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Association of impostor phenomenon and burnout among Swiss residents and junior anaesthesiologists: results of a cross-sectional survey

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Abstract

Background Imposter phenomenon (IP) can impact professional performance and has been described as a risk factor for burnout within healthcare workers. We hypothesize that IP and burnout are prevalent among Swiss anaesthesiology residents and junior anaesthesiologists, and that specific risk factors are significantly associated with these conditions.

Methods We conducted a cross-sectional web-based survey of anaesthesiologists working in regions of Switzerland. The survey included demographic questions, the Clance Impostor Phenomenon Scale (CIPS), and the Maslach Burnout Inventory for Medical Personnel (MBI-HSS-MP). Descriptive statistics and logistic regression were used to identify demographic variables predictive of IP and burnout and to examine the association between IP and burnout.

Results A total of 318 people were eligible to participate. Of those, 136 (42.8%) participants completed the CIPS, and 127 (39.9%) completed the MBI-HSS-MP. Among CIPS respondents, 55% (75/136) identified as women, and 59% (80/136) were Swiss nationals. The prevalence of IP was 56% (76/136) and burnout was 10.2% (13/127). Women were more at risk of IP and burnout ($p=0.037$). Independent covariates associated with IP were woman gender ($p=0.015$) and Swiss nationality ($p=0.023$). Additionally, the presence of IP was correlated with an increased likelihood of burnout ($p=0.04$).

Conclusions IP was correlated with the presence of burnout in anaesthesiologists in training. Additionally, IP affected more than half of the participants. Two risk factors were identified for IP: being a woman and a Swiss national. The rates of IP and its concerning association with burnout among resident and junior anaesthesiologists needs to be addressed.

Trial registration NCT06097325, https://www.clinicaltrials.gov/study/NCT06097325

Keywords Impostor phenomenon, Impostor syndrome, Burnout, Education, Anaesthesiology

Preliminary results of the present study were presented as an e-poster at the European Society of Anaesthesiology and intensive care meeting (Euroanaesthesia) in May 2024 in Munich, Germany.

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Background

Impostor phenomenon (IP), sometimes referred to as impostor syndrome, is defined as the "inability to internalize success and the tendency to attribute success to external causes such as luck, error or knowing the appropriate individuals" [1]. Failure to recognize personal or professional success may have negative consequences for career advancement and well-being [2]. Several studies have explored IP among health professionals and its impact on professional performance [3–8]. IP appears to be common in medical residents, regardless of specialty, more prevalent in women, and is associated with burnout [7, 9–11].

Burnout syndrome is characterized by emotional exhaustion, a reduced sense of personal accomplishment and depersonalization (a feeling of detachment from one's job) [12]. This syndrome significantly impacts quality of life, job performance, and well-being, leading to negative consequences such as decreased physician health, quality of care and lower patient satisfaction. Anaesthesiologists are at increased risk for burnout due to work-related stress when compared to other physicians [13]. Recent studies have linked burnout in anaesthesiology to being a resident and a lack of perceived support at work [14]. Sources of stress for anaesthesia residents include frequent on-call work and night shifts which can impair quality of life [15].

Results from our previous web-based survey of the European Society of Anaesthesiology and Intensive Care (ESAIC) members revealed high levels of IP among anaesthesiologists, particularly in women and junior doctors but had a low response rate (< 10%) [16]. To our knowledge, no study has yet investigated the association between impostor experiences and burnout in anaesthesiologists in training. Additionally, there is a current gap in knowledge regarding IP and its determinants in anaesthesiology. The co-occurrence of IP and burnout has been noted in many healthcare settings, with IP often leading to anxiety and significantly impacting self-confidence [8].

We hypothesize that imposter phenomenon (IP) and burnout are prevalent among Swiss anaesthesiology residents and junior anaesthesiologists, and that specific risk factors are significantly associated with these conditions.

Methods

Ethics

This study did not involve research on patients. It was approved by the appropriate district ethical committee "*Commission cantonale d'éthique de la recherche (CCER)- Swissethics*" – *IRB N° 2022–01782, 2023–02–14*). Informed consent was obtained from all participants in the trial and implied by submission of a questionnaire, the necessity for separate written consent was waived by the district ethical committee. The trial was registered at clinicaltrials.gov(NCT 06097325, Principal investigator: Mia Gisselbaek, Date of registration:10.23.2023). The manuscript adheres to the applicable Checklist for Reporting of Survey Studies (CROSS) guidelines (Appendix 1) [17].

Setting

We conducted a cross-sectional, web-based survey study targeting all residents and junior anaesthesiologists working in hospitals in the French and Italian-speaking regions of Switzerland. All public hospitals in Latin (French and Italian) Switzerland participated in the current investigation (11/11). These hospitals were university (Geneva and Lausanne), district (Fribourg, Lugano and Sion), regional (Bellinzona, Morges, Neuchâtel and Rennaz) or small regional (Nyon and Payerne) hospitals. Inclusion criteria were residents in anaesthesiology or junior anaesthesiologists (defined as board-certified anaesthesiologists working under supervision of senior consultants). Exclusion criteria were: consultants, chairs and division chairs, medical students and private practice anaesthesiologists. Participation was voluntary and anonymous.

Survey design

The survey was conducted in French and had three sections, which could be completed in one or more sessions. The first section contained 13 demographic and professional experience questions (Appendix 2). These questions were tested by five anaesthesiologists who were not involved in the study to gather feedback on the questions' clarity, comprehensiveness and interpretability.

The second section consisted of the Clance Impostor Phenomenon Scale (CIPS). The CIPS is a validated survey using a 5-point Likert-scale on 20 questions that investigates feelings about success, praise, and self-assessment of competency [18]. Levels of IP severity have been described and validated in previous studies [5–7, 18]. CIPS scores of 40 or less indicate that the respondent has few IP characteristics; if the score is between 41 and 60, the respondent has moderate IP experiences; a score between 61 and 80 means the respondent frequently has impostor feelings; a score higher than 80 means the respondent often has intense IP experiences. The higher the score, the more frequently and seriously the IP interferes in a person's life. For this study, the presence of IP was defined as a CIPS score ≥ 60 [11]. In this study, we used a validated French version of the CIPS score showing a good internal coherence [19].

The third section consisted of the Maslach-Burnout-Inventory for medical personnel (MBI-HSS-MP). The

MBI-HSS MP is a score that includes a three dimensions analysis (emotional exhaustion, depersonalization and personal accomplishment) to assess the presence of burnout in the population and uses a 7-level frequency scale on 22 questions [20]. The presence of burnout was defined if the following criteria in the three dimensions of MBI-HSS were met: high emotional exhaustion (EE) (score ≥ 27), high depersonalization (DP) (score ≥ 10), and low personal accomplishment (PA) (score ≤ 33). A French validated translation of the Survey instrument was used [21]. Upon completing the survey, the respondent's scores and their interpretation were displayed to them. Contact information for several psychological support resources was also provided.

Survey data collection

We obtained professional email addresses of residents and junior anaesthesiologists working in participating hospitals of the COMASUL (Latin Commission for Training in Anaesthesiology), which regulates the admission of residents to the anaesthesiology postgraduate training and establishes a network to coordinate the rotation and training of admitted candidates. Mailing lists were retrieved in May 2023, and email invitations with links to the survey were sent on June 12th 2023, followed by a total of three reminders. The survey was closed on November 3rd 2023.

Surveys were created and managed using an online platform created specifically for our study and using the Joomla 3.10 content management system (Open Source Matters, New York, NY, USA). The platform was secured by Akeeba Admin Tools 6.1 (Akeeba Ltd, Nicosia, Cyprus) and RSFirewall 3.10 (RSJoomla, Constanta, Romania) and was fully adherent with the European General Data Protection Regulation.

Mailing lists obtained from the COMASUL were merged into a single mailing list. Unique identifiers were randomly created for each email address and embedded in individual links which automatically logged users into the survey webpage. Invitations were sent using AcyMailing 5.11 (Acyba, Lyon, France). Questionnaires were administered using Community Surveys 6 (Shondalai, Hyderabad, India) and Balbooa Forms 2 (Balbooa, Ukraine). Balbooa Forms 2 allowed for the immediate computation, display and interpretation of scores to the respondent.

Upon completion of all three sections of the survey, the respondent's email address was securely erased by virtue of a custom PHP code embedded in the results page displayed upon questionnaire completion. This code, which was included using Regular Labs' Sourcerer 9.3 Pro (Regular Labs, Zandpol, Netherlands), ensured irreversible anonymization. Since page completion checks were performed prior to data validation, there could be no missing data if the questionnaires were marked as completed.

Statistical analysis

Data were extracted to comma separated values (CSV) files for analysis after the study end date. The STATA 17.0 software (StataCorp LLC, USA) was used for data curation and analysis [22]. Descriptive statistics were generated for variables such as gender, age, family status, country of undergraduate medical studies, nationality, previous work experience as well as presence or absence of recent professional transitions in participants' careers. A recent professional transition was defined as a change in hospital or in medical specialty in the last six months. Demographic data and questionnaire scores were cross tabulated using the predetermined score categories and subgroups of participants. Statistical significance tests (Chi^2, t-test and Fisher) were done for univariate analysis. A Pearson's pairwise correlation matrix was used to assess correlations between the presence of burnout and IP and its components. Multivariable logistic regression was used to search for associations between sociodemographic variables, Burnout and IP. Univariate analyses of associations between impostor syndrome and sociodemographic variables were carried out to identify which variables were to be included in the regression models. All variables with p values < 0.2 were included, and overfitting was ruled out by ensuring that there was less than 1 variable per 10 occurrences. Since the only purpose of the univariate analyses was to determine the independent variables which were to be integrated in the regression model, no correction for multiplicity testing was applied. To ensure the stability of the regression models, multicollinearity was assessed, and variables were excluded accordingly.

Odd Ratios with 95% confidence intervals (CI) were computed to report effect sizes for bivariate and multivariable analyses. A two-sided p value lower than 0.05 was considered significant. Total nonresponse or item nonresponse in one of the questions of the CIPS or the MBI-HSS-MP was handled by analysis withdrawal. Since the attrition rate was very limited and because all compensation methods present limitations, no imputation method was used. No alpha-adjustment such as the Holm-Bonferroni correction was used for the comparisons of sociodemographic characteristics reported in Table 2.

Results

The response rate of the demographic section was 145/318 (45.6%); the CIPS component was completed by 136/318 (42.8%), and the MBI-HSS-MP (all three

sections of the survey) by 127/318 (39.9%) of survey the responders (see Fig. 1). Of the 136 participants who completed the CIPS 55.1% (75/136) were women and 44.9% (61/136) were men, no one identified as other genders. Specific demographics characteristics of the survey participants can be found in Table 1.

Impostor phenomenon

The point prevalence of IP was 56% (76/136; CI 95: 47% to 64%), with 9% (12/136; CI 95: 5% to 15%) of participants experiencing intense IP. The mean overall CIPS score was 62 (SD ± 15.6). Descriptive statistics and univariates analysis for each of the socio-demographic criteria can be found in Table 2. In the multivariable regression analysis, the IP scores were strongly associated with woman gender and Swiss nationality (see Table 3).

Burnout

Of the 127 participants who completed the MBI-HSS-MP, 57 (45%; CI 95: 36.1 to 53.9) had a positive DP score, with a mean score of 10.2 (SD ± 7.2). The mean EE score was 22.1 (SD ± 12.3) and 46 participants (36%; CI 95: 27.9 to 45.2) reported feeling emotionally exhausted. The mean PA score was 36.9 (SD ± 6.8) and 24 participants had a low PA score (27%; CI 95: 19.3 to 35.4). All three dimensions were positive for burnout in 13 participants (10%; CI 95: 5.6 to 16.9). Burnout was correlated with woman gender. See Table 2 for detailed statistics.

The presence of burnout was positively correlated with the presence of IP (r 0.20, $p=0.028$). The EE score was moderately correlated with IP score (r 0.41, $p<0.001$), a smaller correlation with the DP score was observed (r 0.29, $p<0.001$), while PA and CIPS scores did not correlate (r −0.14, $p=0.114$). PA scores did not differ between CIPS categories (Fig. 2). There was no association between burnout and any of the socio-demographic variable studied (Table 3).

Discussion

We conducted a web-based survey to investigate risk factors, prevalences of and associations between burnout and impostor phenomenon among anaesthesiology residents and junior anaesthesiologists working in French and Italian-speaking Switzerland in 2023. The prevalence of both IP and burnout were of 56% and 10% respectively. This study is the first to show an association between IP and burnout in this population. IP was more prevalent in women respondents and Swiss nationals, while burnout was also more frequent in women. Our current results corroborate our earlier research, suggesting that

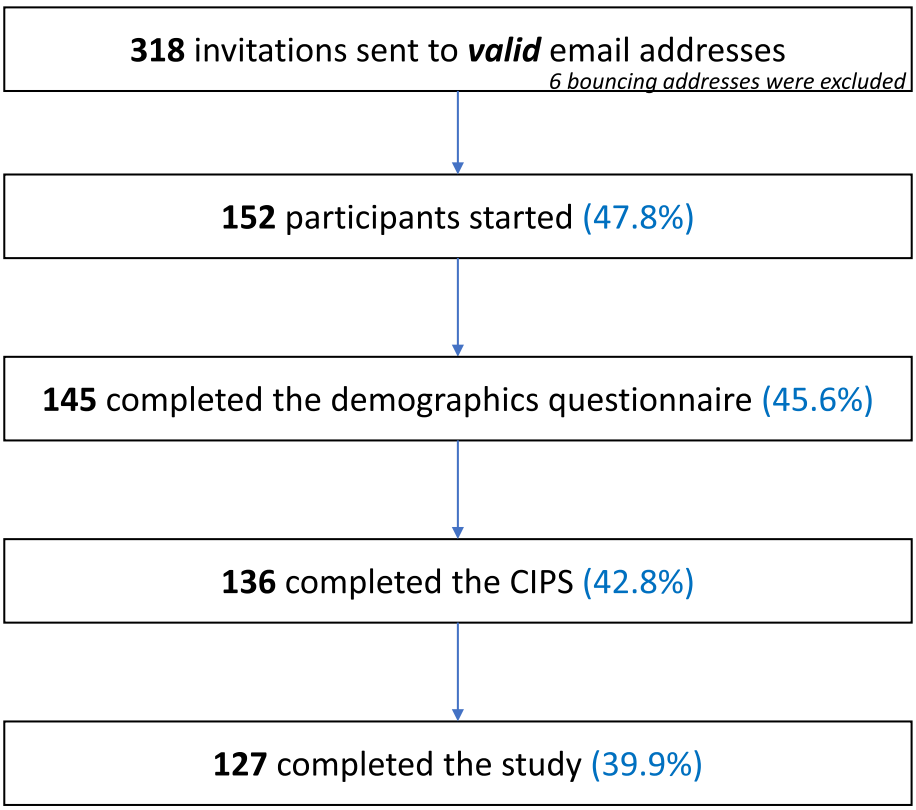

Fig. 1 Recruitment flow chart

Table 1 Sociodemographic characteristics of survey participants. Results are presented as N (and percentage), except for continuous variable which are presented as mean and standard deviation (SD)

Variable	Categories	Number of participants Total N = 136
Position	Resident	80 (59%)
	Junior anesthesiologists	56 (41%)
Gender	Woman	75 (55%)
	Man	61 (45%)
Relationship status	Single	62 (45%)
	Registered partnership	14 (10%)
	Married	54 (40%)
	Separated	2 (1%)
	Divorced	4 (3%)
Age	Continuous (mean (SD))	35 years (4.5)
Medical studies	In Switzerland	80 (59%)
	Outside of Switzerland	51 (38%)
	In both	5 (4%)
Swiss Nationality	Yes	80 (59%)
	No	56 (41%)
Legal status	Swiss national	80 (59%)
	B or C Permit (permanent)	53 (39%)
	G permit (temporary)	3 (2%)
Anesthesiology experience	Continuous (mean (SD))	5,1 years (3.4)
Recent professional transition (position or hospitals)	Yes	37 (27%)
	No	99 (73%)
Current type of hospital	University hospital (level A1)	116 (85%)
	District hospital (level A2)	7 (5%)
	Regional hospital (level B)	11 (8%)
	Small regional hospital (level C)	2 (1%)
PhD diploma	Yes	6 (4%)
	No	130 (96%)
Command of language in the workplace	Moderate	1 (1%)
	Good	7 (5%)
	Very Good	19 (14%)
	Excellent	109 (80%)

variables like gender and professional experience potentially impact the prevalence of IP [16]. Gender differences in IP and burnout among physicians have also been reported by several authors [8, 9, 23–25].

The association between Impostor Phenomenon (IP) and burnout is not unique to anaesthesiology. Studies across various medical specialties and countries have reported similar findings. For instance, a Canadian study of postgraduate medical learners across multiple specialties found IP to be an independent risk factor for burnout, with a prevalence of 62.7% [7]. Additionally, a recent study by Shanafelt et al. revealed that 23.6% of US physicians experienced IP often or very often, which is significantly higher than the general working population [9]. This study also noted a correlation between gender and the experience of IP, as well as a link between IP and burnout among physicians. Interestingly, a study of general surgeons and surgery residents in the United States reported no significant gender differences in IP prevalence, suggesting the influence of specialty-specific factors [11]. These variations in findings may be attributed to differences in healthcare systems, self-selection in certain specialties, work environments, or cultural factors specific to each country and medical specialty.

While much of the research on IP has focused on the individual psychological level, Feenstra et al. have called for greater attention to how context and social structure elicit imposter feelings among certain categories of

Table 2 Sociodemographic characteristics of survey participants according to absence or presence of IP and the absence or presence of burnout. Results are presented as N (and percentage), except for continuous variable presented as Median and IQR. No alpha-adjustment was applied

Variable	Categories	IP absent (*N* = 60)	IP present (*N* = 76)	*P*-value*	Burnout absent (*N* = 114)	Burnout present (*N* = 13)	*P*-value*
Position	Resident	34 (56%)	46 (61%)	0.650	66 (58%)	10 (77%)	0.240
	Junior anesthesiologists	26 (43%)	30 (39%)		48 (42%)	3 (13%)	
Gender	Woman	27 (45%)	48 (63%)	0.035	59 (52%)	11(85%)	0.037
	Man	33 (55%)	28 (37%)		55 (48%)	2 (15%)	
Relationship status	Single	28 (47%)	34 (45%)	0.557	53 (46%)	6 (46%)	0.340
	Registered partnership	4 (7%)	10 (13%)		11 (10%)	2 (15%)	
	Married	26 (43%)	28 (37%)		45 (39%)	4 (31%)	
	Separated	0	2(3%)		1 (1%)	1 (8%)	
	Divorced	2(3%)	2 (3%)		4 (4%)	0	
Age	Continuous	34, IQR 32–38	34, IQR 32–38	0.992	34, IQR 32–38	35, IQR 33–37	0.833
Medical studies	In Switzerland	29 (48%)	51(67%)	0.043	71 (62%)	5 (38%)	0.195
	Outside of Switzerland	27 (45%)	24 (32%)		39 (34%)	7 (54%)	
	In both	4 (7%)	1 (1%)		4 (4%)	1 (8%)	
Swiss Nationality	Yes	30 (50%)	50 (66%)	0.063	71 (62%)	5 (38%)	0.135
Legal status	Swiss national	30 (50%)	50 (66%)	0.114	71 (62%)	5 (38%)	0.103
	B or C Permit (permanent)	29 (48%)	24 (31%)		41 (36%)	7 (54%)	
	G permit (temporary)	1 (2%)	2 (3%)		2 (2%)	1 (8%)	
Anesthesiology experience (years)	Continuous	5, IQR 2–8	4, IQR 3–6	0.527	5, IQR 3–7	4, IQR 3–6	0.983
Recent professional transition (position or hospitals)	Yes	12 (20%)	25 (33%)	0.093	31 (27%)	5 (38%)	0.516
Type of hospital	University hospital (level A1)	49 (82%)	67 (88%)	0.263	98 (86%)	11 (85%)	0.273
	District hospital (level A2)	4 (6%)	3 (4%)		7 (6%)	0	
	Regional hospital (level B)	7 (12%)	4 (5%)		8 (7%)	1 (8%)	
	Small regional hospital (level C)	0	2 (3%)		1 (1%)	1 (8%)	
PhD diploma	Yes	1 (2%)	5 (7%)	0.228	5 (4%)	0	1.000
Command of language in the workplace	Moderate	1 (2%)	0	0.107	0	1 (8%)	0.133
	Good	4 (6%)	3 (4%)		7 (6%)	0	
	Very Good	12 (20%)	7 (9%)		17 (15%)	1 (8%)	
	Excellent	43 (72%)	66 (87%)		90 (79%)	11 (84%)	

* *P*-value derived by appropriate statistic test. The presence and absence of impostor phenomenon (IP) and burnout is presented for each variable

Table 3 Results of the multivariable regression analyses for associations between socio-demographics characteristics and impostor phenomenon or burnout. Table presents Odds Ratio (OR) with 95% Confidence intervals (CI) and p-value. 95%CI = 95% Confidence Interval; OR = Odds Ratio

Socio-demographic characteristic	Impostor Phenomenon			Burnout		
	OR	95%CI	P-Value	OR	95%CI	P-Value
Age	0.99	0.91 – 1.08	0.906	0.97	0.83 – 1.14	0.730
Gender (M)	0.39	0.18 – 0.83	0.015	0.22	0.05 – 1.07	0.061
Marital status	0.88	0.42 – 1.87	0.748	0.97	0.28 – 3.33	0.961
Swiss nationality	2.45	1.13 – 5.32	0.023	0.44	0.13 – 1.48	0.183
Recent professional transition	1.76	0.76 – 4.08	0.184	1.72	0.49 – 6.00	0.393
Pseudo-R^2	0.07			0.10		

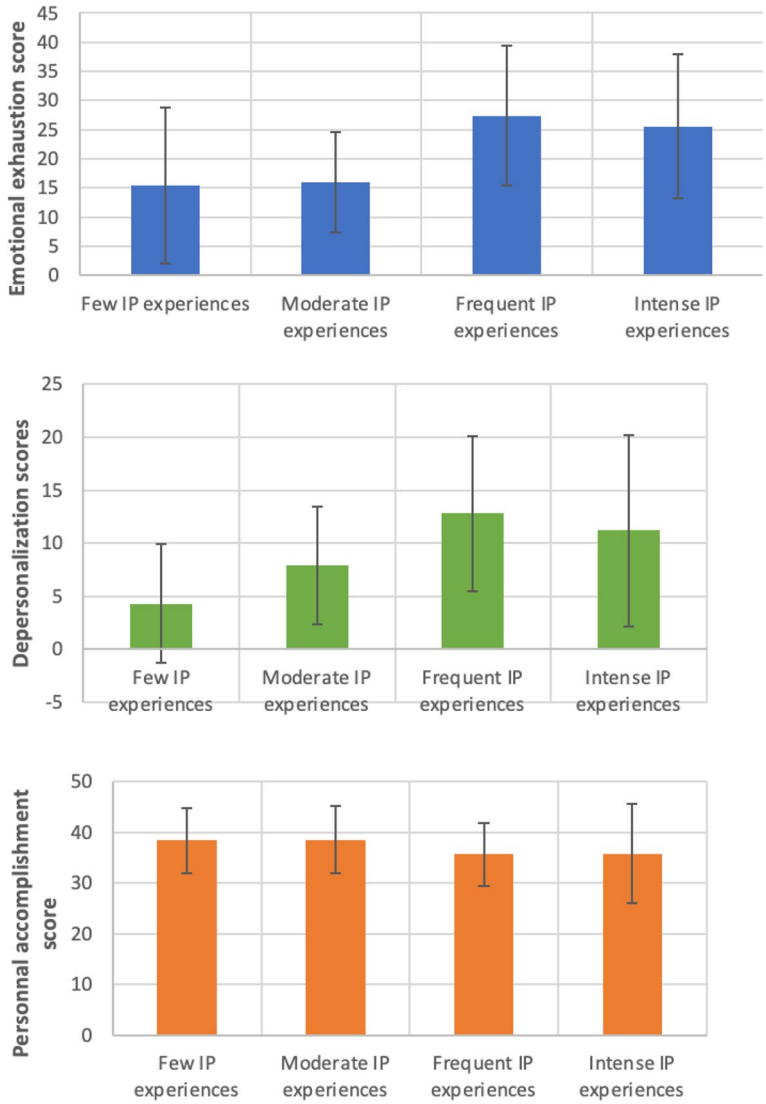

Fig. 2 MBI Single dimensions scores correlated with CIPS categories on frequency of Impostor phenomenon (IP) experience. The whiskers represent 95%CI

individuals. [2] They argue that IP should be seen as "a psychological response to a dysfunctional context" and posit that women will only feel like imposters in contexts that signal (explicitly or implicitly) that they do not belong.

Women physicians frequently report experiencing disparities in opportunities, recognition, and credibility, which can influence their professional endeavors, interpersonal dynamics, and mental well-being [26, 27]. The operating room environment in particular remains entrenched in a predominantly male-dominated culture, characterized by the tacit acceptance and even glorification of disruptive behaviors including incivility and micro-aggression [28]. In contexts where stereotypically "male" qualities and leadership styles are valued (i.e., assertiveness), women may feel out of place and insecure [2, 29]. Moreover, gender stereotypes endured by women lead to biased decisions and judgment hindering women's career advancement [30–33]. Perhaps not surprisingly, women anaesthesiologists remain a minority in leadership and senior academic positions [34–36], despite an equal representation in medical school and in the anaesthesia workforce [37]. A survey conducted by the European Society of Anaesthesiology and Intensive Care (ESAIC) on gender imbalance in leadership positions reported that while a similar proportion of men and women wanted a leadership career, more women experienced barriers, including a lack of self-confidence [38].

Swiss nationals were also more prone to IP than non-Swiss participants; While adapting to different cultural and institutional norms in a new country is challenging, non-Swiss participants may inherently have more experience adapting to new environments than Swiss participants and have likely developed a certain resilience and self-concept clarity that protects them from IP [39]. It is, however, also possible that nationality is a confounder for some other, unidentified factor. For example, workplace expectations, levels of institutional support, or other systemic factors may differ for Swiss and non-Swiss participants, influencing their experiences of IP. Nevertheless, these results highlight the complexity of understanding IP and suggest the need for further research to untangle the interplay of nationality, cultural adaptation, resilience, and systemic influences.

Recognizing that IP development early in one's career can lead to lasting impacts due to its association with burnout is crucial [8–10]. It has been suggested that IP may hinder residents from developing a sense of accomplishment from positive patient outcomes, leading to a sense of futility, thus increasing burnout susceptibility [7]. All we know to date is that IP may be an independent risk factor and a target for intervention aimed at decreasing professional exhaustion [9]. However, common characteristics of IP and burnout, such as perfectionism, workaholism, and impaired job satisfaction may also contribute to the negative experience.

Individuals experiencing IP may also be at heightened risk for unfavorable psychological outcomes following adverse events. For instance, the "second victim phenomenon," where healthcare professionals involved in adverse events experience profound emotional distress, may intersect with IP [40, 41]. Those with IP could perceive such events as confirmation of their self-doubt and inadequacy, further compounding their emotional burden and exacerbating feelings of moral distress or moral injury. Addressing this gap in knowledge in the future may help prevent burnout in this population.

Occupational burnout among physicians stems from systemic issues within the practice environment, exacerbated by professional norms and cultural aspects of medicine [9]. These norms include the expectation of "superhuman" capabilities, prioritization of work over personal well-being, and reluctance to seek help [42]. In addition, anaesthesiology presents several challenges including sleep disruption and prolonged work hours [14]. Anaesthesiologists routinely navigate high-pressure situations [43], which may contribute to depleted emotional resources. Also, working in isolation within the operating room may limit opportunities for anaesthesiologists to share their emotional experiences, further exacerbating feelings of exhaustion [44, 45]. Addressing burnout among anaesthesiologist's is crucial due to its associations with poor quality of care and reduced physician productivity, substance abuse, and suicidal ideation [25, 46].

Interestingly, PA scores were relatively high among anaesthesiologists in our study. We hypothesize that high PA scores among anaesthesiologists may be related to the nature of the profession. Anaesthesiologists often work in high-stress environments where they are required to make critical decisions swiftly and effectively. Their ability to successfully manage these situations may lead to a sense of accomplishment and competence. Anaesthesiologists also play a crucial role in patient care, contributing significantly to positive surgical outcomes. The tangible impact of their work on patient well-being can also contribute to a sense of accomplishment. PA scores were also found to be high among German-speaking anaesthesiologists in Switzerland [14]. Hence, like many other physicians, anaesthesiologists remain at high risk of burnout [45], even when PA scores are high [14].

If lack of confidence and feelings of impostorism are indeed psychological responses to a dysfunctional context, and can be associated with burnout, then IP needs to be addressed at both the individual and systemic/institutional levels [3, 47]. A recent scoping review of education interventions for IP identified a range of mostly individual-focused interventions such as workshops, small group discussions and individual coaching, but also noted that a common theme in the reviewed studies was a call for intervention at three levels: individual, peer-to-peer, and institutional [48]. While one-on-one psychological interventions aim to empower individuals to effectively deal with imposter feelings, they risk placing sole responsibility for IP on the individual. Group and peer interventions encourage greater awareness of the pervasiveness of IP and the role of institutional culture in shaping such feelings. Institutional interventions such as supervisor education, mentorship programs, support networks, wellness-centered leadership and initiatives to address systemic bias could contribute to creating a more positive workplace environment [48–50]. This perspective aligns with the findings of La Donna et al. which emphasize the importance of addressing wellness and resilience at multiple levels to mitigate burnout and counteract the cultural myths of invincibility and self-reliance among physicians. [49] Future research should aim to better understand the experiences and coping strategies of those experiencing IP and determine whether interventions need to be tailored differently for men and women [51]. Future interventions should be evaluated using robust and longitudinal methods [48].

Study limitations

Our study sample was confined to two linguistic regions of Switzerland and results may not be generalizable to anaesthesiologists working elsewhere. Survey-based estimates of IP and burnout may be influenced by biases stemming from response, non-response and self-selection factors [52]. We also may have missed individuals currently experiencing burnout symptoms due to sick leave thus potentially underestimating the prevalence of this phenomenon. However, individuals experiencing IP may indeed be more motivated to participate due to a heightened awareness or personal connection to the topic. The questionnaires were administered in French, to both French and Italian-speaking regions of Switzerland. As doctors from the Italian-speaking region of Switzerland were required until recently to complete their studies either in French or in German, we believe this is an acceptable limitation. We asked participants to identify their gender, but only two categories (women and men) were represented in the responses. Therefore, our study findings may not be applicable to populations with significant representation of other genders. Finally, we limited the number of demographic questions to limit attrition, but other unidentified potential confounders may exist. Additionally, the potential occurrence of Simpson's Paradox cannot be excluded, as aggregated data may mask or reverse trends present in subgroup analyses, highlighting the need for caution in interpreting our findings. For instance, we hypothesized that non-Swiss participants might be more prone to IP due to cultural differences and adaptation challenges; however, our results showed the opposite. The proportion of Swiss nationals in our sample was higher than that of non-Swiss participants, which may have affected the findings. It is possible that this unexpected finding reflects other, unidentified factors such as resilience, self-concept clarity, or cultural differences in self-awareness and reporting of IP. Nationality may also be a confounder for other systemic or workplace-related factors, which were not captured in this study. Moreover, social desirability, trust issues, stereotype threat, and skepticism could have influenced responses to sociodemographic questions, potentially impacting the accuracy of the collected data.

Conclusion

For the first time, a correlation has been found between IP experience and burnout among residents and junior anaesthesiologists, emphasizing the urgent need to address these high rates. Anaesthesiologists play a critical role in patient care, often dealing with high stress situations and complex medical procedures. Burnout not only affects their own well-being but also has the potential to impact patient safety and the quality of care in anaesthesiology. Future research should focus on gaining a deeper understanding of the personal and contextual factors that shape IP and burnout experiences in order to develop effective solutions to mitigate these phenomena.

Abbreviations

IP	Impostor phenomenon
COMASUL	Commission Latine d'Engagement pour la formation en Anesthésiologie
CIPS	Clance Impostor Phenomenon Scale
MBI-HSS-MP	Maslach-Burnout-Inventory for medical personnel
ESAICP	European Society of Anaesthesiology and intensive care

Supplementary Information

The online version contains supplementary material available athttps://doi.org/10.1186/s12871-025-02957-8

Supplementary Material 1.

Supplementary Material 2.

Supplementary Material 3.

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Authors' contributions

Mia Gisselbaek: This author helped conceive the study, design, analyze, and interpret the data; draft the manuscript, and critically revise the manuscript for content. Mélanie Suppan: This author helped design the study, analyze, and interpret the data, and critically revise the manuscript for content. Sarah Saxena: This author helped design the study and critically revise the manuscript for content. Patricia Hudelson: This author helped conceive the study, interpret the data, and critically revise the manuscript for content. Georges L. Savoldelli: This author helped conceive the study, design, analyze, and interpret the data, and critically revise the manuscript for content.

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Data availability

Supplementary data files are available from corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

This study did not involve research on patients. It was approved by the appropriate district ethical committee "Commission cantonale d'éthique de la recherche (CCER)- Swissethics" – IRB N° 2022–01782, 2023–02-14). Informed consent was obtained from all participants in the trial and implied by submission of a questionnaire, the necessity for separate written consent was waived by the district ethical committee.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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