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Is there a chilly climate? An educational environmental mixed method study in a chiropractic training institution

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Objective: The attitude towards gender in an educational environment has a significant impact on a student's behavior, sense of well-being, and academic performance. Our study aimed to explore the presence and extent of gender-related issues in a chiropractic undergraduate learning environment, which has been a scarcely researched topic in the literature.
Methods: The Perceived Chilly Climate Scale (PCCS) was used as the initial tool for screening the gender issues among undergraduates. The issues identified were explored further with a series of focus group interviews.
Results: The PCCS had an 83% response rate. The PCCS score (105/196) indicated the nonexistence of alarming gender-related issues. However, the PCCS score was significantly higher among female than male subjects, immigrants than nonimmigrants, and minorities than majority ethnic groups. Despite high ratings on the questionnaire quantitative findings, the focus groups indicated a good sense of equality, oppression-free environment, and no obvious signs of discrimination.
Conclusion: The educational environment of the institution concerned was conducive to equality. However, subtle but important gender-, ethnic-, and minority-related issues could be addressed to provide an enhanced educational environment to learners.

Key Indexing Terms: Chiropractic; Education; Ethnic Groups; Gender Issues; Minority Groups

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INTRODUCTION

The learning environment of a given educational institution is formed primarily by the interaction between different stakeholder groups and its organizational structure.[1] It influences heavily on the behaviors of students, and contributes to their learning, performance, contentment, and success.[2–7] An educational environment is a theoretical construct that cannot be measured directly. However, the students' experiences, which mirror the underlying construct of an educational environment, can be assessed. Therefore, the educational environment embraces numerous factors that contribute to effective education and is the backbone on which a curriculum resides. The educational environment should accommodate the needs and aspirations of its stakeholders, especially students, and is sensitive to their demographic backgrounds, such as ethnicity and gender. Such an environment supports effective learning. The focus of our study, however, is primarily on gender equality as an important part of the learning environment. Certain other aspects related to academic issues were dealt with in a previous study.[8]

Gender equality or inequity is interwoven with all actions, interactions, occurrences, and outcomes within an educational institution, and the issues related to gender inequity may have a strong negative impact on the quality of education of students.[9–13] In modern-day educational institutions, it is unlikely that gender inequity always is gross and apparent, but it may exist subtly.[14] However, this may not necessarily mean that such environments provide healthy educational experiences for male and female students; usually female students are victimized in such environments.[15,16] Hall and Sandler termed the prevalence of subtle sexist environment towards females as the "chilly climate."[14] The chilly climate can manifest in several forms,

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including preventing women from seeking help outside class, making disparaging comments about women, disparaging women's intellectual abilities, implying that women lack commitment, making comments about women's physical attributes or appearance, disparaging women's professional accomplishments, making sexist jokes, ridiculing scholarship that deals with women's perception and feelings, or making direct sexual overtures to women.[14] Previous studies have indicated that the faculty appears to be more sexist than peers.[17] Although there may be exceptions, generally, the curricula are androcentric; dominated by or emphasizing male interests or point of view.[17] It is important to emphasize that the chilly climate concept in today's context encompasses not only the studying of gender issues, but also the ethnicity and minority issues in higher education settings.

In the current context of chiropractic education, where increasing number of females enter into a traditionally male-dominated field, the exploration of gender issues in chiropractic learning environments is timely. However, it has scarcely been researched.

In our study, we investigated the existence and the extent of a perceived chilly climate among undergraduate chiropractic students, and how it may vary with demographic characteristics of students.

METHODS

Setting

The study setting was the Scandinavian College of Chiropractic (SCC), Sweden, which offers a five-year fulltime undergraduate academic program. It is driven by a private foundation with no profit interests.

Ethics

The study was approved by the Scandinavian College of Chiropractic Scientific Council (Board of Ethical Approval, *p*-100-08-11-06) and Regional Ethics Committee (Etikprövningsnämnden Stockholm, 2012/416-31/5), in accordance with the Declaration of Helsinki.

Design

The study is part of a larger project employing a case study methodology, and conducted within a pragmatic and interpretive research tradition. We used a mixed method approach, including a quantitative descriptive survey using the PCCS and in-depth qualitative exploration using focus group interviews.

Quantitative Descriptive Survey

Janz and Pyke developed a psychometric scale to assess higher education students' perceptions of the chilly climate, the Perceived Chilly Climate Scale (PCCS).[17] Initially, the items were generated based on the original definition of a chilly climate.[14] The PCCS is a multi-item (28 items) self-perception questionnaire, and has proven validity and reliability in several diverse contexts.[17,18]

The 28 items of the PCCS represent five factors: Climate Students Hear About (CSHA: items 1–8), Sexist Attitudes and Treatment (SAT: items 9–14), Climate Students Experience Personally (CSEP: items 15–20), Classroom Climate/Course Material (CCCM: items 21–25), and Safety (SAF: items 26–28).[17] Each item is rated on a 7-point Likert scale ranging from strongly agree (score = 1) to strongly disagree (score = 7). The total score, therefore, ranges from 28–196, with a midpoint of 112. For sub-scale and total scores, the higher the score the chillier the perceived the educational climate. According to Morris and Daniel, a score of anything above one in any of the 28 individual items indicates some perception of discrimination.[18] Permission to perform translation of the instrument into Swedish was obtained by the original authors. For cross-cultural adaptation, two independent bilingual English educationalists translated the questionnaire into Swedish (forward translation). A reconciliation meeting was conducted to obtain a consensus version. A native English speaker, who was blinded to the original version, retranslated the reconciliated Swedish version into the source language (back translation) with adequate and uncontorted results. The translated version was piloted on a small cohort ($n = 10$) of newly graduated students.

A convenience sample of 150 undergraduate chiropractic students from five cohorts, 104 (69%) male and 46 (31%) female students from 19–46 years old with a mean age of 26.2 (SD 5.3), were invited to take part in the educational environment survey. Undergraduate students attending individually adapted curriculum ($n = 23$) were excluded because of the possibility of not being physically present at the time of data collection. The PCCS was administered during classes to ensure a high response rate. However, the participation in the survey was entirely voluntary and anonymous.

The completed survey was scored manually as several items of the PCCS needed reverse scoring. Accordingly, 14 items (items 1, 4, 8, 10, 16, and 20–28) were allocated reversed scores, a feature to increase validity by minimizing carelessness in marking items, and to prevent the participants from determining the intent of the instrument and responding in a monotonous way. Final scores for each item were entered to Statistical Package for the Social Sciences version 20.00 (IBM Corporation, Armonk, NY), for inferential statistical analysis. Internal consistency of the scale was determined by calculating Cronbach's alpha, and the correlation between sub-scales and total score was determined by calculating Pearson's correlation coefficient. The D'Agostino and Pearson omnibus normality test was performed to determine normal distribution of each variable. Differences were compared using the *t*-test and differences between cohorts were compared using ANOVA followed by Tukey's multiple comparison. The dependent variables were perception of the educational climate as measured by scores on the five sub-scales of the PCCS. The independent variables were year of class, gender, age, previous studies in higher education, ethnicity, and minority belonging. In this study, ethnicity was defined as having at least one parent with an ethnic background other than Swedish, and minority belonging was epitomized in the survey by disability, religion, political

affiliation, sexuality, feminism, social class, and ethnicity. For all statistical calculations probability values less than 0.05 were considered significant.

Qualitative Exploration with Focus Groups

Six students from each cohort were selected randomly, consented to participate in the study, and were invited to participate in focus group discussions. The chosen number of participants was within the acceptable norm for an effective and meaningful focus group discussion.[19] A total of five focus group interviews was done and all interviews were audio-recorded. The overall structure and questions used in each focus group complied with the method outlined by Krueger[20] with a series of carefully planned opening, introductory, transitional, key, and ending questions phrased in a conversational manner. The results of the PCCS questionnaire were taken as a point of departure for the discussion. The principle investigator served as moderator for all five sessions and an independent observer was seated at the periphery of the group. Each focus group lasted for about 40 minutes.

We employed thematic content analysis, described by Krueger[21] to analyze focus group data. An independent research assistant transcribed the audio-taped group sessions verbatim. Transcripts were examined line-by-line. Significant sentences were identified, and central concepts were grouped inductively into emerging themes through an iterative process of going back and forth between original transcripts, significant sentences, and themes.

RESULTS

Perceived Chilly Climate Scale

> A total of 124 students completed the questionnaire (83%). No questionnaire was excluded due to incompleteness. There were 87 male (70%) and 37 female (30%) respondents and the mean age of the sample was 26.7 (SD 5.5, range 19–46). In the first year, 73% of the students completed the survey. The second year had the lowest response rate with 71%. In years 3 and 4, the response rate was 88% and 85%, respectively. All fifth year students completed the survey. A total of 28 participants (male 70% and female 30%) reported that at least 1 of their parents was an immigrant, and 16 participants (male 88% and female 12%) perceived themselves as belonging to a minority group. A total of 34 participants (27%), 23 men and 11 women, had formerly been studying in higher education institutions. The internal reliability of the scale was represented by a Cronbach's alpha = 0.989, and the sub-scales displayed alpha values at CSHA 0.991, SAT 0.985, CES 0.970, CCCM 0.916, and SAF 0.971.

Total, Individual, and Sub-Scale Scores

The total score for the PCCS questionnaire was 105.0 (SD 22.7). The mean score and SD for each of the individual 28 items is presented in Table 1. It was observed that the highest mean score for an individual question item was 5.1 (question 24 – "Most of my textbooks contain some examples of feminist research") and lowest 1.1 (question 28 – "The campus is a relatively safe place"). The total scores and sub-scale scores for different demographic groups are included in Table 2. Pearson correlation coefficients among the five sub-scales were robust and designated a relationship significant at minimum 0.05 level (2-tailed).

Demographic Variations

There were statistically significant differences in perceiving the chilly climates among certain demographic groups (Table 2).

Year of Class

There were no statistically significant differences between the 5 cohorts in relation to the total and sub-scale scores except for the CCCM sub-scale. Using multiple comparisons identified that fifth year students perceived this aspect of the environment significantly chillier than year 1 ($p = .013$) and 2 ($p = .01$) students. However, there was a marginally significant difference of the CSHA sub-scale, when comparing the means between students from years 2 and 5 ($p = .058$) but this did not meet the classic criteria for statistical significance and, therefore, could be discarded as not significant.

Gender

Female students perceived that the overall educational climate was significantly chillier than their male counterparts. Although the means scores of females for all 5 sub-scales were higher than those of males, only the sub-scales SAT and CCCM indicated significant differences. The only cohort that demonstrated a significant within cohort gender difference was the third year (126.9 ± 17.50, $n = 7$ vs. 98.91 ± 5.44, $n = 22$; $p = .049$). Of the mean score differences for individual items, question 6 – "I have HEARD of a member of the teaching staff treating female students as though they have limited intellectual ability" (1.5 ± 0.2 vs. 1.1 ± 0.1, $p = .009$), question 11 – "A woman student must outperform male students in order to be taken seriously by the teaching staff" (1.9 ± 0.2 vs. 1.3 ± 0.1, $p = .001$), and question 14 – "Teaching staff have made sexist remarks e.g., suggesting that women are too emotional to be a scientist, or men are too aggressive to be caretakers of the young or elderly" (1.7 ± 0.3 vs. 1.2 ± 0.1, $p = .006$) were statistically significant. All items in the questionnaire were rated higher by females than males.

Age

Dichotomizing the participants as 26 or under and 27 or above using an arbitrary cut off point close to the total mean of age revealed no statistical significant differences. However, when analyzing question items individually, question number 8 – "I have NEVER HEARD that a member of the teaching staff has made crude and offensive sexual remarks to female students," showed statistically significant higher mean score among older students compared to younger students in the dichotomized groups (1.5 ± 0.1 vs. 1.1 ± 0.1,

Table 1 - Total Minimum and Maximum Values, Mean and SD for Individual PCCS Items

Question Items	Min-Max	Mean (SD)
1. I have NEVER HEARD that a female student has been sexually harassed by a member of the teaching staff.	1–5	1.2 (0.6)
2. I have HEARD of one or more instances where a member of the teaching staff put a female student down or was rude to her because she was a female.	1–7	1.5 (1.3)
3. I have HEARD of one or more instances where a member of the teaching staff has used humor (e.g., sexual/sexist humor, or told sexually suggestive stories, jokes, etc.) to "liven up" the class.	1–7	1.9 (1.4)
4. I have NEVER HEARD that a member of the teaching staff has attempted to establish a sexual relationship with a female student.	1–5	1.4 (0.9)
5. I have HEARD of one or more instances when a member of the teaching staff has engaged in inappropriate physical contact toward a female student.	1–7	1.4 (1.3)
6. I have HEARD of a member of the teaching staff treating female students as thought they have limited intellectual ability.	1–6	1.2 (0.8)
7. I have HEARD that some members of the teaching staff haves said things that made female students feel uncomfortable.	1–7	2.0 (1.6)
8. I have NEVER HEARD that a member of the teaching staff has made crude and offensive sexual remarks to female students.	1–7	1.3 (1.0)
9. The teaching staff most often uses examples from men's lives.	1–7	2.0 (1.4)
10. In general, I believe that the academic climate at this college is very supportive of female students.	1–7	1.8 (1.1)
11. A woman student must outperform male students in order to be taken seriously by the teaching staff.	1–7	1.5 (1.0)
12. Some teaching staff have "put down" or belittled specific individuals who raise feminists' issues or take a feminist position in the classroom.	1–6	1.3 (0.9)
13. The teaching staff generally seem to associate particular occupations or achievements with one sex (e.g., by saying, "suppose you went to the doctor and he…."; or "suppose you spoke with a psychologist and she……"	1–7	2.4 (1.2)
14. Teaching staff have made sexist remarks (e.g., suggesting that women are too emotional to be scientist, or men are too aggressive to be caretakers of the young or elderly).	1–7	1.3 (1.1)
15. A member of the teaching staff has treated me as though I have limited intellectual ability.	1–7	1.5 (1.3)
16. Most teaching staff have supported and encouraged me to obtain my academic goals (e.g., provided emotional support, important information, etc.).	1–6	1.6 (1.0)
17. I have received an unfair grade due to differences in opinion between myself and a member of the teaching staff.	1–7	1.7 (1.4)
18. I have made a comment in class that has been ignored and later another student received credit for my idea.	1–7	1.5 (1.4)
19. A member of the teaching staff has incorrectly, seemed to think that I was incompetent when I asked a question.	1–7	1.7 (1.4)
20. Most teaching staff seem to have enough time to meet with me.	1–7	3.4 (1.6)
21. Topics regarding women (e.g. women's contributions to the field) are integrated into course material in most of the classes I have taken.	1–7	3.2 (1.3)
22. Most teaching staff have assigned readings that were written by women.	1–7	4.9 (1.6)
23. Course material is presented from a broad range of perspectives (i.e., includes many ways of looking at the same material, includes the perspective of women, etc.).	1–7	2.1 (1.5)
24. Most of my textbooks contain some examples of feminist research.	1–7	5.1 (1.3)
25. Most teaching staff seem to respond just as well to female students as they do to male students.	1–6	1.4 (0.9)
26. I have HEARD that most female students are not afraid to go to the library alone at night.	1–7	1.5 (1.3)
27. I am not afraid to go to the library alone at night.	1–7	1.3 (1.2)
28. The campus is a relatively safe place.	1–7	1.1 (0.8)
Total	1–7	105.0 (22.7).

$p = .047$). Correlational analysis displayed no significant associations between age and the five sub-scales.

Previous Higher Education Experience

Comparing students who had previous higher education experience to those who had no such experience disclosed no statistically significant differences with regard to the total PCCS score or the five sub-scales. When analyzing individual items, it was detected that those who had studied previously in higher educational programs reported statistically significantly higher mean score for question number 19 – "A member of the teaching staff has

Table 2 - PCCS Sub-Scales and Total Scores for Each of the Cohorts and Demographic Groups with Data Presented as Mean, SD and Significance Level

Demographic Groups		Total Score		Sub-Scale: CSHA	
		Mean (SD)	Significance	Mean (SD)	Significance
Cohort	Year 1 ($n = 19$)	97.9 (19.3)	NS	11.8 (4.4)	NS
	Year 2 ($n = 24$)	106.5 (23.7)		10.6 (2.7)	
	Year 3 ($n = 29$)	105.7 (33.1)		12.6 (6.3)	
	Year 4 ($n = 28$)	104.7 (17.5)		12.0 (4.2)	
	Year 5 ($n = 24$)	108.7 (12.8)		13.2 (4.1)	
Gender	Male ($n = 87$)	102.3 (20.0)	0.045*	11.8 (4.3)	NS
	Female ($n = 37$)	111.3 (27.6)		12.8 (5.2)	
Age	≤ 26 ($n = 73$)	105.4 (25.3)	NS	12.5 (5.1)	NS
	>26 ($n = 51$)	104.4 (18.8)		11.5 (3.7)	
Previous higher education training	Yes ($n = 34$)	11.9 (5.1)	NS	12.0 (5.1)	NS
	No ($n = 90$)	12.1 (4.4)		12.1 (4.4)	
Ethnic origin	With a migrant parent ($n = 28$)	112.8 (5.3)	0.040*	13.0 (5.9)	NS
	Without a migrant parent ($n = 96$)	102.8 (2.1)		11.8 (4.2)	
Minority	Minority ($n = 16$)	118.6 (6.9)	0.010**	14.3 (6.1)	0.036*
	Non-minority ($n = 108$)	103.0 (2.1)		11.7 (4.3)	

NS = Nonsignificant at .05 level.
* $p < .05$.
** $p < .01$.

incorrectly seemed to think that I was incompetent when I asked a question" (2.1 ± 0.3 vs. 1.5 ± 0.1, $p = .027$).

Ethnicity

More than one-quarter of the sample reported having a non-Swedish ethnic background. Students with at least one immigrant parent had significantly higher total and CCCM sub-scale mean scores. Assessing individual items revealed significantly higher mean values for question 5 – "I have HEARD of one or more instances when a member of the teaching staff has engaged in inappropriate physical contact toward a female student" (2.1 ± 0.4 vs.1.3 ± 0.1, $p = .003$) and question 8 – "I have NEVER HEARD that a member of the teaching staff has made crude and offensive sexual remarks to female students" (1.7 ± 0.3 vs. 1.2 ± 0.1, $p = .036$).

Minority

More than 10% reported perception of a minority belonging. There was a statistically significant difference in the total and sub-scale mean scores of CSHA and SAT. Mean scores of individual items where students from minorities perceived the climate significantly chillier than the rest are displayed in Table 3.

Focus Group Interviews

The analysis of the focus group discussions yielded the following three themes (see Figure 1).

Equality Scaffolding

The participants reported that in general they experienced a good sense of equality within the educational institution and equality was permeated. Some gender differences in class activities were highlighted, but these differences in class were thought to depend more on the individual and individual characteristics than gender. The participants felt it was easy to make true contact with teachers and that they did not feel anonymous in the institution. Teachers were thought to treat students equally, but some of the interviewees raised negative concerns that teachers were encouraging students who were more active in class to a greater extent. There were signs that clinical teachers sometimes could display an arrogant behavior, leaving students the perception of being insulted. Some clinical teachers were recognized as chilly towards patients. Peers were thought to be treating each other with respect and equally.

There were no direct indications of a chilly climate. Jokes with sexual insinuations were reported to have occurred, but this was perceived as done in a nonoffensive manner. However, there was a perception that subtle signs of inequality resided.

"I think this school has a very high tolerance for all students. I have never experienced any kind of discrimination in any of the courses I have been taking." (Male, year 4)
"Of course, there can be a joke situation between teachers and students, but it is very harmless (observers note that everybody concurs)." (Female, year 1)
"Last year when I was in another class, I heard about a girl who perceived herself harassed because she was woman, not very social, and also immigrant." (Female, year 3)

Relaxed and Fertile Environment

The institutional climate was perceived as very relaxed. The interviewees felt that the institution in general was a

Table 2 - Extended.

Sub-Scale: SAT		Sub-Scale: CSEP		Sub-Scale: CCCM		Sub-Scale: SAF	
Mean (SD)	**Significance**	**Mean (SD)**	**Significance**	**Mean (SD)**	**Significance**	**Mean (SD)**	**Significance**
9.0 (2.2)	NS	10.8 (1.1)	NS	15.5 (3.4)	0.049*	3.6 (1.3)	NS
10.8 (4.3)		12.3 (4.7)		17.3 (3.5)		4.7 (3.7)	
10.9 (5.1)		10.9 (4.6)		16.8 (4.5)		3.3 (0.8)	
10.5 (2.9)		12.0 (4.4)		15.6 (3.2)		4.4 (3.0)	
9.9 (3.0)		11.1 (3.7)		18.3 (3.5)		3.7 (1.5)	
9.8 (3.3)	0.016*	11.4 (4.3)	NS	16.3 (3.6)	0.044*	3.9 (2.1)	NS
11.5 (4.4)		11.5 (4.9)		17.8 (4.0)		4.9 (2.0)	
10.3 (3.8)	NS	11.6 (4.9)	NS	16.6 (3.7)	NS	3.6 (1.7)	NS
10.3 (3.7)		11.3 (3.7)		16.9 (3.9)		4.4 (4.0)	
10.4 (4.3)	NS	11.6 (5.1)	NS	17.2 (4.3)	NS	3.5 (1.2)	NS
10.3 (3.6)		11.4 (4.2)		16.5 (3.6)		4.1 (2.6)	
11.3 (5.1)	NS	12.1 (5.7)	NS	18.0 (4.0)	0.039*	4.0 (2.7)	NS
10.0 (3.0)		11.3 (4.0)		16.3 (3.7)		3.9 (2.3)	
12.8 (4.3)	0.005**	13.4 (6.1)	NS	17.1 (4.3)	NS	3.4 (0.9)	NS
9.9 (3.6)		11.4 (4.1)		16.7 (3.7)		4.0 (2.5)	

stimulating learning environment, but with great variations depending on the course. The enjoyment of studying chiropractic was perceived to outweigh the stress of studying at the program. The first years of study generally were thought of as more stressful, but in a positive way. Some areas were perceived as more stressful, such as written examinations and examination projects. More group activities and less lecturing were thought to reduce excessive stress levels. There was a feeling that the institution should monitor the stress level to a greater extent. The smallness of the institution enhanced good contact among students, teachers, and administration, and it generally was perceived that participants could ask anything to anybody. The students understood that it was important to take their own responsibility to enhance the institutional environment. There was a general agreement that internships at hospitals and the student outpatient clinic were good learning environments.

"Most times it feels like it is a stimulating environment! I think so, yes most of the time! You always have the possibility to learn here, but then it is very much up to the individual." (Female, year 2)
"It is small classes. You get good contact with fellow students and teachers. You really get help and advice from many persons." (Male, year 1)

Institutional Friendship

The participants depicted the institution as a very friendly place, and friendship and interactions was thought to be across years. There was a request for mentorship from fellow students, but only if this was voluntary and not forced upon. There were some indications that the participants felt alone from time to time and this was more evident for students coming from cities other than Stockholm or countries other than Sweden. However, this generally was perceived as acceptable, as the participants knew they were only here for a short period of time and to obtain a professional degree. The social and private life generally was seen as difficult mainly due to financial problems.

The interviewees were happy with the plasticity of the institutional friendship and that it was easy to contact the institutional management through informal channels, other than through normal institutional committees with student representatives. However, most participants were not aware of any support system for students who become stressed or feel bad. They would turn to their peers, friends, or a specific teacher instead.

"The friendship spans over the different classes of years, and you can spend time with anybody." (Female, year 2)
"I think it is very hard to be away from the family. But of course I know it is worth it." (Male, year 3)

Table 3 - Statistically Significant Different PCCS Items of Outcome Variable of Minority

	Minority		
Items	**Yes ($n = 16$)**	**No ($n = 108$)**	***p* Value**
3	3.0 ± 0.5	1.8 ± 0.1	.001**
4	1.9 ± 0.3	1.4 ± 0.1	.020*
5	2.1 ± 0.5	1.4 ± 0.1	.035*
8	2.0 ± 0.5	1.2 ± 0.1	.004**
9	2.6 ± 0.4	1.9 ± 0.1	.039*
12	1.9 ± 0.5	1.2 ± 0.1	.004**
13	3.2 ± 0.3	2.3 ± 0.1	.010*
17	2.7 ± 0.5	1.6 ± 0.1	.003**
25	1.9 ± 0.4	1.4 ± 0.1	.035*

Data presented as mean, SD and p values.
* $p < .05$.
** $p < .01$.

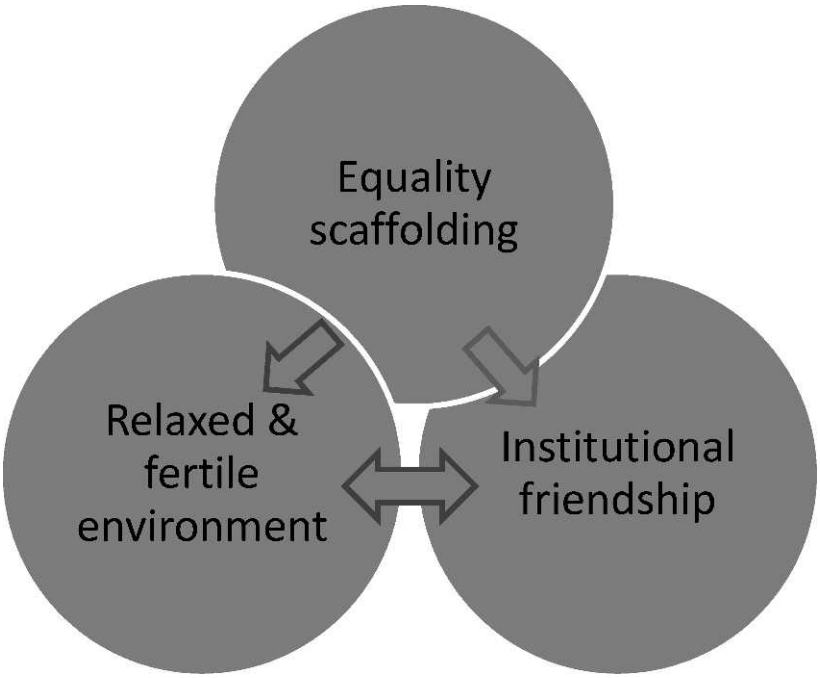

Figure 1 - A Model Summarizing the Emerging Themes in This Study and Their Relationships

"I knew about this support system because I am part of the student union. But I think a lot of students don't know about it." (Female, year 4)

DISCUSSION

Overall, the findings of our study revealed that, though there are no alarming issues of gender equality, female students found the climate to be chillier than males. Students whose parents have different ethnic backgrounds or who belong to a minority group perceived the learning environment to be chillier than those who did not. However, the results from the focus group interviews displayed some incongruence compared to the PCCS results. What could be the meaning of this?

The Explored Educational Climate

The total mean score of the PCCS observed in our study (105/196) is the highest reported in the literature to our knowledge.[17,18] The higher the score, the chillier the perceived climate. The gender difference in scores represents over one-third of the standard deviation and these results designated that females students perceived themselves being treated differently than male students, which provided evidence for a deficit model.[22] Supporters of the deficit model[18] have argued that women in male dominated educations are exposed to a chillier climate than women in traditional higher educational programs despite secular changes in the health care education, and chiropractic education is not an exception.[23]

Females perceiving the educational climate as chilly can influence adversely their self-efficacy and subsequent success in the field.[24] However, subsequent communications with female students, in conjunction with our focus group interviews, revealed that they did not intend to let a chilly climate affect their success negatively. The materialization of their intentions, however, is challenged partly by the fact that chiropractic (especially, training, research, and literature resources) in many parts of the world still is male-dominated.[25,26]

Female students perceiving the climate chillier than males have been observed previously by Janz and Pyke,[17] and Morris and Daniel,[18] and our results also can be supported indirectly by Blickenstaff,[27] who pointed out that, "Chilly climate for women seems to exist in many science classrooms and is largely comprised of the sexist course materials and poor pedagogy. However, the likelihood of harassing behavior toward women by male peers and tutors cannot be uncared for, and has to be addressed by society at large." Our findings are no different than other studies. This notion may be attributable to attitudes and teaching style within the institution or in wider society in general.

Different ethnic and minority background (a parent being an immigrant or belonging to an ethnic minority group) tends to affect the perception of the educational climate adversely,[17,18] and our results suggested a similar trend. However, incongruence in our results exits as this was not evident and manifest from our focus group interviews.

Ethnic and minority differences in academic achievement seem to be a constant feature of health care education. In a recent systematic review and meta-analysis it was professed that discriminations are present across educational institutions, diverse examination styles, on the undergraduate and postgraduate levels, and that these discrepancies have endured for the past three decades.[28]

Woolf et al have pointed out that much effort must be made to resolve these issues.[28] These problems exist and are displayed on a manifest and latent level. If not resolved there will be a struggle to ensure a fair and just method of training, and assessing our future and current primary care providers.

We have reported previously that the institution under scrutiny has displayed an excellent general educational environment.[8] However, in a small institutional environment, even a slight chilliness may become more readily apparent. In contrast, in large institutions such microcultural "defects" tend to become diluted and nonapparent.

Despite demographic differences, all students attending a higher education institution should possess equal opportunities to experience its social and scholastic advantages. When the climate is perceived as intimidating and hostile by various groups of students, the egalitarianism has not been attained. Even with this combined study, it was of course very difficult to pinpoint why female students, students with an ethnic background, and students perceiving themselves belong to a minority group showed significantly lower scores. It also is difficult to execute comparative analysis because the issue is highly dependent on local context, cultural dissimilarities, and unrecognized confounding factors. However, our study made us aware of the existence of such an environment, and may help improve teaching practices, and the personal and professional growth of students.[29] The chilly climate could be improved through enhanced feedback and incorporation of feminist pedagogies, that is replacing competition with collaboration and substituting didactic teaching methods with more inclusive strategies.[30]

Limitations

Our study has provided a greater understanding of the possible reasons for the existence of a chilly climate among undergraduate chiropractic students – an important and underexplored area.

A moderately high response rate (83%), which enhanced the credibility of our findings, suggested that students were interested in completing the project, as they perceived it as an opportunity to make themselves heard and express their opinions. The high internal consistency of the survey, which was above the norm[31] and complied with previous studies,[17,18] supported the choice of the tool.

The PCCS combined with focus groups appeared to be a reliable method of understating gender issues in chiropractic training institutions. Although to our knowledge this is the first study that examines the perception of chiropractic students regarding gender, ethnic, and minority equality, there may be potential limitations to this study that influenced the results.

The potential range of scores for the PCCS is from 28–196, with a midpoint of 112. Hence, a score of less than 112 might erroneously lead one to believe that perceptions of chilly climate are low. However, Janz and Pyke did not offer suggestions for interpreting scores on the scale, making comparisons difficult.[17] With the exclusions of a few PCCS items, the PCCS focus first and foremost on the classroom climate. Furthermore, most items on the PCCS refer exclusively to the treatment of women. As only 9 of the 28 items on the PCCS refer evenly to genders, the PCCS perhaps is a more truthful measure of perceptions of chilly climate for women than for men.

Additionally, Schönrock et al. reported recently that many of the instruments used to assess educational environment in healthcare education, including PCCS, are not grounded on theory.[32] They pointed out that the deficiency of a theoretical framework may describe differences regarding concepts measured in many studies.

From a statistical point of view, using calculations of means and parametric interferential testing on ordinal data derived from Likert scales in surveys as used in this study may not be acceptable to some statisticians. Nevertheless, Carifio and Perla, who raise many supportive statistical arguments, recommend the use of parametric statistics for Likert scales if analyzing more than one single Likert item,[33] which is the case in this study.

Even though it has been advocated that the quantitative and qualitative paradigms should be seen as complementary instead of rivalry,[34] a reasonable question would be: Why did data provide such incongruence in relation to our question?

Although focus groups, as used in our study, provide a very effective forum for an in-depth analysis of a topic, the sensitivity of chilly climate may not have helped achieving its full potential. Maybe the issue of chilly climate is such a delicate and sensitive issue that participants were not totally honest and sincere during the focus group interviews. Personal information most likely will be disclosed when assertion of discretion, privacy, and a noncondemnatory attitude can be secured. In focus groups some of these aspects cannot be achieved. However, Wellings et al. have investigated focus group–generated research with the common challenge of generating discussions around sensitive topics, and have reported that focus groups truly can elicit responses and opinions about sensitive topics, and the dynamics of the focus groups can provide data that are not generated by other research methods.[35]

In our study we looked at the data from a manifest rather the latent angle, from front stage rather than backstage, using the terms derived from the dramaturgical model by Goffman's seminal work.[36] Therefore, it is possible that if other forms of analysis (e.g., discourse analysis) would have been used or if data were looked at using other lenses, such as feminism theory, other concepts would have surfaced and latent notions would have been more translucent.

The study was limited to a single institution and, therefore, generalizability of findings across institutions of chiropractic education may not be possible. However, these findings are not aimed towards empirical generalizability, but conceptual applicability to other settings. Further research may help overcome this limitation. Primarily, the insight generated from our study may help us improve better educational environment by initiating a dialogue around the issues, planning staff development activities, and making necessary changes to the program.

CONCLUSION

The institutional educational environment did not demonstrate alarming issues related to inequity. However, subtle but important gender-, ethnic-, and minority-related issues indicating a propensity of a chilly climate were detected. The findings can help improve the educational environment and culture to provide better educational experience to students. The chilly climate could be fought through awareness, feedback, and incorporation of more versatile pedagogies.

CONFLICTS OF INTERESTS

There were no external sources of funding for this study and no conflicts of interests were identified within this investigation.

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