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Developing leadership and patient management skills in imaging technicians/technologists and RTTs: education for active roles in the oncological care pathway

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Abstract
Oncology patients navigate complex care paths involving many professionals. Imaging technicians/technologists and RTTs are present at nearly every phase, from diagnostic imaging to simulation, treatment planning and delivery, yet their role is often viewed as purely technical. This raises critical questions: Are we training our students adequately during clinical practice? Are we preparing them for their real responsibilities in the oncology team? Are we guiding them beyond "the doctor said" toward: "we are here to do this, together"? This study explores the impact of targeted education on leadership and patient-centered competencies among imaging and radiotherapy students. A total of 204 students in Medical Imaging and Radiotherapy completed a focused training intervention over a three-month period, from April to June 2025. The program mapped the oncology care pathway and emphasized the decision-making role of non-physician professionals. Pre- and post-training evaluations included Likert-scale surveys and reflective assessments measuring factors that influence professional agency in clinical settings, like empathy, patient-centered awareness, professional identity, active role perception, readiness for clinical responsibility, confidence in interdisciplinary communication and understanding of shared leadership. Post-training, 86 % of students reported enhanced awareness of their clinical value. 74% had not previously viewed themselves as key actors in patient care. Findings emphasize the need for education beyond technical skills. Mentorship, role modeling, and supportive environments are essential to cultivate leadership and clinical agency. This study has shown that imaging technicians and RTTs are more than technical staff. Training must prepare them to lead with empathy, communicate purposefully, and support the patient journey. Educational priorities must evolve to empower them as decision-makers.
Keyword: shared leadership, mentorship, RTT, imaging technicians, patient-centered competencies
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Background

Oncology patients navigate complex treatments and often fragmented care pathways involving multiple healthcare professionals. Imaging technicians and radiotherapy technicians (RTTs) are present at nearly every phase, from diagnostic imaging to simulation, treatment planning, and treatment delivery, yet their role is still too often perceived as purely technical.

In practice, the oncology pathway involves a broad multidisciplinary team. For a single patient, the number of professionals involved can easily exceed 25, including oncologic surgeons, medical and radiation oncologists, radiologists, nurses, physicists, imaging and radiotherapy technicians, laboratory staff, physiotherapists, pharmacists, nutritionists, psychologists, and administrative coordinators. Among these, only a small fraction are physicians, while technical staff often carry the continuity of daily patient interaction. This creates an inherently fragmented care experience, in which non-physician professionals play a disproportionately large but often invisible role.

This imbalance raises critical educational questions: *Are we training students adequately during clinical practice? Are we preparing them for their actual responsibilities as part of the oncology team? Are we guiding them beyond "the doctor said" toward "we are here to do this together"?*

Despite the complexity of modern oncological care, undergraduate and postgraduate curricula for medical imaging and radiotherapy typically offer minimal or no dedicated oncology-specific modules. Technical education remains heavily procedure-oriented, focusing on image acquisition or treatment delivery, with limited emphasis on patient-centered communication, interdisciplinary collaboration, and clinical leadership.

This educational gap contributes to a passive professional identity: technicians often see themselves as executors of medical orders rather than active participants in patient care. In contrast, the patient experience shows how central they are. A single oncology patient may encounter at least nine different technicians throughout their diagnostic and treatment journey, including imaging technicians (MRI, CT, nuclear medicine, ultrasound) in the pre-diagnostic and pre-surgical phases, simulation and planning technicians during radiotherapy preparation, RTTs throughout treatment delivery, and additional technical staff involved in monitoring, follow-up imaging, and supportive care. From the first imaging appointment before diagnosis to the final radiotherapy session, these multiple encounters shape not only the accuracy of clinical processes but also the patient's sense of safety, trust, and support. Bridging this gap requires targeted educational interventions that strengthen leadership, communication, and patient management competencies, enabling imaging technicians and RTTs to contribute meaningfully to shared decision-making and coordinated care.

Objective:

This paper presents a structured educational intervention designed to strengthen leadership and patient-centered competencies among future imaging technicians and RTTs, enabling them to act as active contributors and not only executors in the oncological care continuum. Imaging technicians and RTTs are frequently the professionals that patients interact with most during their cancer journey. These repeated interactions position them uniquely to contribute to patient education, emotional support, and continuity of care. However, without proper training in leadership and patient management, their potential remains underutilized.

Empowering technical staff through targeted education can enhance team communication, patient experience, and ultimately, clinical outcomes. This aligns with modern models of shared leadership and interdisciplinary collaboration. Despite this, curricula often lack structured modules addressing these dimensions. This study explores the impact of a targeted educational intervention on leadership, patient-centered care, and professional identity among future imaging and radiotherapy students.

Materials and Methods:

In addition to standard curricula, which traditionally focus on technical and administrative aspects of patient management in medical imaging and radiotherapy technicians, this study introduced a leadership-focused educational component. While current modules at the participating faculties provide technical patient-handling training, they do not address clinical leadership or decision-making roles for technicians.

A total of 204 students in Medical Imaging and Radiotherapy (164 Bachelor's and 40 Master's) participated in this study over a three-month period, from April to June. The participants were enrolled from two faculties: the Medical Imaging program at the Faculty of Technical Medical Sciences, University of Medicine, Albania, and the Medical Imaging and Radiotherapy program at the the Faculty of Technical Medical Sciences, University of Aldent.

Both faculties provide patient management and administrative training. The Medical Imaging program at the the Faculty of Technical Medical Sciences, University of Medicine, includes imaging health management content but does not offer any oncology- or leadership-specific training. On the other hand, the Medical Imaging program at the the Faculty of Technical Medical Sciences, Aldent University provides students with training in patient administration and management procedures in Radiotherapy, however, neither of both faculties includes structured modules on clinical leadership. Building on this foundation, the intervention active training on "Leadership in Oncology Pathway for Technicians" integrated simulation-based scenarios, structured discussions on MDT (multidisciplinary team) dynamics, role-play exercises for informed patient handoff and case-based discussions to encourage technicians to act as informed clinical partners rather than passive technical executors. It emphasized clinical decision-making within technical procedures, alongside ethical reflection on communication (e.g., "Would I say this in the physician's absence?"). The approach aimed to strengthen leadership skills and clinical agency without altering existing clinical hierarchies.

The program consisted of structured sessions integrating leadership principles, oncology care pathway mapping, patient communication strategies, and reflective practice. Key components included:

- Mapping the oncology care pathway
- Role definition and shared leadership
- Patient-centered communication workshops
- Interprofessional teamwork exercises
- Reflective sessions on clinical identity and agency
- Conflict management and communication ethics
- Understanding leadership vs. management in oncology contexts
- Spoken consent and patient confidentiality
- Knowledge of legislation, ethics, and professional boundaries in radiotherapy

Pre- and post-training evaluations included Likert-scale questionnaires and reflective self-assessment essays. The following domains were measured:

- Empathy and patient-centered awareness
- Professional identity and active role perception
- Readiness for clinical responsibility
- Confidence in interdisciplinary communication
- Understanding of shared leadership
- Roles within the department
- Ability to handle case reports and conflict situations
- Knowledge about leadership, legislation, ethics, and patient confidentiality
- Enthusiasm to work in a radiotherapy team before and after shifting from passive to active roles.

Descriptive statistics were used to compare pre- and post-intervention scores, while qualitative reflections were thematically analyzed to identify shifts in professional perception and role ownership.

Results:

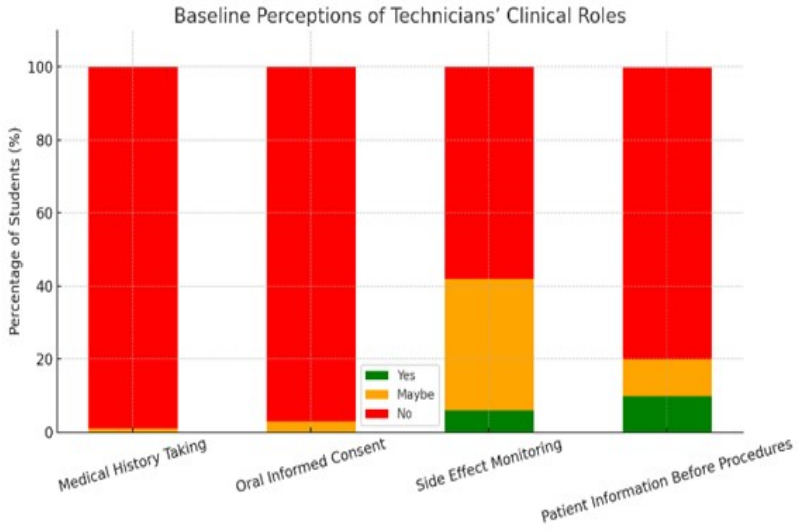
Before the educational intervention, a baseline questionnaire with “Yes,” “No,” and “Maybe” options was administered to assess students’ initial perceptions of the clinical role of technicians in oncology care. When asked whether it was the technician’s responsibility to take the patient’s medical history before any procedure, 202 students (99%) answered “No,” and only 2 students (1%) answered “Maybe,” emphasizing that this was considered a physician’s responsibility.

When asked whether technicians should obtain oral informed consent before imaging or radiotherapy procedures, 198 students (97%) answered “No” and 6 students (3%) “Maybe,” reasoning that written consent was the physician’s duty.

Regarding whether technicians should monitor and be informed about potential side effects, 118 students (58%) answered “No,” 12 students (6%) answered “Yes,” and 74 students (36%) answered “Maybe.”

When asked whether technicians should inform the patient before each procedure—including diagnostic or therapeutic steps, equipment movement, expected sensations, and how to communicate concerns during the session, 164 students (80%) answered “No,” 20 students (9.8%) “Yes,” and 24 students (10%) “Maybe.”

These findings reveal that prior to the leadership and communication-focused educational intervention, the overwhelming majority of students perceived themselves primarily as technical executors, with no active role in history taking, obtaining informed consent, managing side effects, or patient communication. This highlights significant gaps in professional training and the need to integrate explicit clinical and communication competencies into educational programs for imaging technicians and RTTs.

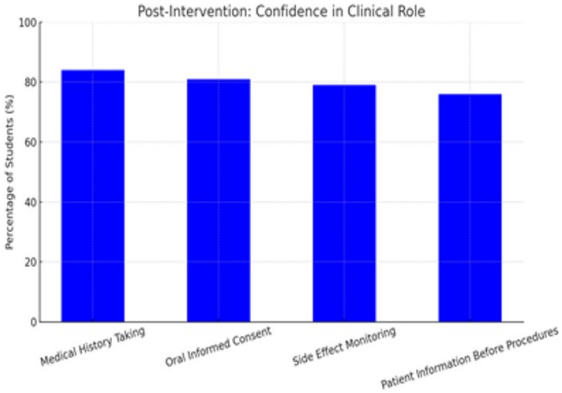


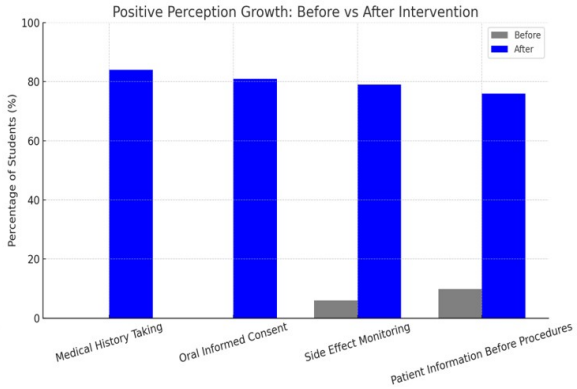
Post-intervention, the data indicate a clear shift in students' perceptions of their clinical role and responsibilities. When asked to self-assess their level of enthusiasm for taking an active role in patient history taking, 84% of students reported feeling "very confident" or "highly enthusiastic," compared to almost none at baseline. Similarly, 81% reported being confident in obtaining oral informed consent prior to each procedure, while 79% felt capable of informing patients and coordinating effectively with radiologists and radio-oncologists. In addition, 76% expressed confidence in communicating openly and documenting relevant clinical information such as patient history, condition, or complaints in the system.

The findings suggest that structured leadership education not only empowers technicians but also improves their clinical readiness, communication effectiveness, and their contribution to multidisciplinary decision-making and quality improvement in oncology departments. Post-training results have shown that 86% of students reported enhanced awareness of their clinical value following the intervention, compared to baseline perceptions. 74% indicated that prior to training they did not view themselves as key actors in patient management; however, after training, 68% reported feeling capable of contributing actively to patient care discussions. There was also a significant increase in enthusiasm to work within radiotherapy teams after the training, reflecting a shift from passive to active role perception. Students demonstrated a marked increase in self-reported confidence in patient interaction and interprofessional communication, with a clearer understanding of shared leadership models and their application in oncology care.

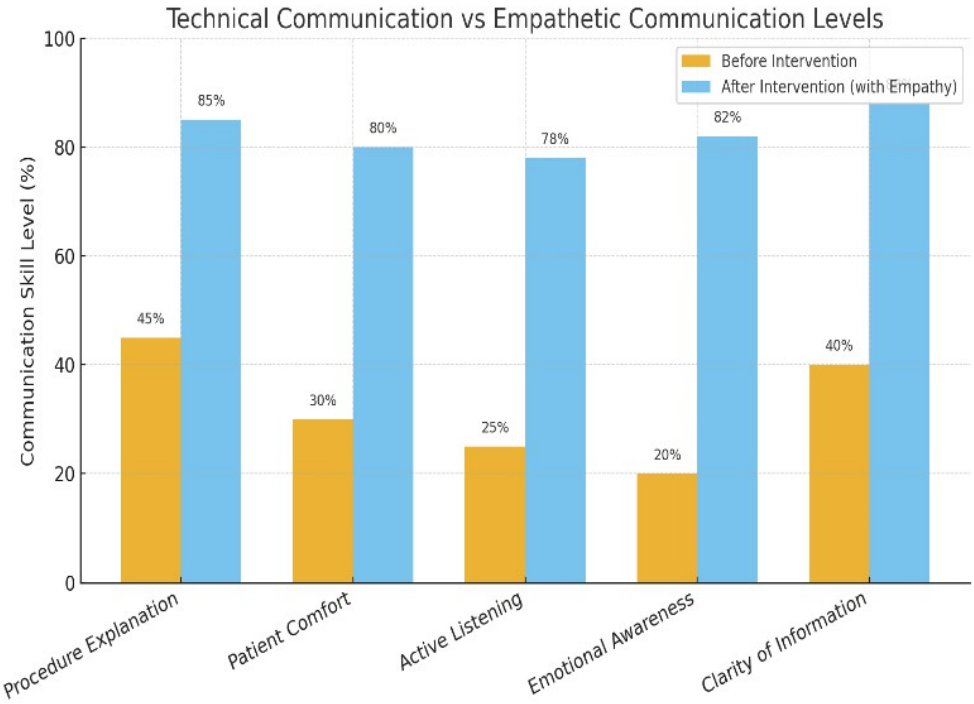
Students demonstrated measurable improvements in:
Conflict management skills and patient confidentiality awareness
Understanding the distinction between leadership and management in clinical practice
Confidence in communicating spoken consent

Knowledge of ethical and legislative frameworks specific to radiotherapy and oncology greater self-efficacy in contributing to team discussions. Empathy emerged as a central component of the leadership skills developed through this intervention. Empathy is not merely "feeling with" the patient, but understanding their perspective and communicating in a way that makes them feel hearable, safe, and supported. It is directly linked to the quality of clinical communication and patient safety. After the training, students reported greater confidence in empathetic communication, demonstrating a clearer understanding of the patient experience and recognizing the importance of explaining procedures with sensitivity and emotional awareness.





Their ability to engage with patients as people, not just "technical cases," but individuals facing fear, questions, and long-term uncertainty, increased significantly. Empathy acted as a bridge between technical tasks and clinical leadership, enabling technicians to foster trust, enhance patient safety, and model collaborative behavior within the multidisciplinary team. It also served as a positive driver for team dynamics, reflecting its value not only in patient care but also in interprofessional collaboration. Empathy levels were assessed through reflective self-assessments and Likert-scale questionnaires, which revealed measurable growth in students' communication confidence and emotional intelligence. These findings highlight empathy as a key leadership skill to be intentionally developed in oncology education for imaging and radiotherapy professionals.



The findings suggest that structured leadership education not only empowers technicians but also improves their clinical readiness, communication effectiveness, and their contribution to multidisciplinary decision-making and quality improvement in oncology departments. Students showed increased awareness of the gap between technical delivery and patient-centered care, highlighting opportunities for clinical improvement.

Discussion:

Traditionally, imaging technicians have been seen and have seen themselves as 'the ones who do what the doctor says.' However, oncology care requires coordinated leadership from all professional levels. Shifting from 'the doctor said' to 'we are here to do this together' represents not only a change in language but in mindset, communication, and clinical culture.

Technicians are often the first and last point of contact for patients, uniquely positioned at the intersection of technology, emotion, and care. Empowering them through education and supportive environments can transform fragmented care into connected, patient-centered care.

This short intervention demonstrated that leadership and communication training can significantly enhance the professional identity and agency of imaging technicians and RTTs. By reframing their role from technical executors to active contributors, we address a crucial gap in oncological care delivery. The collected data reflect a shift in mindset, students recognized themselves not only as operators but as essential links in the patient care chain. This is particularly important in oncology, where continuity of care and patient trust are critical for treatment adherence and well-being.

Moreover, mentorship and supportive environments emerged as key factors. Leadership development should not be limited to senior clinicians; it must be embedded throughout the health workforce. Structured education can foster interdisciplinary respect, improve communication flow, and contribute to a culture where technical professionals feel empowered to participate in decision-making processes.

The absence of structured oncology leadership modules in standard curricula for imaging and radiotherapy technicians reflects a broader gap in professional education. While somehow administrative and ethical regulations are covered, students are rarely trained to exercise clinical agency, communicate effectively in interdisciplinary settings, or recognize their potential leadership roles in the patient pathway. Introducing targeted leadership training not only improved students' perception of their clinical value but also addressed the emotional and organizational disconnect often experienced by patients and teams. Such modules can bridge the gap between technical proficiency and clinical participation.

It is important to note that this study was conducted over a relatively short time frame, with a limited target group and in the absence of a dedicated leadership module. The training was designed as an add-on to the existing curriculum, providing supplementary knowledge on radiotherapy and the role of technicians in oncology care. Further and more in-depth research is needed, ideally embedded within dedicated curricular structures, to better assess the long-term impact and scalability of such leadership training interventions.

Conclusion:

Technical staff are not only machine operators but essential members of the oncology team. Their continuous presence throughout the oncology pathway places them in a unique position to influence patient care, communication, and overall system efficiency. Given that a single oncology patient may interact with multiple technicians from pre-diagnostic imaging to treatment completion, strengthening their leadership and communication skills is essential to ensure coordinated, patient-centered care. In healthcare, leadership is expressed through initiative, influence, and clinical responsibility, even for secondary professionals who may not hold formal managerial titles.

This study demonstrates that leadership is not the sole responsibility of physicians, it occurs at every level of the team. Oncological care is complex and requires close interprofessional collaboration and shared leadership. When technicians are empowered, clinical decision-making becomes more efficient, and patients receive better, more coordinated care. Empowering imaging technicians and RTTs means shifting from "silent contributors" to recognized collaborators, decision-makers, and clinical leaders within multidisciplinary oncology teams. Strengthening their leadership role is not only an investment in professional growth, it is a direct investment in improving the quality and humanity of cancer care. Training programs and educational systems must evolve to prepare these professionals to lead with empathy, communicate purposefully, and actively support the patient journey. This requires curriculum reform, mentorship integration, and institutional commitment to embed leadership and clinical agency in professional formation. Leadership and patient management competencies are no longer optional but necessary for delivering safe, empathetic, and structured oncological care.

Conflict of interest statement: This study has no conflicts of interest with third parties or financial interests. Although the study aims to evaluate leadership among students in imaging and radiotherapy technicians/ technologists, it is not sponsored by either of the two faculties where the research was conducted, nor will it favor any of them in any way.

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