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Review Article

Impostor Syndrome in Graduate Medical Education: A Systematic Review

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Abstract

Background: Impostor syndrome is a complex phenomenon defined as self-doubt, low sense of belonging, and persistent worry of being discovered as a fraud, despite objective measures of success. Impostor syndrome is associated with increased burnout and worse mental health in several physician studies. This systematic review explores impostor syndrome among resident and fellow physicians. ***Objective:*** We performed a systematic review to identify articles that studied the prevalence of impostor syndrome among resident and fellow physicians. ***Methods:*** Using standard PRISMA protocol, relevant peer-reviewed articles were identified in 2023 that explored impostor syndrome among resident physicians. The primary inclusion criterion was assessment of impostor syndrome in graduate medical trainees. Conference abstracts and non-peer-reviewed literature were excluded. Article quality was assessed using the Newcastle-Ottawa criteria. The study protocol was registered in PROSPERO. ***Results:*** 296 studies were initially identified. 212 articles were screened for relevance after duplicates were removed. 34 articles were assessed for eligibility. 15 articles were identified, 13 of which were good quality. Impostor syndrome tends to be higher among women and is associated with increased anxiety, depression, and burnout. Impostor syndrome is also associated with negative impacts on professional identity development and readiness for autonomous practice. No difference was found among White and non-White trainees. ***Conclusions:*** Impostor syndrome among trainee physicians is highly prevalent and has multiple negative associations for mental health and professional development. While typically viewed as pathological, given its prevalence, impostor syndrome may also be viewed as a developmental stage for many trainees. A multi-pronged approach is needed that addresses institutional culture and learning climate to ameliorate impostor syndrome. Longitudinal, multi-center trials would help elucidate these issues further.

Keywords: ***Medical education, physician well-being, burnout.***

Introduction

Impostor syndrome is a psychological phenomenon defined by Clance and Innes in 1978 as a "continual discounting of one's own abilities and persistent fears of failure… (and) an internal experience of intellectual phoniness" [1]. Despite objective measures of competence and success, impostor syndrome is characterized with nagging self-doubt, a low sense of belonging, and a persistent worry of being discovered as a fraud [2]. Among physicians, impostor syndrome is also associated with burnout, anxiety, depression, low job satisfaction, and poor career advancement [3-5]. Certain demographic characteristics are often associated with increased rates of impostor syndrome such as women, ethnic minorities, and foreign medical graduates [6-8].

To date, three systematic reviews have explored impostor syndrome among attending physicians, graduate trainees, and medical students, which have demonstrated rates between 22 and 60% [9-11]. Burnout, gender, low self-esteem, and institutional culture were associated with higher rates of impostor syndrome. Social support, validation of success, positive affirmation, and personal reflection were protective [11]. Impostor syndrome has also been associated with maladaptive perfectionism, where the drive for perfection results in low self-esteem and anxiety [9]. A large study among medical students showed that nearly one quarter of men and one half of women met criteria for impostor syndrome, which was positively correlated with burnout [12]. While comprehensive, these projects did not evaluate the unique experience of graduate medical trainees. Further, as impostor syndrome has been increasingly recognized as an important concept in medical education, more recent research has been performed that focuses exclusively upon graduate medical education.

Impostor syndrome has a unique impact upon graduate medical trainees as they emerge in their role as autonomous practitioners. While burnout and mental health issues have been well studied in graduate medical education, impostor syndrome represents the intersection of mental health and professional identity formation [13]. To address impostor syndrome in graduate medical education presents unique challenges as physicians navigate autonomy and career trajectory. Impostor syndrome has impacted career choices, which is associated with satisfaction and physician

shortages [14]. Given the recent increased attention that impostor syndrome has had in the medical education literature and the unique challenges graduate trainees face, this systematic review focuses on those projects specific to resident and fellow physician trainees in order to identify the impact of impostor syndrome as reported via quantitative prevalence studies.

Methods

We conducted a systematic review in 2023 according to the protocol described by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). The study protocol was registered with the International Prospective Register of Systematic Reviews (PROSPERO): CRD42023436990. A comprehensive search for eligible projects was conducted by a professional librarian on several databases from their inception to September 2023. These databases included Embase, Web of Science, MEDLINE, and PsycINFO. Broad categories of impostor syndrome were included, such as impostor phenomenon and self-fraudulence.

Included studies were those that focused primarily on the experience of impostor syndrome by resident and fellow trainees. Such eligible projects included cohort studies, randomized controlled trials, longitudinal studies, web-based surveys, and similar projects. Studies were excluded if resident or fellow physicians were not included in the study design. Such excluded studies were those that focused on medical students, attendings, or non-physician trainees. Meeting abstracts, theses, position papers, and those not written in English were also excluded.

All eligible projects were uploaded into Covidence, an online data organization program employed for systematic reviews. Two reviewers independently assessed each project for eligibility via a two-stage screening process of title/abstract followed by full text. Conflicts were resolved through consensus. Data extracted from selected studies included demographics, study type, program type, validated scales employed, and outcomes.

We assessed study quality using the modified Newcastle-Ottawa Quality Assessment Scale (NOS) for Cohort Studies [15]. The NOS scale is widely used to evaluate cohort, case-control, prospective studies for systematic reviews and employ three domains: selection, comparability, and outcome. A maximum of four stars is given for selection, two stars for comparability, and four stars for outcome. The scores from these three domains were converted to an overall quality score of "good," "medium," and "low," based on the Agency for Healthcare Research Quality (AHRQ). Due to the heterogeneity of the data, it was not possible to perform a meta-analysis.

Results

Figure 1 describes the details of the search process. Of the 296 papers identified in the initial search, 84 were removed prior to screening. 34 papers were ultimately included for full-text review, of which 15 were included in the final systematic review. Characteristics and key findings from the identified studies are listed in Table 1. The majority of studies (n=14) were cross-sectional survey studies, though one prospective study was identified. Twelve studies were published subsequent to the last review of impostor syndrome in GME [11]. The number of GME trainees included in the studies ranged from three to 269. A wide variety of specialties were represented, with some studies including more than one specialty.

Table 2 describes the Newcastle-Ottawa quality assessment. Of the 15 studies, only two met criteria as "poor"[16,17]. All studies met appropriate selection criteria. Ten of the 15 studies controlled for appropriate variables [5,18-26]. For outcomes, only one had follow-up data at six months while the others were correlation studies [20].

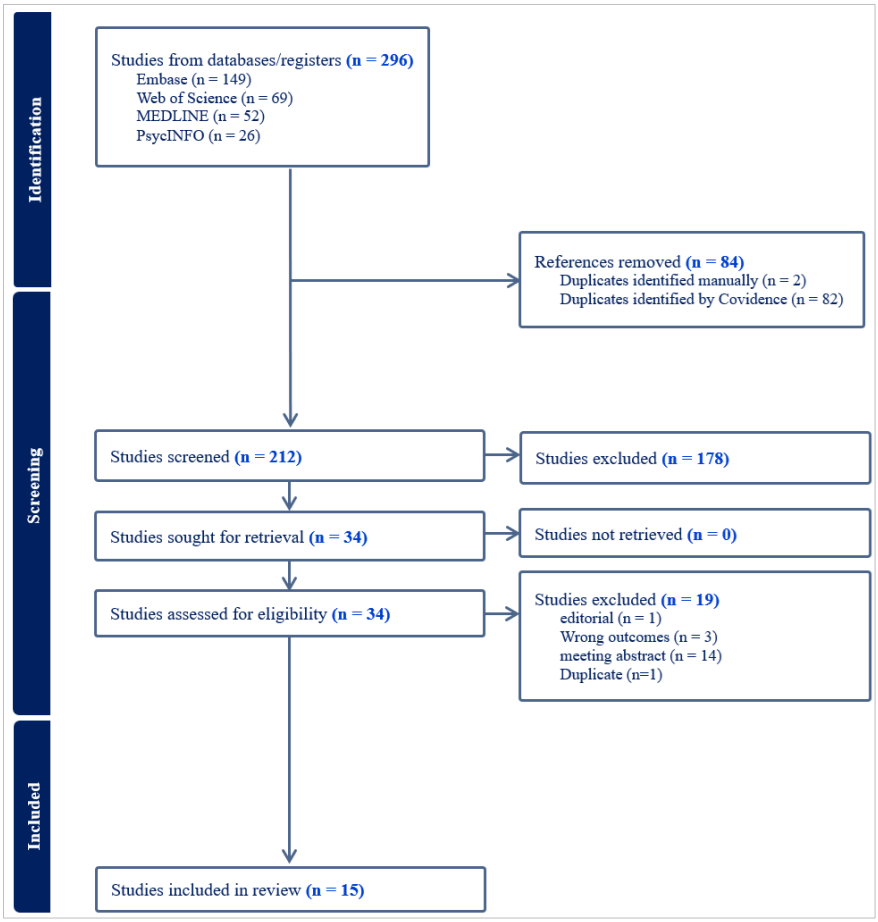

Figure 1: PRISMA diagram

Table 1: Summary of studies identified by search protocol

Paper	Specialty	Study Type	N (R/F)	Scale	Mean Score	IP Prevalence	Key Findings
Addae-Konadu et al., 2021[18]	OB/GYN	Cross-sectional survey	41	Clance	65.04 +/- 17.56 (6-100)	8.1% few 24.3% moderate 49.5% frequent 18.0% intense	- Trainees scored higher than faculty on IP measure - IP and anxiety were positively correlated - No relationship between IP prevalence and gender, race, or geographic region
Bhama et al., 2021[19]	Surgery	Cross-sectional survey	141	Clance	69 (33-97)	2.1% none/mild 21.8% moderate 54.2% significant 21.8% severe	- No difference in IP scores between White and non-White - No difference in IP across years of training - No relationship between IP and examination scores
Chakraverty et al., 2022[29]	Not specified	Cross-sectional survey, semistructured interview (mixed methods)	3	Clance	Not stratified by GME vs student	Not stratified by GME vs student	- Interviews revealed themes of professional identity formation, fear of evaluation, status as minority, program-transition experiences - All participants reported difficulty establishing physician-scientist identity and finding belonging in medicine and research
Chodoff et al., 2023[16]	Internal Medicine	Mixed methods	28	Clance	63	57% moderate or above	- IP was associated with excessive comparison with others - IP affects self-assessment of performance and distorts feedback - Residents with IP lose focus on learning
Fainstad et al., 2022[20]	Mixed	Prospective, interventional	79	Young	5.40 +/- 2.13	Not listed	- Web-based coaching can decrease IP in trainees
Leach et al., 2018[21]	Surgery	Cross-sectional survey	43	Clance	61.0 +/- 14.2	Not listed	- Residents score higher than faculty on IP scales - Burnout is associated with higher IP scores - No differences in IP across gender or years in practice
Liu et al., 2022[22]	Mixed	Cross-sectional survey	269	Clance	Not listed	62.7% present	- IP prevalence was higher in women - IP increased risk of anxiety and burnout - Perceived lack of support raises risk of IP
Medline et al., 2022[23]	Surgery	Cross-sectional survey	142	Clance	60.5 +/- 16.5	Not listed	- IP was less common in men and older participants (including those in practice)
Ogunyemi et al., 2022[24]	Mixed	Retrospective cross-sectional survey	33	Young	Not listed	57% present	- Participants identified multiple factors contributing to IP: parental expectations, female gender, academic “rat race,” and first-generation college graduate - IP was seen as a source of stress and a limit to reaching one’s full potential - “Competencies” increased risk of IP: Expert, Super Person, Perfectionist

Oriel et al., 2004[5]	Family Medicine	Cross-sectional survey	185	Clance	Not listed	33.0% present	- IP scores correlated with depressive symptoms and state anxiety - The majority of those with IP feared they would not be prepared to practice independently by graduation - IP scores did not correlate with year of training, residency program attended, age, or marital status
Regan et al., 2020[17]	Dermatology	Cross-sectional survey	121	Clance	63.13 +/- 17.3	89% moderate to intense	- Odds of burnout were significantly higher in those with IP - IP was more prevalent in women (significance not listed)
Sawant et al., 2023[28]	Mixed	Cross-sectional survey	45	Clance	66.04 +/- 14.22	Not stratified interns vs. students	- Interns scored higher than later year medical students - IP correlated positively with neuroticism - IP correlated negatively with self-esteem, as well as personality traits of extraversion, agreeableness, and conscientiousness
Sergesketter et al., 2023[25]	Plastic Surgery	Cross-sectional survey	80	Clance	64.5 +/- 13.7	2.9% few 35.3% moderate 50.7% frequent 11.0% intense	- Residents had higher prevalence of frequent IP compared to faculty - Mean IP scores not associated with PGY year in residents
Strandbygaard et al., 2022[27]	OB/GYN, Anesthesia	Cross-sectional survey	16	Clance	61	0% few 50% moderate 38% frequent 12% intense	- Residents exhibited higher mean CIPS scores than nurses, anesthesiologists, and OB/GYNs
Zaed et al., 2022[26]	Neurosurgery	Cross-sectional survey	80	Clance	Not listed	88.2% present 11.8% few 42.1% moderate 34.2% frequent 11.8% intense	- Neurosurgery residents had higher IP prevalence and more severe symptoms than young neurosurgeons - No difference between junior and senior residents - Female residents and early career neurosurgeons were more likely to have IP

Table 2: Newcastle-Ottawa and AHRQ Quality Assessment

Author/Year	Selection	Comparability	Outcome	AHRQ Quality Assessment
Addae-Konadu et al., 2021[18]	***	**	**	Good
Bhama et al., 2021[19]	***	**	**	Good
Chakraverty et al., 2022[29]	***	*	**	Good
Chodoff et al., 2023[16]	***		**	Poor
Fainstad et al., 2022[20]	***	**	***	Good
Leach et al., 2018[21]	***	**	**	Good
Liu et al., 2022[22]	***	**	**	Good
Medline et al., 2022[23]	***	**	**	Good
Ogunyemi et al., 2022[24]	***	**	**	Good
Oriel et al., 2004[5]	***	**	**	Good
Regan et al., 2020[17]	***		**	Poor
Sawant et al., 2023[28]	***	*	**	Good
Sergesketter et al., 2023[25]	***	**	**	Good
Strandbygaard et al., 2022[27]	***	*	**	Good
Zaed et al., 2022[26]	***	**	**	Good

Prevalence of Impostor Syndrome in GME

Thirteen studies used the Clance Impostor Phenomenon Scale (CIPS),3 while two used the Young Impostor Syndrome Scale [12]. In the CIPS, impostor syndrome prevalence is stratified by score into few impostor characteristics (≤40), moderate (41-60), frequent (61-80), and intense (>80). Table 1 lists the data on CIPS scores when available. Mean reported CIPS scores ranged from 60.5 to 69. Those

studies which included the prevalence data of CIPS, they were in the moderate to frequent range [16-19,25-27].

Factors associated with Impostor Syndrome

Some studies investigated factors associated with impostor syndrome. Anxiety was found to positively correlate with impostor syndrome,[5,18,22] as was depression [5]. Burnout was also found to be associated with impostor syndrome [17,21,22]. Multiple studies showed impostor syndrome to be higher in women,[22,23,26] though one found no difference across gender [21]. One study also identified associated neuroticism [28]. In the one study that examined effects of race, no difference was found between White and non-White residents [19].

Impact of Impostor Syndrome

Impostor syndrome was shown to negatively affect professional identity development and increase fear of evaluation [29]. Impostor syndrome was also related to excessive comparison with others,[16] correlated negatively with self-esteem,[28] and was seen as a source of excessive stress and a limit to reaching one's full potential [24]. Those with high levels of IS feared they would not be ready for independent practice [5]. On the other hand, no association was found between the prevalence of impostor syndrome and in-service exam scores in surgery residents [19].

Discussion

Impostor syndrome has both individual impact upon the trainee and a systemic impact upon the learning climate. These projects demonstrate the common, endemic prevalence of impostor syndrome and its widespread association with poorer mental health and increased burnout. Given that mental health and burnout are associated with trainee attrition, poorer patient care and increased medical errors, addressing underlying forces associated with impostor syndrome is paramount for leaders in education.

In particular, the increased prevalence among women points to systemic issues beyond the confines of the clinic and the wards. Racial bias in the healthcare setting has been associated with increased rates of burnout [30] and likely plays a role in worsening impostor syndrome as well. The medical learning climate reflects the challenges many of our trainees face in society, outside of the hospital walls. These considerations highlight the importance of assessing and addressing impostor syndrome in trainees at risk due to race or gender.

Impostor syndrome represents an over-arching theme associated with mostly negative impact upon trainees and the learning climate. However, within this definition, there may be important elements that are positively adaptive to the trainee. While impostor syndrome is associated with poorer mental health and other issues, in light of its high prevalence, impostor syndrome may represent an important growth phase for trainee physicians. To feel like an impostor may be natural when in a new role with higher levels of responsibility, which characterizes many residency experiences. Instead of ridding impostor syndrome from the learning climate, perhaps recognizing its pervasiveness will allow educators to use it as a springboard towards a positively adaptive state. In the same way that perfectionism can be maladaptive, leading to anxiety and low self-esteem, or positively adaptive, leading towards discipline and growth, impostor syndrome may be either maladaptive or positively adaptive. The key is to normalize the experience and use it as an opportunity for reflection on growth, thereby combating the otherwise negative effects that can occur when trainees suffer silently.

While the prevalence of impostor syndrome is increasingly well-understood, less is known about effective interventions. One study included here examined a potential intervention for impostor syndrome [20]. The authors employed web-based video coaching as well as asynchronous coaching and guided self-study, focused on topics related to trainee well-being including impostor syndrome. Participants demonstrated reduced impostor syndrome scores following this intervention [20]. This suggests that naming and directly confronting the experience of impostor syndrome can be beneficial in decreasing feelings of being an impostor.

Presently, the state of the literature on impostor syndrome is confined mostly to prevalence studies, and one small intervention study of limited duration [20]. Like burnout and other mental health issues, the solution requires a multi-pronged approach that supports individuals as well as the broader learning climate. The challenge then is that while single interventions, such as a workshop, may lead to small effects, they likely will not ameliorate the broader culture of which a program has little control. More effective interventions will be longitudinal, multi-pronged, institutional, and likely will use positive psychology to reframe impostor syndrome.

Limitations

Broad conclusions from the studies identified are limited by small, cohort study populations and disparities in data reporting. It is also possible that some studies were not identified by our search strategy, though all efforts were made to be as inclusive as possible.

Conclusion

Impostor syndrome is a widely experienced phenomenon among graduate medical trainees. Given its high prevalence, impostor syndrome may be appropriately viewed as a developmental stage for many trainees rather than a pathologic phenomenon. Future studies should focus on effective longitudinal interventions to address and reframe impostor syndrome.

Declarations

Not Applicable

Consent of Publication

Not Applicable

Conflict of Interest

None

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