53–55] In summary, the same coping strategy may be adaptive or maladaptive. Context and time determine the relative effect. For example, problem-focused strategies are adaptive when dealing with poor grades or inadequate academic training, but they are generally maladaptive when dealing with loss of a parent or a failed final exam. Although no "magic bullet" strategy exists for coping with stress,[56] we believe this study will inform college services that can reduce student-perceived stress, enhance students' sense of wellbeing, and facilitate learning.

Institutions seeking to reduce PCCS should encourage adaptive problem-focused and active emotion coping behaviors commonly used by both sexes (eg, active coping, acceptance, planning, and positive reframing) and help students change maladaptive avoidant-emotion behaviors such as self-blame, venting, denial, and substance abuse that are associated with increased PCCS. This has been accomplished at other institutions by offering classes and workshops that teach stress management and self-care skills.[57–59]

Study Limitations

This study has many limitations. It is only a starting point for exploring the relationship between perceived stress and coping behaviors in a chiropractic training institution. The study assumes no substantial change in students' coping strategies from the single time they were assessed at the beginning of the 1st term of the chiropractic training program and 6 months into the program, when PCCS was again assessed (PCCS2). This assumption, coping stability over the 6-month period, was not evaluated in the study. Moreover, coping inventories like that used in this study can only record strategies of which individuals are consciously aware and willing to report; unconscious strategies were, therefore, not assessed.[16] In addition, the study does not address causation. Correlation between behavior and PCCS may reflect use of the behavior in response to PCCS or the PCCS may change due to use of the behavior. Moreover, because the surveys were not anonymous, it is possible that students may not have honestly answered sensitive questions about substance use (social bias). In addition, a 3rd factor may be driving both the behavior and PCCS (the "tertium quid" effect). Additional studies are needed to explore these issues. Finally, student perspectives were assessed only at initial and 6-month landmarks in our chiropractic training program. Results cannot be readily generalized to students in subsequent terms, other chiropractic institutions, or other health care training programs.

CONCLUSION

This study is a starting point for exploring the relationship between perceived stress and coping behaviors in a chiropractic training institution. An understanding of the various sources of student stress and the coping strategies used by chiropractic students in response to perceived stress should guide curriculum changes and inform advisors that counsel students to help them manage stress, enhance their sense of wellbeing, and facilitate learning. In this study, students generally used healthy adaptive coping strategies with minimal sex differences. Only avoidant-emotion coping appeared to be a reliable predictor of PCCS, with sex being a poor predictor. Specific coping strategies may be adaptive or maladaptive. Both context and time determine the relative effect. We believe this study will inform college services that strive to reduce student-perceived stress, enhance students' sense of wellbeing, and facilitate learning.

Chiropractic educational institutions should encourage adaptive problem-focused and active emotion coping behaviors and help students change maladaptive avoidant-emotion behaviors that are associated with increased PCCS. This has been accomplished at other institutions by offering classes and workshops that teach stress management and self-care skills. As noted, this study should be viewed as a starting point for exploring the relationship between perceived stress and coping behaviors in a chiropractic training institution. A posited causal relationship between coping factors and PCCS could be examined with controlled studies that evaluate curriculum-embedded educational programs that train and encourage students to replace maladaptive strategies with adaptive coping behaviors. Future studies might also examine changes in coping strategies that may occur as students move through these intensive health care training curriculums. Lastly, generalizability would be enhanced by performing multisite collaborations with other chiropractic institutions and collaborative studies with other health care disciplines such as medicine, osteopathy, nursing, and physical therapy.

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The authors have no conflicts of interest to declare relevant to this work.

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