Resident Early Attrition in Residents Medical Training.

Abandono temprano de los residentes en la formación médica de los residentes.

Autores

Antonio Eugenio Rivera Cisneros[1]
antonio.rivera.academico@gmail.com
https://orcid.org/0000-0002-1448-5024
Universidad del Futbol y Ciencias del Deporte
México

Pablo Julián Medina Sánchez[2]
pjms73@hotmail.com
https://orcid.org/0009-0005-6889-4324
Hospital Aranda de la Parra
México

Jorge Manuel Sánchez González[3]
juevesm@gmail.com
https://orcid.org/0000-0003-1942-0163
National Institute of Learning, Skills and Research in Sciences, S.C (INAHIC)
México

Jorge Horacio Portillo Gallo[4]
galeno_100@hotmail.com
https://orcid.org/0000-0003-4902-0072
Mexican Federation of Clinical Patholgyy and Medicine Laboratory Medicine
México

María Cristina Morán Moguel[5]
cristina.moran@academicos.udg.mx
https://orcid.org/0000-0001-6458-9617
Centro Universitario de Ciencias de la Salud
Universidad de Guadalajara
Guadalajara, Jal. - México

Abstract

Resident attrition is a growing concern in medical education systems worldwide. This article analyzes key personal, institutional, economic, and vocational factors associated with early departure from residency training programs. A structured narrative review of studies published between 2000 and 2025 was performed. A structured narrative review was conducted using PubMed, Scopus, SciELO, and Google Scholar. Additional analytical tools were used, including heatmaps, interaction matrices, influence diagrams, and a multivariate AI-based predictive model. Five residents who had entered one of thirteen medical specialties at a general hospital belonging to the Mexican Ministry of Health, in the city of León, located in central Mexico, were interviewed within the first 15 days after voluntarily requesting . open-ended interview. The interviews were conducted by the medical coordination and for teaching and research. Three were from Internal Medicine, one from Geriatrics, and one from General Surgery. The average age was 26 ± 1 years. In Internal Medicine, three men indicated that they were married and could not afford a study abroad program; the other was single, which was also the reason for his withdrawal literature review Findings demonstrate that burnout, excessive workload, vocational mismatch, institutional mistreatment, and socioeconomic pressures significantly predict attrition risk. A predictive model based on artificial intelligence is proposed to identify high-risk residents. Strengthening well-being programs, improving structural working conditions, and integrating vocational assessment into specialty selection may reduce early attrition.

Key Words: Attrition, Medical Residents, Educative Impact, Vocational Issue

Resumen

La deserción de residentes es una preocupación creciente en los sistemas de educación médica en todo el mundo. Este artículo analiza los factores personales, institucionales, económicos y vocacionales asociados con el abandono temprano de los programas de formación de residencia. Se realizó una revisión de la literatura sobre estudios publicados entre 2000 y 2025 en PubMed, Scopus, SciELO y Google Scholar. Se utilizaron herramientas analíticas adicionales, incluyendo mapas de relación, matrices de interacción, diagramas de influencia y una propuesta de análisis factorial. Se entrevistaron a cinco residentes de primer ingreso que solicitaron su baja en los primeros 15 días. para conocer las causas de su decisión. Las entrevistas fueron realizadas por la coordinación general de enseñanza e investigación. Tres fueron de Medicina Interna, uno de Geriatría y uno de Cirugía General. La edad promedio fue de 26 ± 1 años. En Medicina Interna, tres hombres indicaron que estaban casados y uno soltero y no podían costear un programa de estudios. Estudios revisados señalan que el agotamiento profesional, la carga de trabajo excesiva, el desajuste vocacional, el maltrato institucional y las presiones socioeconómicas predicen significativamente el riesgo de deserción. El fortalecimiento de los programas de bienestar, la mejora de las condiciones laborales estructurales y la integración de la evaluación vocacional en la selección de especialidades pueden reducir la deserción temprana.

Palabras clave: Deserción, Residentes médicos, Impacto educativo, Vocación Profesional

Introduction

Resident training is one of the most demanding stages in medical education, and attrition —defined as voluntary or involuntary discontinuation of residency prior to program completion—has become increasingly prevalent [1,2]. International literature reports attrition rates ranging from 2% to 20%, varying by specialty and country. In Latin America, particularly Mexico, socioeconomic burden, lack of support networks, and institutional culture play a significant role. Understanding the determinants of resident attrition is crucial to guide reforms in academic medicine [4,7].

The fact that five first-year residents dropped out of a total of 200 residents in the first 15 days at a public general hospital caught our attention. There had been changes in the student selection process and the implementation of new federal government admissions systems [8,9]. Additionally, there was a problem with the timely payment of stipends for their medical training. Given the global trend of increasing dropout rates, we decided to conduct this study to identify the reasons cited by the residents who dropped out, as well as the specific specialties involved, within such a short period [9,13]. The objective of this work was to analyze the contributing factors that led to this dropout rate.

Although the early disillusionment of residents entering medical residency programs is a matter of concern not only to the health sector but also due to the shortage of these specialists for the general population, a great effort is made to study—sometimes for up to three consecutive years in Mexico—to gain entry into the medical residency system, a fact recognized worldwide. Furthermore, those who are accepted displace other, more dedicated physicians who aspire to enter, and this influx of residents results in economic losses and reduced patient care in hospitals, as described in the first seven articles reviewed of this study [1-7].

In February 2024, it we was noted that five residents at a general hospital in central Mexico, the subject of this study, dropped out within the first 15 days of their residency, raising a fundamental research question: Why does early dropout within the first 15 days occur in hospitals of this type, and what is the international context, including the factors that contribute to this disillusionment?

When identifying factors, guidance should be provided on the main specialties that cause dropout, as well as matrix analysis through heatcam factor analysis of personal and ecological factors. The purpose of this study was identifying the most important causes of dropout in our nation and comparing them with those found worldwide.

Materials and Methods

A structured narrative review was conducted using PubMed, Scopus, SciELO, and Google Scholar. Search terms included: 'resident attrition', 'medical residency dropout', 'burnout residents', 'vocational mismatch', 'surgical training attrition', and 'Mexico residency training'. Inclusion criteria encompassed quantitative, qualitative, mixed-methods, and a literature review review studies from 2000 to 2025 exploring causes of attrition, institutional determinants, outcomes, and mitigation strategies. Additional analytical tools were used, including heatmaps, interaction matrices, influence diagrams, and a multivariate AI-based predictive model.

After reviewing the literature, structured interviews were conducted with students who dropped out after their initial hospital stay. These interviews included questions about their personal information, university, place of origin, marital status, their first choice of specialty (based on their selection for the Mexican National Medical Residency Exam), whether they had chosen a different specialty, their reasons for leaving the residency program, and why they left early, within 15 days of entering the hospital. The data obtained by the General Coordinator of Teaching and Research was then discussed with the Teaching and Research Coordinators and the Head of the medical specialty the students were to pursue.

Ethics Statement. This article is based on a narrative and analytical review of previously published literature and did not involve human participants, patient data, or experimental intervention. Therefore, formal approval from an Institutional Review Board (IRB) or Research Ethics Committee was not required. The study adhered to international ethical standards for scholarly research, including: The Declaration of Helsinki (relevant

principles on scientific integrity); guidelines for responsible authorship as defined by the ICMJE (International Committee of Medical Journal Editors); ethical publication practices recommended by COPE (Committee on Publication Ethics).

No identifiable individual data were used, and no intervention, observation, or recruitment of human participants was performed.

Results

Five residents who had entered one of thirteen medical specialties at a general hospital belonging to the Mexican Ministry of Health, in the city of León, located in central Mexico, were interviewed within the first 15 days after voluntarily requesting to withdraw from their studies. They were first-year residents who had applied through Mexico's National Medical Residency Exam (ENARM). Through an open-ended interview that considered the reasons for their dropout, the contributing factors, and their hopes for the future, residents were asked their opinions on the residency selection system. The interviews were conducted by the medical coordinator and deputy coordinator for teaching and research. Their responses are described below. Two of them highly specialized (oncological surgery and 5-year geriatrics), voluntarily decided to abandon their undergraduate studies in a medical specialty. Of these, four were men and one was a woman. All came from a different state than the one where the hospital is located. Three were from Internal Medicine, one from Geriatrics, and one from General Surgery. The average age was 26 ± 1 years. The youngest resident was a woman at 24 years old. All came from public universities in states in the central-western region of Mexico. Four of them were taking their medical residency exam for the first time, and only one was taking it for the second time. In Internal Medicine, three men indicated that they were married and could not afford a study abroad program; the other was single, which was also the reason for his withdrawal. The student indicated that she did not like the Internal Medicine Hospital System and the clinical teaching activities. There were no other reasons. In summary, the reasons for dropping out were economic factors (4/5), marital status (3/5), the teaching system (1/5), and 4/5 indicated that the choice may not have been the most suitable even though they took the exam seeking their desired specialty.

Other authors [11-17], identified several recurrent predictors of resident attrition such as high levels of burnout and emotional exhaustion; excessive workload and prolonged shifts; institutional mistreatment or hostile learning environments; vocational mismatch resulting from selection systems (ENARM/USMLE); socioeconomic constraints, limited remuneration, and geographic displacement. Some conditions are similar to our findings [14-20]. However, the economic and vocational factors were predominant.

In another hand, Specialties with the highest attrition risk included General Surgery, Obstetrics & Gynecology, Internal Medicine, Anesthesiology, and Emergency Medicine, but in our study were Internal Medicine and Geriatry, probably related with the educational offer that the hospital offer[5,7-11].

Heatmap analysis showed that surgical disciplines accumulate the highest risk exposure. The interaction matrix demonstrated a high degree of interdependence between personal, institutional, economic, and vocational systems 1, [7-11,13.] The AI-based predictive model [5,9-11,13], showed increased attrition probability when burnout and workload indices were elevated.

Following we try to explain the literature data and the contrast that we have in our study.

The figure 1 showed the medical specialties founding through the world in this issue.

**Figure 1. Heatmap of attrition for Medical Speciality (%)**
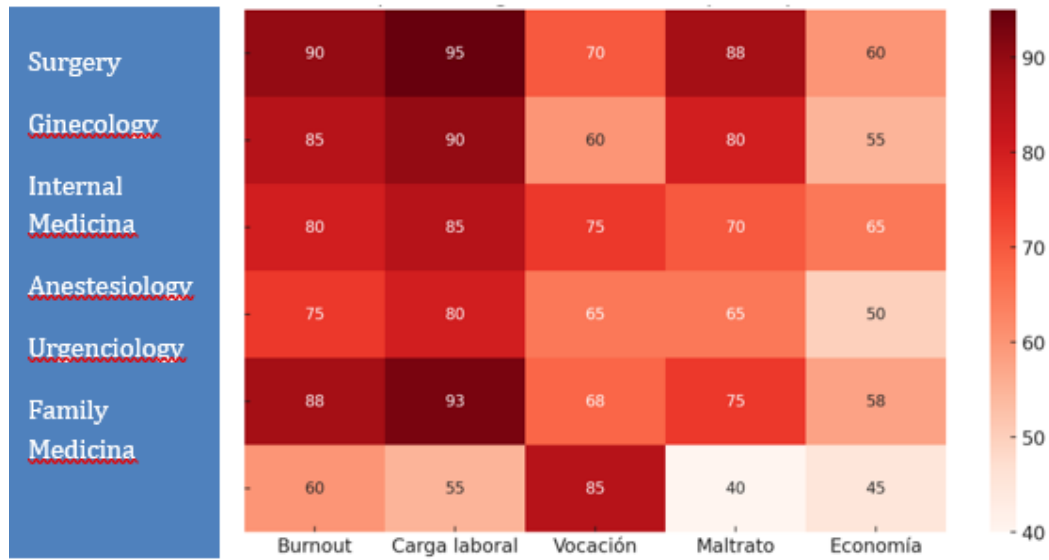
The figure 2 shows the matrix of personal factors described in literature.

Figure 2. Interaction matrix between desertion factor (Probability values are: 0=No; 1=Interaction)
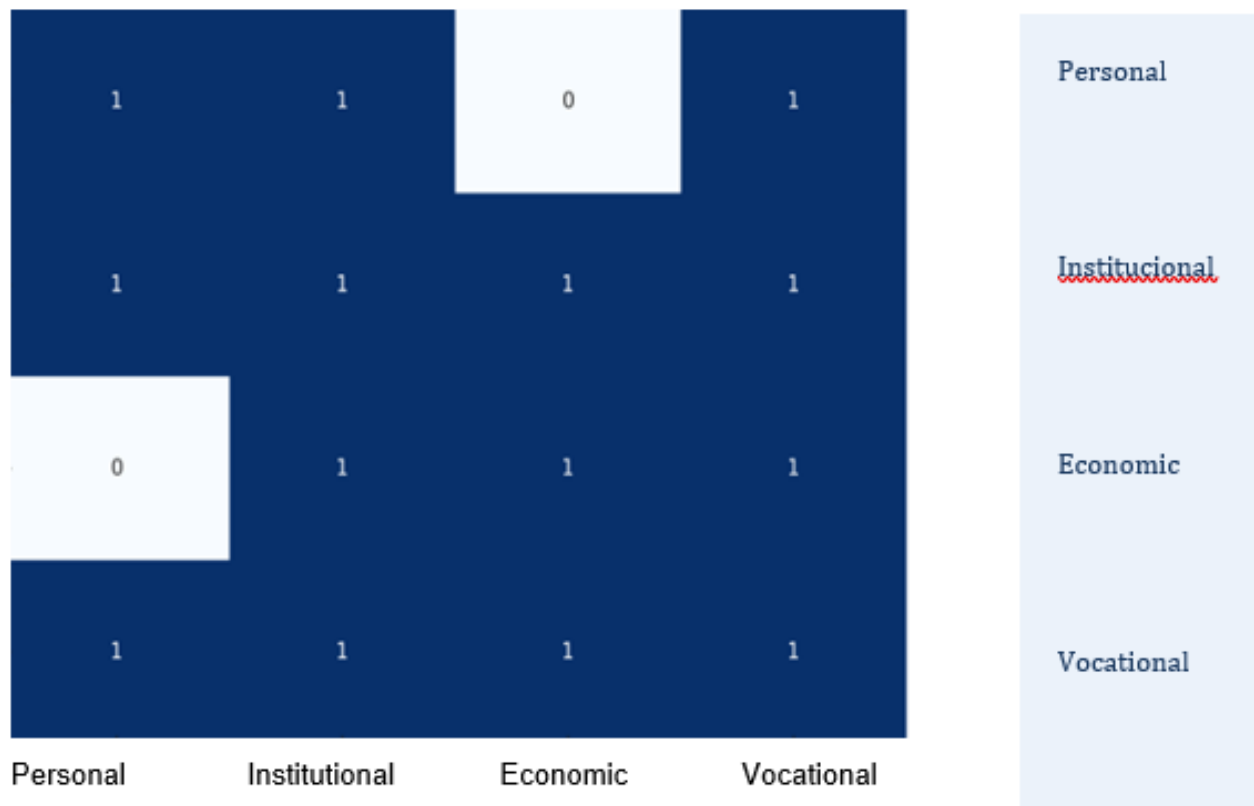
The figure 3 shows the analyzed a schematic approach of the interaction of environmental factors in the early attrition risk of medical resident students

Epidemiological Attrition Risk of Medical Resident Students
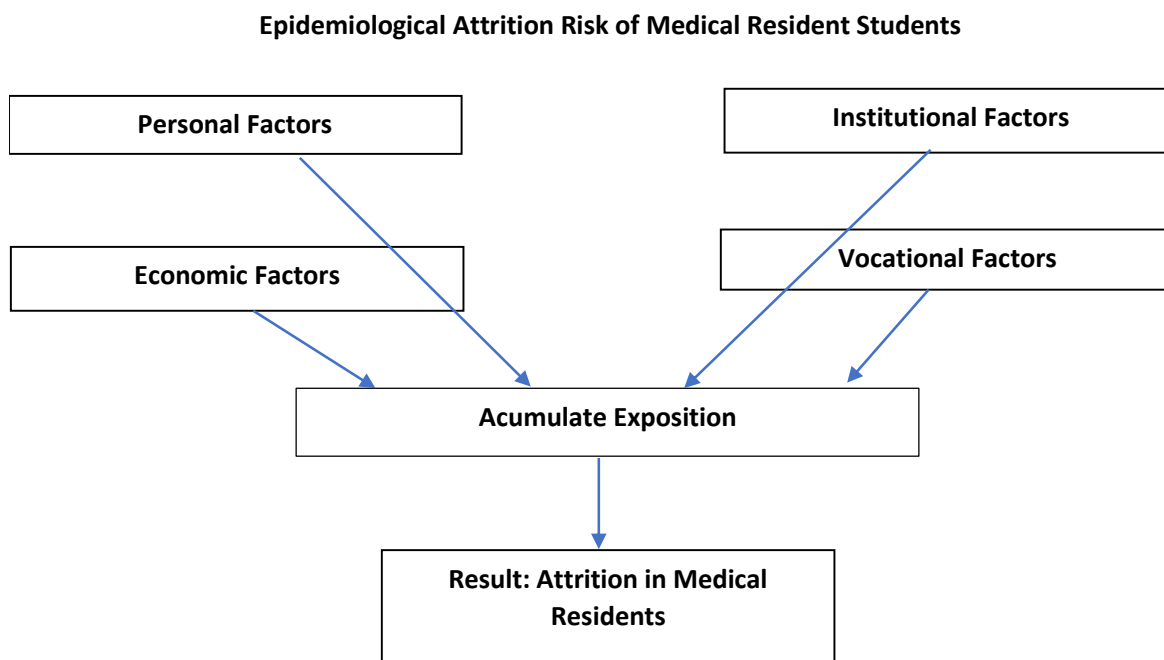
Discussion

Our results, show that the principal reason of very early attrition in medical residents at the beginning of their studies are related with economic factor, civil status and vocational issue. The findings align with previous international evidence linking attrition with burnout, hostile institutional culture, and misalignment between resident expectations and program demands [1,2-4]. In Latin American countries, additional pressures such as financial burden, relocation to distant training sites, and cultural barriers further increase attrition risk. Compared to Anglo-Saxon systems, Mexico lacks standardized nationwide resident-wellness structures [16,17,18-19].

Otherwise, while the medical residency exam does determine the knowledge and skills required to pursue a specialty, there is a lack of information regarding the conditions under which it is administered, hindering the assessment of factors such as economic circumstances, marital status, vocation, and the self-identification of newly enrolled

physicians[1,5-7,9-11]. Further studies are needed to better weigh the most important factors contributing to mid-career (halfway through residency) or long-term dropout rates. The requirements and criteria for efficient and timely selection should be reviewed to prevent the dropout rates discussed here1[9,10,12]. Although results are scarce and each hospital has its own characteristics across different parts of the country, the national exam should include other factors, such as early interviews with residents. These interviews are conducted after students have taken their exams, with professors and department heads from each specialty, but they are carried out belatedly. The consequences of this early interview are residents occupying positions intended for other residents and uncertainty about their vocation. resident, which in turn affects the hospital dynamics, into which doctors enter annually for their training[10,11,13,16,18-20].

The proposed AI-based model offers a promising tool for early identification of high-risk residents. However, further longitudinal research is needed to validate predictive accuracy and operational feasibility (21).

Conclusion

Resident attrition is a multifactorial issue that compromises educational quality and health-system function. Strengthening resident support systems, incorporating vocational assessment into specialty selection, improving working conditions, and using predictive informatics could improve retention and training outcomes.

Bibliographic References

1. Yao DC, Wright SM. The challenge of problem residents. Med Teach. 2001;23(6):595–9.

2. Dyrbye LN, Shanafelt TD. Resident burnout and early attrition. JAMA. 2016;315(3):25–40.

3. West CP, Dyrbye LN, Shanafelt TD. Physician burnout. Lancet. 2018;392:101–12.

4. IsHak WW et al. Burnout during residency training. J Grad Med Educ. 2017;9(2):165–79.

5. McKinley SK et al. Attrition in general surgery. JAMA Surg. 2021;156(12):e214278.

6. Giffin BK et al. Surgical residency attrition. Ann Surg. 2020;272(6):1076–82.

7. Shapiro J. Attrition in medical training. Acad Med. 2019;94(9):1332–8.

8. Goldberg R et al. Resilience and attrition. Acad Psychiatry. 2017;41:174–82.

9. Graham M et al. Specialty mismatch. Med Educ. 2019;53(4):379–88.

10. Stewart EA et al. Early resignation predictors. BMC Med Educ. 2020;20:130.

11. Leisy H. Problem residents. Perm J. 2016;20(4):15–233.

12. Rosenstein AH. Communication and attrition. J Hosp Admin. 2015;4:1–12.

13. Shanafelt TD et al. Physician well-being. Mayo Clin Proc. 2019;94:2020–34.

14. Gutiérrez Salazar M et al. Burnout among Mexican residents. Rev Med IMSS. 2019;57:163–9.

15. Martínez-Ponce G et al. Burnout in surgical residents in Mexico. Cir Cir. 2015;83:193–9.

16. Pérez-Cuevas R et al. Work factors and attrition. Salud Publica Mex. 2010;52:129–38.

17. López-Medina LM et al. Resignation intent in residents. Rev Med IMSS. 2020;58:78–86.

18. Padilla-Rosas M et al. Mistreatment in training. Gac Med Mex. 2018;154:178–84.

19. Gutiérrez-González R et al. Cultural mismatch in residents. Educ Med. 2020;21:76–82.

20. Sánchez-Mendiola M, Martínez-Frías ML. Early attrition in Mexican medical education. Invest Educ Med. 2015;4:4–12.

21. Wasserman MA. A Strategy to Reduce General Surgery Resident Attrition: A Resident's Perspective. *JAMA Surg.* 2016;151(3):215–216. doi:10.1001/jamasurg.2015.4607

Authors' contributions

Antonio Eugenio Rivera Cisneros: conceptualization, methodology, formal analysis, research, resources, supervision, writing, revision and editing.

Pablo Julián Medina Sánchez: conceptualization, formal analysis, visualization, writing, revision and editing.

Jorge Manuel Sánchez González: conceptualization, formal analysis, writing - original draft, writing, revision and editing.

Jorge Horacio Portillo Gallo: research, methodology, supervision.

María Cristina Morán Moguel: Research, methodology, supervision.