

2023

## Prevalence and predictive factors of impostor phenomenon among graduate students in healthcare-related programs

Stefanie Anderson

*Department of Physical Therapy, University of Findlay, andersons4@findlay.edu*

Ally Decker

*Department of Physical Therapy, University of Findlay*

Taylor Garlock

*Department of Physical Therapy, University of Findlay*

Calista Hammonds

*Department of Physical Therapy, University of Findlay*

Hannah Morris

*Department of Physical Therapy, University of Findlay*

*See next page for additional authors*

Follow this and additional works at: <https://hpe.researchcommons.org/journal>

---

### Recommended Citation

Anderson, Stefanie; Decker, Ally; Garlock, Taylor; Hammonds, Calista; Morris, Hannah; and Sowers, Braxton (2023) "Prevalence and predictive factors of impostor phenomenon among graduate students in healthcare-related programs," *Health Professions Education*: Vol. 9: Iss. 3, Article 1.

Available at: <https://hpe.researchcommons.org/journal/vol9/iss3/1>

This Featured Articles is brought to you for free and open access by Health Professions Education. It has been accepted for inclusion in Health Professions Education by an authorized editor of Health Professions Education.

---

## Prevalence and predictive factors of impostor phenomenon among graduate students in healthcare-related programs

### Authors

Stefanie Anderson, Ally Decker, Taylor Garlock, Calista Hammonds, Hannah Morris, and Braxton Sowers

## FEATURED ARTICLES

# Prevalence and Predictive Factors of Impostor Phenomenon Among Graduate Students in Healthcare-related Programs

Stefanie Anderson\*, Ally Decker, Taylor Garlock, Calista Hammonds, Hannah Morris, Braxton Sowers

Department of Physical Therapy, University of Findlay, 1000 N. Main St. Findlay, OH 45840, USA

### Abstract

**Purpose:** Impostor Phenomenon (IP) is characterized by an individual's self-perception of incompetence and self-doubt that may not accurately reflect their true capabilities. This study investigated the prevalence and predictive factors of impostor phenomenon among graduate students enrolled in healthcare-related programs.

**Methods:** A mixed methods study was conducted at the University of Findlay utilizing an electronic questionnaire that was distributed to students enrolled in graduate level healthcare-related programs at the university and other academic institutions. The survey consisted of 36 questions to collect demographic information, stress and mental health information, and the validated 20-item Clance Impostor Phenomenon Scale (CIPS). Results were analyzed in JASP 16.3 including descriptive statistics and logistic regression.

**Results:** The frequency distributions for scoring  $\geq 62$  on the CIPS demonstrated the prevalence of IP for each healthcare program. Mean CIPS scores for nursing practitioner students (59.96), occupational therapy students (67.39), pharmacy students (70.69), physical therapy students (68.53), physician assistant students (68.29), and speech therapy students (69.67) were determined. When examining predictive factors of IP, there was a statistically significant difference ( $p < 0.001$ ) in the odds of scoring  $\geq 62$  on the CIPS based on gender (OR = 0.53 [0.38, 0.74]), anxiety (OR = 0.36 [0.27, 0.48]) and depression (OR = 0.28 [0.20, 0.40]). There was no statistically significant difference in the odds of scoring  $\geq 62$  on the CIPS based on minority status (OR = 1.23 [0.87, 1.74]) or being a first-generation college student (OR = 0.78 [0.56, 1.07]).

**Conclusion:** The results of this study confirmed that graduate students enrolled in healthcare-related programs experience IP. Students who are female or with a previous diagnosis of anxiety or depression were significantly more likely to experience IP. First generation college students and minority status did not significantly influence impostor experiences in this study. Given the high prevalence of IP among graduate healthcare students found in this study, it is important for educators and administrators to be aware of the issue and take steps to support students with impostor experiences.

**Keywords:** Impostor phenomenon, Impostor syndrome, Graduate students, Health care students, Mental health

## 1. Introduction

Impostor phenomenon (IP), also known as impostor syndrome (IS), has become a frequently discussed topic in higher education. First identified as a phenomenon by Clance and Imes (1978), IP is characterized by an individual's self-

perception of incompetence and self-doubt that may not accurately reflect their true capabilities [1]. Individuals experiencing IP often find ways to disprove evidence supporting their intelligence attributing success to luck, a mistake in judgment by others, or the ability to fool others [1,2]. Therefore, IP often leads to fear of exposure as a fraud [1,2].

---

Received 31 January 2023; revised 26 April 2023; accepted 28 April 2023.  
Available online 1 August 2023

\* Corresponding author.

E-mail addresses: [Andersons4@findlay.edu](mailto:Andersons4@findlay.edu) (S. Anderson), [deckera2@findlay.edu](mailto:deckera2@findlay.edu) (A. Decker), [garlockt@findlay.edu](mailto:garlockt@findlay.edu) (T. Garlock), [lewisc@findlay.edu](mailto:lewisc@findlay.edu) (C. Hammonds), [morrish1@findlay.edu](mailto:morrish1@findlay.edu) (H. Morris), [sowersb@findlay.edu](mailto:sowersb@findlay.edu) (B. Sowers).

<https://doi.org/10.55890/2452-3011.1047>

2452-3011/© 2023 Association of Medical Education in the Eastern Mediterranean Region (AMEEMR). This is an open access article under the CC BY-NC license (<http://creativecommons.org/licenses/by-nc/4.0/>). Sponsored by King Saud bin Abdulaziz University for Health Sciences.

Clinical symptoms that have been associated with IP include generalized anxiety disorder, low self-esteem, and depression [2].

### 1.1. Graduate student populations

In this study, a graduate student is defined as an individual seeking a degree beyond a bachelor's level, including a master's or doctoral degree. The mental health of graduate students is a growing concern. In a global survey of 14,000 graduate students, it was found that 35% met the criteria for one or more mental health conditions [3]. Graduate students often experience high levels of stress due to program academic rigor, competitive environments, high level evaluations, and managing additional responsibilities outside of academia [3]. Therefore, academic stressors combined with difficulty managing work-life balance can lead to burnout and mental health conditions. One study found that one out of every three graduate students sought counseling for anxiety or depression, while another found that graduate students were six times more likely to experience anxiety and depression than their peers in the same age bracket [3].

Graduate students enrolled in healthcare-related programs have the additional stressor of clinical education. Clinical education is essential in the development of professionalism, psychomotor skills, and integrating theoretical didactic education into clinical practice. Transitional periods of life such as entering a new clinical environment or a graduate program have been linked to IP experiences placing graduate students in healthcare-related programs at an elevated risk [4]. Fear of mistakes, supervision by an experienced clinician, new clinical environments, and feeling inadequately prepared for the clinical environment may lead to increased stress, IP, and burnout, [5].

When determining the prevalence of IP among graduate students enrolled in healthcare-related programs, demographic variables and personal factors must be taken into account. Studies have shown that IP is more prevalent among female students, first generation students, minority students, students with low self-esteem, and students with perfectionistic tendencies [2,6,8]. A systematic review by Bravata and colleagues (2020) of 33 articles comparing IP based on gender, found 16 articles identifying women as having a statistically significant increased rate of IP compared to men [2]. However, 17 of the articles found no significant difference between men and women in rate of IP.

Overall, the study concluded that IP commonly affects women, but is also experienced by men [2]. Those studies indicating a higher prevalence of IP in women graduate students, may be impacted by the higher rate of females enrolled in healthcare-related graduate programs compared to men. The Council of Graduate Schools reported in 2020 that the majority of graduate master's and doctoral degrees in Health and Medical Science programs were earned by women (79.1%) compared to men (20.9%) [7].

Furthermore, the study by Bravata and colleagues (2020) identified multiple studies correlating IP with minority groups including African Americans, Asian Americans, and Latino Americans [2]. Several factors were identified as contributing to distress in minority college students including decreased financial aid, work responsibilities, racial discrimination, stereotyping, and being a first-generation college student [2]. Additionally, another study found that college students who experienced self-perceived competitive course environments reported increased impostor feelings [8]. This was especially true among first generation college students contributing to a decline of overall performance and program commitment [8]. Since healthcare-related graduate programs are often competitive in nature, this may place first generation students in these programs at increased risk for IP [3].

### 1.2. Student performance

IP has been shown to have an adverse effect on graduate students' mental health, self-esteem, problem-solving capabilities, collaboration, and overall performance [9]. By attributing their successes to external factors, rather than their own capabilities, students are perpetuating negative beliefs about themselves that lead to self-imposed unrealistic expectations to combat their feelings of inadequacy [9–11]. The inability to meet self-imposed high standards can lead to depression and negative coping mechanisms including perfectionism and procrastination [3]. This can further lead to compensatory excessive work to the level of perfection combined with additional stress and anxiety resulting from procrastination [11].

The most common clinically reported symptoms associated with IP includes anxiety and low self-esteem [9]. Furthermore, IP has been associated with burnout contributing to increased levels of exhaustion, cynicism, depersonalization, inability to concentrate, irritability, and insomnia [10]. Burnout often mimics depression symptoms and fifty percent of individuals with burnout, also meet the

criteria for depression [10]. IP combined with burnout can result in maladaptive coping strategies, negative mental health effects including anxiety and depression, and overall exhaustion resulting in negatively impacted student performance in the classroom and in their chosen profession [9–11].

### 1.3. Study aim

Most previous research exploring the prevalence of IP in graduate healthcare student populations has primarily focused on medical students. The research is lacking in other graduate level healthcare-related programs including physical therapy, occupational therapy, pharmacy, speech pathology, physician assistant, and nurse practitioner. This study aimed to fill this gap in knowledge by exploring the prevalence of IP in a variety of graduate level healthcare-related programs, and investigating the impact of gender, minority status, and other personal factors on IP experiences for these students. By better understanding the prevalence and impact of IP on graduate healthcare students, educators and practitioners can develop interventions to help students overcome these negative beliefs and improve their mental health and performance in their chosen profession.

## 2. Methods

### 2.1. Overview

This was a mixed methods study with a survey design. Participants in this study were students from multiple graduate level healthcare-related programs across the United States. Potential participants were identified through student rosters and through email to program chairs. 755 graduate students enrolled in the researching university's healthcare-related graduate programs were directly contacted via email and 1643 program chairs were emailed to share the study's student recruitment email with their students. Targeted healthcare-related graduate programs included physical therapy, occupational therapy, speech therapy, pharmacy, physician assistant, and nurse practitioner programs. Participants received a recruitment email providing a link to a secure electronic database, SurveyMonkey, to complete the electronic questionnaire composed of 36 questions. Participation was restricted to graduate level students currently enrolled in healthcare-related programs in the United States of America. Participants were informed that the study received ethical approval from the Researchers' Ethics Board. Participation was voluntary, no identifying data was

collected, and participants were not compensated. Estimated completion time for the survey was 10–15 min.

### 2.2. Materials

Web-based data collection has been found to be a valid approach for questionnaire-based research [12]. This study utilized a secure electronic database, Survey Monkey, for data collection via an electronic survey. The Clance Impostor Phenomenon Scale (CIPS) was utilized within the study's survey to assess participant impostor experiences [13]. The CIPS has been found to have high internal reliability of 0.96 [14]. Written approval to include the CIPS in this study's questionnaire was granted by Dr. Pauline Rose Clance, Ph.D., ABPP before recruiting participants. The CIPS is comprised of 20 items that each participant rates on a 5-point Likert scale (1; not at all true, 2; rarely true, 3; sometimes true, 4; often true, 5; very true) resulting in a total score ranging from 20 to 100. According to the CIPS scale a total score of 40 or less indicates few impostor experiences, a score between 41 and 60 indicates moderate impostor experiences, a score between 61 and 80 indicates frequent impostor feelings, and a score higher than 80 indicates intense impostor experiences [13]. Overall, a higher score on the scale, indicates a higher prevalence of IP experiences [13]. An established CIPS cutoff score of 62 was established by Holmes and colleagues (1993) indicating the lowest total score for the high impostor experiences category in this study [14]. In addition to the CIPS, participants responded to 16 questions collecting demographic information, program requirements, and the presence of a diagnosis of anxiety, depression, or other mental health disorders. In answering these questions, the participants provided information on previously identified predictive factors of IP.

### 2.3. Participants

Of the total 1285 responses, 1204 participants met the inclusion criteria of being actively enrolled in graduate level healthcare-related programs and completion of the CIPS questionnaire in its entirety. Of the 1204 participants, 316 were physical therapy graduate students, 192 were physician assistant graduate students, 50 were nurse practitioner graduate students, 254 were speech pathology graduate students, 263 were occupational therapy graduate students, 95 were graduate pharmacy students, and 34 selected "Other" (Table 1a). With respect to

participant gender demographics, 165 students were male, 1021 were female, 15 were non-binary, 2 preferred not to disclose, and 1 did not indicate gender (Table 1b). With respect to participant race/ethnicity, 2 participants were American Indian or Alaska Native, 49 were Asian, 35 were Black or African American, 1 was Native Hawaiian or other Pacific Islander, 1024 were white, 39 were two or more races, 42 selected “Other”, and 12 preferred not to disclose (Table 1c). When participants were asked whether or not they were a first-generation college student, 249 answered “Yes”, 954 answered “no”, 1 did not disclose (Table 1d).

#### 2.4. Analysis

Descriptive statistics and frequency were calculated for each subgroup within the total sample in JASP 16.3. A logistic regression analysis was calculated in JASP 16.3 across all program types for each previously identified predictive factor (gender, race, first generation college student, anxiety, and depression). Participants identifying as female or male were included in the gender data analysis. Those participants identifying as non-binary or that did choose a gender identity were excluded as outliers due to the small sample size. Confidence interval and relative odds were used to explore the association between categorized variables. A Wald Chi-Squared test was performed to confirm significance. The statistical level of significance was set at  $p < 0.05$ .

### 3. Results

Table 2a displays the differences between graduate level healthcare-related programs in the prevalence of high impostor experiences, mean impostor scores, and standard deviation. All healthcare-related graduate level programs with the exception of nurse practitioner programs, had a greater prevalence of students in the higher impostor experience category (CIPS score  $\geq 62$ ) than the lower impostor experience category (CIPS score  $< 62$ ). Mean scores for students enrolled in healthcare-related programs included occupational therapy 67.39 (13.76),

Table 1a. Number of participants per area of study.

Area of Study	Number of Responses
Nurse Practitioner	50
Occupational Therapy	263
Pharmacy	95
Physical Therapy	316
Physician Assistant	192
Speech Pathology	254
Other	34
TOTAL	1204

Table 1b. Number of participants by gender.

Gender	Number of Responses
Male	165
Female	1021
Non-Binary	15
Transgender	0
Preferred Not to Disclose	2
Did not disclose	1
TOTAL	1204

pharmacy 70.69 (13.56), physical therapy 68.53 (12.36), physician assistant 68.29 (14.73), and speech therapy 69.67 (14.22) and across all programs 68.20 (14.07); were above the cut off score of 62 indicating high impostor experiences, with the exception of nurse practitioner students 59.96 (17.89).

Table 2b shows the association between the previously identified predictive factors and IP. These factors were gender, race, first generation college students, anxiety and depression. The results showed there was a statistically significant difference ( $p < 0.001$ ) in the odds of scoring  $\geq 62$  on the CIPS based on gender (OR = 0.53 [0.38, 0.74]). There was also a significant difference ( $p < 0.001$ ) in the odds of individuals scoring  $\geq 62$  on the CIPS based on mental health diagnoses including anxiety (OR = 0.36 [0.27, 0.48]) or depression (OR = 0.28 [0.20, 0.40]). However, there was not a statistically significant difference in the odds of scoring  $\geq 62$  on the CIPS based on minority status (OR = 1.23 [0.87, 1.74]) or being a first-generation college student (OR = 0.78 [0.56, 1.07]).

### 4. Discussion

This study aimed to determine the prevalence of IP in graduate healthcare-related programs. Results revealed that 69.52% of the graduate students surveyed scored in the high impostor experiences category. Graduate students in occupational therapy, pharmacy, physical therapy, physician assistant, and speech therapy programs had frequent fraudulent feelings and self-doubt. Females and those with a previous diagnosis of anxiety or

Table 1c. Number of participants by ethnicity/race.

Ethnicity/Race	Number of Responses
American Indian or Alaska Native	2
Asian	49
Black or African American	35
Native Hawaiian or other Pacific Islander	1
White	1024
Two or More Races	39
Other	42
Preferred Not to Disclose	12
TOTAL	1204

Table 1d. Number of responses per generational status.

Generational Status	Number of Responses
First Generation Student	249
Not First Generation Student	954
Did not disclose	1
TOTAL	1204

depression were more likely to have high impostor experiences. Contrary to prior research, being a first-generation college student and minority status did not significantly influence impostor experiences in this study.

The prevalence of IP across the graduate healthcare-related programs studied was high, with a mean score of 68.20. This prevalence was similar to another study of pharmacy residents finding an IP prevalence of 57.5% and a mean score of 64.0 [15]. Prior mental health treatment was found to be a predictor of IP in this study, as well. Another study provided insight into the impact of prior clinical experience on impostor feelings for new graduate nurse practitioners [16]. The authors described Benner's stages of career development. This model states that it takes 3–5 years within a field to become an expert and notes a progression of expertise over time [16]. Nurse practitioner students have prior nursing experience before entering the graduate level program. This may explain the reasoning behind the lower CIPS scores found in our study for nurse practitioner students compared to students enrolled in other healthcare-related programs without prior clinical experience in their chosen field.

Female gender was found to be a significant predictor of IP in this study. There is conflicting evidence in the current literature on the impact of gender as a predictor of IP experiences. One study assessed the prevalence and predictive factors of IP experiences in individuals studying nutrition found that female gender was not a predictor of greater IP experiences, despite having a greater population of female participants [17]. A similar study looking at IP prevalence in the field of radiology found no association between gender and IP experiences; however, this study had a greater male participant population than female [18]. Studies where a higher prevalence of IP in women was found, may be contributed to the fact that there are more women pursuing healthcare-related graduate degrees compared to men [7]. Despite conflicting evidence on the impact of gender on IP, it can be stated that both female and male graduate students are capable of experiencing IP. Gender comparisons for this study was specific to male and female genders due to the small sample size of participants identifying as non-binary, future research focusing on this population of students is needed.

A diagnosis of depression or anxiety was found to be a significant predictor of IP in this study. However, since this is a non-experimental study, causality cannot be determined. Similarly, another study found a correlation between CIPS scores and depressive symptoms, trait anxiety, and state anxiety in family medicine residents [19]. Thus, it is necessary to raise awareness of the issue and provide assistance to graduate students with impostor experiences.

Table 2a. Healthcare Graduate Program differences in CIPS Scores.

Graduate Level Health Professional Programs	CIPS Score 0–61	CIPS Score 62–100	CIPS Mean Scores (SD)
	Low Impostor Experiences Frequency (%)	High Impostor Experiences Frequency (%)	
Nurse Practitioner	27 (54.00%)	23 (46.00%)	59.96 (17.89)
Occupational Therapy	88 (33.33%)	176 (66.67%)	67.39 (13.76)
Pharmacy	22 (22.92%)	74 (77.08%)	70.69 (13.56)
Physical Therapy	92 (29.02%)	225 (70.98%)	68.53 (12.36)
Physician Assistant	65 (33.51%)	129 (66.49%)	68.29 (14.73)
Speech Therapy	63 (24.71%)	192 (75.29%)	69.67 (14.22)
Total across all programs	367 (30.48%)	837 (69.52%)	68.20 (14.07)

Table 2b. Association between predictive factors and IP.

Demographic Subgroup	Odds Ratio	95% CI	p-value
Gender	0.53	[0.38, 0.74]	<0.001
Race	1.23	[0.87, 1.74]	0.24
First Generation Student	0.78	[0.56, 1.07]	0.12
Individuals Diagnosed with Anxiety	0.36	[0.27, 0.48]	<0.001
Individuals Diagnosed with Depression	0.28	[0.20, 0.40]	<0.001

Contrary to prior research, being a first-generation college student and minority status did not significantly influence impostor experiences in this study. This finding may be due to the low number of participants in this study identifying as first-generation college students and minority races. Further research is needed to examine the relationship between IP and these factors.

Approaches to support students with high IP experiences are limited, with a few recommendations including validating individuals' doubts and fears, addressing fear of failure, and group therapy [2]. Two recent studies reported benefits of workshops geared toward individuals with IP, including a cognitive processing therapy intervention workshop and an interactive education workshop [20,21]. However, further research and guidelines are needed to address student impostor feelings in graduate healthcare-related programs.

Moreover, this study has important implications for healthcare educators and administrators. Given the high prevalence of IP among graduate healthcare students, it is imperative that educators and administrators are aware of the issue and take steps to support students with impostor experiences. Furthermore, interventions aimed at addressing impostor feelings along with providing support to students with mental health issues such as anxiety and depression may be beneficial. Additionally, workshops and other interventions may be useful tools in helping students cope with impostor experiences.

#### 4.1. Limitations

There were several limitations in this study that provides areas for future research. First, impostor feelings were measured by a self-reported survey. This limitation is largely mitigated due to the reliability of the CIPS. That being said, the CIPS does not diagnose an individual as having IP, but instead provides insight into impostor experiences. Future research utilizing an interview to substantiate CIPS results may be beneficial. Second, participant honesty was another possible limitation. Participants may not have been fully honest regarding their demographics or their answers on the CIPS. Third, participant report of a depression or anxiety diagnosis was not further assessed utilizing an assessment questionnaire. Future research should include a reliable and valid assessment questionnaire for anxiety and depression. Fourth, demographic information specific to students' current year of study was not collected. It is possible that students with higher IP experiences were in the

early years of graduate training. Fifth, was the small minority and first-generation sample size in this study. The small number of participants identifying as a minority race or a first-generation student may not accurately reflect the experiences of all students in those groups. Further research targeting these populations is needed.

#### 4.2. Conclusion

In conclusion, this study provides insight into the prevalence of IP among graduate healthcare students enrolled in programs outside of medical school. The findings suggest that a large proportion of these students experience fraudulent feelings and self-doubt. Females and those with a previous or current diagnosis of anxiety or depression were found to be at increased risk of having impostor experiences. The results did not identify being a first-generation college student or a student of a minority race as significant predictive factors for impostor experiences. Given the high prevalence of IP among graduate healthcare students, it is important for educators and administrators to be aware of the issue and take steps to support students with impostor experiences. Further research is needed to develop effective interventions to address this important issue.

#### Ethical approval

Ethical Approval has been granted from The University of Findlay Institutional Review Board for research involving human subjects (3 March 2022, IRB#1608).

#### Funding

None.

#### Other disclosure

Written permission received by Dr. Pauline Rose Clance, Ph.D., ABPP the use of Clance Impostor Phenomenon Scale (CIPS) in this research survey.

#### Conflicts of interest

None.

#### Acknowledgements

The authors are thankful to Dr. Pauline Rose Clance, Ph.D., ABPP for permission to utilize the Clance Impostor Phenomenon Scale (CIPS) in this research study, without compensation.



## References

- [1] Clance P, Imes S. The impostor phenomenon in high achieving women: dynamics and therapeutic intervention. *Psychotherapy* 1978;15:241–7.
- [2] Bravata DM, Watts SA, Keefer AL, Madhusudhan DK, Taylor KT, Clark DM, et al. Prevalence, predictors, and treatment of impostor syndrome: a systematic review. *J Gen Intern Med* 2020;35(4):1252–75. <https://doi.org/10.1007/s11606-019-05364-1>.
- [3] Okoro C, Owojori OM, Umeokafor N. The developmental trajectory of a decade of research on mental health and well-being amongst graduate students: a bibliometric analysis. *Int J Environ Res Publ Health* 2022;19(9):4929. <https://doi.org/10.3390/ijerph19094929>.
- [4] Durham AJ, Anderson S. Unmasking the student impostor: remedies for the impostor phenomenon to promote student success in the clinic. *Educ Health Prof* 2022;5(1):1–3.
- [5] Durgun Ozan Y, Duman M, Çiçek Ö, Baksi A. The effects of clinical education program based on Watson's theory of human caring on coping and anxiety levels of nursing students: a randomized control trial. *Psychiatr Care* 2020;56(3):621–8. <https://doi.org/10.1111/ppc.12477>.
- [6] Gottlieb M, Chung A, Battagiolo N, Sebok-Syer SS, Kalantari A. Impostor syndrome among physicians and physicians in training: a scoping review. *Med Educ Rev* 2019;54:116–24.
- [7] Perry M. Women earned majority of doctoral degrees in 2020 for 12th straight year and outnumber men in grad school 148 to 100. *AEI* October 14, 2021. . [Accessed 18 April 2023].
- [8] Canning EA, LaCrosse J, Kroeper KM, Murphy MC. Feeling like an imposter: the effect of perceived classroom competition on the daily psychological experiences of first-generation college students. *Soc Psychol Personal Sci* 2019;11(5):647–57.
- [9] Wiegand R, Barton A, Zaksessi B, Mackey I. Impostor syndrome: what it is and how to overcome it as a graduate student. *Nat Assoc School Psychol* 2021;49(8):35.
- [10] Villwock JA, Sobin LB, Koester LA, Harris TM. Impostor syndrome and burnout among American medical students: a pilot study. *Int J Med Educ* 2016;7:364–9.
- [11] Maftai A, Dumitriu A, Holman A-C. “They will discover I’m a fraud!” The impostor syndrome among psychology students. *Stud Psychol* 2021;63(4):337–51.
- [12] Gosling SD, Vazire S, Srivastava S, John OP, et al. Should we trust web-based studies? A comparative analysis of six pre-conceptions about internet questionnaires. *Am Psychol* Feb. 2004;59(2):93–104.
- [13] Clance PR. *Clance Impostor Phenomenon Scale (CIPS)*. From *The Impostor Phenomenon: When Success Makes You Feel Like A Fake*. Bantam Books; 1985. 20–22. Accessed January 3, 2022.
- [14] 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.
- [15] Sullivan JB, Ryba NL. Prevalence of impostor phenomenon and assessment of well-being in pharmacy residents. *Am J Health Syst Pharm* 2020;77(9):690–6.
- [16] Huffstutler SY, Varnell G. The impostor phenomenon in new nurse practitioner graduates. *Adv Pract Nurs eJ* 2006;6(2).
- [17] Landry MJ, Bailey DA, Lee M, Van Gundy S, Ervin A. The impostor phenomenon in the nutrition and dietetics profession: an online cross-sectional survey. *Int J Environ Res Publ Health* 2022;19(9):5558. <https://doi.org/10.3390/ijerph19095558>.
- [18] Deshmukh S, Shmelev K, Vassiliades L, Kurumety S, Agarwal G, Horowitz JM. Imposter phenomenon in radiology: incidence, intervention, and impact on wellness. *Clin Imag* 2022;82:94–9.
- [19] Oriel K, Plane MB, Mundt M. Family medicine residents and the impostor phenomenon. *Fam Med* 2004;36(4):248–52.
- [20] Hutchins HM, Flores J. Don't believe everything you think: applying a cognitive processing therapy intervention to disrupting imposter phenomenon. *New Horiz Adult Educ Human Res Develop* 2021;33(4):33–47.
- [21] Ogunyemi D, Lee T, Ma M, Osuma A, Eghbali M, Bouri N. Improving wellness: defeating Impostor syndrome in medical education using an interactive reflective workshop. *PLoS One* 2022;17(8):1–13.