

"LEADERSHIP AND MANAGEMENT IN UNDERGRADUATE MEDICAL EDUCATION"

Research Paper

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"Abstract"

Leadership and management competencies are essential for effective medical practice, yet are not systematically taught in medical undergraduate training. This pilot study assesses the opinions of medical students and healthcare professionals on the relevance of, and self-reported competence in, 22 leadership and management skills, to inform the development of a curricular module. Participants completed a structured questionnaire. Descriptive and inferential statistics were used to summarize and compare groups. Overall, both groups rated most skills as highly relevant, with Communication receiving unanimous importance. Professionals rated Ethics significantly higher than students ($p = 0.024$), with trends toward higher ratings in Creativity and Inspiring Others. Across nearly all skills, competence ratings lagged behind relevance, with the largest gaps in technical and administrative domains. These findings highlight the need to introduce structured leadership and management training early in the medical curriculum, incorporating experiential and practice-oriented learning to prepare future physicians for complex healthcare roles.

Keywords: Leadership, Management, Medical education, Undergraduate curriculum.

1. Introduction

Although many physicians enter the field without receiving professional leadership and management training, they play a crucial role in the administration and governance of healthcare systems. Although clinical rotations during graduate school may provide some exposure to leadership, this kind of training ought to be implemented far earlier, at the undergraduate level, to provide a solid basis for individuals who might go on to hold leadership positions in the future. To guarantee that these ideas are suitably contextualized for healthcare settings, it is crucial to incorporate management and leadership principles within the medical curriculum. Leadership and management are widely acknowledged as essential skills for doctors worldwide, not just for those in executive positions but also for regular clinical practitioners.

Interactions with patients, interdisciplinary healthcare teams, and administrative bodies require these abilities. In healthcare teams, good leadership encourages cooperation, unites team members around a common goal, and has been demonstrated to enhance patient satisfaction and clinical results. On the other hand, inadequate communication and leadership can have detrimental effects. Even though these problems are becoming more widely acknowledged, leadership and management training are still mostly lacking in undergraduate medical school, according to an analysis of the curricula of several US and UK universities. In order to provide safe and effective healthcare services, management concentrates on

carrying out the vision, while leadership entails establishing it. Accidental leadership is the term for the informal or default leadership roles that many doctors take on, frequently without sufficient training.

An accidental leader is someone who finds oneself in a leadership role without any prior planning or warning (Robbins and Finley, 2003). They stress that when you are suddenly put in command of a team or project, you have become an accidental leader (Robbins and Finley, 2003, pp. 1–2). Without the requisite basic training, doctors take on leadership roles that could affect patient safety and team performance.

The literature will specifically look at books on management and leadership in the medical field, articles from peer-reviewed, indexed journals and Scopus, university curricula from the UK and the USA, and data from the UK National Health System, which was one of the first national health systems to recognize the value of management and leadership. In order to navigate the increasingly complex and multidisciplinary nature of contemporary healthcare systems, future doctors must be prepared with leadership and management skills, according to recent trends in medical education. Competency-based curricula that incorporate non-clinical abilities like communication, teamwork, systems thinking, and organizational leadership are becoming more popular worldwide.

2. Literature Background

While management entails organizing, planning, directing, and regulating resources to accomplish this goal effectively and efficiently, leadership entails establishing a vision, providing guidance, and inspiring and motivating others to attain this vision (Toor and Ofori, 2008, pp.61-71). Interpersonal skills, strategic thinking, and the capacity to cultivate a constructive and good company culture are all necessary for effective leadership (Yukl, 2013). Although the phrases "manager" and "leader" are sometimes used synonymously, they are not interchangeable. In order to influence the values and behaviors of their teams, leaders frequently concentrate on change, innovation, and long-term objectives. Managers are in charge of preserving stability, maximizing output, and making sure daily operations run smoothly without facing any problems.

They emphasize resource allocation, short-term objectives, and following rules and regulations (Kotler, 1990). By emphasizing vision creation, empathy, adaptability, and cultivating a positive organizational culture, several important theories and models of management and leadership (Andriessen, 1998, pp.321-55) come together to offer a thorough framework for acquiring critical skills necessary for negotiating the complexity of healthcare environments.

In the healthcare industry, providing high-quality patient care requires both management and leadership (Asif et al. 2019, p.3212). In a variety of care contexts, leadership is associated with high-quality treatment and a number of patient outcomes, including mortality, safety, satisfaction, and pain management (Sfantou et al. 2017, p. 73). Higher patient satisfaction and decreased patient mortality are linked to effective leadership philosophies, especially transformational leadership (Sfantou et al. 2017, p. 73). Patient satisfaction is also significantly impacted by task-oriented and relational leadership. Leadership at the individual, team, organizational, and national levels, are among the levels that call for both management and leadership (West et al. 2015). Motivating and inspiring healthcare staff is one way that effective leaders promote a culture of innovation and ongoing progress.

Effective managers simultaneously make sure that procedures are optimized, resources are used effectively, and organizational objectives are reached. Physicians must have a thorough understanding of healthcare, including its funding, organization, administration, and management, as well as its political, economic, social, and technical drivers, to attain high-standard medical leadership. Nontechnical abilities, including networking, self-awareness, negotiation, direction setting, vision formulation, and teamwork, are essential for aspiring leaders (Warren, 2011, p.27-32). Despite having a significant leadership role in the administration and control of the healthcare system, many doctors acquire these skills through "accidental leadership", assuming the job without necessarily intending to become one, instead of receiving official training.

To manage the organizational and systemic changes required to enhance health through innovation in patient care, research, and health professions education, the Institute of Medicine (now the National Academy of Medicine) advises academic health centers to cultivate leaders at all levels (Institute of Medicine, 2024, pp.802-6). The position of "Manager" was renamed "Leader" by the Royal College of Physicians and Surgeons of Canada in 2015 as one of the seven primary positions in the CanMEDS Physician Competency Framework. In addition to being skilled physicians, doctors also serve as leaders for their organizations and colleagues, according to the UK General Medical Council (GMC) (GMC Guidance. Leadership and Management for all Doctors, 2012). Revalidation and preserving a practice license depend heavily on demonstrating these obligations.

The Healthcare Leadership Model, which was established by the UK National Health Service (NHS) and the NHS Leadership Academy, aims to improve the leadership skills of health care professionals by providing examples of general leadership behaviors along with nine dimensions of leadership. The model was created using evidence-based research that considers the principles of the NHS, its understanding of effective leadership, and the demands that patients and communities place on healthcare staff in their role as leaders.

To minimize "accidental leadership" and give doctors the tools they need to assume more significant leadership responsibilities in the healthcare system, leadership and management skills must be included early in the curriculum, even though they are essential in postgraduate medical study (Chen, 2018, pp.66-70). In spite of this, there hasn't been much work done to change medical undergraduate programs, and there isn't much information available on how to include these kinds of abilities. Only two of the eight studies that Kiesewetter and colleagues found in their systematic review provide undergraduate medical students with instruction in different interpretations of leadership (Kiesewetter et al. 2013, pp.9-16).

Although cooperation, leadership models, and change management are common themes in graduate leadership training, even postgraduate leadership curricula vary widely and have minimal efficacy (Sadowski, 2018, pp.134-48). The curriculum should thoroughly incorporate the principles of management, and it is preferable to collaborate with business school instructors to modify ideas for the healthcare industry and apply this understanding in real-world settings (Till and Swanwick, 2018, pp.1214-20). The Mayo Medical School conducted a survey in 2009 to find out what administrators, staff, and students thought about the skills and knowledge required for a leadership program, which was nonexistent at the time (Varkey et al. 2009, pp.244-50).

Department and division chairs, staff physicians, scientists, and non-medical administrative leaders are among the roles targeted by the three-tiered Mayo Leadership Education Program for Physicians. The first MedTech and Leadership program in the UK, "Barts X Medicine," was introduced for medical students in 2017 by Barts and The London Medical School. This program was more about empowerment through digital health concepts than it was about leadership and management, despite the fact that it was a positive step towards modernizing medical curricula (Bhanot, 2018, pp.305-6).

Although the asynchronous mode of delivery might not be optimal for undergraduate students, the Physician Leadership Certificate (PLC), created by the Memorial University of Newfoundland Faculty of Medicine, comprised eight 3-hour online asynchronous modules spread over a 4-year undergraduate program (2 modules per year) and pre- and post-module tests (Maddalena, 2018, pp.348-51). Research indicates that a more thorough approach to leadership development is required, one that takes character, emotional intelligence, and cognitive competence into account (Sultan et al. 2019, pp.4409). A requirement for graduation was the Duke Leadership and Education and Development (LEAD) program, a four-year longitudinal leadership curriculum established by students that covered emotional intelligence and selflessness.

Good medical leadership is essential to creating high-quality healthcare. The foundations of management should be fully incorporated into the curriculum, and faculty from business schools should collaborate with them to modify business course concepts for the healthcare industry and offer opportunities for students to apply what they have learned (Till and Swanwick, 2018, pp.1214-20).

Individual and interpersonal dynamics, team and unit dynamics, and organizational dynamics should all be included in a “Management 101” program (Myers and Pronovost, 2017, pp.582-4), along with character and emotional intelligence. Physicians will find leadership to be an attractive alternative for career choices in leadership roles and for ongoing professional development if leadership content is incorporated into medical curricula (Maddalena, 2018, pp.348-51).

By creating a leadership/management module especially for undergraduate medical students, our study seeks to close this gap. By collaborating with the Medical School and School of Management, the project takes advantage of interprofessional opportunities to create a module that enhances leadership elements in undergraduate medical programs using modified content that is frequently taught to business students. Regarding the information and abilities required for management and leadership in the healthcare industry, the module design also considers the views of medical educators, medical students, and important stakeholders, including doctors in leadership roles. Volunteer students in a sixyear undergraduate Doctor of Medicine (MD) program received the module as a pilot, and following delivery, participant feedback on its effectiveness was gathered.

3. Methodology

Researchers from a Medical School and a School of Management & Management Information Systems investigated the development of a leadership and management module tailored to undergraduate medical students. Voluntary response sampling was used to recruit participants for the study, with email invitations sent to students in Years 4-6 (clinical years) of the 6-year MD undergraduate programme at the University of Nicosia Medical School, as well as to faculty, staff, and clinicians associated with the School. The first stage of the study involved the assessment of participants’ opinions and competencies on various leadership skills. This stage aimed to gather information for developing the module by utilizing responses from a pre-module survey. The study received approval from the Cyprus National Bioethics Committee (protocol number: EEBK/EPI/2022.01.39).

3.1 Tools

Participants completed Questionnaire 1 (QUEST1), which was designed to assess their perspectives on the knowledge and competencies considered necessary for an undergraduate leadership module. QUEST1, developed by Itani et al. (Itani et al. 2014, pp.328-31), and later used by Varkey et al. (Varkey et al. 2009, pp.244–50), elicited views on the skills that are important for leadership and management in medicine. Physicians, Medical School faculty, and healthcare leaders (e.g., department heads, clinic directors) were also invited to complete QUEST1 to compare the perspectives of experienced professionals with those of medical students. The full questionnaire can be found in Table 1. Participants also completed Cattell’s 16-factor personality questionnaire (Cattell, 2008, pp.135-59); however, these responses were not analyzed, as the personality assessment was beyond the scope of this study.

3.2 Data collection

QUEST1 was distributed online using Qualtrics software (Qualtrics, Provo, UT) to collect participant demographics (e.g., gender, age, year of study), as well as quantitative (Likert-scale) and qualitative (open-text) data. Participation was anonymous, and responses were collected solely to inform the design of the module.

3.3 Data analysis

Quantitative analysis focused on data collected from Sections A (leadership knowledge and skills) and B (curriculum considerations) of QUEST1 (Table 1). Responses were summarized, and descriptive statistics (mean, standard deviation) were used to report the distribution of participant opinions. Statistical significance of differences between student and professional responses was assessed with the non-parametric Wilcoxon rank-sum test ($\alpha=0.05$). Qualitative content analysis was conducted on responses to the two open-ended questions in Section C of QUEST1. Participants provided their perspectives on key attributes and skills for effective medical leadership and the essence of leadership in the medical profession. A deductive coding approach was employed to categorize responses based on

the 13 pre-defined areas of leadership knowledge and skills outlined in QUEST1). Coding was performed independently by two co-authors to ensure reliability, with agreement between coders quantified and discussed.

QUEST 1: perspectives on the knowledge and competencies considered necessary for an undergraduate leadership module.

Section A: 22 skills relevant to leadership knowledge and skills.

Q1 – rate with respect to relevance to leadership knowledge and skills (rating scale: 1 – not important; 2 – minimally important; 3 – somewhat important; 4 – important).

Q2 – rate your competence in each of these areas (rating scale: 1 – not competent; 2 – minimally competent; 3 – somewhat competent; 4 – fully competent).

Communication (among colleagues and patients)

Ethics (applied ethics in the working environment)

Conflict resolution

Time management skills

Managed care (health care delivery system organised to manage cost and maintain quality)

Management principles (planning, organizing, staffing, leading and controlling)

Coding and billing

Quality improvement (analysis and efforts to improve performance)

Public speaking (act as figurehead)

Risk management (eliminate risks)

Negotiation

Writing proposals

Investment principles (match goals and funds – search for funding)

Confidence

Inspire others

Decision making

Creativity

Empathy (patients and colleagues)

Vision/goal setting

Integrity (personal and in the working environment)

Planning

Coordination

Section B: areas to consider for medical school curriculum.

Q3 – Should the following skills be included in the medical school curriculum? (Yes / No / Maybe).

Leadership

Communication

Teamwork

Quality improvement

Managing hospitals

Planning and decision making

Organising (financial, human and other resources to meet objectives)

Managing/motivating human resources (as individuals and as group members)

Managing change and innovation

Controlling (resources and efforts to achieve planned results)

Section C: free-text questions

Please discuss, in your own words, what attributes or skills you believe are important for a physician leader.

In your opinion discuss what constitutes the essence of effective leadership in the medical profession

Other comments: feel free to add any other comments/ideas/suggestions

Demographics

Gender, age, current status (student / year of study; faculty / rank; administrator / department; physician / currently in position of leadership? Y/N)

Table 1. Knowledge and skills for leadership and management questionnaire (Source: Varkey et al., 2007).

4. Results

Thirty-six participants answered the study questionnaire. From these, sixteen were undergraduate medical students, with a mean age of 23.5 ± 2.4 years. The majority were female (n = 13) and in their fourth or fifth year of study; two participants did not specify their year of study. Twenty participants were from Medical School faculty and staff (mean age 43.6 ± 10.4 years), with thirteen female respondents. Seven were from an administrative staff position, one was a physician, ten were faculty and two did not specify. One participant provided answers to Q1 of the questionnaire only.

Table 2 summarises the mean and standard deviation (SD) of participant responses for Q1 (skill relevance). The table provides the descriptive statistics over all participants, as well as per category of participant (students, professionals), and the mean difference between the two groups (mean professionals – mean students). As presented in Table 2, participants rated the relevance of the 22 professional skills positively overall, with mean scores ranging from 2.86 ('coding and billing') to 4.00 ('communication'). Notably, 'communication' received a perfect mean score (4.00, SD = 0.00) across all respondents, indicating universal agreement on its importance. Comparison between student and professional subgroups revealed that professionals consistently rated most skills as slightly more relevant (positive differences), though differences were generally small. A statistically significant difference was observed for 'ethics', where professionals reported higher perceived relevance than students (0.25, p = 0.024). Additionally, near-significant trends were found for 'creativity' (0.37, p = 0.060) and 'inspire others' (0.33, p = 0.060), both of which were rated more highly by professionals. Other domains showing moderate positive mean differences, though not statistically significant, included 'time management', 'public speaking', and 'negotiation'. Conversely, students rated 'risk management' and 'decision making' marginally higher than professionals, though again without statistical significance. Overall, the results indicate broad agreement between groups, with professionals tending to report slightly higher perceived relevance for leadership and innovation-oriented competencies.

	ALL PARTICIPANTS		STUDENTS		PROFESSIONALS		MEAN DIFFERENCE	p-value
	Mean	SD	Mean	SD	Mean	SD		
Communication	4.00	0.00	4.00	0.00	4.00	0.00	0.00	---
Ethics	3.89	0.32	3.75	0.45	4.00	0.00	0.25*	0.024
Conflict resolution	3.91	0.28	3.88	0.34	3.95	0.23	0.07	0.474
Time management	3.86	0.36	3.75	0.45	3.95	0.23	0.20	0.107
Managed care	3.60	0.55	3.56	0.63	3.63	0.50	0.07	0.875
Management principles	3.77	0.43	3.81	0.40	3.74	0.45	-0.08	0.617
Coding and billing	2.86	0.81	2.81	0.83	2.89	0.81	0.08	0.773
Quality improvement	3.71	0.57	3.69	0.60	3.74	0.56	0.05	0.804
Public speaking	3.49	0.74	3.38	0.89	3.58	0.61	0.20	0.593
Risk management	3.69	0.53	3.81	0.40	3.58	0.61	-0.23	0.230
Negotiation	3.63	0.49	3.56	0.51	3.68	0.48	0.12	0.477
Writing proposals	3.29	0.62	3.31	0.70	3.26	0.56	-0.05	0.723
Investment principles	3.26	0.70	3.31	0.70	3.21	0.71	-0.10	0.678

Confidence	3.83	0.38	3.81	0.40	3.84	0.37	0.03	0.839
Inspire others	3.74	0.51	3.56	0.63	3.89	0.32	0.33	0.060
Decision making	3.94	0.24	4.00	0.00	3.89	0.32	-0.11	0.202
Creativity	3.51	0.56	3.31	0.60	3.68	0.48	0.37	0.060
Empathy	3.80	0.41	3.81	0.40	3.79	0.42	-0.02	0.886
Vision/goal setting	3.89	0.32	3.88	0.34	3.89	0.32	0.02	0.881
Integrity	3.94	0.24	3.94	0.25	3.95	0.23	0.01	0.934
Planning	3.86	0.36	3.88	0.34	3.84	0.37	-0.03	0.806
Coordination	3.80	0.41	3.81	0.40	3.79	0.42	-0.02	0.886

*Table 2. Descriptive statistics (mean, standard deviation (SD), mean difference) and significance levels (p-values) for the perceived relevance of 22 professional skills among students and professionals. A positive mean difference indicates higher relevance ratings by professionals compared to students. Significance is estimated via non-parametric Wilcoxon ranksum test ($\alpha=0.05$). *: mean difference significant with $p\text{-value}<0.05$.*

Similarly, Table 3 summarises the mean and standard deviation (SD) of participant responses for Q2 (self-reported competence). The table provides the descriptive statistics over all participants, as well as per category of participant (students, professionals), and the mean difference between the two groups (mean professionals – mean students). As shown in Table 3, participants' self-reported competence across 22 professional skills ranged widely, with mean scores spanning from 1.69 ('coding and billing') to 3.75 ('empathy'). In general, students and professionals reported moderate to high levels of competence across most domains. Professionals tended to rate their competence higher than students in most areas, although none of the differences reached statistical significance ($p > 0.05$). The largest positive mean differences, indicating higher self-rated competence among professionals, were observed in 'time management' (0.38, $p = 0.164$), 'planning' (0.25, $p = 0.254$), and 'communication' (0.25, $p = 0.246$). In contrast, students rated themselves higher in 'managed care' (-0.56, $p = 0.096$) and 'empathy' (-0.25, $p = 0.114$), although these differences were also not statistically significant. Competence in 'creativity' was rated equally by both groups (mean 3.00, SD 0.72–0.73), while small and non-significant group differences were found across other skills, including 'confidence', 'decision making', 'public speaking', and 'negotiation'. Interestingly, both groups reported relatively low competence in technical or administrative areas such as 'coding and billing' (1.69, SD 0.86), 'investment principles' (2.09, SD 1.09), and 'managed care' (2.28, SD 0.96), suggesting these may be less developed or less emphasized areas of training. Overall, while professionals generally perceived themselves as more competent, particularly in leadership- and organization-related domains, no statistically significant differences emerged, indicating broadly similar self-assessments between groups.

	ALL PARTICIPANTS		STUDENTS		PROFESSIONALS		MEAN DIFFERENCE	p-value
	Mean	SD	Mean	SD	Mean	SD		
Communication	3.63	0.55	3.50	0.63	3.75	0.45	0.25	0.246
Ethics	3.72	0.52	3.63	0.62	3.81	0.40	0.19	0.395
Conflict resolution	2.97	0.82	3.06	0.77	2.88	0.89	-0.19	0.508
Time management	3.25	0.67	3.06	0.77	3.44	0.51	0.38	0.164
Managed care	2.28	0.96	2.56	1.03	2.00	0.82	-0.56	0.096
Management principles	3.00	0.84	2.88	1.02	3.13	0.62	0.25	0.609
Coding and billing	1.69	0.86	1.63	0.89	1.75	0.86	0.13	0.575
Quality improvement	2.81	0.90	2.75	1.00	2.88	0.81	0.13	0.763
Public speaking	2.91	0.78	2.75	0.86	3.06	0.68	0.31	0.297
Risk management	2.59	0.91	2.63	0.89	2.56	0.96	-0.06	0.889

Negotiation	2.97	0.78	3.13	0.72	2.81	0.83	-0.31	0.216
Writing proposals	2.69	1.06	2.63	1.09	2.75	1.06	0.13	0.770
Investment principles	2.09	1.09	2.06	1.06	2.13	1.15	0.06	0.937
Confidence	3.22	0.55	3.19	0.66	3.25	0.45	0.06	0.874
Inspire others	3.00	0.72	2.94	0.68	3.06	0.77	0.13	0.637
Decision making	3.16	0.72	3.13	0.81	3.19	0.66	0.06	0.983
Creativity	3.00	0.72	3.00	0.73	3.00	0.73	0.00	1.000
Empathy	3.75	0.44	3.88	0.34	3.63	0.50	-0.25	0.114
Vision/goal setting	3.31	0.74	3.38	0.62	3.25	0.86	-0.13	0.851
Integrity	3.72	0.46	3.69	0.48	3.75	0.45	0.06	0.717
Planning	3.56	0.56	3.44	0.63	3.69	0.48	0.25	0.254
Coordination	3.63	0.55	3.56	0.51	3.69	0.60	0.13	0.363

*Table 3. Descriptive statistics (mean, standard deviation (SD), mean difference) and significance levels (p-values) of self-assessed competence scores, for 22 professional skills, comparing students and professionals. A negative mean difference indicates higher competence ratings by students. Significance is estimated via non-parametric Wilcoxon ranksum test ($\alpha=0.05$). *: mean difference significant with p-value <0.05 .*

Across all 22 professional skills, perceived relevance consistently exceeded self-reported competence, indicating a systematic skills gap. This gap was most pronounced in technical and administrative areas, such as ‘managed care’, ‘coding and billing’, and ‘investment principles’ (differences between overall relevance and self-reported competence: 1.32, 1.17, and 1.16, respectively), followed by leadership and decision-making skills. In contrast, interpersonal and ethical competencies, including ‘empathy’, ‘ethics’, and ‘integrity’, showed the smallest gaps (differences between overall relevance and self-reported competence: 0.05, 0.17 and 0.22, respectively), suggesting stronger alignment between training and perceived ability in these domains.

The last part of the questionnaire included three free-text questions. With regards to question 1, “*Please discuss, in your own words, what attributes or skills you believe are important for a physician leader*”, key differences emerged between students and professionals in their perceptions of leadership attributes and competencies (Table 4). While students prioritized inclusiveness, empathy, and cultural awareness, professionals placed greater emphasis on ethics, integrity, and strategic thinking. Students often rated themselves as highly competent in areas such as decision-making and administrative skills, despite limited exposure to real-world challenges, whereas professionals demonstrated a more calibrated self-assessment, particularly in complex skills such as conflict resolution and risk management. Additionally, professionals highlighted the importance of operational competencies, such as coding and workflow management, which were rarely mentioned by students. These differences underscore the influence of practical experience on leadership perceptions, highlighting potential gaps in student preparedness for the multifaceted demands of leadership in healthcare settings.

With regards to question 2, “*In your opinion, please discuss what constitutes the essence of effective leadership in the medical profession*”, students and professionals shared common views on the core traits of effective leadership in the medical profession, such as strong communication skills, teamwork, empathy, and ethical principles (Table 5). However, notable differences emerged between the groups. Students emphasized clinical knowledge, inclusiveness, and interpersonal skills such as respect and conflict resolution, focusing on immediate, patient-centered outcomes. In contrast, professionals placed greater importance on macro-level leadership skills, such as strategic thinking, recognizing team members’ strengths and weaknesses, and addressing systemic challenges. Professionals also highlighted the need for continuous education and organizational improvements, reflecting their broader experience with leadership in complex healthcare systems. These differences underscore the importance of bridging gaps in leadership training to align early expectations with the realities of professional practice.

Theme	Students	Professionals
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Communication Skills	Emphasis on clear communication, inclusiveness, and creating trust within teams.	Emphasis on active listening, conflict resolution, and fostering trust through ethical communication.
Team Management	Focus on motivating, delegating, and recognizing team members' strengths.	Highlighted the importance of multidisciplinary teamwork and systematic delegation.
Interpersonal Skills	Focused on empathy, flexibility, and inclusiveness, with cultural awareness as a key attribute.	Stressed ethics, integrity, and fairness as foundational qualities for effective collaboration.
Decision-Making	Viewed confidence and decisiveness as important attributes for gaining trust.	Recognized the complexity of decisionmaking, particularly under pressure and in conflict settings.
Vision and Strategic Thinking	Less emphasis on long-term strategic planning, focusing more on immediate team dynamics.	Emphasized creating clear goals, long-term vision, and strategic thinking as critical leadership attributes.
Administrative Competence	Rarely mentioned operational skills (e.g., coding, billing, workflows).	Highlighted the relevance of operational and administrative competencies in effective leadership.
Competence Perception	Often rated themselves as highly competent, even in areas with limited practical experience.	Took a more calibrated approach, acknowledging challenges and gaps in complex leadership skills.

Table 4. Comparison of perceptions and priorities of students and professionals in terms of “Please discuss, in your own words, what attributes or skills you believe are important for a physician leader”.

Theme	Students	Professionals
Focus on Knowledge	Prioritized clinical knowledge and technical competence as core attributes of leadership.	Stressed maintaining expertise through continuous education and staying updated on research and healthcare trends.
Team Relationships	Emphasized mutual respect, inclusiveness, and minimizing conflict within teams.	Highlighted the importance of recognizing team members' strengths and weaknesses to maximize cohesion and efficiency.
Vision and Strategy	Focused more on immediate and patient-centered outcomes, such as improving doctor-patient relationships.	Broader focus on long-term organizational goals, macro-thinking, and “thinking outside the box” for systemic healthcare improvements.
Ethics and Integrity	Discussed respect, humility, and individual attributes like empathy and fairness in leadership.	Expanded on ethical values, incorporating systemic issues, such as fair appointments and addressing healthcare inequalities.
Education and Development	Emphasized the importance of developing leadership skills early in training to improve team outcomes.	Suggested that the desire for leadership and continuous leadership education are essential, with skills developing over time.
Situational Leadership	Highlighted the distinction between direct and collaborative leadership styles, depending on context (e.g., emergencies vs. daily operations).	Maintained that leaders must balance these approaches while practicing inclusion to ensure buy-in from all stakeholders.

Table 5. Comparison of perceptions and priorities of students and professionals in terms of “In your opinion, please discuss what constitutes the essence of effective leadership in the medical profession”.

5. Discussion

The introduction of leadership and management training early in medical education is essential for preparing future physicians to handle the complex demands of healthcare leadership roles. The findings from this study highlight important differences in how students and professionals perceive both the relevance and their own competence across a broad range of leadership-related skills. While professionals generally rated most skills as more relevant, they also tended to report higher levels of competence across a majority of domains, particularly in communication, time management, planning, and public speaking. Although these differences were not statistically significant, the consistent directional trend suggests that real-world experience may influence perceptions of relevance as well as confidence in applying these skills (Table 2 and Table 3). The lack of statistical significance may also reflect the limited sample sizes of the compared groups, rather than a true absence of differences.

Both students and professionals rated the relevance of technical and administrative skills, such as ‘coding and billing’, ‘investment principles’, and ‘managed care’, relatively lower than interpersonal and leadership skills, with minimal differences observed between the two groups. Despite these being areas where practical exposure during training is often limited, self-reported competence levels were low across both groups. Professionals rated themselves slightly higher in ‘coding and billing’ and ‘investment principles’, while students reported notably higher competence in ‘managed care’, although none of these differences were statistically significant. These findings suggest a misalignment between training and workplace expectations, potentially due to limited curricular emphasis or insufficient opportunities for experiential learning in non-clinical competencies. Contrary to earlier assumptions, students did not report systematically higher competence than professionals. Instead, professionals tended to rate themselves as more competent across most domains. For example, small to moderate differences favoring professionals were observed in ‘communication’ (mean difference = 0.25), ‘time management’ (0.38), and ‘planning’ (0.25), although none reached statistical significance. This pattern may indicate that experiential learning and workplace exposure play a meaningful role in the development of key leadership and management skills over time.

Notably, several interpersonal and ethical skills, such as ‘empathy’, ‘ethics’, ‘integrity’, and ‘planning’, were rated highly in both perceived relevance and self-reported competence by students and professionals alike. This alignment may reflect the successful integration of professionalism and interpersonal development in existing curricula and clinical environments. Prior research supports the importance of emphasizing these core attributes early in training, as they are foundational to effective collaboration, trust-building, and leadership in healthcare (Swick, 2000).

Interestingly, professionals sometimes rated themselves with respect to competence lower than students in some domains, including ‘conflict resolution’ and ‘negotiation’, areas that are inherently complex and context-dependent. In ‘decision-making’, however, ratings were nearly identical across groups. This may reflect a more calibrated self-assessment among professionals, informed by their real-world understanding of the challenges these skills entail. It also highlights how leadership competencies are not merely theoretical constructs but are shaped by the nuances of organizational dynamics and team-based care. Professionals’ lower ratings may indicate a greater awareness of their limitations or a recognition of the evolving nature of these competencies in dynamic healthcare environments.

The need for situational adaptability was also a recurring theme, consistent with respondents’ descriptions of shifting between directive leadership in acute situations and collaborative leadership in routine practice. Teaching situational leadership, through case-based learning and high-fidelity simulations, could better prepare students to modulate their leadership style depending on the clinical context. Professionals also emphasized the role of lifelong learning in leadership development. Unlike students, who often perceive leadership as a skill to be developed during formal education, professionals described it as a continuous process, shaped by experience, reflection, and adaptation. Integrating lifelong learning principles into medical education, such as maintaining awareness of evolving best practices and fostering strategic thinking, could better prepare students to grow into leadership roles over the course of their careers.

Physician leadership is critical in clinical settings, yet physicians-in-training rarely receive formal education in leadership despite frequently being placed in roles that require managing clinical teams or overseeing resuscitation efforts. Dine et al. highlight four essential domains of effective physician leadership: team management, vision-setting, communication, and personal attributes, emphasizing the need to develop structured leadership training programs tailored to the unique demands of medical practice (Dine et al. 2011, 31-36, while Frich et al. point to the ability of such training to enhance leadership capabilities significantly (Frich et al. 2015, 656-674). Similarly, Hopkins et al. (Hopkins, 2015, pp.556-84) highlight that equipping medical professionals with both technical and interpersonal skills, such as risk management and conflict resolution, is critical to fostering effective healthcare leadership.

The discrepancies between self-assessed competence and the perceived relevance of skills highlight the need to better align medical education with the realities of professional practice. Technical and administrative competencies, such as 'managed care', 'investment principles', and 'coding and billing', were consistently rated as important but showed the largest gaps in self-reported competence, suggesting these areas may be underemphasized in traditional curricula. Incorporating experiential learning opportunities that mirror real-world scenarios can help bridge this gap, ensuring that training prepares students for the demands they will encounter in practice. As Blumenthal et al. (Blumenthal, 2012, pp.513-22) emphasize, structured leadership development initiatives can strengthen team management and decision-making abilities, ultimately contributing to improved patient care and outcomes.

The alignment in the valuation of ethical and interpersonal skills underscores their foundational importance in healthcare leadership. Previous research supports this view, demonstrating that the integration of professionalism and integrity into medical education fosters a shared understanding between students and practitioners of the critical role these qualities play in effective collaboration and leadership (Swick, 2000). Several interpersonal and ethical skills, such as empathy, ethics, integrity, and planning, were consistently rated highly in both relevance and self-reported competence across both groups. These findings suggest that such competencies are well-integrated into both educational programs and professional practice, representing a shared understanding of their foundational role in effective leadership and collaboration. Interestingly, professionals frequently rated themselves less competent than students in areas where they simultaneously rated the skill as more relevant (e.g., conflict resolution, risk management, negotiation, and decision making). This may reflect a greater awareness of the complexity and challenges associated with these competencies in real-world settings, or a more calibrated self-assessment informed by experience. However, the lower self-perceived competence reported by professionals in areas such as conflict resolution and decision-making likely reflects the nuanced and context-dependent nature of these skills in real-world scenarios, where experience and sound judgment are vital. A particular focus on communication, empathy, and inclusivity highlights how these interpersonal and ethical skills contribute to building trust and promoting cohesive teamwork in healthcare environments. Embedding ethics and professionalism into medical curricula from the outset helps cultivate these qualities early, establishing shared values and preparing graduates to navigate complex ethical dilemmas they will face in practice (Swick, 2000). Consequently, leadership education should not only continue to emphasize these core attributes but also address gaps in operational skills, such as resource management and systems thinking, that professionals identified as essential to effective leadership but were less valued by students. By balancing the development of ethical foundations with practical, operational competencies, healthcare education can better prepare future leaders to meet the multifaceted demands of modern healthcare systems.

The differences in how students and professionals perceive effective leadership in the medical profession highlight the importance of aligning leadership training with real-world expectations. While both groups emphasized foundational skills such as communication, teamwork, empathy, and ethics, professionals placed greater focus on system-level thinking, strategic vision, and addressing organizational challenges, all of which are critical aspects of effective healthcare leadership. These differences underscore the need for leadership curricula to extend beyond interpersonal skills and immediate team dynamics to equip students with the operational and strategic competencies required for real-world practice.

Students reported higher competence than professionals only in selected administrative domains, most notably ‘managed care’, despite rating its overall relevance lower. This pattern may suggest an overestimation of preparedness in areas where their practical exposure is limited. In contrast, professionals rated themselves higher in the majority of skills, including ‘decision making’, ‘time management’, and ‘communication’, reflecting a potentially more calibrated self-assessment informed by real-world experience. These findings underscore the importance of incorporating reflective practices and experiential learning opportunities, such as live simulations, case-based tasks, or shadowing programs, to help students develop a more realistic understanding of leadership and administrative competencies. Structured feedback and performance-based assessments, such as Objective Structured Clinical Examinations (OSCEs), could further support students in refining their self-perceptions and bridging the divide between perceived competence and actual preparedness.

The recurring theme of situational leadership from respondents’ perspectives reinforces the importance of adaptability in modern healthcare leadership. Both groups noted the variation between directive leadership needed in emergencies and collaborative leadership preferred in routine operations. Teaching situational leadership through case-based learning and high-pressure simulations can prepare students to adapt their leadership styles to different contexts, improving their effectiveness in both immediate and long-term decision-making.

Professionals also highlighted the necessity of lifelong learning for effective leadership. While students perceived leadership as a skill to be developed early in training, professionals recognized it as a continuous process that evolves in response to changing healthcare landscapes. Incorporating lifelong learning principles into leadership programs, such as staying updated on research and healthcare advancements, can prepare students to succeed as leaders in both clinical and organizational contexts. Additionally, introducing strategic thinking and macro-level planning into leadership curricula could help students understand the broader implications of their roles within healthcare systems.

5.1 Practical implications

To better prepare future healthcare leaders, educational programs should focus on improving the alignment between students’ perceptions of competence and the realities of professional practice. This could be achieved by:

- **Highlighting practical relevance:** Undervalued domains, especially technical and administrative competencies, should be more clearly linked to their importance in clinical and organizational settings.
- **Providing experiential opportunities:** Leadership education should incorporate simulations, clinical placements, and project-based learning that reflect real-world complexity.
- **Encouraging critical self-reflection:** Structured reflection, mentorship, and feedback mechanisms can help students develop more accurate self-assessments and recognize the multifaceted nature of leadership roles.

While this study focuses on self-reported perceptions, which constitute an important subjective measure, the inclusion of third-party evaluations or performance-based assessments in future research could yield a more objective understanding of competence gaps. Tools such as Objective Structured Clinical Examinations (OSCEs), or case simulations and 360-degree feedback could provide a more robust understanding of competence gaps and a more rigorous evaluation of leadership competencies. Moreover, incorporating longitudinal studies to track skill retention and career outcomes would provide deeper insights into the impact of these educational interventions.

5.2 Broader considerations

These findings contribute to the growing recognition of the need to re-examine how leadership training is integrated into medical education. Leadership competencies should be introduced early and built progressively throughout training. International initiatives, such as the NHS Leadership Academy and frameworks developed by the Institute of Medicine, highlight the global relevance of leadership in improving health system performance (Institute of Medicine, 2004, and NHS Leadership Academy

model). International studies, such as Maddalena's work on undergraduate leadership training (Maddalena, 2016, pp.348-51), demonstrate how adaptable and effective leadership programs can be across diverse educational and healthcare contexts. To ensure that future healthcare professionals are equipped to meet the demands of increasingly complex systems, leadership education must go beyond interpersonal communication and team dynamics to include systems thinking, resource management, strategic planning, and change leadership. Standardizing these efforts across cultural and institutional boundaries will help ensure future healthcare leaders are equipped to address the evolving challenges of the profession.

6. Conclusions

This study highlights the subtle differences in how medical students and professionals perceive and assess competencies relevant to leadership in healthcare. Both groups consistently rated interpersonal and ethical attributes as highly relevant and areas of relative strength, underscoring their foundational importance in leadership development. At the same time, notable gaps emerged between the perceived relevance of skills and self-reported competence across most domains, with the largest discrepancies observed in technical and administrative areas. In some areas, students rated themselves more competent than professionals despite less real-world exposure, while in others, professionals reported higher competence, suggesting that workplace experience may foster more calibrated self-assessments. These findings underscore the need for leadership training that reinforces core interpersonal and ethical competencies and addresses underdeveloped technical and administrative skills. Incorporating experiential learning, practical scenarios, and reflective exercises into medical education may help bridge the gap between perceived preparedness and professional expectations. Future research using longitudinal designs and performance-based assessments would provide deeper insight into the effectiveness of such interventions, ensuring that graduates enter practice with both the ethical grounding and the operational competence required for modern healthcare leadership. By building on shared values while strengthening underdeveloped competencies, medical education can better prepare the next generation of physician leaders to navigate the complexity of healthcare systems with confidence, adaptability, and integrity.

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