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Dropout in postgraduate programs: a underexplored phenomenon – a scoping review

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ABSTRACT

Postgraduate education has become increasingly crucial for nations in recent years, contributing to scientific, technological, and social progress. However, high dropout rates may undermine the benefits of postgraduate education. This study aims to identify which individual, academic, socio-economic, and institutional variables influence student attrition at the postgraduate level (master's and doctoral) through a scoping review. Using the PRISMA-ScR method, we analyzed 40 research articles for bibliometric insights and specifically examined explanatory variables for postgraduate dropout. Within the individual determinant, explanatory variables include nationality, gender, age, marital status, family support, family and work obligations, and motivation levels. Socio-economic variables encompass the student's income, employment status, and the national macroeconomic environment. In the academic context, key variables comprise prior knowledge, academic performance, student satisfaction, autonomy, self-efficacy, and research interest. Lastly, variables such as insufficient financial resources, institutional policies, teacher-student interaction, student support, academic infrastructure, and curriculum design play pivotal roles in the institutional realm. In conclusion, this study enhances our understanding of postgraduate dropout, offering valuable insights for the academic community and States to develop strategies that improve retention rates and reduce dropout levels in postgraduate education.

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1. Introduction

Education is considered a fundamental factor for the progress of nations (Guzmán et al., 2021c; Herbaut & Geven, 2020; Lasso et al., 2020; OECD, 2015) due to the individual and social benefits it yields (Guzmán et al., 2021c). Consequently, higher levels of education enable individuals to acquire and develop knowledge and skills, making them more attractive to the job market as qualified professionals (Lauder & Mayhew, 2020; OECD, 2022). This, in turn, is associated with increased employment opportunities (OECD, 2015), higher salaries (Ghignoni, 2017; Lance, 2011; OECD, 2022), job stability (OECD, 2022), and an overall better quality of life (Smith-Greenaway, 2020). Societally, a more educated population within a country experiences greater cohesion, civic participation, and the reinforcement of democratic values (Callender & Dougherty, 2018). Additionally, a population with higher levels of education is less prone to common types of crime (Castellar & Uribe, 2004; Chalfin & Deza, 2019). Given education's individual and social benefits, governments have promoted access to higher education through public policies.

In recent years, especially in western countries, there has been a promotion of postgraduate education to maximize the educational benefits previously described, along with the potential for scientific, technological, and social advancements resulting from specialized knowledge (Hernández-Martínez et al., 2018; Núñez & González, 2019). Postgraduate education has thus become a strategic tool for

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governments due to its capacity to boost economic and social development (Núñez & González, 2019; Xianghan, 1995).

Despite the clear importance of postgraduate education, it is essential to address student attrition at this level because it limits the benefits of education when study plans to remain incomplete, or degrees are not obtained (Guzmán et al., 2021a; Guzmán et al. 2023). Government attention to national attrition statistics has primarily focused on undergraduate education, resulting in a lack of up-to-date information on this phenomenon in educational systems related to postgraduate education. Nevertheless, some research has estimated dropout rates in specific cases within Higher Education Institutions (HEIs) and, in some instances, on a global scale. For instance, Rotem et al. (2021) estimated that 12% of master's students dropped out at the Hebrew University of Jerusalem. In the case of Zewotir et al. (2015), 35.4% of master's students dropped out in the first year of study at the University of KwaZulu-Natal. Regarding doctoral students, the estimation for North America conducted by Litalien and Guay (2015) indicated that 40–50% of students did not complete their doctoral programs.

Beyond quantifying attrition and its impact on realizing educational benefits, this educational phenomenon extends to various environments involving the dropout student. Consequently, postgraduate attrition leads to problems such as financial losses due to the resources invested in program fees (Guzmán et al., 2021a), as well as a reduction in future income or job opportunities without the corresponding postgraduate qualification (Phan, 2023; Perkins et al., 2018). Similarly, dropouts in postgraduate programs can negatively affect the reputation of educational institutions, tarnishing their image and ability to attract future students (Cristia & Pulido, 2020). In the case of private universities, it may lead to financial difficulties since tuition fees are their primary source of income (Guzmán et al., 2021a). Moreover, dropout hampers a country's economic and social development by diminishing its capacity to compete globally, as postgraduate degree holders are increasingly valuable for such development (Acevedo, 2020).

Considering the context mentioned above, it is crucial to highlight that research related to attrition in postgraduate education is limited and fragmented. Both systematic and non-systematic literature reviews have predominantly focused on undergraduate education (e.g. Behr et al., 2020; Foreman-Murray et al., 2022; Guzmán et al. 2021b; Orellana et al., 2020). Hence, there is a need for a comprehensive understanding of the determinants and variables influencing attrition at the postgraduate level. Such insights are valuable for the academic community, program leaders, and HEI decision-makers who aim to reduce attrition and increase student retention in postgraduate education.

Thus, this article aimed to identify which individual, academic, socio-economic, and institutional variables influence student attrition at the postgraduate level (master's and doctoral) through a scoping review. To achieve this, the following guiding questions were formulated for the scoping review:

- RQ1: What has been the bibliometric behavior of publications on postgraduate student attrition (master's and doctoral)?
- RQ2: What variables explain attrition among postgraduate students (master's and doctoral), categorized into individual, socio-economic, academic, and institutional determinants?

To answer these questions, this article is structured into four sections. The first section presents the theoretical framework and contextualizes attrition. The second section outlines the methodology that allowed us to achieve the aim. The third section presents the main findings, and the fourth section discusses the findings and provides the conclusions of this study and its limitations.

2. Theoretical framework

2.1. Conceptualization of dropout

Definitions of student dropout vary considerably (Xavier & Meneses, 2020). This diversity arises from the influence of different academic, political, and social stakeholders who analyze and study this educational phenomenon (Barragán & González, 2017; Guzmán et al., 2021c; Ruete et al., 2021). In this regard, these definitions can be categorized into two broad approaches. The first corresponds to an operational approach, which counts the number of students who drop out and analyzes some characteristics of the

dropouts. An example of this definition is used by the Colombian government, where a student is considered a dropout if they do not enroll for two consecutive academic periods and do not graduate or receive disciplinary sanctions (OECD, 2022). The second approach seeks to understand the causes and variables that explain a student's premature decision to terminate their academic education. An example of this type of definition is the one provided by the ALFA GUÍA project, in which attrition is considered 'a complex, multidimensional, and systemic event that can be understood as a cause or effect, failure or reorientation of a formative process, choice or obligatory response, or as an indicator of the quality of the educational system' (Proyecto ALFA GUÍA DCI-ALA/2010/94,94, 2013, p. 6).

It is important to note that no universally accepted definition of dropout exists (Zuñiga, 2006) because this phenomenon can vary in different contexts and educational systems. Definitions may differ in the criteria used to determine attrition, the statistical and mathematical models implemented for its diagnosis and monitoring, the stages of the educational process considered, and the variables deemed relevant to understanding and addressing the phenomenon (Guzmán et al., 2021c). For the purposes of this article, to achieve the research objective and address the research questions, it adheres to academic definitions, precisely that of the ALFA GUÍA project.

2.2. Modeling dropout in higher education and its determinants

Until the 1970s, the study of dropouts primarily focused on primary and secondary education levels. However, in this decade, the examination of this phenomenon in higher education began, leading to the development of the first models that explained the variables and causes of dropout at this level. Spady (1970) introduced the first model for higher education from a sociological perspective, including both intrinsic and extrinsic explanatory variables. This model was based on Emile Durkheim's theory of suicide, arguing that attrition results from the disconnection of an individual from the social system, and therefore, this phenomenon can be explained by the student's lack of social integration within the higher education environment. Spady's model highlighted that the family environment is one of the main sources influencing the student's integration into the educational level, as students are exposed to its influence, expectations, and demands, which can lead them to decide to drop out.

Subsequently, Fishbein and Ajzen (1975) suggested that attrition was related to students' beliefs and attitudes. They argued that prior behaviors, attitudes, and subjective norms regarding actions resulted in the intention to engage in dropout behavior, which was later manifested in actual behavior. In parallel with Fishbein and Ajzen's model (Fishbein & Ajzen, 1975), the Tinto and Cullen model (Tinto & Cullen, 1973) emerged. Tinto later improved this model in Tinto (1975, 1987), basing it on the emotional and intellectual structure of the student. This allowed identifying individual characteristics, academic history, and family backgrounds as factors that directly influence student retention in HEIs and their ability to integrate successfully into the academic and social system within them. Thus, attrition in HEIs results from a longitudinal interaction process between the academic and social systems in which the student is involved (Ertem & Gokalp, 2022).

The models mentioned above laid the foundations for the study of attrition in higher education. Since their formulation, the number of studies and developed models has increased, evident in both previous review articles that provide theoretical insights (e.g. Guzmán et al. 2021b; Kehm et al., 2019; Orellana et al., 2020) and empirical research supporting these theories (Barragán & González, 2017; Fonseca & García, 2016; Guzmán et al. 2021c; Kemper et al., 2020; Radovan, 2019; Rincón & Vila, 2021; Segovia-García et al., 2022). As the study of dropout has deepened, it has become evident that this phenomenon results from a complex interaction of various determinants encompassing individual, socio-economic, academic, and institutional variables.

The individual determinant comprises the student's characteristics and personal environment, which directly influence the decision to abandon their educational journey. The socio-economic determinant encompasses variables related to the economic and social context of the student and their family, which impact the completion of the higher education process. The academic determinant refers to student performance, achievement of learning outcomes, development of competencies, and other factors influencing the teaching and learning process. It also considers the student's academic history, including prior education levels and performance in standardized government tests. Finally, variables grouped under

Table 1. Examples of explanatory variables in each determinant.

Determinant	Variable	Authors
Individual	Gender	Cornér et al. (2021), Cochran et al. (2014) and Van Bragt et al. (2011)
	Family educational background	Rincón and Vila (2021) and Ghignoni (2017)
	Age	Beck and Milligan (2014)
	Family obligations	Arias-Velandia et al. (2018) and Packham et al. (2004)
	Work obligations	Wollast et al. (2018), Rice et al. (2013) and Packham et al. (2004)
Socioeconomic	Social inequality	Behr et al. (2020)
	Origin site mobility	Guzmán et al. (2022)
	Access to public services	Segovia-García et al., (2022)
	Family income	Lewine et al. (2021)
Academic	Academic capacity	Heidrich et al. (2018), Choi and Kim (2018), Contini et al. (2018)
	Low secondary academic performance	Rehs (2021), Rice et al. (2013) and Voelkle and Sander (2008)
	Low academic performance in higher education	Cerezo et al. (2015)
	Self-efficacy	Su and Waugh (2018)
Institutional	Lack of infrastructure	Choi and Kim (2018)
	Quality of administrative personal attention	Orellana et al. (2020)
	Participation in extracurricular activities	Amare and Simonova (2021).

the institutional determinant enable the student's educational process and depend on the HEIs. Table 1 provides examples of variables and authors who have addressed them in their studies.

3. Methodology

To achieve the aim of this study and address the research questions, a literature review was conducted using the PRISMA-ScR method, version 2018. The PRISMA-ScR method was selected for the present study due to its ability to extensively and generally examine the nature and scope of the available evidence on a topic, instrumental in emerging or underexplored fields of study, such as in the case of dropout in postgraduate education (Tricco et al., 2018). Thus, the PRISMA-ScR method is characterized by facilitating the consolidation of knowledge on a studied phenomenon, which is marked by a heterogeneous and multidisciplinary body, through a series of pre-established steps. Although there are other methods to carry out the scoping review, such as that established by Mak and Thomas (2022), the PRISMA-ScR method offers a more detailed structure for the execution of the literature review, hence its popularity in social sciences due to its ease of adaptation. Moreover, this method aids in identifying areas where evidence is limited or inconsistent, thereby helping to point out future directions for research.

The following phases of the method were followed: protocol and registration, eligibility criteria, information sources, search, choice of evidence sources, data table, and information elements development process.

3.1. Protocol and registration

The protocol was developed following the criteria required by the International Platform of Registered Systematic Review and Meta-analysis Protocols (INPLASY), an international and interdisciplinary database for registering reviews, including scoping reviews. The criteria included objectives, background, fundamental rationale, data synthesis strategies, eligibility criteria, and sources of evidence for screening and selection, among others. The protocol was reviewed independently by members of the research team for completeness. The final version was prospectively registered and is available under the code INPLASY202360011 (Valencia & Guzmán, 2023).

3.2. Eligibility criteria

This study included peer-reviewed documents in the review, which should focus on dropouts in postgraduate education, specifically master's and doctoral programs since these types of education are the most common in the international education system. The selected documents had to be empirical, whether using quantitative, qualitative, or mixed methodologies, to consider explanatory variables of attrition, including individual, socio-economic, academic, and institutional determinants. Only documents

written in English or Spanish were included. Works that combined undergraduate and postgraduate students' results and did not provide a distinctive analysis of the student populations were excluded. Literature reviews were also excluded.

3.3. Information sources

To identify potentially relevant documents, a search was conducted in the SCOPUS database, known for its comprehensive coverage, diverse sources, quality, and rigor in selecting indexed journals (Schotten et al., 2017). SCOPUS has comprehensive coverage, covering a wide range of disciplines. It allows it to group documents related to dropout in postgraduate studies that may not necessarily be found in social science journals but in other fields such as health, humanities, or technology, among others. In terms of diverse sources, SCOPUS includes scientific journals, conference proceedings, books, and other peer-reviewed academic documents, providing a panoramic view of the literature. Finally, SCOPUS is known for the quality and rigor of the journals it indexes, as they must meet criteria such as peer review, regular publication, international authorship, and citation of articles, among others. SCOPUS also uses bibliometric algorithms and metrics to assess the quality and influence of journals and documents, including journal impact factors, citations received by articles, and other performance indicators.

3.4. Search

The search in the database used truncated symbols and Boolean operators. The research team formulated search terms based on previous literature reviews to ensure coverage of most synonyms used by academics to refer to dropouts in English (e.g. Behr et al., 2020; Foreman-Murray et al., 2022; Guzmán et al., 2021c; Orellana et al., 2020; Artiles et al., 2018). The search was limited to higher education, using the terms 'Higher Education' and 'Tertiary Education' to avoid results from lower educational levels. Similarly, the search was confined to master's and doctoral programs. A total of 97 results were obtained using these parameters, as reflected in the following search equation:

TITLE-ABS-KEY((dropout OR 'drop out' OR 'drop – out' OR 'desertion' OR 'attrition' OR 'withdrawal') AND ('higher education' OR 'tertiary education') AND (master$ OR magister$ OR doctoral OR phd))

3.5. Choice of evidence sources

For document selection, the phase of removing duplicate records was not carried out as the search was confined to a single database. Two reviewers reviewed the title, abstract, and keywords of the 97 identified documents to determine which ones should be excluded from the review and which should continue with the full-text reading process. In cases of discrepancies, another reviewer was consulted, and his recommendation was followed. This resulted in the exclusion of 15 documents for full-text reading. Table 2 summarizes the reasons for exclusion.

Following the exclusion of documents, 82 were subjected to a thorough reading, during which the reviewers filtered those that focused on the central theme of postgraduate education desertion and identified variables explaining this phenomenon from individual, socio-economic, academic, and institutional determinants. Each review was conducted independently, and an external review was carried out in cases where there was no consensus on the possible inclusion of a document. In total, 42 documents were excluded, leaving a total of 40. The reasons for exclusion are presented in Table 3. Figure 1 summarizes the described process.

Table 2. Excluded documents in the screening phase.

Cause	Number of documents
Literature reviews	1
Desertion in levels prior to postgraduate education	4
Did not address topics related to postgraduate program desertion	10

Table 3. Documents excluded at the full reading phase.

Cause	Number of documents
Undergraduate dropout	36
Did not specify the educational level of the study sample	4
Did not address issues related to dropout	1
Did not identify explanatory variables associated with dropout determinants	1

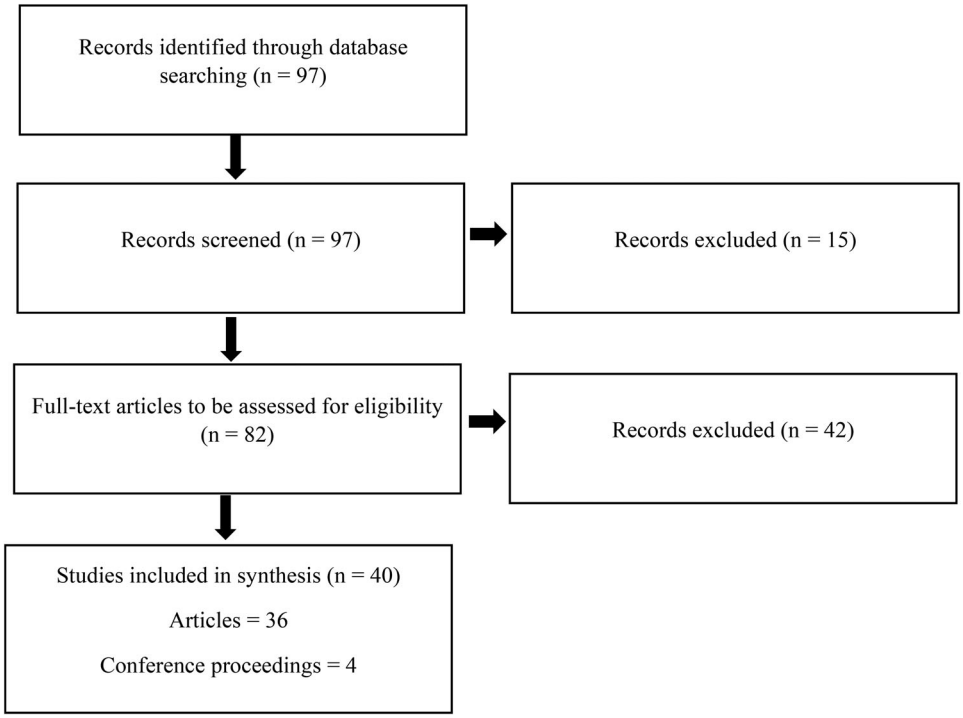

Figure 1. Evidence source selection. PRISMA-ScR flowchart depicting the literature search and evidence source selection process.

3.6. Data table and information elements development process

For this stage, the reviewers jointly created a spreadsheet-based form to determine which variables should be extracted from the documents, thus generating a standardized abstraction tool. This tool stored the following fields: code, title, authors, publication year, classification in the Scimago Journal Ranking (SJR) (applicable only to journals), country, name of the journal or conference where the document was published, APA-format reference, methods used, variables studied in the categories of individual, socioeconomic, academic, and institutional determinants, general results, limitations, and future research directions.

The spreadsheet was independently completed by the reviewers, and the results were discussed and updated through an iterative process. In this phase, no external peer was consulted to resolve discrepancies. Previous studies were consulted for determination in cases of disagreement regarding the classification of explanatory variables for dropout.

Additionally, to address RQ1, a bibliographic and co-occurrence analysis was included using the VOSviewer tool. Metadata from the selected articles downloaded in CSV format from the SCOPUS database, was used for this purpose.

3.7. Information synthesis

With the data table and information elements process completed, a bibliometric analysis was conducted to address RQ1. Following Nightingale's (2009) parameters, the country of origin of the research, publication frequency by journal, and categorization of articles based on SCOPUS ranking were determined. They used VOSviewer, a co-occurrence analysis of the most frequently used keywords, and a bibliographic linkage of 40 publications on postgraduate attrition.

Regarding the response to RQ2, the variables grouped by determinant that explained dropout in postgraduate education (Master's and Ph.D. programs) were synthesized. This was done using an inductive approach.

4. Results

4.1. Bibliometric analysis

The review of the 40 research documents revealed the participation of 24 countries in the analysis of dropouts in higher education at the postgraduate level. The United States stands out with ten publications, followed by Belgium with five documents, and Brazil, Finland, and Mexico with two articles each. Additionally, individual publications were found from Germany, Argentina, Australia, Benin, Canada, Chile, Colombia, Croatia, Cuba, Spain, Estonia, India, Italy, the Netherlands, Puerto Rico, Turkey, Uruguay, Vietnam, and Zimbabwe.

In the case of studies conducted in the United States, the focus has primarily been on postgraduate programs in computer science, similar to observations in Finland and Italy. These countries have also explored the effects of adaptive learning and the implementation of innovative pedagogical strategies. In Belgium, studies have examined the role of technology and its effects on postgraduate education, as well as strategies to improve the student experience in virtual modalities, an aspect also investigated in Canada and India. In Mexico, studies have centered on methods to detect students at risk of dropping out and the development of predictive models. A similar situation is observed in Brazil, Puerto Rico, Chile, and Uruguay, where research focused on preventing student dropout has also been developed.

In Zimbabwe, the study of dropout has focused on postgraduate students, analyzing the impact of educational policies and accessibility to higher education. In Argentina, Germany, Croatia, and Australia, studies have been conducted in engineering and sciences, highlighting the importance of pedagogical innovation and its relationship with student dropout. In the same vein, research conducted in Estonia, Spain, Colombia, the Netherlands, and Turkey has focused on innovation in higher education and advanced pedagogical strategies, seeking to improve the quality of education and reduce the dropout rate.

Regarding the publication of documents by year from 2011 to 2023, the increase in the number of publications is most pronounced in 2021, as shown in Table 4. However, no widespread, sustained upward trend was observed.

Furthermore, considering the number of publications per scientific journal, it was found that the International Journal of Doctoral Studies published four research articles on the subject in question, followed by the journal Higher Education with three publications, as well as the journals Studies in Continuing Education and PLOS ONE with two documents. The remaining 25 journals had a single publication on the topic, as listed in Table 5.

Finally, Table 6 presents the number of scientific articles categorized according to the SJR impact factor, highlighting the interest of researchers in publishing in journals indexed in the first quartile (Q1).

Two clusters were generated regarding the co-occurrence analysis with all the keywords in the 40 resulting documents. The first cluster establishes the set of words that characterize the subjects of study within the research, with terms such as human, adult, male, and students related to terms like academic

Table 4. Number of documents published by year.

Year of publication	Number of documents published
2011	1
2013	1
2014	3
2015	2
2016	3
2017	3
2018	7
2019	3
2020	3
2021	9
2022	4
2023	1
Total	40

Table 5. Number of documents published by journal.

Num	Journal	Number of papers published
1	*Soft Computing*	1
2	*Revista de Contabilidade e Organizacoes*	1
3	*Revista Espanola de Pedagogia*	1
4	*CBE Life Sciences Education*	1
5	*Electronic Journal of Research in Educational Psychology*	1
6	*Music Education Research*	1
7	*Journal of Women and Minorities in Science and Engineering*	1
8	*Studies in Higher Education*	1
9	*SAGE Open*	1
10	*Contemporary Educational Psychology*	1
11	*Education Policy Analysis Archives*	1
12	*Journal of Professional Nursing*	1
13	*Studies in Continuing Education*	2
14	*Higher Education*	3
15	*BMC Medical Education*	1
16	*European Journal of Psychology of Education*	1
17	*PLoS ONE*	2
18	*Research in Higher Education*	1
19	*International Journal of Higher Education*	1
20	*Learning and Individual Differences*	1
21	*Nurse Education Today*	1
22	*International Journal of Doctoral Studies*	4
23	*Communications in Computer and Information Science*	1
24	*Nursing Outlook*	1
25	*American Journal of Distance Education*	1
26	*Universidad y Sociedad*	1
27	*Online Learning Journal*	1
28	*Journal of College Student Retention: Research, Theory and Practice*	1
29	*Education and Information Technologies*	1
	Total	36

Table 6. Number of papers by category in SCOPUS.

Classification SCOPUS	Number of scientific articles
Q1	22
Q2	9
Q3	2
Q4	3
Total	36

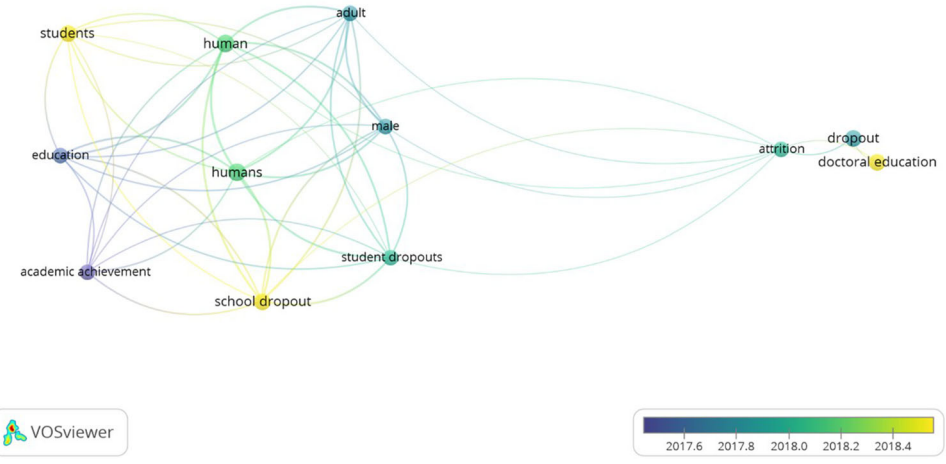

Figure 2. Co-occurrence of keywords.

achievement, student dropout, school dropout, and education. On the other hand, the second cluster relates terms that denote thematic specificity, addressing words such as doctoral education, dropout, and abandonment. Thus, a total of 9 keywords were obtained for the first cluster and three for the second cluster, as shown in Figure 2 and Table 7.

From the 40 selected documents, 12 authors were identified and grouped into four clusters. Authors with greater prominence are displayed more prominently and are closer to each other than those with

Table 7. Keywords with the highest co-occurrence in 40 publications on postgraduate attrition.

	Keyword	Co-occurrence
Cluster one		
1	Human	7
2	Humans	7
3	School dropout	6
4	Adult	5
5	Male	5
6	Student dropouts	5
7	Education	5
8	Academic achievement	5
9	Students	6
Cluster two		
1	Attrition	5
2	Dropout	6
3	Doctoral education	6

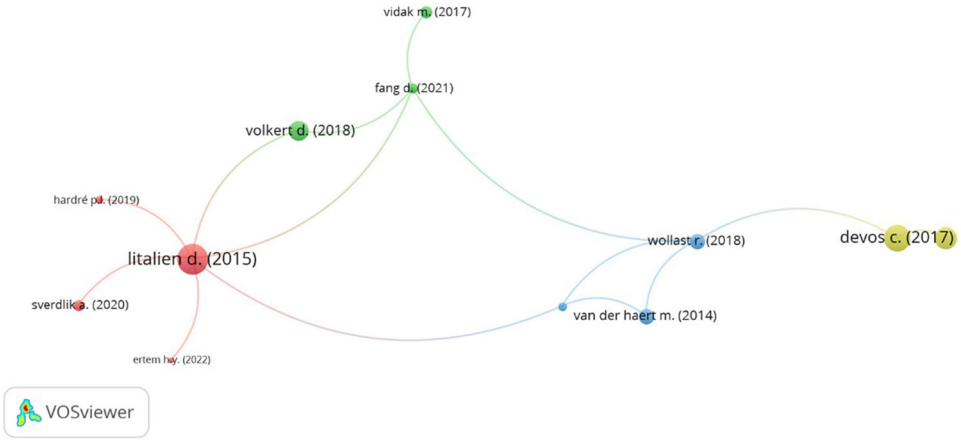

Figure 3. Bibliographic linkage of 40 publications on postgraduate attrition.

fewer contributions, as shown in Figure 3 and in the Table 8. The first cluster, marked in red, comprises the four studies with the most citations and links to other documents. Notably, the research conducted by Litalien and Guay (2015) stands out in this group, as the authors developed a predictive model of dropout intentions, providing a better understanding of persistence and completion in doctoral programs. The second cluster, in blue, includes three studies, with the study by Wollast et al. (2018) being the second study with the highest number of links. This is due to their analysis of dropouts in a population of doctoral students in all disciplines from the two largest universities in the French-speaking Community of Belgium, contributing to an understanding of dropouts in that country. The third cluster, identified in green, consists of three studies, with particular emphasis on the research conducted by Fang and Zhan (2021), who delved into measuring dropout rates in doctoral programs in nursing, comparing face-to-face and virtual modalities. Lastly, two studies stand out in the fourth cluster, marked in yellow, one conducted by Devos et al. (2017). These researchers aimed to identify academic incongruities and their impact on student dropout.

4.2. Analysis of explanatory variables grouped into determinants of postgraduate dropout

Below, a qualitative synthesis of the findings from the analyzed documents is presented, categorized into four determinants (individual, socioeconomic, academic, and institutional), as explained in the theoretical framework section.

4.2.1. Individual determinant

The individual factor refers to personal aspects and characteristics that can influence a student's decision to drop out of an academic program, particularly at the postgraduate level. Thus, based on the analyzed documents, it was found that nationality or the condition of being a foreigner in a country where a

Table 8. Most cited documents on postgraduate dropout.

	Authors	Title	Cites	Links
Cluster 1				
1	Litalien and Guay (2015)	Dropout intentions in PhD studies: A comprehensive model based on interpersonal relationships and motivational resources	102	6
2	Sverdlik et al. (2020)	Phd imposter syndrome: Exploring antecedents, consequences, and implications for doctoral well-being	14	1
3	Hardre et al. (2019)	Modeling American graduate students' perceptions predicting dropout intentions	8	1
4	Ertem and Gokalp (2022)	Role of personal and organizational factors on student attrition from graduate education: A mixed-model research	2	1
Cluster 2				
1	Wollast et al. (2018)	Who are the doctoral students who drop out? Factors associated with the rate of doctoral degree completion in universities	26	4
2	Van der Linden et al. (2018)	Gaining insight into doctoral persistence: Development and validation of doctorate-related need support and need satisfaction short scales	10	3
3	van der Haert et al. (2014)	Are dropout and degree completion in doctoral study significantly dependent on type of financial support and field of research?	26	2
Cluster 3				
1	Fang and Zhan (2021)	Completion and attrition of nursing PhD students of the 2001–2010 matriculating cohorts	12	4
2	Volkert et al. (2018)	Student motivation, stressors, and intent to leave nursing doctoral study: A national study using path analysis	45	2
3	Viđak et al. (2017)	Improving completion rates of students in biomedical PhD programs: An interventional study	16	1
Cluster 4				
1	Devos et al. (2017)	Doctoral students' experiences leading to completion or attrition: a matter of sense, progress and distress	74	2
2	van Rooij et al. (2021)	Factors that influence PhD candidates' success: the importance of PhD project characteristics	54	1

postgraduate program is pursued may lead to dropout situations due to limited familiarity with the academic system, culture, and language. This can facilitate academic challenges, financial difficulties, and potential social exclusion (Laufer & Gorup, 2019).

Regarding the variable of gender, there is no absolute consensus on whether men or women are more prone to dropping out of postgraduate programs. In this regard, there are studies where men have a higher dropout rate (Fang & Zhan, 2021; Hosoi & Canetto, 2011; Perkins et al., 2018; Petersen et al., 2018; Ruete et al., 2021), while in other cases, women are more likely to abandon their education (Castelló et al., 2017). This variation can be attributed to the interaction between the gender variable and other factors such as workload, personal life activities, marital status, entering motherhood, and time dedicated to postgraduate education (Phan, 2023; Wollast et al., 2018).

Regarding age, it's essential to highlight that it is not a determining variable by itself. Each individual has unique circumstances and motivations, so the decision to drop out of a postgraduate program is highly individual and can be influenced by a combination of variables. However, the interaction between age, work, and family commitments can trigger academic dropout (Ertem & Gokalp, 2022; Fang & Zhan, 2021; Ruete et al., 2021).

Concerning marital status, it was found that married individuals were more likely to complete the postgraduate program, as they may receive greater support from their partners, in contrast to single students who dropped out to a greater extent (Wollast et al., 2018). Furthermore, students who lack emotional support from their families may feel isolated and incapable of continuing their studies. Thus, individuals from households with low educational capital had less emotional support to persevere in their

academic pursuits (Acevedo, 2020; Madhlangobe et al., 2014; Sverdlik et al., 2020; Volkert et al., 2018). Additionally, personal and family issues can be a significant source of stress for postgraduate students, which can affect their ability to complete the program (Montero et al., 2014).

Regarding family and personal obligations, it was established that difficulties in balancing personal life and doctoral studies are frequent reasons to consider dropping out (Castelló et al., 2017; Phan, 2023). Similarly, in terms of work commitments, work schedules and workloads reduce the possibility of completing postgraduate studies (Castelló et al., 2017; Fang & Zhan, 2021; Leijen et al., 2016; Salani et al., 2016).

Finally, psychological aspects such as distraction, disorientation, cognitive overload, and lack of commitment to distance learning can lead to academic dropout (Martins et al., 2021). Likewise, a lack of motivation and commitment to the program due to a wrong choice of career, a negative perception of the value of higher education, a widespread lack of enthusiasm for learning, or the perception related to wasting time can be reasons for dropping out (Acevedo, 2020; Artiles et al., 2018; González-Moreno, 2012; Pereira et al., 2021; Perkins et al., 2018; Madhlangobe et al., 2014; Montero et al., 2014). Table 9 lists the identified variables for the individual factor.

4.2.2. Socioeconomic determinant

This determinant refers to the influence of socioeconomic conditions on a person's decision to drop out of an educational program. The student's income level is related to a lack of financial resources to pay tuition or cover other expenses related to the program (Acevedo, 2020; González-Moreno, 2012; Montero et al., 2014). This variable leads to higher withdrawal rates (Geven et al., 2018; van der Haert et al., 2014; Wollast et al., 2018). Related to the income level variable, a lack of job opportunities was cited as an important reason for dropout, as without stable employment, students would not have a salary to facilitate payment for their studies (Acevedo, 2020; Geven et al., 2018; González-Moreno, 2012; Montero et al., 2014; Pereira et al., 2021; van der Haert et al., 2014).

Regarding variables related to the country's macroeconomic environment, economic recessions or high national unemployment rates will impact student academic dropout (Pereira et al., 2021). Table 10 shows the identified variables for the socioeconomic factor.

4.2.3. Academic determinant

This Determinant pertains to aspects related to academic processes themselves that can influence student dropout. Concerning academic performance, it has been determined that poor school performance or a lack of necessary skills to meet the demands of the educational program significantly influences a student's decision to drop out (Acevedo, 2020). Thus, previous studies have indicated that a lack of prior knowledge in subjects like accounting or finance may be considered a motivating variable for dropping

Table 9. Main individual determinant variables present in postgraduate dropout.

Authors	Nationality	Gender	Age	Marital status	Family support	Family and personal obligations	Work obligations	Motivation
Martins et al. (2021)								x
Pereira et al. (2021)								x
Acevedo (2020)					x			x
Artiles et al. (2018)								x
Montero et al. (2014)					x			x
González-Moreno (2012)								x
Hosoi and Canetto (2011)		x						
Madhlangobe et al. (2014)					x			x
Salani et al. (2016)							x	
Leijen et al. (2016)							x	
Castelló et al. (2017)		x				x	x	
Petersen et al. (2018)		x						
Wollast et al. (2018)		x		x				
Perkins et al. (2018)		x						x
Volkert et al. (2018)					x			
Laufer and Gorup, (2019)	x							
Sverdlik et al. (2020)								x
Ruete et al. (2021)		x	x					
Fang and Zhan (2021)		x	x				x	
Ertem and Gokalp (2022)			x					
Phan (2023)		x				x		

out of postgraduate programs (Artiles et al., 2018; Bridgeman & Cline, 2022; Pereira et al., 2021; Ruete et al., 2021; Wollast et al., 2018). This motivation to drop out results from not understanding the course material (Litalien & Guay, 2015; Montero et al., 2014; Rehs, 2021; Van der Linden et al., 2018; Viďak et al., 2017; Wollast et al., 2018).

Satisfaction with the academic program is a variable that influences student dropout. In this regard, dissatisfaction can result from the academic quality of the program (Pereira et al., 2021), the overall experience of the university environment (Hardre et al., 2019), or a lack of interest in studies, especially at the doctoral level (Cornér et al., 2021). For doctoral programs, it is reported that high workloads experienced are negatively related to student satisfaction (Ertem & Gokalp, 2022; van Rooij et al., 2021), as well as direct experience in educational settings related to a lack of guidance or tutoring (Meyer et al., 2022; Rekha et al., 2023).

The development of competencies directly impacting academic performance, such as autonomy and self-efficacy, is an essential skill for achieving educational objectives as they promote persistence in completing postgraduate studies. In this aspect, not developing self-efficacy and autonomy increases the likelihood of dropping out (Hardre et al., 2019; Litalien & Guay, 2015; Van der Linden et al., 2018). Thus, allowing for the development of autonomous work activities and freedom to develop projects is fundamental for student retention in postgraduate programs (van Rooij et al., 2021). Similarly, it is found that computer self-efficacy significantly impacts the intention to continue in postgraduate programs in a virtual mode (Rekha et al., 2023).

Finally, a lack of interest in research is identified as a variable that affects student dropout. From this perspective, when research does not progress as planned, or the process feels burdensome, research activity can be a reason for wanting to drop out (Cornér et al., 2021). Table 11 presents the identified variables for the academic factor.

4.2.4. Institutional determinant

The variables that make up the institutional factor are those related to the educational institution or the support activities of the teaching-learning process. Related to this, variables such as lack of funding, understood as difficulties in paying tuition or accessing scholarships, often affect student retention (Otero et al., 2021). Similarly, the lack of institutional policies, specifically those that impact support for student supervision, influences the decision to drop out of postgraduate programs (Djohy, 2019; Meyer et al., 2022).

Regarding the curriculum design of the program, specifically in aspects such as the content of the subjects (Leijen et al., 2016; Pereira et al., 2021; Wainerman & Matovich, 2016), the time in which they must be completed, as well as the time allocated for the development of the doctoral thesis, can influence the decision to drop out of postgraduate programs (Otero et al., 2021; Pacheco et al., 2015; Ruete et al., 2021; Viďak et al., 2017). In this sense, when doctoral programs aim to be more structured, increasing student supervision, providing intermediate deadlines, and establishing a final deadline for thesis submission, they often improve academic retention indicators (Geven et al., 2018).

Under this same determinant is the variable related to how interactions between the teacher and the student are developed. In this regard, the absence of supervision or mentoring agreements as a support and guidance mechanism negatively impacts the retention of graduate students (Leijen et al., 2016; Madhlangobe et al., 2014; Meyer et al., 2022; Otero et al., 2021). Thus, the absence of guidance and communication with the teacher significantly predicts the intention to drop out (Artiles et al., 2018; Rincón & Vila, 2021; Volkert et al., 2018).

Table 10. Main variables of the socioeconomic determinant present in postgraduate dropout.

Authors	Student's income	Employment status of the student	Environment macroeconomic environment
Pereira et al. (2021)		x	x
Acevedo (2020)	x	x	
Montero et al. (2014)	x	x	
González-Moreno (2012)	x	x	
van der Haert et al. (2014)	x	x	
Geven et al. (2018)	x	x	
Wollast et al. (2018)	x		

Table 11. Main variables of the academic determinant influencing postgraduate dropout.

Authors	Previous knowledge	Performance	Satisfaction	Autonomy and self-efficacy	Interest in research
Pereira et al. (2021)	x		x		
Acevedo (2020)		x			
Artiles et al. (2018)		x			
Montero et al. (2014)		x			
Litalien and Guay (2015)		x		x	
Viďak et al. (2017)		x			
Wollast et al. (2018)	x	x			
Van der Linden et al. (2018)		x		x	
Hardre et al. (2019)			x	x	
Ruete et al. (2021)	x				
Rehs (2021)		x			
Rincón and Vila (2021)					
Cornér et al. (2021)			x		x
van Rooij et al. (2021)			x	x	
Meyer et al. (2022)			x		
Bridgeman and Cline (2022)	x				
Ertem and Gokalp (2022)			x		
Rekha et al., (2023)			x	x	

Table 12. Main variables of the institutional determinant influencing postgraduate dropout.

Authors	Lack of funding	Institutional policy	Interaction professor - student	Attention student	Infrastructure academic	Curriculum design
Madhlangobe et al. (2014)			x			
Pacheco et al. (2015)						x
Leijen et al. (2016)			x	x	x	
Wainerman and Matovich (2016)						x
Leijen et al. (2016)						x
Otero et al. (2021)	x		x			
Pereira et al. (2021)						x
Otero et al. (2021)						x
Meyer et al. (2022)		x	x	x		
Viďak et al. (2017)						x
Artiles et al. (2018)			x	x		
Volkert et al. (2018)			x	x		
Geven et al. (2018)						x
Djohy (2019)		x				
Ruete et al. (2021)						x
Rincón and Vila (2021)				x		

A similar aspect to the above is the attention directed to the student in terms of administrative counseling for their academic activity. When a student does not perceive support in these actions, dissatisfaction can arise, which may lead to dropping out (Artiles et al., 2018; Leijen et al., 2016; Meyer et al., 2022; Rincón & Vila, 2021). Finally, academic infrastructure, i.e. if an institution does not have the necessary resources to carry out academic activities, such as well-equipped laboratories, libraries with a wide range of materials, or updated technology, students may face obstacles in completing their tasks for research. This lack of resources can hinder learning and reduce the quality of the educational experience, which in turn can affect motivation and student retention (Leijen et al., 2016). Table 12 consolidates the identified variables for the institutional determinant.

5. Discussion

Based on the findings, convergence points were identified with scholars who have examined dropouts in postgraduate (master's and doctoral) programs across various educational settings. In this context, the most common variables explaining dropout in relation to individual determinants are lack of family support, low motivation, age, as well as familial and work obligations. Concerning the lack of family support, this presents a counterintuitive notion, as one might expect postgraduate students, often more mature and experienced, to have more established family support networks. This perspective is consistent with that of undergraduate studies, where, as articulated by Spady (1970), Sverdlik et al. (2020), Acevedo

(2020), Volkert et al. (2018), and Madhlangobe et al. (2014), the family environment can impact how students integrate into the academic setting, exerting an influence that can lead to dropout.

The absence of motivation, as described by Fishbein and Ajzen (1975) and Martins et al. (2021), is an attitude towards academic actions resulting in the intention to leave studies and is also observed in postgraduate education. This lack of motivation can be particularly salient in postgraduate studies due to various factors. For instance, the level of autonomy and self-efficacy required in postgraduate studies is significantly higher than in previous educational levels. Students who do not develop these skills for independent work may face challenges that ultimately result in dropout. Moreover, in postgraduate studies, students often balance multiple responsibilities, including family and work obligations, which can increase their workload and decrease their available time and energy for studies (Guzmán Rincón et al. 2023). This balance can affect their motivation and commitment to the academic program.

Age is among the most common determinants in dropout studies, both at undergraduate and postgraduate levels. Beck and Milligan (2014) acknowledge that age, interacting with other variables, can catalyze dropout (Ertem & Gokalp 2022; Fang & Zhan, 2021; Ruete et al., 2021). Thus, personal and work commitments and responsibilities tend to increase with age (Ruete et al., 2021), potentially limiting the time and resources students can devote to their studies. Moreover, age can influence motivation and priorities, impacting their commitment to the academic program. Therefore, younger students may face different challenges compared to their older peers (Guzmán et al. 2021c), such as lack of experience and time management skills. Conversely, older students may face unique challenges balancing their studies, work, and family responsibilities.

As mentioned, familial and personal obligations, as well as work commitments, reduce the time available for academic activities and increase daily workload, hastening the decision to abandon studies, as proposed in studies by Wollast et al. (2018) and Ghignoni (2017). Contrary to evidence in undergraduate studies (Orellana et al., 2020), family academic backgrounds do not influence dropout in postgraduate studies. This finding suggests that while family education may have a significant impact in the early stages of higher education, its influence appears to diminish at the postgraduate level.

Regarding the socioeconomic determinant, a student's ability to pay tuition and associated higher education costs stands out as an explanatory variable for dropout. In this regard, Heidrich et al. (2018) argued that the lack of financial resources can affect academic perseverance at the postgraduate level. The financial capability of postgraduate students is crucial, as the costs associated with advanced programs can be substantially higher than undergraduate studies. This reality can be particularly challenging for students without access to scholarships, grants, or financial support. The absence of job opportunities exacerbates this situation and increases the likelihood of dropout, as indicated by Martínez et al. (2022).

In terms of the academic determinant, low academic performance at the secondary level (Rehs, 2021) or in higher education (Cerezo et al., 2015; Guzmán et al., 2023; Orellana et al., 2020) is considered one of the main predictors of dropout in postgraduate programs as students may not possess the necessary skills to meet program demands. This relationship illustrates that previous academic difficulties affect students in their academic journey. (Segovia-García et al., 2022). A lack of self-efficacy and autonomy can lead to challenges related to the inability to perform independent work adequately, ultimately resulting in dropout.

For the institutional determinant, deficiencies in infrastructure related to academic work, such as laboratories, libraries, materials, and technologies, can create barriers to effective learning, as expressed by Choi and Kim (2018). This issue is particularly critical in postgraduate programs, where students often require access to specialized equipment, research materials, and advanced technology to effectively conduct their studies and research projects, especially at the doctoral level. Furthermore, the attention received from administrative services of the HEI is a critical variable for students in their intention to stay and graduate from the educational process. Orellana et al. (2020) recognized that efficient administrative services are essential in facilitating postgraduate students' access to crucial information, assistance in course enrollment, scholarship management, and other vital aspects of academic life. Factors such as participation in extracurricular activities were not identified as explanatory variables for postgraduate dropout, as identified by Amare and Simonova (2021) in other levels of academic education.

6. Conclusions

The implementation of the methodology designed for this research achieved the aim of identifying which individual, academic, socioeconomic, and institutional variables influence student dropout at the postgraduate level (master's and doctoral) through a scoping review, addressing three key questions. The bibliometric analysis of publications related to dropout among postgraduate students revealed a growing attention to this phenomenon from the academic community. This reflects the concern about understanding and addressing the challenges students face in their postgraduate journey, suggesting a continued interest in their retention and academic success.

The answer to which variables explain the dropout of postgraduate students lies in their identification framed within the individual, socioeconomic, academic, and institutional determinants, demonstrating the multifactorial nature of studies on academic dropout. Some explanatory variables recognized at levels before postgraduate education (primary, secondary, or undergraduate) also raise concerns. These findings highlight the importance of addressing dropout from a holistic perspective, considering a wide range of variables that interact with each other.

The practical implications of the review for HEIs and the State are critical in enhancing retention strategies in postgraduate programs and promoting academic success. For HEIs, it is essential to implement support programs tailored to the individual, academic, and socioeconomic needs of postgraduate students. These programs may include academic guidance, emotional support, and financial assistance. Moreover, HEIs should focus on developing policies that enable students to balance their academic commitments with personal and professional responsibilities, thus fostering a more inclusive and flexible environment. It is also important for HEIs to invest in improving their infrastructure and resources to provide a stimulating and conducive academic atmosphere for research.

On the other hand, the State plays a crucial role in formulating higher education policies that promote the accessibility and affordability of postgraduate education, especially for students from disadvantaged or low-income groups. The State should consider investment in postgraduate programs as a strategy to drive innovation and technological development, thereby strengthening the economy and national competitiveness. It is fundamental for the State to work in collaboration with HEIs to develop effective strategies and programs that reduce dropout rates and encourage the successful completion of postgraduate programs.

Regarding future research directions and academic work opportunities, this research suggests several areas of focus that could further enrich the understanding of dropout at the postgraduate level. It becomes evident that there is a need for longitudinal research that analyzes student life throughout their entire academic journey, which would allow the identification of changes in the intensity with which variables influence dropout over time.

7. Limitations

Considering the limitations in implementing this study's methodology, it is essential to highlight that the decision was made to use SCOPUS exclusively as the information search source, sidelining interdisciplinary databases such as Web of Science and specialized disciplinary databases like ERIC or JSTOR. This choice implies the risk of excluding articles only indexed in these other databases. Such an omission could result in a partial understanding of the phenomenon under study, limiting both the breadth and depth of the analysis conducted. However, it is pertinent to consider that, unlike systematic reviews or meta-analyses, scope reviews do not necessarily require covering the entirety of the existing literature on the phenomenon in question. Although this characteristic may reduce the possibility of selection biases, it remains crucial to recognize the limitations implied by the exclusive use of a single database in terms of the representativeness and diversity of the consulted sources.

On the other hand, the employment of the PRISMA-ScR method and the exclusion and selection criteria of the studies represent an additional limitation by not considering grey literature. Grey literature includes technical reports, theses, dissertations, and other materials not published or subject to peer review. Excluding these types of sources can result in a bias concerning original data, practical experiences, and innovative approaches that are not always found in publications like academic journals. Additionally, the

restriction in document selection based on language, including only those written in English or Spanish, could have excluded relevant publications in other languages.

Given the limitation of studies in geographical aspects, it is worth mentioning that future research should include a larger sample of countries to improve the understanding of the studied phenomenon. This geographical expansion will not only enrich the diversity of contexts and cultures represented in the analysis but will also allow for exploring the behavior of individual, socioeconomic, academic, and institutional variables on dropout in various scenarios. This comprehensive approach will enable not only the identification of common factors influencing dropout at a global level but also the development of more effective and context-specific educational strategies and policies.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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