
ORIGINAL ARTICLE

Impostor phenomenon among US chiropractic students

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Objective: Impostor phenomenon is expressed by feelings of self-doubt and the belief that one is unintelligent. The purpose of this research was to describe the prevalence of impostor phenomenon among students enrolled in a doctor of chiropractic program and to evaluate for any differences in the rates of impostor phenomenon between males and females.

Methods: We performed an anonymous cross-sectional, online survey of all students enrolled in the doctor of chiropractic program at 2 campuses of 1 chiropractic college. We reported the point prevalence of impostor phenomenon and used χ^2 to evaluate the differences in impostor phenomenon among males and females. We also evaluated for between-group differences for 4 other demographic factors believed to influence impostor phenomenon.

Results: We received 406 survey responses (34% response rate). Impostor phenomenon was reported in 39% of students responding to our survey. Approximately 46% of all females and 32% of all males met the criteria for impostor phenomenon, and females had significantly higher rates of impostor phenomenon ($p = .005$). The following variables were not associated with impostor phenomenon: year in which students were enrolled; marital status; whether chiropractic was their first career; and type of clinical experience the student encountered.

Conclusion: Our findings demonstrate that over a third of students enrolled in a doctor of chiropractic program met the criteria for impostor phenomenon, and females were significantly more likely to experience impostor phenomenon. The results from this survey are similar to those reported in other healthcare educational settings.

Key Indexing Terms: Chiropractic; Education; Survey; Education, Impostor Phenomenon

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INTRODUCTION

Impostor phenomenon (IP), impostor syndrome, or impostorism, is defined as “an internal experience of intellectual phonies”¹ and is expressed by feelings of self-doubt and the belief that the individual is unintelligent. Despite past achievements, individuals experiencing IP do not experience an internal sense of competence and frequently credit their successes to factors other than their own intelligence: luck, hard work, personal charm, or a mistake on the part of authorities.¹ Preparedness does not relieve feelings of self-doubt, but has been shown to be weakly correlated with IP.² Additionally, impostor feelings “are shown to be associated with such characteristics as introversion, trait anxiety, a need to look smart to others, a propensity to shame, and a conflictual and nonsupportive family background.”³ IP was originally described in high-achieving females,¹ and several studies have shown that IP is more prevalent in females in a variety of professions, including healthcare.^{4,5} Feeling like an impostor or fake can lead to chronic fear of not being able to achieve or

maintain success in one’s field or area of study, thus causing additional stress, worry, anxiety, and depression.³

Mental health among healthcare professionals and students is a growing area of interest. Mastering knowledge, little time for personal activities, peer competition, and long hours contribute to higher levels of anxiety and stress.⁶ The prevalence of physician burnout, depression, and anxiety has recently been described as being widely prevalent as well. The presence of IP among healthcare students has been shown to be a useful predictor of psychological distress among medical, dental, nursing, and pharmacy students.⁵ IP is also associated with increased anxiety and depression in both undergraduate students and family medicine residents,^{5,7} as well as several components of burnout in American medical students, namely exhaustion, cynicism, emotional exhaustion, and depersonalization.⁴

Female healthcare students appear to be more likely to experience IP, as it has been reported to exist in nearly half of all female medical students,⁴ and it is more than twice as prevalent in female medical students and family medicine

residents than in their male counterparts.^{4,7} Rates of IP have been shown to be significantly higher in 4th-year medical students,⁴ potentially due to increased stress as students prepare to enter residency. This is consistent with Clance's¹ findings that IP tends to present itself more strongly when individuals are faced with new challenges. In 1 study, married medical students were shown to have significantly lower rates of IP than their nonmarried counterparts,⁵ suggesting that being married has a protective effect against IP. However, this finding had only a small association that was not replicated in dental, nursing, or pharmacy students. While IP has been studied in medical, dental, nursing, and pharmacy students and medical residents,^{2,5,7} research in this area among doctor of chiropractic students is limited.

The primary objective of this study was to provide descriptive statistics related to the prevalence of IP among students currently enrolled in a doctor of chiropractic program (DCP) within the United States and to compare the rates of IP between males and females. The authors hypothesized that female DCP students would have higher rates of IP, mirroring what has previously been observed in other healthcare educational settings. Additionally, the authors wished to explore whether other demographic variables were associated with IP. Previous studies have suggested an association between IP and a student's year of enrollment as well as marital status; therefore, we decided to explore the relationship between IP and these demographic variables as a secondary objective of this study. We also evaluated the relationship between IP and 2 other demographic variables that were of interest to us, which were the type of clinical experience the student engaged with and whether chiropractic was the student's first career.

METHODS

We conducted an anonymous, cross-sectional, online survey of IP rates among US chiropractic students enrolled at 2 Palmer College of Chiropractic campuses during the fall-winter 2018–2019 trimester/quarter. The campuses were located in Davenport, Iowa, and San Jose, California. The Palmer College of Chiropractic institutional review board approved the research methods, survey questionnaire, and all associated materials before participant recruitment and data collection took place.

Survey Questionnaire

A review of the literature demonstrated that the Clance Impostor Phenomenon Scale (CIPS) was an appropriate survey to use for specific application to chiropractic students. The CIPS comprises 20 items in which subjects rate their level of agreement on a scale from 1 to 5. Sample items include: "I'm afraid people important to me may find out that I'm not as capable as they think I am" and "I often compare my ability to those around me and think they may be more intelligent than I am." This questionnaire has been shown to have high internal reliability and to be a more sensitive and reliable instrument than other surveys.⁸ The CIPS has been validated⁹ and successfully

used to assess rates of IP among medical, dental, nursing, and pharmacy students, as well as medical residents.^{4,5,7} We obtained permission to use the CIPS and adapt it for our study from the author, Dr. Pauline Rose Clance, via personal communication on August 1, 2018. In addition to the CIPS, our survey included a series of questions to demographically describe study participants.

Pretesting

We pretested the questionnaire with a small group of students representative of the campus population (Campus Guides on Palmer's Davenport, Iowa, campus) to evaluate content validity, clarity, and usability. Narrative feedback was collected, and there were no changes made to the survey.

Eligibility Criteria

This survey involved a convenience sample of students enrolled in the DCP at both campuses. Each respondent agreed to the informed consent in order to be eligible to participate in the study. Informed consent occurred prior to students having access to the survey questionnaire.

Recruitment

The college's registrar provided our team with the email addresses of all DCP students currently enrolled at Palmer's Davenport, Iowa, campus and San Jose, California, campus. Students who had previously placed a hold on their information through the Family Educational Rights and Privacy Act or who had already opted out of SurveyMonkey (San Mateo, CA) surveys were not included within our sample. We received 1198 student email addresses. Of these, 7 were omitted, as 2 email addresses were bounced back, and 5 individuals opted out of SurveyMonkey. Each DCP student received an invitation email to participate in this survey and 2 reminder emails during the 9-day period that the survey was open. All emails contained opt-out instruction, and email addresses that were previously opted out of SurveyMonkey surveys did not receive an invitation or reminder emails.

Reminders to participate also included a written announcement included in the weekly campus announcements email at each campus. A video of the student investigator requesting participation was posted on Palmer student Facebook (Menlo Park, CA) groups on the day the survey opened and on the same days that the reminder emails were sent. Additional recruitment strategies included posting and distributing promotional flyers at both campuses, announcements on campus monitors, and an announcement on the student announcements page on the Palmer website.

Study Design

We developed an online (Survey Monkey) survey questionnaire as part of this project, which incorporated the informed consent document, CIPS, and demographic questions (see Appendix A at www.journalchiroed.com). The survey invitation emails contained a custom URL for each potential participant. The custom URLs prevented duplicate

responses. SurveyMonkey hosted the survey and collected data until the end of the study. At the end of the study, the data were downloaded, stored on a Palmer password-protected server, and prepared for statistical analysis.

Statistical Analysis

Descriptive statistics were summarized and reported in tables using frequency counts and percentages. We also performed χ^2 tests to evaluate for between-group differences regarding IP rates of males and females as well as to evaluate group differences regarding IP and the student's year within the DCP curriculum.

We used a CIPS score of ≥ 62 as the threshold for those individuals demonstrating IP. This threshold for IP identification has been shown to minimize false-positives and false-negatives.⁸

RESULTS

Out of 1191 total students who received our invitation to participate, we received a total of 443 responses from students who gave consent to participate in the survey. Of those, 37 were omitted from statistical evaluation because the survey was either blank or incomplete, giving a total of 406 remaining participants (34% response rate).

The demographic information about the respondents to our survey are summarized in Table 1. We had approximately equal numbers of males and females respond to the survey, and most respondents were young adult, Caucasian, and in the preclinical phase of the educational program, who selected chiropractic as their first career. No significant differences in the rates of IP were observed between the 2 campuses involved in this survey or between racial/ethnic groups ($p = .455$ and $p = .730$, respectively).

The primary outcome of interest in this study was whether gender was related to the rate of IP in DCP students, as assessed using the χ^2 test of independence. The percentage of male respondents who met the criteria for IP was 32%, whereas 46% of the female respondents met the criteria for IP (Table 2). Figure 1 depicts these findings. There was a significant difference in the proportions of males and females who met the criteria for IP ($\chi^2_{1df} = 7.73$; $p = .005$). Therefore, females were statistically more likely to meet the criteria for IP than were males.

Four additional variables were also evaluated, using χ^2 tests, to evaluate potential relationships that may exist with these variables and DCP students manifesting with IP. These 4 variables were (1) year of enrollment in the DCP, (2) the type of clinical experience DCP students engaged with, (3) whether chiropractic was the student's first career, and (4) marital status; these tests are summarized in Table 2.

A χ^2 test was performed to examine the relationship between year in the program and rates of IP. The percentage of students in the first year of the program who met the criteria for IP was 40%, while 37% of 2nd year students met the criteria and 40% of 3rd year students met the criteria. The differences in the proportions of students who met the criteria for IP did not significantly differ between these 3 years ($\chi^2_{2df} = 0.32$, $p = .851$). Therefore, no differences were observed in the proportions

Table 1 - Demographic Information for Survey Respondents

	Total Respondents = 406	Count	Frequency
Gender			
Female		214	52.7%
Male		192	47.3%
Age			
18–24		204	50.2%
25–34		182	44.8%
35–44		16	3.9%
45–54		3	0.7%
55–75+		1	0.2%
Race/ethnicity			
White or Caucasian		352	86.7%
Black or African American		3	0.7%
Hispanic or Latino		18	4.4%
Asian or Asian American		25	6.2%
American Indian or Alaska Native		2	0.5%
Native Hawaiian or Pacific Islander		2	0.5%
Other		4	1.0%
Marital status			
Married		70	17.2%
Unmarried		336	82.3%
Campus			
Davenport, Iowa		323	82.8%
San Jose, California		83	20.4%
Year in the program			
Year 1		172	42.4%
Year 2		100	24.6%
Year 3		134	33.0%
Clinical experience			
On-campus externship		114	28.1%
Off-campus preceptorship		14	3.4%
DoD/VA clerkship		6	1.5%
Students who have not entered into the clinical phase of their DCP		272	67.0%
Was chiropractic their first career			
Yes, first career		303	74.6%
No, not first career		103	25.4%

DoD, US Department of Defense; VA, Veterans Health Administration; DCP, doctor of chiropractic educational program.

of students who met the criteria for IP during the 3 different years of this educational program.

A χ^2 test was performed to examine the relationship between the type of clinical experience DCP students had during the final year of curriculum and rates of IP. The 3 categories of clinical experiences included (1) an on-campus externship, (2) an off-campus preceptorship, or (3) an off-campus Veterans Affairs (VA)/Department of Defense (DoD) clerkship. Students in the clinical phase of their DCP, who responded to this survey, were not evenly distributed across each of these 3 clinical experiences; 85% were engaged with an on-campus externship; 10% were engaged with an off-campus preceptorship, and 5% were participating in a VA/DoD clerkship. The percentage of on-campus externs who met the criteria for IP was 37%, while the percentage of students participating in an off-campus preceptorship was 57% and the percentage of off-

Table 2 - Comparisons of Baseline Characteristics and Impostor Phenomenon (IP)

Baseline Characteristic	Met Criteria for IP	Did Not Meet the Criteria for IP	χ^2 Results
Gender			
Males	62 (15.3%)	130 (32.0%)	$\chi^2 (1) = 7.73$ $p = .005^*$
Females	98 (24.1%)	116 (28.6%)	
Year in the DCP			
Year 1	69 (17.0%)	103 (25.4%)	$\chi^2 (2) = 0.32$ $p = .851$
Year 2	37 (9.1%)	63 (15.5%)	
Year 3	54 (13.3%)	80 (19.7%)	
Clinical experience during final year ^a			
On-campus externship	42 (31.3%)	72 (53.7%)	$\chi^2 (2) = 3.95$ $p = .139$
Off-campus preceptorship	8 (6.0%)	6 (4.5%)	
VA or DoD clerkship	4 (3.0%)	2 (1.5%)	
Chiropractic as the student's first career			
Yes, first career	120 (29.6%)	183 (45.1%)	$\chi^2 (1) = 0.02$ $p = .890$
No, not first career	40 (9.9%)	63 (15.5%)	
Marital status ^b			
Married	22 (5.4%)	48 (11.9%)	$\chi^2 (1) = 2.18$ $p = .140$
Not married (single)	137 (33.8%)	198 (48.9%)	

* Statistically significant.

^a Only 134 respondents were in the clinical phase of training and eligible to answer this question.

^b Only 405 (out of a total of 406) of our survey respondents reported their marital status.

campus VA/DoD externs was 67%. There were no significant differences in the proportions of students who met the criteria for IP at any of the 3 different clinical experiences involved with this DCP ($\chi^2_{2df} = 3.95, p = .139$).

A χ^2 test was performed to examine the relationship between rates of IP and whether chiropractic was the student's first career. The percentage of students stating that chiropractic was their first career who met the criteria for IP was 40%, whereas 39% of students stating that chiropractic was not their first career met the criteria. There were no significant differences in the proportions of students who met the criteria for IP based on whether chiropractic was their first career or if they enrolled in the DCP after engaging with another career ($\chi^2_{1df} = 0.02, p = .890$).

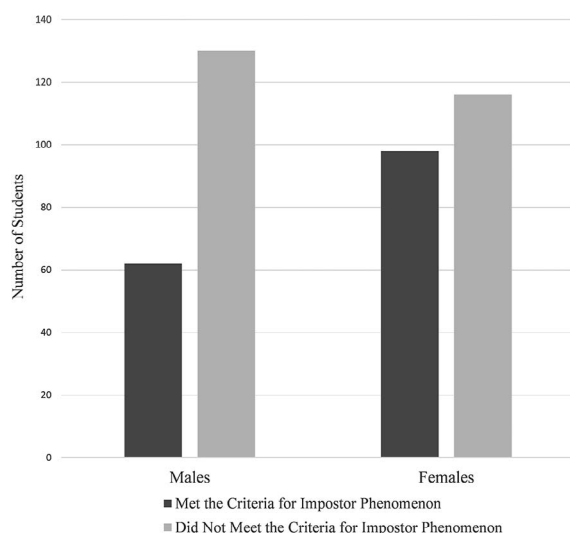


Figure 1 - Differences in gender and IP. Females are more likely to demonstrate IP than are males ($\chi^2_{1df} = 7.73; p = .005$).

A χ^2 test was performed to examine the relationship between marital status and rates of IP. The percentage of married DCP students who met the criteria for IP was 31%, while 41% of unmarried students met the criteria. There were no significant differences in the proportions of married or single students who met the criteria for IP ($\chi^2_{1df} = 2.18, p = .140$).

DISCUSSION

To our knowledge, this study is the first investigation into the prevalence of IP within chiropractic education, as well as the chiropractic profession, and contributes to the evolving understanding of IP in healthcare. The prevalence of IP among DCP students (46% females, 32% males) is similar to the rates reported in medical residents (41% females, 24% males)⁷; medical students (49.4% females, 23.7% males)⁴; and a group of medical, dental, nursing, and pharmacy students (37.8% females, 22% males).⁵ Our results support that IP is significantly more prevalent in female DCP students than in males, which is consistent with the existing literature on IP in other healthcare fields.

IP has been shown to be a better indicator of psychological distress in medical, dental, nursing, and pharmacy students than demographic factors or personality characteristics⁵ and has also been shown to be associated with test anxiety in students.¹⁰ Therefore, identifying individuals with IP can help identify those who are at a higher risk of psychological distress and reduced academic performance, who may be in need of additional resources in the DCP. Working to ameliorate IP in the DCP may improve educational and professional experiences overall.

No correlation was found between IP and year in the DCP, marital status, chiropractic as the individual's first career, or type of student clinical experience. In contrast,

IP was found to increase in 4th-year medical students.⁴ Further research could include a longitudinal study to see if IP rates change within DCP students over time, even as the overall average remains the same, as observed in the cross-sectional samples acquired in this study. Marital status had a small protective effect against IP in medical students,⁵ but this was not found in dental, nursing, pharmacy students, or in the DCP students in our study.

While IP may prevent setbacks associated with overconfidence in the workplace, current literature shows that IP is associated with several characteristics that contribute to reduced professional success. Individuals experiencing IP have been shown to report greater experiences of negative emotions (anxiety, dissatisfaction, guilt, and humiliation),¹¹ attribute failure to personal characteristics,¹¹ have less confidence in their own intelligence,¹⁰ and to have reduced adaptive coping.¹² As a result, these individuals are likely to have reduced resilience in the professional sphere when experiencing setbacks. This is particularly important for healthcare professionals who help patients through health setbacks along their road to recovery. Resilience is important not only for the clinical sphere, but also for doctors' business responsibilities. Many doctors of chiropractic choose to open private practices, which brings about both business and clinical challenges. Resilience to work through setbacks is crucial for successful entrepreneurship. IP has also been found to impact goal setting, which could impact both clinical and business goals for doctors of chiropractic. Individuals experiencing IP are more likely to be driven by a fear of failure than the drive to achieve when setting goals,¹⁰ which may cause doctors to set goals lower than their full potential, hindering their businesses and altering clinical goals communicated to patients.

Individuals experiencing IP who choose not to open a business may be less likely to have success in climbing professional hierarchies, as IP has been shown to negatively impact career planning in students,¹³ negatively influence working professionals' motivation to lead,¹³ and contribute to career decision-making difficulties.¹² Several studies have noted that IP is associated with low self-esteem and unstable self-esteem,¹⁴ which may negatively contribute to professional relationships. Further research could investigate whether IP increases the risk of dropping out of the chiropractic profession and whether efforts to ameliorate IP might lead to improved academic and/or clinical success in the DCP and beyond.

Workshops for clinical nurse specialists,¹⁵ which focused on awareness and working on personal strategies to address IP, have been shown to qualitatively improve individuals' experiences of IP. A similar workshop could be applied to chiropractic students, and future research could investigate if this workshop could improve CIPS scores. IP has also been shown to be correlated with low levels of self-compassion,¹⁶ so workshops focused on improving self-compassion may also help individuals overcome IP. Women not experiencing IP have been shown to have strong relationships

with mentors, romantic partners, and other women in leadership.¹⁷ Programs that highlight women in chiropractic leadership and networking opportunities to establish professional mentors may also help female chiropractic students overcome IP. Further research could also include investigations into students' perceptions of mentorship throughout the DCP, particularly by same-gendered faculty.

Limitations

This study is limited in its generalizability, as the investigation was limited to 2 campuses of 1 college. Selection bias may have contributed to our results, as students who self-selected to participate in the survey could be significantly different from those who chose not to respond.

CONCLUSION

IP was present in over one third of doctor of chiropractic students at 2 campuses of 1 chiropractic college and significantly more prevalent in females. We found no association between IP and year in the program, marital status, chiropractic as the individual's first career, or type of clinical experience. Our results are similar to previous studies investigating IP in healthcare student populations.

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Author Contributions

Concept development: KAK, CBR. Design: KAK, CBR, KH. Supervision: KAK, CBR, KH. Data collection/processing: KAK, CBR, KH. Analysis/interpretation: CBR. Literature

REFERENCES

1. Clance PR, Imes SA. The imposter phenomenon in high achieving women: dynamics and therapeutic intervention. *Group Dyn*. 1978;15(3):241–247.
2. Christensen M, Aubeeluck A, Fergusson D, et al. Do student nurses experience imposter phenomenon? An international comparison of final year undergraduate nursing students readiness for registration. *J Adv Nurs*. 2016;72(11):2784–2793.
3. Langford J, Clance PR. The impostor phenomenon: recent research findings regarding dynamics, personality and family patterns and their implications for treatment. *Psychotherapy*. 1993;30(3):495–501.
4. Villwock JA, Sobin LB, Koester LA, Harris TM. Impostor syndrome and burnout among American medical students: a pilot study. *J Int Assoc Med Sci Educ*. 2016;7:364–369.
5. Henning K, Ey S, Shaw D. Perfectionism, the impostor phenomenon and psychological adjustment in medical, dental, nursing and pharmacy students. *Med Educ*. 1998;32(5):456–464.
6. Vitaliano PP, Russo J, Carr JE, Maiuro RD, Becker J. The ways of coping checklist: revision and psychometric properties. *Multivariate Behav Res*. 1985;20(1):3–26.
7. Oriol K, Plane MB, Mundt M. Family medicine residents and the impostor phenomenon. *Fam Med*. 2004;36(4):248–252.
8. Holmes SW, Kertay L, Adamson LB, Holland CL, Clance PR. Measuring the impostor phenomenon: a comparison of Clance's IP Scale and Harvey's I-P Scale. *J Pers Assess*. 1993;60(1):48–59.
9. Chrisman SM, Pieper WA, Clance PR, Holland CL, Glickauf-Hughes C. Validation of the Clance Impostor Phenomenon Scale. *J Pers Assess*. 1995;65(3):456–467.
10. Kumar S, Jagacinski CM. Imposters have goals too: the imposter phenomenon and its relationship to achievement goal theory. *Pers Individual Dif*. 2006;40(1):147–157.
11. Thompson T, Davis H, Davidson J. Attributional and affective responses of impostors to academic success and failure outcomes. *Pers Individual Dif*. 1998;25(2):381–396.
12. Neureiter M, Traut-Mattausch E. Two sides of the career resources coin: career adaptability resources and the impostor phenomenon. *J Vocat Behav*. 2017;98:56–69.
13. Neureiter M, Traut-Mattausch E. An inner barrier to career development: preconditions of the impostor phenomenon and consequences for career development. *Front Psychol*. 2016;7:48.
14. Schubert N, Bowker A. Examining the impostor phenomenon in relation to self-esteem level and self-esteem instability. *Curr Psychol*. 2019;38:749–755.
15. Haney TS, Birkholz L, Rutledge C. A workshop for addressing the impact of the impostor syndrome on clinical nurse specialists. *Clin Nurse Spec*. 2018;32(4):189–194.
16. Patzak A, Kollmayer M, Schober B. Buffering impostor feelings with kindness: the mediating role of self-compassion between gender-role orientation and the impostor phenomenon. *Front Psychol*. 2017;8:1289.
17. Sanford AA, Elaina M Ross, Blake SJ, Cambiano RL. Finding courage and confirmation: resisting impostor feelings through relationships with mentors, romantic partners, and other women in leadership. *Advancing Women Leadership Online Journal*. 2015;35:31–41.