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What are the Leadership and Management Positions in Medical Education? A Scoping Review

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Abstract

Leadership can be defined as a combination of position, responsibilities, attitude, skills, and behaviours contributing to sustainable success. Despite extensive research on the representation of various groups, including genders and personal qualities, in leadership and management positions in medical education, there remains a lack of clarity regarding what these positions exactly are. In this scoping review, we aimed to determine these positions by following Levac et al.'s framework. We searched four databases; PubMed, ERIC, Scopus, and Web of Science until March 23, 2023, resulting in 558 records for screening after removing duplicates and applying some exclusions. The review included 266 studies for data extraction and synthesis. In addition to the leadership positions, we revealed the studies' countries, main context, discipline, and year. We identified 396 leadership and management positions in medical education under four categories: academic, administrative, journal-related, and society-related positions. Additionally, the majority of the studies (59.77%) were on gender-related topics, followed by those focusing on underrepresented minorities. The articles covered 40 different disciplines, with the surgical fields exhibiting the highest frequencies, such as orthopaedic surgery, neurosurgery, and plastic and reconstructive surgery. The systematically developed list of positions in our study may be considered as a valuable resource for future research, especially in studies that aim to determine the representation of women and underrepresented minorities in leadership and management positions in medical education.

Keywords: leadership, management, positions, medical education, academic medicine

1. Introduction

Leadership can be defined as "a combination of position, responsibilities, attitude, skills, and behaviors that allows someone to bring out the best in others, and the best in their organization, in a sustainable manner" (1). It resembles "the abominable snowman whose footprints are everywhere but who is nowhere to be seen", as quoted from Klein (2). As this description implies, it is a complex and subjective concept with different interpretations in different contexts (3).

Leadership has been conceptualized differently over time, influenced by societal factors and cultural norms (2): earlier theories emphasized personal qualities, often associated with masculinity, but later research found weak correlations between successful leaders and certain personality traits. Behavioral theories focused on decision-making styles and concern for tasks and people. Contingency theories highlight the need for leaders to adapt their styles to the competence and commitment of their followers. Values and ethics have also been integrated into leadership models, such as the servant leadership model, which emphasizes the human aspect of leadership. As the need to navigate continuous change became prominent, transformational leadership emerged as a

paradigm that empowered and developed followers, aligning them with long-term goals. Finally, contemporary leadership theories draw on systems and complexity theory, ranging from instrumentalist approaches that manipulate systems to nihilistic models that describe existing circumstances.

Leadership is often described in relation to management, with leadership focusing on setting direction, influencing others, and managing change, while management deals with organizing resources and maintaining stability (4). It is recognized that leadership and management complement each other, and both are important for success in the clinic (2). Therefore, both leadership (5-6) and management (7) found a place in the medical curriculum due to their importance.

Regardless of the interpretative lens applied to the concept of leadership, it is evident that both leadership and management positions play a crucial role in the functioning of leaders. Despite this important role, it is not clear what leadership and management positions in medical education are. Numerous studies have examined the representation of different groups, including genders (8) and underrepresented minorities (9-10), in leadership and management positions within medical education. However, to the best of our knowledge, none of the studies benefited from a systematically created list of positions. Instead, they mostly focused on positions that were subjectively identified since there is no such source. Only one study systematically revealed the pathways into academic medicine positions, but it was conducted specific to family medicine (11). Therefore, it is necessary to establish a comprehensive list of leadership and management positions.

In this study, by focusing only on formal positions (12), we aimed to determine leadership and management positions in medical education.

2. Methods

We employed the comprehensive framework of Levac et al. for scoping reviews (13) adapted using Arksey and O'Malley's framework (14) to reveal leadership and management positions within medical education. Although the most published form to synthesize knowledge in medical education is systematic reviews (15), due to the inability to narrow down the research question to a specific hypothesis, we were unable to produce objective findings and interpretations through a systematic review. Therefore, we opted for a scoping literature review. We conducted the research with a postpositivist orientation as a relative objectivist epistemology (16-17).

2.1. Identifying the research question

We identified our research question as "What are the leadership and management positions in medical education?". This question was formulated to serve our study's objective. Our study focuses on filling the research gap concerning the lack of information on undefined leadership and management positions in medical education. Specifically, we aim to investigate leadership positions across all three stages of medical education: undergraduate, postgraduate, and continuing education.

2.2. Identifying relevant studies

Once our research question was established, we developed the following Boolean search query in English by trying different words and combinations iteratively to find the optimal one to conduct our database search: ("medical education" OR "academic medicine") AND ("management position" OR "management positions" OR "manager position" OR "manager positions" OR "leader position" OR "leader positions" OR

"leadership position" OR "leadership positions"). The keywords were determined by the research team through discussions.

We scanned four databases: PubMed, ERIC, Scopus, and Web of Science. We applied a filter to search within "titles, abstracts, keywords" for Scopus and "All fields" for the rest. Our search ended on March 23, 2023. The search was performed by one author. We obtained a total of 1173 records and subsequently removed duplicates (n=574) using Zotero software. To refine the selection, we excluded book sections/books (n=6) and systematic reviews (n=35), as we concluded that the remaining records provided the desired breadth of information, resulting in a final set of 558 records for screening. This exclusion process was carried out by another author. This stage (identification) and the next stage (screening) are presented in Figure 1.

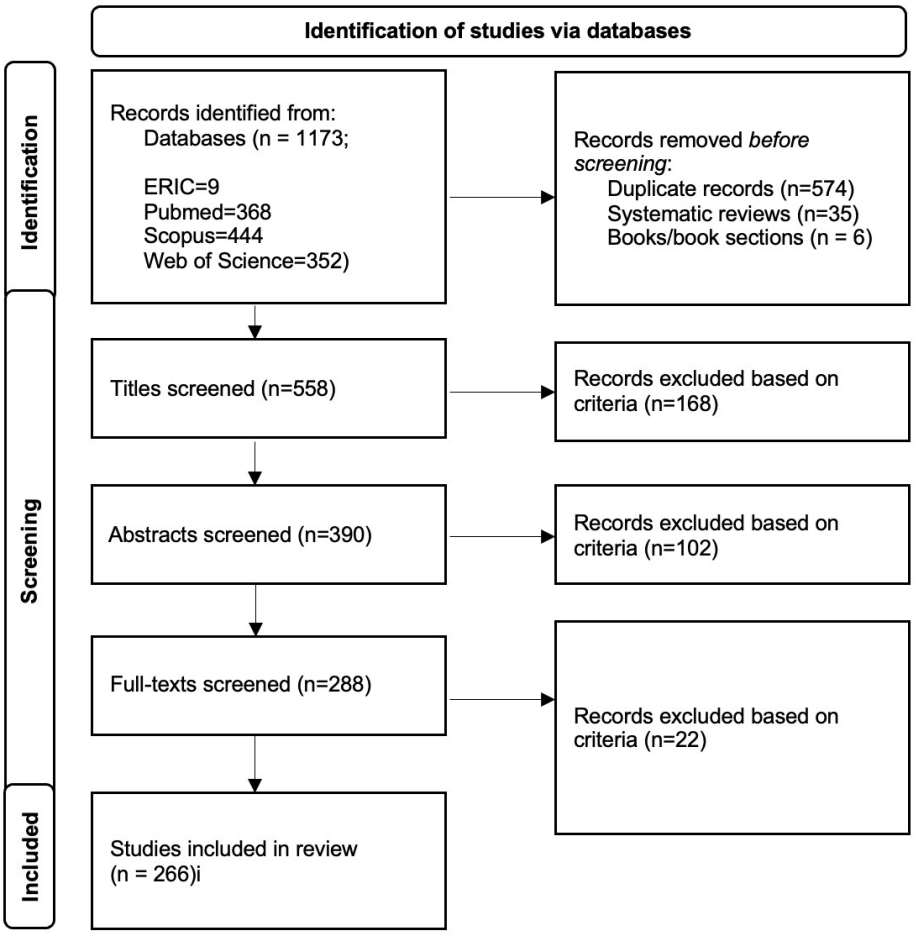

Figure 1. Exclusion process

2.3. Selecting the studies

Our screening process was divided into three parts: title, abstract, and full-text screening. The screening has been conducted by four authors, which consisted of three medical students who have leadership and management experience in national and/or international student organizations and one medical education researcher who has a PhD degree in medical education and conducted several systematic reviews before. Before initiating the screening, we established our inclusion and exclusion criteria through hours of discussion. We decided to exclude:

1. Articles written in languages other than English.

2. Articles from areas outside of medical education (other health profession education areas, e.g., nursing, dentistry, pharmacy).
3. Articles that are unlikely to include leadership or management positions.

We conducted a calibration exercise among our four authors as suggested in our guide (13) to ensure a consistent assessment of study relevance, particularly considering the ambiguity of the third exclusion criterion. For this purpose, we randomly selected 10 articles. Each author independently evaluated the titles of these articles. Subsequently, the authors discussed their individual results and developed a shared understanding. This pilot exercise helped us to establish the criteria for determining the "not relevant" articles, enabling us to proceed with the evaluation of the remaining articles.

Following the pilot exercise, we divided the authors into two groups. Each member of the groups independently evaluated the studies, and then each group was gathered for discussion. Each study was evaluated by at least two authors. In cases of disagreement, both groups consulted the authors in the other group, and decisions were made by a third author. We included records that met our predefined criteria during the screening process. If a record contained exclusionary information at that phase, it was removed. However, if the record did not contain any exclusionary information, such as no available abstract, it proceeded to the next screening phase.

Following the title screening based on the established criteria, 390 records progressed to the abstract screening phase. The same strategy was employed during the abstract screening, and 102 records were excluded because they did not meet the criteria. The title and abstract screening process needed multiple meetings and involved in-depth discussions that lasted more than 10 hours in total.

With the final 288 records, we proceeded to the full-text screening. Twenty-one records were excluded either containing no leadership or management positions or not being relevant to our criteria. One of these articles was excluded in the data analysis process due to the reasons mentioned in the “Collating, summarizing and reporting the results” section, but we counted that study to be excluded at this stage to be seen in the flowchart.

2.4. Charting the data

We created an Excel file for charting the data. It included information on the title, authors, publication year, type of articles, discipline, main context and positions. Each author used an Excel file to fill in the mentioned information regarding the studies.

We initiated the process by selecting 10 random articles to calibrate our data extraction procedures as suggested by Levac et al. (13). This calibration allowed us to determine which positions to include and what specific data to extract from the articles. As was carried out in the previous phase, each member of the two groups independently evaluated the studies, and then each group gathered for discussion. Each full text was evaluated by at least two authors. When necessary, certain positions were reevaluated afterwards, and all authors participated in voting during the meetings to determine whether these positions should be retained or removed.

The remaining data, in addition to the positions, were also thoroughly discussed by each group during the charting process. The titles of the articles were used as presented in the paper. The authors' names and publication year information for each article were directly obtained from Zotero software, ensuring the accuracy and reliability of the data.

We documented the country of the corresponding authors for each article, as the location of the corresponding author usually corresponds with the data provided in the article. To maintain consistency, we considered the corresponding author's address even when it did not align with the country in which the study was conducted. The types of articles were charted in the consensus of the two authors of each group and discussed with the other group if necessary. The discipline of the studies was charted according to the information provided in the article. Studies that focused on multiple disciplines or had broad focuses on academic medicine were labeled "unclassified." In the process of charting the main contexts of the studies, after carrying out a thorough evaluation, we noticed that the most mentioned contexts were related to “gender” and “underrepresented minorities”. Therefore, we decided to include these labels in our charting process. Although we came across studies from various contexts, we chose to disregard them in our analysis due to their limited representation, and we decided to label those studies as "Other".

Through iterative evaluations and collaborative meetings, we resolved conflicts and reached a consensus on the inclusion of data. In total, the duration of these meetings involving four authors exceeded 20 hours. The charted data (an Excel file) are presented in the Supplementary Material.

2.5. Collating, summarizing, and reporting the results

The outcomes were categorized into primary findings and secondary findings. The primary findings included the positions, while the secondary findings consisted of the year, country, type of article, discipline, and main context. The methods of collating, summarizing and reporting these outcomes are presented in the steps below.

2.5.1. Primary findings: positions

To address our research question, the research team noted specific leadership positions mentioned in the articles by using an Excel file. To report that data:

1. We started by organizing the data extracted in the previous stage and ensuring consistency in the positions where we agreed and disagreed, as well as correcting any typos.
2. To summarize the data regarding the positions, we started by deleting the duplications. For that purpose, a single use Python code was developed and used.
3. After that, the positions that were identical but written differently among the studies were standardized. (e.g., “vice-chair” and “vice chair”)
4. One of the articles (ID: 7) remained with no positions as a result of this process; therefore, we decided to exclude this article.
5. After collecting, organizing, and analyzing the data, we identified 396 unique leadership positions in the field of medical education.
6. The next step was classifying these positions. We established four main categories: academic positions (mostly ranks), administrative positions, journal-related positions, and society-related positions.
7. The positions that could not be categorized were labeled as "Unclassified". (e.g. studies mentioned “chair” but not specified what chair is)
8. To enhance consistency, we subdivided the categories into sections by benefiting from the Handbook of Academic Titles (18).
9. Subsequently, we generated the final table based on these categorizations.

2.5.2. Secondary findings:

We mainly focused on determining the distribution of data for each category in the secondary findings. In addition, we visually presented the data about year and discipline.

After determining the range of publication years, we created a bar graph to illustrate the distribution and trends of the yearly data over time. Similarly, for the discipline data, we analyzed the frequencies and percentages of each discipline and presented them in a table format. The country, article type, and main context data were evaluated based on our labeling system as described in the "Charting the data" stage.

3. Results

3.1. Primary Findings: Positions

We identified 396 leadership positions in the field of medical education. Table 1, Table 2, and Table 3 present the leadership and management positions classified under four main categories and unclassified positions within the field of medical education. We identified four main categories for these leadership positions:

- Academic positions (mostly ranks such as professor, assistant professor, etc.).
    - There were two subheadings: "Regular Faculty" and "Other".
- Administrative positions (such as dean, provost, department head, etc.).
    - There were 16 subheadings. Positions related to "Clerkship Administration", "Residency Administration", and "Fellowship Administration" were classified under these respective categories. Positions related to "Program Administration", "Education Administration", and "Training Administration" were grouped due to their broader terms, although they are likely to be equivalent or similar to positions in the previous categories. Positions associated with department, section, and division administration were categorized as "Department Administration", "Section Administration", and "Division Administration". Positions related to centers, units, clinics, and services were classified as "Center/Academic Center Administration", "Unit Administration", "Clinic Administration", and "Service Administration". Positions involved in conference administration were categorized as "Conference Administration". "Dean and Dean-Related Administrative Positions" and "Provost and Provost-Related Administrative Positions" were assigned to their respective categories.
- Journal-related positions (such as journal editor-in-chief, journal deputy editor, etc.).
    - They were classified under two subheadings: "Editorial" and "Other". Under the "Unclassified" category, we classified positions that could not be categorized distinctly or were unclear in their relationship. This category comprises eight subheadings, including "Committee Positions", which includes various committee positions, as well as "Chair", "Director", "Chief", "Head", "Coordinator", and "President/Member". Any remaining positions were labeled "Other".
- Society-related positions (such as society president, society chair, and society secretary).
    - They were classified under ten subheadings. Positions such as "President", "Director", "Chair", "Executive", and "Secretary/Treasurer" were categorized

accordingly. Leadership positions associated with a board or committee of a professional medical society were classified under "Board" and "Committee". Similarly, positions related to courses and task forces of professional medical societies were classified as "Task Force" and "Course". Any remaining positions were labeled "Other".

3.2. Secondary Findings

3.2.1. Year

The studies included in our analysis spanned a wide range, with publications dating from 1981 to March 23, 2023. A diagram is provided to visually illustrate the distribution of studies across various publication years (Figure 2). It highlights a notable upward trend in research focused on leadership positions in medical education, particularly in recent years.

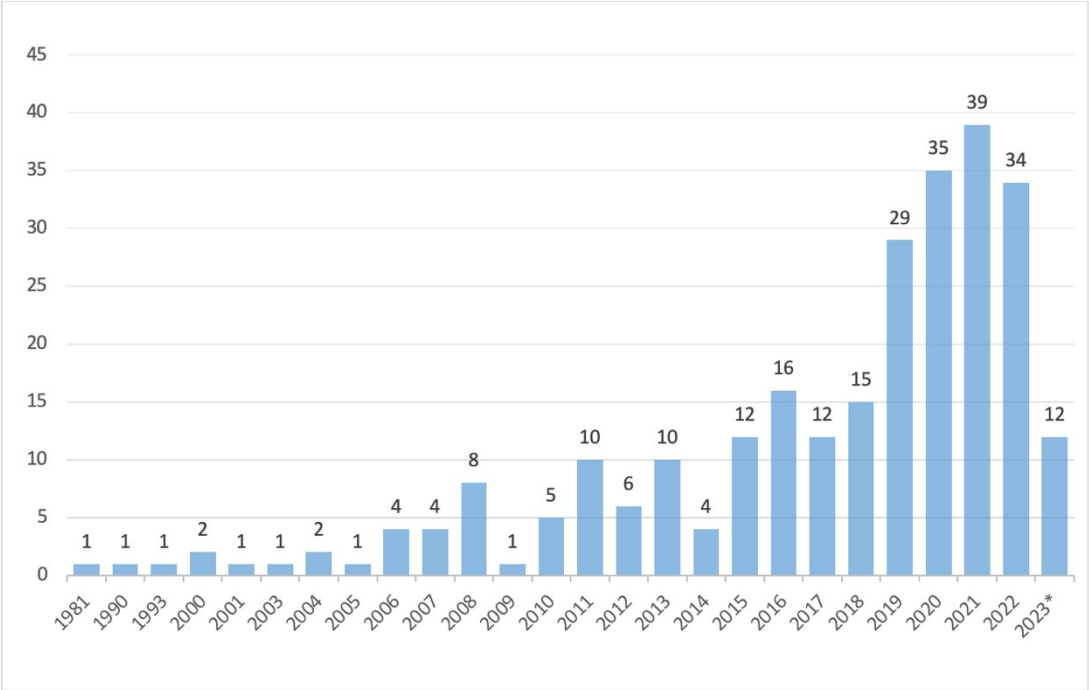

Figure 2. Distribution of studies across publication years. *until March 2023

3.2.2. Country

Our findings indicate that the majority of the studies (222 out of 266, corresponding to 83.45%) were from the United States. Additionally, other countries were Canada (17 out of 266, corresponding to 6.39%), Australia (4), Austria (4), Germany (3), the United Kingdom (3), Japan (3), Pakistan (2), Colombia (1), Croatia (1), Italy (1), the Kingdom of Bahrain (1), Mexico (1), Saudi Arabia (1), Sweden (1), and Switzerland (1).

3.2.3. Type of Article

Our findings revealed that the majority of the studies on this topic were research articles, comprising 215 (80.82%) out of the 266 articles reviewed. The second most prevalent study type was perspective/commentaries, with 45 (16.91%) articles. Furthermore, the distribution included one editorial, two letters to the editor, one meeting report, one white paper, and one workshop report.

3.2.4. Discipline

The articles we reviewed spanned 40 different disciplines. Table 4 presents the frequency and percentages of the studies in terms of disciplines.

3.2.5. Main Context

Out of the total of 266 studies examined, a majority (159 studies, accounting for 59.77%) had a primary focus on gender-related topics. Ten studies (%3,75) specifically centered around underrepresented minorities (URM), while 13 studies (%4,88) addressed both gender and URM simultaneously. The remaining 84 articles (31.57%) explored other various contexts.

4. Discussion

Many studies have investigated the representation of various groups in leadership and management positions in medical education and academic medicine (8–10,19). However, none of them benefited from a systematically created list to determine the positions on which they focused. To fill this gap, we aimed to create an inventory of formal (12) leadership and management positions by conducting a scoping review. We found that there are 396 positions mentioned in the medical education literature.

Our key findings showed that medical educators can find a place among a high number of positions in various institutions. These positions are not limited to academic ranks, such as professor and associate professor, and administrative positions, such as dean and vice-dean, in medical schools. From a horizontal point of view, they can also take place in educational roles in professional societies and scientific journals, which satisfy the needs of learners, particularly in terms of continuous medical education. From a vertical point of view, they can be a president, chair, director, head, chief, coordinator, and member of different formal structures such as centers, divisions, departments, committees, sections, and programs. The landscape of possibilities as a formal leader or manager in medical education is vast, both horizontally and vertically. Therefore, researchers who aim to carry out leadership studies in medical education regarding positions should consider this vastness and should benefit from the list to enhance the rigor of their research.

Among secondary findings, the results of the present study showed that the majority of the studies (83.45%) were from the United States. The literature shows a dominance of the Global North in medical education research, which was illustrated as a leaky pipeline regarding the lack of representation of the Global South (20-21). There is a similar problem in published curricula demonstrated in recent studies (22-23), and even the definition of terms and presentation of narratives are determined by the Global North (24-25). We found the same problem in this secondary finding related to the origin countries.

Another interesting secondary finding was the distribution of studies among disciplines. We found that the highest frequencies belonged to surgical fields such as orthopedic surgery, neurosurgery, and plastic and reconstructive surgery. It appears that these male-dominant fields are more interested in producing knowledge that includes leadership and management positions. This finding may suggest the need to address leadership and management issues within these fields. These issues were mostly related to the gender disparities and representation of women in orthopedic surgery (26–34), neurosurgery (35–44), and plastic and reconstructive surgery (45–51). It is not surprising given that approximately 60% of all studies focused on topics related to gender.

Table 1. Professional-society-related, academic, and journal-related (three categories out of four) leadership and management positions in medical education.

CATEGORY 1: PROFESSIONAL-SOCIETY-RELATED POSITIONS			**CATEGORY 2: ACADEMIC POSITIONS (RANKS)**	**CATEGORY 3: JOURNAL-**RELATED POSITIONS
President	**Secretary/Treasurer**	**Committee**	**Regular Faculty**	**Editorial**
associate vice president	secretary	committee chair	assistant professor	advisory editor
executive vice president	section secretary	committee chairperson	associate professor	associate editor
president	section treasurer	committee chairperson	clinical instructor	associate editor-in-chief
vice president	treasurer	committee cochair	full professor	coeditor
		committee member	instructor	consulting editor
Director	**Executive**	educational committee member	professor	deputy editor
assistant executive director	chief executive	executive committee member	senior instructor	deputy editor-in-chief
associate executive director	executive council member	membership committee chair		editor-in-chief
director	executive staff member	national committee chair	**Other**	editorial assistant
division associate director		program committee member	adjunct professor	editorial board member
division director	**Board**	residency review committee member	emeritus professor	emeritus editor
executive director	board chair	subcommittee member	endowed professor	international consulting editor
medical director	board chairpersons		lecturer	lead editor
membership director	board committee member	**Task Force**	tenured faculty member	managing editor
	board director	task force chair	tenured professor	section editor
Chair	board member	task force cochair	visiting professor	senior editor
district chair	board of regents member	task force vice chair		editor
region chair	board president			
section chair	board of regents president	**Other**		**Other**
vice chair	executive board member	council member		advisory board member
chair		councilor		chairperson
	Course	education project coordinator		international consultant
	course codirector	lecturer		review committee member
	course director			
	course committee member			

Table 2. Administrative (one category out of four) leadership and management positions in medical education.

CATEGORY 4: ADMINISTRATIVE POSITIONS			
Program Administration	**Department Administration**	**Residency Administration**	**Division Administration**
assistant program director	academic department chair	assistant residency director	assistant division director
associate program chief	assistant department chief	assistant residency program director	assistant division head
associate program director	assistant department director	associate residency director	associate division chief
associate program head	assistant department head	associate residency program director	associate division director
clinical program assistant director	associate department chair	off-site residency director	associate division head
clinical program associate director	associate department chief	residency chair	clinical division director
clinical program director	associate department director	residency chief	division chair
development program director	associate department head	residency coordinator	division chief
development program educator	department advisory committee member	residency director	division cochief
education program director	department chair	residency program chair	division director
medical student program director	department chairperson	residency program chairperson	division head
medical student teaching program director	department chairperson	residency program chief	division president
program associate chief	department chief	residency program coordinator	subdivision head
program chair	department cochair	residency program director	subspecialty division chief
program chief	department cochief	residency review committee member	vice division chief
program codirector	department codirector	residency site coordinator	vice division director
program coordinator	department committee chair	residency training director	vice division head
program director	department deputy chair	residency training program director	
program evaluation analyst	department deputy chief	resident advisory board member	**Education Administration**
program organizer	department deputy director	resident course director	didactic education director
program vice chair	department director	resident education council member	education committee chair
student program executive director	department education committee chair		education director

subspecialty program chair	department endowed chair	Clerkship Administration	education institution head
training program chair	department head	assistant clerkship director	education vice chair
training program director	department interim chair	associate clerkship director	graduate medical education chief
vice program chief	department vice chair	clerkship coordinator	graduate medical education office director
vice program director	department vice chairperson	clerkship director	graduate medical education vice president
vice program head	department vice chief	clerkship program director	medical education coordinator
	departmental committee chair	clinical clerkship director	medical education director
Unit Administration	interim department chair	medical school clerkship chair	medical student education coordinator
unit advisory board member	training department director	medical school clerkship director	medical student education director
unit chief		medical student clerkship director	national education committee chair
unit director			national education committee member
Clinic Administration	**Section Administration**	**Fellowship Administration**	**Dean and Dean-Related Administration**
clinic director	associate section chief	assistant fellowship director	assistant dean
clinic medical director	associate section director	assistant fellowship program director	associate dean
clinical medical director	associate section head	assistant medical education fellowship director	dean
clinical operations director	section chair	associate fellowship codirector	executive associate dean
clinic chief	section chief	associate fellowship director	full dean
	section director	associate fellowship program director	interim dean
Service Administration	section head	associate medical education fellowship director	senior associate dean
service chief	vice section chief	fellowship codirector	senior vice dean
service director	vice section director	fellowship director	vice dean
service head	vice section head	fellowship program codirector	vice executive dean
		fellowship program director	
Center/Academic Center Administration	**Conference Administration**	medical education fellowship director	**Provost and Provost Related Administrative Positions**
academic center chairperson	conference committee chair		associate provost

academic center director	conference committee member	**Training Administration**	deputy provost
center chair	conference executive council member	training chair	provost
center director	conference programme committee member	skills training director	vice provost
	conference speaker selection committee member	training associate director	
		training department director	
		training director	
		training network director	

Table 3. Unclassified leadership and management positions in medical education.

Committee Positions	Chair	Director	President/Member	Chief
admissions committee member	academic chair	admissions director	assistant vice president	assistant chief
award committee member	assistant chair	assistant director	associate vice president	associate chief
clinical management committee chair	associate chair	assistant medical director	board member	chief
committee chair	board chair	associate director	board of regents member	cochief
committee chairperson	chair	associate executive director	executive board member	medical staff chief
committee cochair	chairperson	associate medical director	executive vice president	subspecialty chief
committee head	chairperson	block director	faculty senate member	surgical chief
committee member	chairperson	codirector	governing board member	teaching hospital chief executive
curriculum committee member	council chair	continuous quality improvement director	group member	vice chief
dean election committee member	deputy chair	course director	group president	
executive committee member	deputy chairperson	curriculum director	interim senior vice president	**Head**
faculty committee member	discipline chair	deputy director	medical affairs vice president	head
faculty executive committee member	discipline vice chair	director	medical college board member	subspecialty head
hiring committee member	faculty development associate chair	elective director	medical school accreditation board member	university hospital head
institutional committee chair	group chair	executive director	medical school faculty council member	
institutional committee member	inaugural chair	faculty course director	president	**Coordinator**
internal promotion committee member	interim chair	faculty development director	senior vice president	academic coordinator
leadership selection committee	interim chairperson	grand rounds director	vice president	course coordinator

member				
liaison committee member	interim chairperson	medical director		intern coordinator
medical college committee chair	multidisciplinary team meeting chair	medical school course director	**Other**	surgical coordinator
medical college committee member	special interest group chair	medical student course director	board diplomate	
medical school admission committee member	study chair	medical student director	faculty development consultant	
medical school committee member	study vice chair	quality assurance director	instructional design consultant	
medical school executive curriculum committee member	tenured chair	quality director	supervisory board divisory member	
nominating committee member	vice chair	quality improvement director		
promotion committee member	vice chairperson	senior director		
search committee head	workshop chair	simulation director		
search committee member		subinternship director		
steering committee member		subspecialty director		
tenure committee member				
tenured committee member				

Table 4. The distribution regarding disciplines.

Discipline	Frequency (Percentage)	Discipline	Frequency (Percentage)
Anesthesiology	1 (%0,37)	Oncology	10 (%1,50)
Cardiology	3 (%1,12)	Ophthalmology	4 (%1,50)
Cardiovascular Surgery	2 (%0,75)	Orthopedic Surgery	17 (%6,39)
Dermatology	5 (%1,87)	Osteopathic Medicine	1 (%0,37)
Emergency Medicine	6 (%2,25)	Otolaryngology	8 (%1,3)
Endocrinology	1 (%0,37)	Pathology	1 (%0,37)
Family Medicine	2 (%0,75)	Pediatrics	11 (%4,13)
Gastroenterology	3 (%1,12)	Physical Medicine and Rehabilitation	3 (%1,12)
General Surgery	4 (%1,50)	Plastic and Reconstructive Surgery	14 (%5,26)
Geriatrics	1 (%0,37)	Podiatry	2 (%0,75)
Hematology& Oncology	1 (%0,37)	Psychiatry	4 (%1,50)
Internal Medicine	4 (%1,50)	Public Health	2 (%0,75)
Medical Education	1 (%0,37)	Pulmonary Critical Care and Sleep Medicine	1 (%0,37)
Medicine	6 (%2,25)	Radiation Oncology	5 (%1,87)
Military Medicine	2 (%0,75)	Radiology	12 (%4,5)
Neurology	2 (%0,75)	Sports Medicine	1 (%0,37)
Neuropsychology	2 (%0,75)	Surgery	15 (%5,63)
Neuroradiology	1 (%0,37)	Urogynecology	1 (%0,37)
Neurosurgery	13 (%4,88)	Urology	3 (%1,12)
Nuclear Medicine	2 (%0,75)	Unclassified	84 (%31,57)
Obstetrics Gynecology	11 (%4,13)		

As with any scoping review, this study has limitations. First, the analysis is based on selected published articles, and we did not include theses, books, and book chapters in our review. Additionally, our search was limited to articles written in English. For instance, Spanish is one of the most widely spoken languages, and there are many relevant studies conducted in Spanish, such as the study by Flores-Domínguez et al (52). Similarly, our study overlooked research from the Global South, including studies from Turkey (53), that contribute to the literature in their native languages. This may have resulted in the oversight of highly relevant articles. Future research may include other publication types and languages to obtain a more diverse global perspective. Furthermore, our research was comprehensive and involved different leadership and management positions in various countries. However, this might have limited our ability to classify positions accurately, and it is possible that we failed to identify certain positions correctly or missed some entirely, despite receiving valuable help from experts on an international level during the consultation phase. Due to the high number and diversity of the positions, it was difficult

for us to categorize them. Therefore, the categorization may include some overlaps and problems in terms of consistency.

5. Conclusions

- Our study identified 396 different formal leadership and management positions in medical education in different categories. It contributed to fill a significant gap in the literature.

- We highlight the importance of systematically approaching to the leadership and management positions, specifically in studies regarding gender and underrepresented minorities since many studies focused on these aspects.

- Our analysis revealed a strong focus on surgical fields in the literature. These fields are the areas that have an increased rate of diversity discussions and also efforts in terms of gender.

- Our findings pointed out an imbalance as a majority of research and roles emanate from the Global North. It, again, showed the need for a more global perspective in medical education literature.

- Future studies, particularly those that investigate gender issues and the representation of women and underrepresented minorities, may benefit from the list of positions to systematically approach what to focus on.

Supplementary material: The Excel file that includes the charted data is accessible from this link: https://doi.org/10.5281/zenodo.10894922.

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