

Imposter Phenomenon in Pediatric Residency: An Empirical Simulation-Based Educational Study

Bahadır M. Samur¹, Furkan Maraşlı², İsmail Dursun³

¹Department of Pediatrics, Erciyes University School of Medicine, Kayseri, Türkiye

²Department of Business Administration, Social Sciences University of Ankara, Ankara, Türkiye

³Division of Pediatric Nephrology, Department of Pediatrics, Erciyes University School of Medicine, Kayseri, Türkiye

What is already known on this topic?

- The imposter phenomenon is known to often cause undesirable negative effects for both individuals and organizations. This is a psychological pattern that is typically associated with high achievers, whereby an individual doubts his accomplishments and has a fear of decision-making.
- Several studies have investigated the effects of imposter phenomenon (IP) on various groups, including medical students, family physicians, surgeons, and dermatologists. However, to date, no published study has evaluated the prevalence of IP among pediatric residents or pediatric physicians. Furthermore, there is a distinct lack of research aimed at distinguishing real impostorism from true self-doubt using empirical methods such as case simulation.

What this study adds on this topic?

- This present study extends the boundaries of the imposter phenomenon concept by demonstrating its debilitating effect on both individuals' decision-making processes and their well-being. It accomplishes this by utilizing an empirical simulation-based methodology while excluding participants who may experience reasonable self-doubt.
- This study, for the first time, suggests a potential correlation between IP scores and the decision-making process of participants. It also demonstrates that IP is common among pediatric residents. This finding is critical for addressing impostorism and improving the efficiency of patient care and resident education.

Corresponding author:

İsmail Dursun and Bahadır M. Samur

✉ drdursun@hotmail.com or mbahadirsamur@yahoo.com

Received: September 6, 2023

Revision Requested: October 8, 2023

Last Revision Received: February 19, 2024

Accepted: February 20, 2024

Publication Date: March 28, 2024

Content of this journal is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.



ABSTRACT

Objective: The imposter phenomenon (IP) may have a negative impact on the ability of health-care providers to make difficult and accurate decisions. This study presents an empirical approach, segregating the real imposters based on a simulation, and aims to investigate the prevalence and severity of IP and evaluate the attitude in the decision-making process of pediatric residents with impostorism.

Materials and Methods: A simulation-based case study with the 113 pediatric residents was performed with the Clance Imposter Phenomenon Scale to identify IP scores and appropriate management skills for the case. The collected data were divided and combined into different categories based on the IP scale scores and the success of case management to further detect how real imposters were affected.

Results: Our study revealed that 24 (21.2%) of residents have moderate, 33 (25.7%) of residents have frequent, and 29 (29.2%) of residents have intense impostorism feelings. The imposter scores were found to be higher among female participants ($P = .006$). However, when considering the prevalence of significant impostorism (defined as both frequent and intense), there was no statistically significant difference between females and males ($P = .088$). The data indicated that an increase in IP scores was associated with a higher likelihood of delayed pressing the help button for both the overall and post-exclusion groups ($P < .001$). The analysis also revealed a significant correlation and a monotonic-linear trend between IP scores and the decision-making process, even after excluding the unsuccessful participants ($P < .001$).

Conclusion: This is the first study to demonstrate the prevalence of IP among pediatric residents, potentially leading to challenges in patient care and resulting in delayed decision-making and self-doubt with feelings of inadequacy. The findings support the claim that higher imposter scores are associated with a greater tendency to seek help from more experienced individuals, even when fully capable of managing cases independently. This emphasizes the importance of awareness about the IP, as these factors can directly impact both the well-being of trainees and patient care outcomes.

Keywords: Imposter syndrome, imposter phenomenon, critical decision-making, pediatric residency, case simulation, well-being

INTRODUCTION

The imposter phenomenon (IP), also known as imposter syndrome, is defined as “an internal experience of intellectual phoniness” and is the feeling that many successful healthcare professionals may face that they are not as bright, productive, and talented as their colleagues think. Imposters have difficulties internalizing their success, which leads them to attribute their success to external causes such as luck, coincidence, or knowledge.^{1,2} These feelings of inadequacy, which persist despite significant success, may result in burnout, especially

Cite this article as: Samur BM, Maraşlı F, Dursun İ. Imposter phenomenon in pediatric residency: An empirical simulation-based educational study. *Turk Arch Pediatr.* 2024;59(3):250-257.

in those who cannot internalize achievements, take fewer risks in decisions, and have self-doubt about their own abilities.³ Hence, IP can negatively interfere with the mental health of healthcare providers, leading to increased anxiety, depression, and overall impairment of functioning.^{4,5} Therefore, some experts claim that IP can be identified as a mental disorder, but it is still not recognized as a disease. Diagnostic criteria are not provided by the Diagnostic and Statistical Manual of Mental Disorders, the American Psychiatric Association's Diagnostic and Statistical Manual, or the International Classification of Diseases (Tenth Revision, ICD-10).⁴

The prevalence rates may vary depending on participants and screening tools; however, approximately 30% of medical students and residents may face IP, and up to 82% of medical professionals experience IP.^{4,6-8} This phenomenon is comorbid with depression and anxiety and directly associated with impaired performance, self-confidence, decision-making, risk-taking, organizing and leading skills, and burnout among healthcare professionals, including clinicians.⁹

The IP involves individuals' belief in their own skills, characterized by a persistent, internalized fear of failure, decreased motivation, and extreme self-doubt despite evidence of their abilities, which may adversely affect healthcare providers' critical care decisions.¹⁰ More specifically, increased fear of failure related to IP, which in turn complicates critical decision-making and underpins reduced motivation, may have a detrimental effect on risky, complex, and emotive decisions by medical professionals such as pediatricians, intensive care specialists, and emergency room (ER) physicians (Figure 1).

Imposter phenomenon potentially causes individuals to promote low self-efficacy, fear of decision-making, and anxiety, which in turn result in undesirable potential outcomes for the well-being of both health-care providers and health-care outcomes. Hesitations in the decision-making process may also cause a delay in diagnosis and treatment for patients.¹⁰ So far, several studies have explored the effects of impostorism

on medical students, family physicians, surgeons, and dermatologists. However, there are currently no studies focusing on pediatric residents or trainees.^{4,10-13} In this study, we aimed to assess the prevalence and characteristics of IP among pediatric residents. Additionally, we investigated how IP influences participants' self-control impulses in critical decision-making processes. We employed a unique case simulation method to select only successful participants, minimizing the overlap of self-doubts related to impostorism or real clinical insufficiency. We believe that this study will contribute to critical awareness in residency education and well-being, potentially improving future patient care outcomes for children.

MATERIALS AND METHODS

Participants and Study Design

This cross-sectional, simulation-based study was conducted with 127 pediatric residents/physician residents of M. Eraslan F. Mercan Children's Hospital, an University-Affiliated Hospital, in Europe between July 2021 and August 2022 (Figure 2). The Erciyes University Ethical Committee approved the study in 2021 (Approval date and number: July 28, 2021, 2021/516). Their permission and consent forms were taken from all the participants. All the 127 residents who participated in the study completed the case simulation. Only residents who had successfully completed their previous emergency rotation after the first year of residency education were included in the study. The sample size was calculated to be 101 (based on studies "expected frequency" in family medicine residents) in a 95% confidence interval and assuming a 10% margin of error using the PASS Sample Size Software.¹³ The study was designed to evaluate the frequency of IP among pediatric residents and compare the data with a simulation-based clinical approach. A case of status epilepticus, one of the main subjects of basic pediatrics education, was simulated and applied to all participants. The simulated case was tested with 12 pediatric emergency physicians before being used on study participants. Consent forms were obtained from all participants after the simulations to ensure that the data collection did not influence the simulation

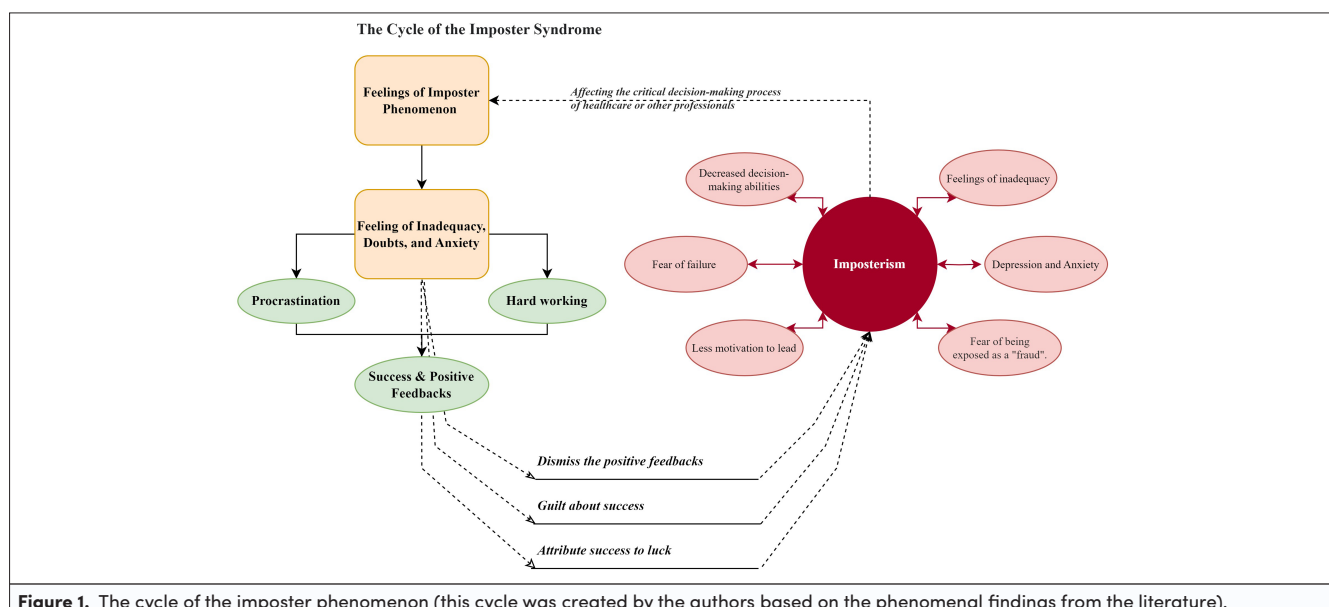


Figure 1. The cycle of the imposter phenomenon (this cycle was created by the authors based on the phenomenal findings from the literature).

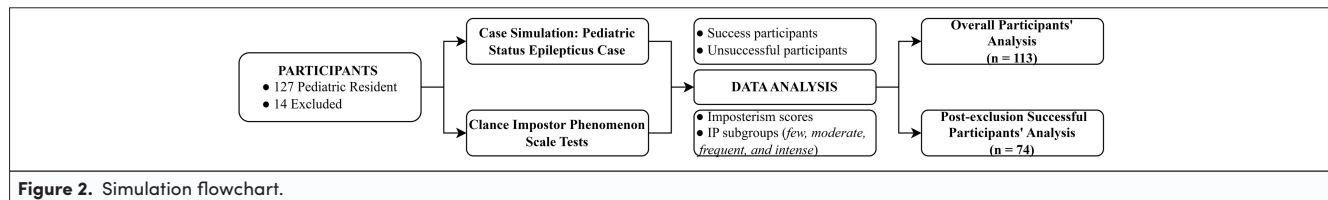


Figure 2. Simulation flowchart.

judgments. Thus, 14 of the participants who did not accept to participate were excluded.

Measures

Alongside the case simulation, participants completed the Clance Impostor Phenomenon Scale survey and provided demographic information, including sex, age, year of graduation, and years of active experience in the medical profession. The Clance and Imes' (1978) imposter scale, adapted into the native language in 2015, was employed to measure IP.^{2,14,15} The internal consistency of the scale was 0.94. Survey items on the Clance Impostor Phenomenon Scale were rated on a 5-point Likert scale ("1 = strongly disagree" to "5 = strongly agree"). Total scores can range from 20 to 100, with scores higher than 61 indicating impostorism (few imposter characteristics <40, moderate imposter feelings 41–60, frequent imposter phenomena 61–80, and intense imposter experiences 81–100).^{2,13}

Case Simulation

The case of "A 20-month, previously healthy, pediatric febrile status epilepticus case was admitted to the emergency room after the first-step paramedic intervention" prepared by the pediatric neurology department based on the American Neurology Academy, American Epilepsy Society Guidelines, was simulated.^{16,17} Participants were tasked with managing a multimedia case step by step in a digital screen setting, which involved a presentation of physical findings in a seizure case without any real patient images. The multimedia screening was adjusted based on the patient's progression, dynamically featuring vitals on every (5 times) changing screen, including heart rate, saturation, respiratory rate, fever, blood pressure, along with indicating the patient's seizure activity. A 5-step evaluation was performed during the simulation. At each step, participants were presented with a multiple-choice question. They had the option to press a button, which allowed them to consult a more experienced pediatrician. Participants were instructed to press the button whenever they felt the need to seek advice from a more experienced colleague.

The IP describes a psychological experience of professional fraudulence among qualified individuals. Impostorism, by its nature, encompasses individuals who are qualified in a professional subject but experience feelings of insufficiency.^{2,8} Hence, data were categorized (including the severity of IP scores, the significance of impostorism, and successful or unsuccessful case-managing individuals) based on fundamental descriptions of IP and previously defined IP severity classifications to identify qualified individuals experiencing high levels of impostorism.^{2,13} Participants giving incorrect answers at any step were considered unsuccessful in the simulation. Consequently, the "overall group" of the sample was further divided based on the participants' case management success into a "post-exclusion group," and unsuccessful participants were eliminated because these candidates were incompetent to manage the case properly, so

their self-doubts might be consistent with reality which may not be related to impostorism. Then the tendency to press the button of successful participants was evaluated to clarify potential relationships between IP scores and self-doubt-related "early pressing the help button" levels.

Statistical Analysis

All data was anonymized before analysis. Categorical variables were presented as frequencies and percentages. The normality of the data was assessed through a combination of normality tests, visual inspections of histograms, and Q-Q plots, along with the examination of standard deviation, mean values, and the coefficient of variation ratio. The chi-square tests were used to assess the differences between dependent and independent groups of categorical variables, respectively. The relationship between binomial variables was performed with chi-squared analysis. Simulation and survey results were also evaluated using ordinal regression models to assess the behavior of ordinal-level dependent variables in relation to another set of independent variables. Chi-square tests were extended with gamma statistics to evaluate monotonic trends between independent and dependent ordinal variables, along with linear trend tests. In addition to the independent samples *t*-test for comparing 2 sample means from unrelated groups, Spearman's rank correlation test was included to detect any potential correlations between ordinal dependent and independent variables. The Spearman's correlation results were interpreted as follows: <0.25 indicated a very weak correlation, 0.26–0.49 suggested a weak correlation, 0.50–0.69 indicated a moderate correlation, 0.70–0.89 pointed to a high correlation, and 0.90–1.0 indicated a very high correlation. Statistical analysis was conducted using the Statistical Package for the Social Sciences (SPSS®) for Windows, version 23.0 (IBM Corp., Armonk, NY, USA). A *P*-value <.05 was considered statistically significant.

RESULTS

General Findings

Out of the 113 respondents, 80 (70.8%) were female, and 33 (29.2%) were male. They ranged in age from 25 to 37 years (30.73 ± 2.74) and in years of active experience in the medical profession from 1 to 12 years (5.44 ± 2.52). No significant relationship was found between the impostorism scores and age ($P = .208$) or between the impostorism scores and years of active experience in the medical profession ($P = .258$). For both overall and post-exclusion group participants, impostorism rates were higher in female participants ($P = .006$ and $P = .001$, respectively, Table 1). While categorical differences were significant, the mean score differences between males and females were not statistically significant for both groups (independent *t*-test value, $P = .142$ and $P = .369$, respectively). Although 62 of the females (77.5% of females) were significant impostors (frequent and intense), it did not reach any statistical

Table 1. Relationship Between Impostorism Among Pediatricians and Participants' Sexes

	Participants with Few IP Scores	Participants with Moderate IP Scores	Participants with Frequent IP Scores	Participants with Intense IP Scores	Mean IP Scores (±SD)	Percentages (%)	P
Sex							
Overall Group (n = 113)							
Male	14 (12.4%)	5 (4.4%)	4 (3.5%)	10 (8.8%)	55.97 (±27.8)	33 (29.2%)	.006
Female	13 (11.5%)	19 (16.8%)	29 (25.7%)	19 (16.8%)	63.11 (±21.2)	80 (70.8%)	
Total	27 (23.9%)	24 (21.2%)	33 (29.2%)	29 (25.7%)	61.02 (±23.4)	113 (100%)	
Post-exclusion Group* (n = 74)							
Male	11 (14.9%)	2 (2.7%)	3 (4.1%)	9 (12.2%)	58.80 (±29.7)	25 (33.8%)	.001
Female	4 (5.4%)	16 (21.6%)	13 (17.6%)	16 (21.6%)	64.34 (±22.0)	49 (66.2%)	
Total	15 (20.3%)	18 (24.3%)	16 (21.6%)	25 (33.8%)	62.45 (±24.8)	74 (100%)	
*Only successful participants who could perfectly manage the entire case simulation was included, as all others were excluded.							

*Only successful participants who could perfectly manage the entire case simulation was included, as all others were excluded.

significance compared to 14 significant imposter males (42.4% of males) for overall participants ($P = .088$).

In the overall evaluation of the participants, responses were categorized according to imposter characteristics, resulting in 27 participants (23.9%) with few imposter feelings, 24 participants (21.2%) with moderate imposter feelings, 33 participants (29.2%) with frequent imposter feelings, and 29 participants (25.7%) with intense imposter feelings. Simulation results showed that 74 participants (65.5%) correctly managed all steps of the case simulation. On the other hand, 39 participants (34.5%) mismanaged at least one step of the case simulation, which included the ER admission, the first step of antiepileptic drug administration, the second step of antiepileptic drug administration, and the refractory status epilepticus stages. The analysis of the participants' use of the help button yielded the following findings: 15 (13.3%) participants pressed the help button after step 0 (immediately after ER admission), 29 (25.7%) after step 1 (first step antiepileptic drug(s) [AED] administration), 28 (24.8%) after step 2 (second step AED administration), and 39 (34.5%) after step 3 (resistant to the second step AED, refractory status epilepticus stage). Only 2 participants never pressed the button.

To align with the study's primary objective, participants who mismanaged the case simulation were excluded from the analysis to assess the direct effects of impostorism on case management. Additionally, we compared the imposter scale scores of participants who correctly managed the case simulation and those who pressed the help button (Table 2). After excluding participants who were unable to successfully manage the case simulation, the analysis revealed the post-exclusion severity of imposter characteristics as follows: 15 participants (20.3%) had few imposter feelings, 18 participants (24.3%) had moderate imposter feelings, 16 participants (21.6%) had frequent imposter feelings, and 25 participants (33.8%) had intense imposter experiences. The analysis of the post-exclusion participants' use of the help button produced the following findings: 12 participants (16.2%) pressed the help button after step 0 (immediately after ER admission), 15 (20.3%) after step 1 (first step AED administration), 21 (28.4%) after step 2 (second step AED administration), and 26 (35.1%) after step 3 (resistant to the second step AED, refractory status epilepticus stage).

Subgroup Analysis

The correlation analysis showed a statistically significant and negative relationship between the imposter scale scores of the

participants and the early pressing the help-button ratio (overall group of participants' correlation coefficient = $-.582$; post-exclusion group of participants' correlation coefficient = $-.721$; both with P -values $< .001$). Additionally, imposter cases were categorized into 2 groups: "imposters" (comprising frequent IP and intense imposter experiences) and "non-imposters" (comprising few imposter characteristics and moderate imposter feelings). There was also a significant relationship between the groups' inclination to press the help button early ($P < .001$, see Table 2).

Our data revealed a significant direct correlation between imposter scores and the decision to press the button during the simulation case management. For the overall group of participants, ordinal regression analysis revealed a negative association between IP scale scores and the stages of pressing the help button during the case simulation (After the first <early>, second, third, or fourth <late> steps), indicating that as the IP scale scores increased, there was a higher likelihood of participants pressing the help button earlier during the case simulation stages (Wald χ^2 (1) = 37.596, odds ratio = 0.945 (0.928-0.962 for 95% CI, $P < .001$). Chi-square tests indicated a statistically significant relationship between IP groups (Few, Moderate, Frequent, and Intense IP Scores) and the level of pressing the help button (After the first, second, third, or fourth steps). This relationship revealed a monotonic trend, as evidenced by the distribution of gamma ($P < .001$, $r_{\text{gamma}} = -.664$).

For the post-exclusion group, ordinal regression analysis also revealed a negative association between IP scale scores and the stages of pressing the help button during the case simulation (After the first <early>, second, third, or fourth <late> steps), indicating that as the IP scale scores increased, there was a higher likelihood of participants pressing the help button earlier during the case simulation stages (Wald χ^2 (1) = 35.221, odds ratio = 0.924 (0.901-0.949 for 95% CI, $P < .001$). Chi-square tests further indicated a statistically significant relationship between IP groups (few, moderate, frequent, and intense IP scores) and the level of pressing the help button (After the first, second, third, or fourth steps). This relationship also displayed a monotonic trend, as evidenced by the distribution of gamma ($P < .001$, $r_{\text{gamma}} = -.802$).

Based on the trend test analysis, a significant linear trend was observed between the IP and the early pressing of the help button for both the overall and post-exclusion subgroups ($P < .001$).

Table 2. The Relationship Between Impostorism Among Pediatricians and the Case Simulation Decision-Making Process

Case Pressing Button Situation	Overall Group (n = 113)						Post-exclusion Group* (n = 74)				
	Participants with Few IP Scores	Participants with Moderate IP Scores	Participants with Frequent IP Scores	Participants with Intense IP Scores	Participants with Significant Imposters (>61)	Participants with Few IP Scores	Participants with Moderate IP Scores	Participants with Frequent IP Scores	Participants with Intense IP Scores	Participants with Significant Imposters (>61)	Participants with Significant Imposters (>61)
After the first step	-	2 (1.8%)	3 (2.7%)	10 (8.8%)	13 (11.5%)	-	-	2 (2.7%)	10 (16.2%)	12 (18.9%)	12 (18.9%)
After the second step	2 (1.8%)	3 (2.7%)	12 (10.6%)	12 (10.6%)	24 (21.2%)	-	2 (2.7%)	4 (5.4%)	9 (12.2%)	13 (17.6%)	13 (17.6%)
After the third step	5 (4.4%)	8 (7.1%)	10 (8.8%)	5 (4.4%)	15 (13.2%)	2 (2.7%)	7 (9.5%)	8 (10.8%)	4 (5.4%)	12 (16.2%)	12 (16.2%)
After the fourth step	20 (17.7%)	9 (8.0%)	8 (7.1%)	2 (1.8%)	10 (8.8%)	13 (17.6%)	9 (12.2%)	2 (2.7%)	2 (2.7%)	4 (5.4%)	4 (5.4%)
Total numbers	27 (23.9%)	24 (21.2%)	33 (29.2%)	29 (25.7%)	62 (54.9%)	15 (20.3%)	18 (24.3%)	16 (21.6%)	25 (33.8%)	41 (55.4%)	41 (55.4%)
P	<.001						<.001				

The chi-square-square test of independence showed a significant association between IP subgroups and early pressing the help button (for overall patients, $P < .001$, $r_{\text{gamma}} = -0.664$; for post-exclusion group, $P < .001$, $r_{\text{gamma}} = -0.802$).
 *Only successful participants who could perfectly manage the entire case simulation we was included, as all others were excluded (2 participants who had moderate IP scores did not press the button for help).

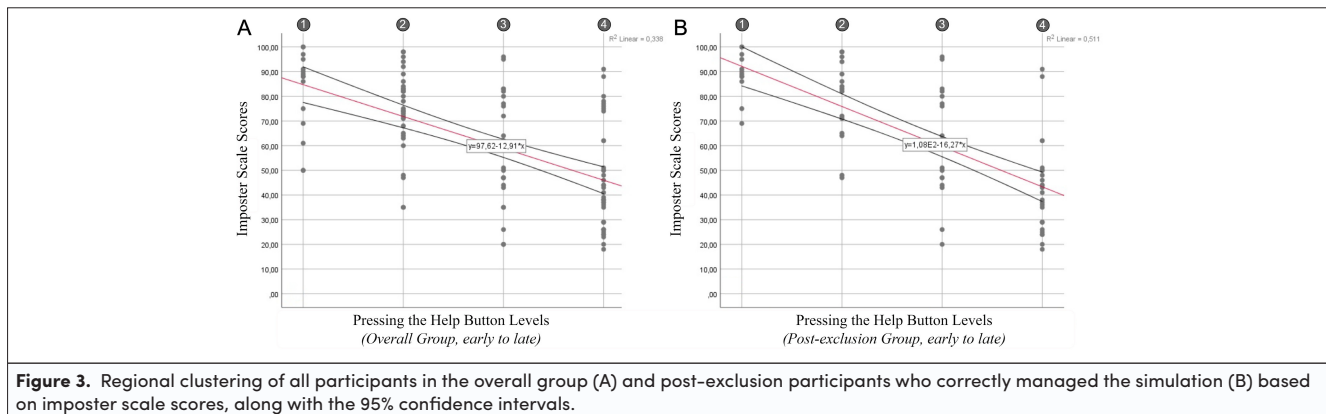
.001). Subsequently, Spearman's rank correlation coefficient analysis revealed a moderate correlation between IP severity subgroups (few, moderate, frequent, and intense IP scores) and the tendency to press the help button earlier (after the first, second, third, or fourth steps), ($P < .001$, $r_{\text{Spearman}} = -0.511$, r_{Spearman} for overall females = -0.423 , r_{Spearman} for overall males = -0.793). Additionally, the post-exclusion analysis showed a positive high correlation between IP severity subgroups (few, moderate, frequent, and intense IP scores) and the trend of early pressing of the help button (after the first, second, third, or fourth steps), ($P < .001$, $r_{\text{Spearman}} = -0.710$, r_{Spearman} for post-exclusion females = -0.595 , r_{Spearman} for post-exclusion males = -0.882) The scatter graphs depict the regional clustering of participants (see Figure 3).

DISCUSSION

This study presents the IP in the first largest pediatric resident's cohort and demonstrates that IP is common, especially among pediatric residents, and being hesitant about their work requirements and requests for help causes difficulties in patient care, a slowdown in workflow, and a loss of time. This study also shows that as the IP scores of the participants increase, they exhibit more external control request reflexes due to the difficulties experienced in the critical decision-making process (Figure 3). Our findings reveal a significant linear trend between the IP scores or severity of IP among pediatric residents and their perceived need for more experienced assistance in managing their cases. This indicates that imposter feelings may directly influence their case management process, which holds great significance for both resident and patient well-being.

Consistent with previous educational studies published in the literature, pediatric residents in our cohort exhibited high rates of IP.^{4,10,13,16} It is understood that individuals with significant imposter rates, especially in professional and academic work areas, experience substantial problems and afflictions.⁴ This phenomenon, which has been described in many professional occupational groups, can interfere with an individual's mental health and overall functioning. Various studies have examined in different professional fields, mainly distributed to young students.^{4,8} However, especially medical professionals who persistently work under extremist conditions and competitions are more likely to have a higher risk of experiencing adverse psychological outcomes. Given the tendency of medical professionals with IP to perfectionist patient care while not accepting recognition of self-sufficiency, affected individuals may experience decreased professional performance, and increased levels of stress result from fear of failure, depression, burnout, and thoughts of being less intelligent or component.

Imposters often perceive themselves as the "only ones" having those feelings.¹⁹ Therefore, raising awareness is critical to preventing these behavioral health-related problems.¹⁹ To the best of our knowledge, there is no study evaluating the relationship between pediatricians and impostorism. This study is influential because it demonstrates potential IP rates in a large population of pediatricians and pediatric residents conducted in a university hospital. We found that 54.9% of residents experienced significant feelings of imposter phenomenon (frequent and intense) with a mean score of $61.02 \pm \text{SD } 23.47$. Even



after exclusion, 55.4% of residents still had significant feelings of imposter phenomenon with a mean score of 62.45 ± 24.81 . These findings are remarkable because this proportionally higher group of imposter feelings has the potential to affect not only their personal perceptions but also the entire educational process directly.

The present research also indicated that females differed significantly from males in terms of their imposter rates, which aligns with existing findings.^{2,9,20,21} Many previous studies, based on the attribution theory, have concluded that female imposters tend to internalize these feelings, leading them to attribute their success to potential external variables rather than inherent ability.^{22,23} However, several subsequent studies have not found any significant differences between male and female individuals in terms of the IP, including in professions like surgery and academia.^{10,22-24} Nevertheless, a recent study in surgical residency suggested a higher prevalence of impostorism among female trainees.¹⁸ In many of these studies, IP was examined by simply comparing the IP scores of females to those of males without considering the type of impostorism or other variables. This particular investigation showed no significant relationship between participants' sex and frequent or intense impostorism, implying that significant impostorism may not be directly related to participants' sex ($P = .088$). On the other hand, when comparing our overall IP scores between males and females, the results were statistically significant. These conflicting results may be attributed to the relatively lower number of male participants compared to females and potential changes in their distribution, particularly after the post-exclusion.

Pediatrics is a cardinal medical field requiring extensive medical knowledge with intense and long working hours and hierarchical functioning; thus, pediatricians and pediatric emergency physicians frequently take care of potentially extreme cases. A bit of self-doubt can even be a healthy way to adapt to this intense and challenging medical profession. However, when it is excessive, burnout may occur due to corrosive, stressful, long, and competitive working conditions.⁵ Increased imposter feelings are directly related to stress, exhaustion, burnout, and anxiety rates, and thus, individuals become unable to perform their profession effectively.^{13,25} Awareness of IP should spread rapidly in intensive medical professions, and a supportive environment should be encouraged to identify and support IP rates in individuals. Otherwise, dealing with behavioral health comorbidities, including burnouts, emotional exhaustion,

mental health problems, and overall well-being, might be more problematic and time-consuming.^{4,10,25}

The underlying thought of impostors is that, while taking critical decisions that may impact the patients' well-being, their incompetence or incapability may be exposed, and concerns about affecting the patient's well-being may negatively arise.⁹ Medical professionals who perceive themselves as incompetent and fear harming their patients will feel reluctant to make critical decisions involving risk.⁹ Our simulation model demonstrated that pediatricians with high imposter scores tend to exhibit a strong inclination for "external help-seeking," as indicated by their preference to seek assistance from more experienced colleagues through the help button, potentially stemming from feelings of insufficiency. This tendency may be attributed to the lack of an internal locus of control. Existing literature supports this hypothesis. According to Brynes and Lester,²¹ individuals who attribute their experiences more strongly to an external locus of control, rather than an internal one, are more likely to experience IP. Because higher attribution to an external locus of control underpins lower responsibility for own actions and lower self-efficacy, frequent feelings of hopelessness or powerlessness under difficult circumstances become inevitable. Accordingly, the IP may involve a complex concordance of inauthentic ideation, extreme self-criticism, exposing anxiety, high self-monitoring skills, and less risk-taking with strong pressures to achieve.²⁶ Data show that IP scores increase among participants who tend to check themselves with someone more sophisticated, even in the early stages of case management. Moreover, this impulse becomes more evident in the sample significant imposters of those managing case simulation perfectly (Figure 3). Additionally, despite our participants demonstrating a prevalence of IP rates similar to those found in other medical-based research, including surgical trainees, family medicine, dermatology, and others, imposter scores did not show significant variations based on age of participants or years of active experience in the medical profession.^{6,10,12,13,27} These findings hold significant importance as they suggest that feelings associated with IP, such as inadequacy and self-doubt, can persist throughout an individual's lifetime, regardless of their graduation year or the duration of their professional experience. These enduring feelings have the potential to chronically influence an individual's professional well-being, lifelong education, and overall progress.

By its nature, impostorism may affect the decision-making process, especially in rapid and critical decision-making required by professionals such as medical doctors, nurses, emergency physicians, pediatricians, intensive care workers, managers, military or police employees, and economists. Studies on the decision-making process with impostorism are limited in the literature. Still, IP creates a feeling of inadequacy and proclivity toward less risk-taking, even for high-achieving professionals who are remarkably competent in their subjects.²⁸ Therefore, our data suggests that medical programs requiring critical decision-making should prioritize addressing impostorism feelings among their high-achieving staff. Recognizing and mitigating the potential stress associated with impostorism in decision-making processes is vital. Prior research has demonstrated that decision-making processes are closely linked to emotional, personal, and environmental factors, including risk aversion, anxiety, depression, self-esteem, personal well-being, and more.^{29,30} Our findings indirectly indicate that impostorism feelings have a consistent relationship with participants' self-doubts. This insight is significant in understanding that these participants may potentially experience heightened feelings of insufficiency and self-doubt during real-case decision-making processes, which are crucial for patient outcomes and critical care.

The present study has some limitations. First, although our results shed light on an important problem, they cannot be generalized as the sample was drawn only from 1 hospital. In order to achieve more objective results, it can be done in different educational institutions and countries, which may lead to more universal results. Second, since the data were taken as self-reported in the study, proportionally lower results may have been obtained. Long-term observational studies may provide more reliable information about the prevalence of IP. Third, since this research was conducted on a simulated patient, it may not fully reflect real-life data. Lastly, it's important to note that due to the confidentiality of the participants, we were unable to exclude residents who might potentially have underlying psychiatric illnesses or other comorbidities. These factors could potentially affect our data and the decision-making process. Despite the limitations, our study remains significant and noteworthy because it addresses an important issue that impacts the quality of healthcare service delivery and patient care, as well as the educational well-being of residents and other trainees.

We believe that it is of utmost importance for program directors and faculty members within educational environments to be aware of impostorism. Equally vital is the provision of education on how to address impostorism and the creation of an educational environment that fosters resilience against impostorism. This can be achieved by providing psychological support and, importantly, by fostering a sense of support and togetherness, thus cultivating self-compassion among trainees.^{31–33}

This is the first study that demonstrates how impostorism is common among pediatric residents. Our findings are particularly important for both trainees and program directors because IP feelings have the potential to affect residents' well-being and educational progress throughout their careers.

Our research revealed that impostorism is notably prevalent among pediatric residents and can potentially lead to challenges in patient care, resulting in delays in decision-making, process slowdowns, and time wastage due to self-doubt and feelings of inadequacy. Also, this study significantly extends the boundaries of the IPn by showcasing its detrimental impact on decision-making processes and individuals' overall well-being through a unique approach. It accomplishes this by employing an empirical simulation-based methodology, excluding participants who may reasonably experience self-doubt. Our findings particularly highlight that higher imposter scores are related to individuals' inclination to seek help from more experienced individuals, even when they are fully capable of managing cases independently. Therefore, it is crucial for program directors or any faculty members involved in the education of residents or students to be aware of impostorism in order to prevent potential burnout, educational handicaps, trainee self-distrust, and related issues. Impostorism can contribute to a sense of inadequacy, low self-efficacy, and a compromised decision-making process for residents, directly impacting the care provided to children, the well-being of residents and trainees, and ultimately influencing patient care outcomes.

Ethics Committee Approval: This study has approved by the Ethical Committee of Erciyes University (date: July 28, 2021; number: 2021/516).

Informed Consent: Permission and consent forms were taken from all the participants.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – B.S., F.M.; Design – B.S., F.M.; Supervision – I.D.; Resources – B.S., I.D.; Materials – B.S., F.M.; Data Collection and/or Processing – B.S., F.M., I.D.; Analysis and/or Interpretation – B.S., I.D., F.M.; Literature Search – B.S., F.M.; Writing – B.S., F.M.; Critical Review – I.D.

Declaration of Interests: The authors have no conflict of interest to declare.

Funding: This study received no funding.

REFERENCES

- Gottlieb M, Chung A, Battaglioli N, Sebok-Syer SS, Kalantari A. Impostor syndrome among physicians and physicians in training: a scoping review. *Med Educ*. 2020;54(2):116–124. [\[CrossRef\]](#)
- Clance PR, Imes SA. The imposter phenomenon in high achieving women: dynamics and therapeutic intervention. *Psychother Theor Res Pract*. 1978;15(3):241–247. [\[CrossRef\]](#)
- Feenstra S, Begeny CT, Ryan MK, Rink FA, Stoker JI, Jordan J. Contextualizing the impostor “syndrome”. Perspective. *Front Psychol*. 2020;11(3206):575024. [\[CrossRef\]](#)
- Bravata DM, Watts SA, Keefer AL, et al. Prevalence, predictors, and treatment of impostor syndrome: a systematic review. *J Gen Intern Med*. 2020;35(4):1252–1275. [\[CrossRef\]](#)
- Mattie C, Gietzen J, Davis S, Prata J. The imposter phenomenon: self-assessment and competency to perform as a physician assistant in the United States. *J Phys Assist Educ (Physician Assistant Education Association)*. 2008;19(1):5–12. [\[CrossRef\]](#)
- Sullivan JB, Ryba NL. Prevalence of impostor phenomenon and assessment of well-being in pharmacy residents. *Am J Health Syst Pharm*. 2020;77(9):690–696. [\[CrossRef\]](#)

7. Chen C. Doctor who? Reflecting on impostor syndrome in medical learners. *Can Fam Physician*. 2020;66(10):e268-e269.
8. Wang J, Shi W, Huang X, Jiao Y. The prevalence of impostor syndrome and associated factors in Chinese medical students and residents: A single-center pilot study. *Med Teach*. 2023;1-7. [\[CrossRef\]](#)
9. Aparna K, Menon P. Impostor syndrome: an integrative framework of its antecedents, consequences and moderating factors on sustainable leader behaviors. *Eur J Train Dev*. 2020.
10. Bhama AR, Ritz EM, Anand RJ, et al. Impostor syndrome in surgical trainees: Clance impostor phenomenon scale assessment in general surgery residents. *J Am Coll Surg*. 2021;233(5):633-638. [\[CrossRef\]](#)
11. Levant B, Villwock JA, Manzardo AM. Impostorism in third-year medical students: an item analysis using the Clance impostor phenomenon scale. *Perspect Med Educ*. 2020;9(2):83-91. [\[CrossRef\]](#)
12. Regan PA, Shumaker K, Kirby JS. Impostor syndrome in United States dermatology residents. *J Am Acad Dermatol*. 2020;83(2):631-633. [\[CrossRef\]](#)
13. Oriel K, Plane MB, Mundt M. Family medicine residents and the impostor phenomenon. *Fam Med*. 2004;36(4):248-252.
14. Şahin EE, Gülşen FU. Clance Impostor Phenomenon Scale (CIPS): adaptation and validation in Turkish university students. *Psycho-Educational Research Reviews*. 2022;11(1):270-282.
15. Ahmet A, YALNIZ A, Ümran A, ÖZÇELİK B, FORMU SÖT. Geçerlilik VE güvenirlik çalışması. *Akad Bakış Uluslararası Hakemli Sosyal Bilimler Derg*. 2015;50:309-315.
16. Glauser T, Shinnar S, Gloss D, et al. Evidence-based guideline: treatment of convulsive status epilepticus in children and adults: report of the Guideline Committee of the American Epilepsy Society. *Epilepsy Curr*. 2016;16(1):48-61. [\[CrossRef\]](#)
17. McKenzie KC, Hahn CD, Friedman JN. Emergency management of the paediatric patient with convulsive status epilepticus. *Paediatr Child Health*. 2021;26(1):50-66. [\[CrossRef\]](#)
18. Narayanamoorthy S, McLaren R, Pendam R, Minkoff H. Are women residents of surgical specialties at a higher risk of developing impostor syndrome? *Am J Surg*. 2024;227:48-51. [\[CrossRef\]](#)
19. Matthews G, Clance PR. Treatment of the impostor phenomenon in psychotherapy clients. *Psychother Priv Pract*. 1985;3(1):71-81. [\[CrossRef\]](#)
20. Clance PR, Dingman D, Reviere SL, Stober DR. Impostor phenomenon in an interpersonal/social context: origins and treatment. *Women Ther*. 1995;16(4):79-96. [\[CrossRef\]](#)
21. Byrnes KD, Lester D. The impostor phenomenon in teachers and accountants. *Psychol Rep*. 1995;77(1):350-350. [\[CrossRef\]](#)
22. Fassl F, Yanagida T, Kollmayer M. Impostors dare to compare: associations between the impostor phenomenon, gender typing, and social comparison orientation in university students. Original research. *Front Psychol*. 2020;11doi. [\[CrossRef\]](#)
23. Cusack CE, Hughes JL, Nuhu N. Connecting gender and mental health to impostor phenomenon feelings. *Psi Chi J Psychol Res*. 2013;18(2):74-81. [\[CrossRef\]](#)
24. Caselman TD, Self PA, Self AL. Adolescent attributes contributing to the impostor phenomenon. *J Adolesc*. 2006;29(3):395-405. [\[CrossRef\]](#)
25. McGregor LN, Gee DE, Posey KE. I feel like a fraud and it depresses me: the relation between the impostor phenomenon and depression. *Soc Behav Pers Int J*. 2008;36(1):43-48. [\[CrossRef\]](#)
26. McDowell WC, Boyd NG, Bowler WM. Overreward and the impostor phenomenon. *J Manag Issues*. 2007;19(1):95-110.
27. Legassie J, Zibrowski EM, Goldszmidt MA. Measuring resident well-being: impostorism and burnout syndrome in residency. *J Gen Intern Med*. 2008;23(7):1090-1094. [\[CrossRef\]](#)
28. Bernard DL, Lige QM, Willis HA, Sosoo EE, Neblett EW. Impostor phenomenon and mental health: the influence of racial discrimination and gender. *J Couns Psychol*. 2017;64(2):155-166. [\[CrossRef\]](#)
29. Lauriola M, Levin IP. Personality traits and risky decision-making in a controlled experimental task: an exploratory study. *Pers Individ Dif*. 2001;31(2):215-226. [\[CrossRef\]](#)
30. Davis C, Patte K, Tweed S, Curtis C. Personality traits associated with decision-making deficits. *Pers Individ Dif*. 2007;42(2):279-290. [\[CrossRef\]](#)
31. Palmer C. How to overcome impostor phenomenon. *Monit Psychol*. 2021;52(4):44-51.
32. Samuel A, Konopasky A. Creating supportive learning environments: the role of the medical educator. *Clin Teach*. 2021;18(5):454-458. [\[CrossRef\]](#)
33. Öztosun B. Being a young physician during COVID-19 pandemic. *Turk Arch Pediatr*. 2023;58(3):239-240. [\[CrossRef\]](#)