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RESEARCH ARTICLE

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Physiotherapists' training in oncology rehabilitation from entry-level to advanced education: A qualitative study

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Abstract

Background and Purpose: Physiotherapy is gaining a central role in oncology. However, the training and competencies needed by physiotherapists in oncology rehabilitation are still unclear. This study aims to articulate the training trajectory of physiotherapists in oncology rehabilitation from entry-level education to advanced education degrees.

Methods: Qualitative focus group study following a 'Reflexive Thematic Analysis' for data analysis. Participants were Italian physiotherapists with expertise in Oncology Rehabilitation (either clinically or academically) and Physiotherapy Bachelor of Science (BSc) course leaders, selected through purposive sampling.

Results: Two focus groups were conducted with 14 participants. Six themes were developed: 1. 'Entry-Level Education in Oncology Rehabilitation: Let's Have a Taste', as the BSc introduces oncology rehabilitation. 2. 'Basic Knowledge: Building up the Library' as students acquire basic knowledge on oncology rehabilitation during their BSc; 3. 'Learning by Experience: The Relevance of the Placement' to answer the question "Is this the right road for me?"; 4. 'Clinical Reasoning and Competencies in Oncology Rehabilitation Embedded in Uncertainty' because oncology physiotherapists need to deal with the uncertainty of their patients' status; 5. 'Advanced Education Degree Skills: from Appetiser to the Main Course', as advanced education degree courses allow for becoming an expert in the field; 6. 'A Call to Action for Physiotherapists: Prevention—Diagnosis—Survivorship & End of Life', to realise their critical role in all the phases of the oncology path.

Conclusions: The BSc in Physiotherapy provides a foundation for future physiotherapists to understand oncology rehabilitation, but advanced education is necessary for expertise. The findings of this study have important implications for creating a shared physiotherapy curriculum in oncology rehabilitation.

Gianluca Bertoni and Valentina Conti these two authors contributed equally.

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Implication for Physiotherapy Practice: This study has significant implications for improving physiotherapy curricula in oncology rehabilitation, positively impacting the skills and competencies of practitioners in this paramount field.

KEYWORDS

curriculum, neoplasms, physical therapy, teaching

1 | INTRODUCTION

Cancer is a leading cause of death and an obstacle to increasing life expectancy (Sung et al., 2021). Globally, new cancer cases were estimated at 19.3 million in 2020, and survivors of cancer were roughly 25 million in 2008, with a trajectory to 75 million by 2030 (Hofmarcher et al., 2020). Among those who survive cancer, about 40% experience long-term physical, cognitive, and psychological side effects due to cancer sequelae and treatments (e.g., pain, fatigue, anxiety and depression), with a negative impact on health-related quality of life (HRQoL) and social participation (Magasi et al., 2022).

Physiotherapy is gaining a prominent position in managing people with cancer and survivors of cancer due to its positive effects on individuals' prognosis and symptoms (Rogers et al., 2023; Tan et al., 2022). In the past, physiotherapy assumed secondary importance in the care of people with cancer because the rapidly worsening course of this disease left little opportunity for rehabilitation (Smith et al., 2020). Currently, thanks to the improvements in cancer care, the management of oncological diseases can not only be oriented towards *quoad vitam* prognosis but also towards achieving the best possible HRQoL, compatible with the consequences of the disease (Schieron M.P., 2017). Therefore, early rehabilitation interventions are necessary, and we should argue about what training and skills physiotherapists require in oncology (Stuiver et al., 2019). Before delving into the description of oncology rehabilitation in Physiotherapy higher education, it is essential to establish the terminology used in this paper, considering the variations in educational systems worldwide. In this context, we will adopt the term 'entry-level education' to denote the minimum level of educational attainment typically required for entering a specific profession or field or being included in the registry of the regulatory body, which, in the case of physiotherapy generally corresponds to a Bachelor's degree or a Doctor of Physiotherapy. Conversely, we will use the term 'advanced education degrees' to refer to educational programmes or courses offering a higher level of difficulty, specialisation, or depth than entry-level education, such as Master's or doctoral degrees.

Entry-level courses in Physiotherapy should provide basic knowledge in detecting and managing the most frequent cancer-related symptoms. Furthermore, the US Institute of Medicine identified the need for advanced oncology education and oncology training for healthcare professionals (Levit et al., 2013). In response to this demand, various healthcare professional associations, such as the American Physical Therapy Association (APTA), have developed resources to address the advanced speciality practice in cancer

rehabilitation, such as the 'Description of Specialty Practice: Oncologic Physical Therapy' (Specialty Council on Oncologic Physical Therapy, 2016). This document is based on comprehensive research, including survey data and expert input. In Canada as well, the Canadian Council of Physiotherapy University Programmes has produced guidelines for oncological curriculum (Canadian Council of Physiotherapy University Programs, 2019). However, in Europe, countries like Italy lack such a document and specialisation course in cancer rehabilitation. Considering the different healthcare and education systems worldwide, it is possible to argue that it is not possible to generalise the finding of the abovementioned American document in other contexts (e.g., Europe). Moreover, Italian entry-level education courses in Physiotherapy have yet to draft a standard curriculum in oncology rehabilitation. Nevertheless, in Italy, oncology diseases represent a high burden, with over 1000 new cancer cases diagnosed daily (Associazione Italiana di Oncologia Medica, 2021). To fill these gaps, our qualitative focus group study aims to articulate the training trajectory of physiotherapists in oncology rehabilitation from entry-level to advanced education degrees by gathering the opinions of clinical and academic experts and course leaders. By doing so, this study might be informative for the creation of a future shared curriculum in oncology rehabilitation for entry-level education and documents and courses focusing on the acquisition of specific knowledge, tasks, and roles relevant to an advanced speciality practice in cancer rehabilitation in countries whose healthcare and education systems are similar to the Italian one.

2 | METHODS

2.1 | Study design

The authors conducted a qualitative focus group study. Qualitative research is the most effective method for gathering experts' opinions (Moser & Korstjens, 2017). A Focus group is the ideal methodological tool to foster the development of peer support: the group can help explore and clarify the views of the individual more quickly than in an individual interview (Kitzinger, 2007). The study was performed in respect of the Declaration of Helsinki and reported following the Consolidated Criteria for Reporting Qualitative Research (COREQ) (Tong et al., 2007). Ethical approval was obtained from the Ethics Committee for University Research, University of University of Genova (Approval date: 19/05/2022; CERA 2022.32), and informed consent was obtained.

2.2 | Participants

Study participants were recruited through purposive sampling (Campbell et al., 2020). Specifically, the participants in this study were carefully selected to include a range of perspectives on oncology rehabilitation. We had Italian physiotherapists with clinical and academic expertise in the field and course leaders (i.e., those responsible for the overall management and administration of a specific course or programme) from Bachelor of Science (BSc) in Physiotherapy programmes. To be considered experts and participate in the focus groups, the participants must have at least 5 years of continuous experience in oncological rehabilitation and possess advanced education degrees and training. All participants held advanced degrees ranging from a Master's to a PhD. We wanted to ensure that the voices of those working directly with patients with oncological diseases and those shaping the education and training offered to physiotherapists were represented. Participants were contacted via email and sourced through universities, oncology facilities, personal networks, and snowball sampling, with eligibility determined by analysing their professional backgrounds. Then, participants were selected primarily through the analysis of their curricula. VC conducted the curriculum analysis. VC is a physiotherapist and identifies herself as a woman. VC has more than 5 years of clinical experience in oncological rehabilitation, and she is a temporary lecturer in oncological and palliative rehabilitation at the BSc in physiotherapy at the University of Milano Bicocca (Milan, Italy). Once VC identified the eligible participants, she recruited them by email. The email read the purpose of the study, how the

research would be conducted (e.g., through focus groups), and the confidentiality and anonymity of the data. Informed consent was sent as an attachment. Each focus group consisted of 6–8 participants, equally divided by gender and professional role: clinicians, academics, and course leaders. Each focus group lasted between 1 and 2 h.

2.3 | Data collection

An open-question-based focus group guide (Table 1) was constructed, based on existing literature on cancer rehabilitation (Mayer & Engle, 2022; Schieron M.P., 2017), by physiotherapists experienced in oncology rehabilitation (GB and VC) and a physiotherapist and a psychologist experienced in education and qualitative research (SB and IC). GB is a physiotherapist and a PhD student at the University of Genova (Genova, Italy). GB has more than 10 years of clinical experience in oncological rehabilitation, and he is a temporary lecturer in oncological and palliative rehabilitation at the BSc in Physiotherapy at the University of Brescia (Brescia, Italy). SB is a physiotherapist, PhD in Neurosciences and PhD in Medical Science, Research Fellow at the University of Genova (Genova, Italy) and temporary lecturer in 'Teaching Methodology for Healthcare Professionals' at the University of Verona (Verona, Italy). IC is a psychologist with a PhD in social psychology and a post-doc research fellow at the University of Genova (Genova, Italy). IC identifies as a woman; SB and GB identify as men. SB and IC are trained in qualitative methodologies with proficiency in conducting qualitative

TABLE 1 Focus group guide.

Questions	
1.	Could you describe in three words/adjectives the role of physiotherapy in oncology?
2.	What are the strengths and weaknesses of including an oncology rehabilitation course in BSc in 'physiotherapy'?
3.	In your experience, what knowledge do physiotherapists obtain in oncology rehabilitation after finishing the BSc programme? What do they not receive? What, instead, should be the basic knowledge needed to perform this role?
4.	In your experience, what competencies do physiotherapists obtain in oncology rehabilitation after finishing the BSc degree programme? What do they not receive? What basic skills should be needed to perform this role?
5.	If a student wanted to specialise in oncology rehabilitation to become a clinically skilled professional, what knowledge do you think they should have in oncology rehabilitation? Which ones do they not obtain? What, instead, should be the advanced knowledge needed to fulfil this role?
6.	In your experience, what competencies do physiotherapists obtain in oncology rehabilitation in an advanced education degrees? What do they not receive? What, instead, should be the advanced competencies needed to perform this role?
7.	In light of your considerations, what are the main differences in the competencies required in entry-level education versus those required in advanced education degrees?
8.	What suggestion(s) would you give to a student and/or professional approaching the world of oncology rehabilitation?
9.	Does anyone want to add other aspects that have not been mentioned?

studies. They provided the other authors with all the necessary training to perform this study.

We used a semi-structured protocol to conduct the focus groups. For each thematic area to be explored, we formulated stimulus questions to encourage dialog and discussion among participants, ultimately aiming to answer our research question. The guide was also reviewed by two patients who underwent oncology rehabilitation to grant patients' perspective in our research (Battista et al., 2022; Rolfe et al., 2018). Finally, a pilot interview was conducted with a lecturer in oncology rehabilitation to test the guide's relevance and understandability. The individual involved in the pilot interview was a male physiotherapist who has been working in oncological and palliative rehabilitation for 15 years. Additionally, he has taught 'Rehabilitation in Oncological and Palliative Care' for the past five academic years in a BSc in Physiotherapy at the University of Brescia. The focus groups were conducted online with only the moderators and participants. The software used for the focus groups was Microsoft Teams. Three moderators (SB, GB and VC) were present during the focus groups. No close relationships were established before the study between the focus group moderators and the participants. No follow-up focus groups were performed. The focus groups were recorded and transcribed verbatim. The transcription was obtained through the software's automatic transcription feature and checked for precision and accuracy by GB and VC by comparing the transcription to the audio recording. The recordings were preserved in a secure database and deleted after data transcription. While conducting the interview, GB anonymised the participants as 'Participant 1', 'Participant 2', etc., according to the chronological order of the interviews. This label is the only information shared with the rest of the group. Analysis of the collected data was carried out after focus group transcription.

2.4 | Data analysis

We collected information related to participants' gender, age, geographic origin, and professional role. Data analysis was performed according to the principles of Braun's and Clark's 'Reflexive Thematic Analysis' (RTA) (Braun & Clarke, 2021b). This choice was made because the research aims to identify patterns of meaning - and consequently themes - relating to the role of physiotherapists in oncology, focusing on knowledge and competencies expected from entry-level education to advanced education degrees (Ayre & McCaffery, 2022). Reflexive Thematic Analysis' is an interpretive approach to qualitative data analysis "that facilitates the identification and analysis of patterns or themes in a given data set" (Braun & Clarke, 2021a, 2021b). Reflexive Thematic Analysis' is situated in a 'Big Q' qualitative paradigm characterised by adhering to a non-(post)positivist paradigm (Braun & Clarke, 2023). Thus, some practices do not apply to RTA (e.g., consensus coding, inter-coder reliability, data saturation, member checking etc.) as they are infused "with assumptions about the nature of reality and meaningful knowledge" that follow a 'small q' (postpositivist) paradigm (Braun,

V., & Clarke, 2021; Braun & Clarke, 2019). Besides, RTA is characterised by researchers' active and creative role in interpreting codes and themes, becoming a resource to tap into rather than a bias (Braun, V., & Clarke, 2021). In our study, RTA was primarily conducted with an inductive approach: codes for focus group analysis were produced based on the content of the data (Byrne, 2022). From the perspective of epistemological conception, our study has adopted a constructionist approach as we appreciated meaning and meaningfulness as the main criteria in the coding process (Byrne, 2022). In the focus group analysis, the reflections on knowledge and competencies needed by the oncology rehabilitation physiotherapist were prioritised to answer our research question. An experiential orientation was used in the analysis of this study. This lens considered participants' thoughts, experiences, and feelings as a reflection of their personal states (Byrne, 2022). The data coding was mainly semantic as we do not think we always went beyond the explicit or surface meanings of the data (Braun & Clarke, 2021b). Thus, the six steps of the RTA were followed for the focus group analysis (see Table 2) (Braun & Clarke, 2021b). No software was used to assist the coding process.

3 | RESULTS

Two focus groups were conducted in July and September 2022 with 14 participants (Age: 43 ± 10 ; 43% Men $N = 6$; 57% Women $N = 8$, Table 3). Of the participants, three were clinicians, seven were clinicians and lecturers, and four were course leaders. All the contacted participants accepted to participate in the study. From the analysis of the focus groups, six themes were developed (see Table 4 for the coding process and quotations). According to our participants, these themes represent the journey that a student needs to take from entry-level education to advanced education degrees to become a physiotherapist experienced in oncology rehabilitation: 1. 'Entry-Level Education in Oncology Rehabilitation: Let's Have a Taste'; 2. 'Basic Knowledge: Building up the Library'; 3. 'Learning by Experience: The Relevance of the Placement'; 4. 'Clinical Reasoning and Competencies in Oncology Rehabilitation Embedded in Uncertainty'; 5. 'Advanced Education Degree Skills: from Appetiser to the Main Course'; 6. 'A Call to Action for Physiotherapists: Prevention—Diagnosis—Survivorship & End of Life'.

4 | THEME 1: 'ENTRY-LEVEL EDUCATION IN ONCOLOGY REHABILITATION: LET'S HAVE A TASTE'

All participants agreed on the importance of including the 'Oncology Rehabilitation' course in the BSc of 'Physiotherapy' to allow the students to "know in order to choose" whether to master this subject in the future. Oncology rehabilitation is crucial in the BSc as our participants see it as "a road not for everyone". Dealing with people whose disease can have a fatal destiny can be burdensome.

TABLE 2 Six steps of the Reflexive Thematic Analysis' (RTA).

Phases	Process	Authors' involvement	Authors' actions
1) Data familiarisation	All authors read and reread several times the transcriptions of the focus groups. This process is fundamental to getting in contact with the data and taking notes of any insights.	All authors engaged in this phase, and they met to reflect upon their first insights	Document theoretical and reflective thoughts: VC documented field notes ("Memos" and diary) during and after each focus group to promote reflexivity. Keep records of all data field notes, transcripts, and reflexive diary Prolong engagement with data and triangulate different data collection modes to increase the probability that the research findings and interpretations will be found credible: VC e GB read and reread the data (transcripts of the focus groups, memos and reflexive diary)
2) Coding	In this phase, two researchers systematically coded the data through an open, evolving and organic process.	VC and GB systematically coded the data. They adopted semantic data coding.	Peer debriefing: Memos were shared during research meetings for reflexive thoughts. Audit trail of code generation: VC and GB coded data through the entire data set to identify interesting aspects in the data items that may form the basis of themes across the data set. Documentation of all team meetings and peer debriefings to help researchers examine how their thoughts and ideas evolve as they engage more deeply with the data
3) Generating initial themes	The researchers generated initial themes from the codes, clustering similar or related codes.	VC and GB generated initial themes separately, clustering similar codes together.	Diagraming to make sense of theme connections: VC and GB generated initial themes through deductive thematic analysis.
4) Reviewing and refining themes	The researcher reviewed the initial themes, reworking or discarding some until finding a final set of themes fitting the data.	All authors reviewed the coding and initial themes separately and then jointly and generated six themes that fit the data the most. VC and GB reviewed the agreed themes against the codes and the entire dataset.	Themes vetted by team members: The research team frequently met to refine the themes and clearly show how each theme was derived from the data.
5) Defining and naming themes	The 'story' of each theme is developed by finalising theme names and their definition.	All authors finalised the final themes and definitions to set the basis of the written report	Peer debriefing and team consensus on themes: The research team met until the final themes were reached. Documentation of theme naming.
6) Producing the report	The authors produced the final report and refined them if necessary.	VC and GB selected the illustrative quotations from the interviews, and all authors reviewed and agreed. SB and VC led the writing of the paper, and all authors participated in this phase.	Producing the report using direct quotes from participants. Report on reasons for theoretical, methodological, and analytical choices throughout the entire study.

TABLE 3 Descriptive statistics.

Participant	Age	Gender	Educational level, professional role	Region
1st focus group (Jul 2022)				
P1	54	Woman	BSc, clinical expert	Liguria
P2	34	Man	MSc, clinical expert	Lombardy
P3	38	Man	MSc, clinical expert	Lombardy
P4	29	Woman	MSc, clinical expert and lecturer	Veneto
P5	40	Woman	MSc, clinical expert and lecturer	Lombardy
P6	30	Woman	MSc, clinical expert, lecturer and researcher	Emilia-Romagna
P7	60	Woman	PhD, course leader	Lombardy
P8	51	Woman	MSc, course leader and researcher	Emilia-Romagna
2nd focus group (Sep 2022)				
P9	53	Man	BSc, clinical expert and lecturer	Liguria
P10	35	Man	BSc, clinical expert and lecturer	Trentino Alto Adige
P11	37	Woman	BSc, clinical expert and lecturer	Liguria
P12	53	Man	MSc, clinical expert and lecturer	Lombardy
P13	53	Woman	MSc, course leader	Liguria
P14	40	Man	MSc, course leader and researcher	Lombardy

Legend: P, participant; BSc, Bachelor of Science; MSc, Master of Science; PhD, Doctor of Philosophy.

Therefore, an individual propensity to it is necessary. However, they highlighted that entry-level education in oncology rehabilitation could only be a taste of how to become an oncology physiotherapist. They reported the presence of a university system based on a rigid didactic plan where it is impossible to go into detail on a topic due to organisational problems, as introducing new topics or more hours for one course involves sacrificing something else. However, how to build up this knowledge "library" is explained in Theme 2.

5 | THEME 2: 'BASIC KNOWLEDGE: BUILDING UP THE LIBRARY'

The library involves basic knowledge and understanding of the course. According to our participants, it is necessary to provide students with notions related to major oncological diseases of rehabilitation interest (e.g., breast, lung, and urogenital). Therefore, explaining the side effects and consequences of oncology therapies (e.g., chemotherapy, radiation therapy, and immuno-oncology) and surgery is essential. From the rehabilitation point of view, it is fundamental for students to know the concept, treatments and characteristics of oncologic fatigue and pain. Oncologic pain must be considered from the acute phase to the end of life (palliative therapies).

Moreover, students need to understand how to make a differential diagnosis once assessing the nature of pain in a patient. That is why it is vital to illustrate the main red flags of cancer pathology in entry-level education. Besides, it was highlighted that students must know how to manage people with bone metastasis characterised by

bone fragility, increasing the risk of fractures. To do so, it is fundamental to provide students with knowledge of aids such as braces and corsets for patients. According to our participants, proper lymphedema management requires many practical skills that might be difficult to master during a BSc. Finally, they highlighted how students must have direct contact with people with cancer to practice this knowledge ("It's one thing to explain, and another to see."). To do so, a placement in oncology rehabilitation is fundamental, and this topic generated Theme 3.

6 | THEME 3: 'LEARNING BY EXPERIENCE: THE RELEVANCE OF THE PLACEMENT'

The progression from knowledge to competencies is fostered through clinical placement. Participants emphasised the importance of students assisting these patients' treatment. According to the participants, placement is essential to help students to confirm or not the idea they have about oncology rehabilitation. Through the placement, the student should gain the necessary experience to answer the question, "Is this the right road for me?". Moreover, participants outlined the importance of the placement for students to understand their ability to handle the emotional burden resulting from their relationship with people with oncological diseases. However, the management of these patients is characterised by an uncertain future that is difficult to predict. Therefore, learning to deal with uncertainty while reasoning upon patients' treatments is fundamental, as reported in Theme 4.

TABLE 4 Defined codes for the generated themes.

Theme 1: Entry-Level Education in Oncology Rehabilitation: let's have a taste

Codes defined by the researchers	Example of quotes extracted from the focus groups
Knowing to choose	"Oncology rehabilitation is important to give students a chance to get curious, to find out there's a whole world out there and see if it's something they'd like to dig into in the future". (P12, man, 53, clinical expert and lecturer)
A road not for everyone	"Handling oncology patients is a personal thing". (P5, woman, 40, clinical expert and lecturer) "These patients are constantly facing an uncertain future, always with a figurative sword hanging over their heads". (P4, woman, 29, clinical expert and lecturer)
Necessity to receive a training in oncology rehabilitation	"Today we can't even fathom the idea of graduating a student without these [oncology rehabilitation] skills. Oncological diseases are everywhere". (P7, woman, 60, course leader)
The importance of the clinical lecturer	"When it comes to picking a lecturer for an oncology rehab module, it's key they've got recent clinical experience. They can't just be a book smart lecturer, the clinical side is just as important. The lecturer needs to bring that expertise to the students". (P4, woman, 29, clinical expert and lecturer)
The rigidity of the teaching plan	"In a BSc, if we add something, we got to cut something else. [...] I always say when someone comes up with a good idea in didactic council, it doesn't matter if it's oncology or not, the question is what are we willing to give up?" (P8, woman, 51, course leader and researcher) "The university gives the students the library, it's up to them to stock it up with the reads they crave!" (P7, women, 60, course leader)

Theme 2: Basic knowledge: Building up the library

Codes defined by the researchers	Example of quotes extracted from the focus groups
Definitions and objectives of oncology rehabilitation	"We discuss two main areas in cancer rehab: Functional and palliative. We cover when and how the PT fits into pre- and post-surgery rehab, and what they do in the palliative stage of disease." (P6, woman, 30, clinical expert, lecturer and researcher)
The main oncological diseases	"We educate students on the types of cancer patients a physiotherapist may work with, like those who had breast, chest, head and neck, prostate, or uterine cancer surgeries." (P10, man, 35, clinical expert and lecturer)
Catheters & vascular accesses	"I tell students about managing "tubes" in the home setting, since they may not encounter them elsewhere. This is especially important for those who haven't had an ICU internship". (P2, man, 34, clinical expert)
Mobilisation and metastases	"I emphasise the importance of explaining joint end-stroke management with bone metastases and setting a treatment threshold for exercise because they have energy that needs to be spent". (P2, man, 34, clinical expert)
Knowing the side effects of oncology therapies	"I aim at educating students on the treatments and outcomes (expected and unexpected) that patients with cancers may experience". (P10, man, 35, clinical expert and lecturer)
Managing fatigue	"We highlight the impact of oncologic fatigue, which is cross-cutting and affects all cancers. There's a lot that physiotherapists can do, based on what's in the literature". (P6, woman, 30, clinical expert, lecturer and researcher)
The importance of differential diagnosis	"I would highlight the importance of knowing oncological pain". (P7, woman, 60, course leader) "It's crucial for students to know the warning signs, like unclear pain in a patient with a history of cancer. A back pain could be a metastasis". (P6, woman, 30, clinical expert, lecturer and researcher)
Proposal and management of aids	"The role of the physiotherapist in treating patients with bone metastases is crucial, including prescribing the necessary aids". (P9, man, 53, clinical expert and lecturer)

(Continues)

TABLE 4 (Continued)

Hints of lymphology	<p>"Lymphology is an important aspect too. We cover the anatomy of the lymphatic system, how it operates in non-cancer patients, the surgical removal of lymph nodes that can obstruct the pathway, and the need for physiotherapy intervention to redirect lymph flow". (P10, man, 35, clinical expert and lecturer)</p> <p>"Lymphology comes to my mind. No one should treat a woman with upper extremity lymphedema as soon as they finish their BSc". (P4, woman, 29, clinical expert and lecturer)</p>
Theme 3: Learning by experience: The relevance of internship	
Codes defined by the researchers	Example of quotes extracted from the focus groups
Experience as a test bench - the internship	<p>"It's one thing to explain, and another to see". (P11, woman, 37, clinical expert and lecturer)</p> <p>"Placement is key if you're curious. It's a chance for students to get hands-on experience and see what it's really like working with patients. You can't grasp the reality of treating patients with cancers in a classroom setting." (P8, woman, 51, course leader and researcher)</p>
Personal predisposition	"The most crucial part of the placement is not just learning techniques, but understanding if you can emotionally detach yourself and handle the weight of treating patients, especially younger ones who are seriously ill. It's a personal journey as well." (P3, man, 38, clinical expert)
Psychological load of the experience	<p>"Some students just aren't cut out for the emotional demands of working in an oncology ward and you can't tell that from a lecture alone." (P5, woman, 40, clinical expert and lecturer)</p> <p>"[In oncology rehabilitation] it is necessary for the physiotherapists to know how to deal with their and patient's emotions [...] when I'm with the students during their placement in palliative care, I allow them to talk with patients, build relationships, and open up to their emotions and experiences. But those who don't come to placement to palliative care, I don't know how they will experience their first patient with cancer if they ever happen to treat them." (P12, man, 53, clinical expert and lecturer)</p>
Relational test bench	"In oncology rehabilitation, physiotherapists need to be able to handle their own and their patients' emotions. During placement in palliative care, I encourage students to form relationships with patients and open up emotionally. But for those who don't experience palliative care placement, I don't know how they'll react when they come across their first oncology patient." (P12, man, 53, clinical expert and lecturer)
Is this the right path for me?	"Having even a brief, but meaningful, experience in this field is crucial so students can make informed choices for themselves." (P8, woman, 51, course leader and researcher)
Theme 4: Clinical reasoning and competencies in oncology rehabilitation embedded in uncertainty	
Codes defined by the researchers	Example of quotes extracted from the focus groups
Learning how to work in multifaceted team	<p>"The oncology rehabilitation course must train future physiotherapists to get acquainted with oncologists, oncology surgeons and nurses, and others (e.g., caregivers) we might have a language barrier". (P4, woman, 29, clinical expert and lecturer)</p> <p>"When it comes to rehab, the relationship with the patient's family is key. And don't forget about the caregiver's involvement - it's essential for their support". (P9, man, 53, clinical expert and lecturer)</p>
Knowing how to conduct an assessment	"Evaluating the patient is crucial for a student. It's the foundation of what we do and can save you in the long run". (P6, woman, 30, clinical expert, lecturer and researcher)
Knowing how to set flexible goals	"I challenge my students to define patient assessment tools, set goals, and determine the best treatment plan". (P6, woman, 30, clinical expert, lecturer and researcher)

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TABLE 4 (Continued)

<p>Having effective communication skills</p>	<p>“What is required of students is to recognise the dynamic of these patients and not to be adamant with their goals because physiotherapists have to be able to change [the rehabilitation programme] as soon as the patient's condition changes”. (P7, woman, 60, course leader)</p> <p>“One important thing to note is communication skills. Patients tend to have more conversations with physiotherapists and ask a lot of questions”. (P11, woman, 37, clinical expert and lecturer)</p> <p>“I think one of the main communication skills is using our hands properly, thinking about how much we communicate through our hands”. (P12, man, 53, clinical expert and lecturer)</p>
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Theme 5: Advanced education degrees skills: From appetiser to main course

Codes defined by the researchers	Example of quotes extracted from the focus groups
<p>Need for advanced training</p>	<p>“In my opinion, offering a master's degree specifically dedicated to oncology rehabilitation would be an excellent alternative. That's what happens in other countries, and it would be amazing to have the same here”. (P4, woman, 29, clinical expert and lecturer)</p>
<p>Advanced interdisciplinary skills</p>	<p>“I'd be interested in a master's programme that brings together other healthcare professionals who work with patients with cancer. That would be a great opportunity for networking and enriching experience”. (P6, woman, 30, clinical expert, lecturer, and researcher)</p>
<p>Exercise medicine</p>	<p>“It's crucial that these patients receive tailored care, especially when it comes to exercise and physiotherapy. Physiotherapists need to know the proper dosage, intensity, frequency, and impact of their therapy. I think this should be covered in a higher education programme”. (P8, woman, 51, course leader and researcher)</p>
<p>Healthcare management</p>	<p>“A master's programme could focus on breast units as a role model and teach physiotherapists how to apply the same model to other areas of oncology. This way, they will have a deeper understanding of how to provide effective care to these patients”. (P10, man, 35, clinical expert and lecturer)</p>

Theme 6: A call to action for physiotherapist: Prevention—diagnosis—survivorship & end of life

Codes defined by the researchers	Example of quotes extracted from the focus groups
<p>The role of the physiotherapists in the preventive phase of diseases</p>	<p>“Exercise has a preventive role in several oncologic diseases and there's strong evidence for it. As physiotherapists, we don't always get to be part of the primary prevention phase, but we should establish ourselves more in this area. Exercise is one of our tools, after all”. (P8, woman, 51, course leader and researcher)</p> <p>“I wrote 'prevention' [during the wordcloud] because we are trying to implement pre-rehabilitation in the pre-surgical phase of the patient undergoing pancreatic or oesophageal surgery. We are trying to identify the most at-risk groups that need to perform this pre-rehabilitation”. (P14, man, 40, course leader and researcher)</p>
<p>The role of the physiotherapists from diagnosis to post-surgery</p>	<p>“I think it is necessary to start talking about a cultural change related to the fact that the patient who has been diagnosed with cancer can come to us [to physiotherapists] earlier”. (P7, woman, 60, course leader)</p> <p>“There is a group of patients that we must not forget. Those who are at the beginning of the oncology pathway and who are relatively well. This population doesn't know they need physiotherapists and don't come looking for us, the physician doesn't suggest us to them, and we, physiotherapists, have yet to understand what we could do for them”. (P8, woman, 51, course leader and researcher)</p> <p>“Recent studies show us that exercise medicine can be performed during chemotherapy, which is pretty innovative”. (P7, woman, 60, course leader)</p> <p>“Evidence shows that exercise helps patients to reduce the negative impact of oncology therapies as well as to increase patients' tolerance of their side effects”. (P9, man, 53, clinical expert and lecturer)</p>

(Continues)

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TABLE 4 (Continued)

<p>The role of the physiotherapists in survivorship</p>	<p>“Survivorship is a big chapter, and not just because of the high risk of cancer recurrence and late side effects of therapies, but also the psychosocial burden that patients face. Physiotherapists and healthcare professionals have a key role here. It's a fascinating but difficult role, but still fascinating.” (P8, woman, 51, course leader and researcher)</p>
<p>The role of the physiotherapists in palliative care</p>	<p>“To students who are sceptical about the approach to terminally-ill patients, I try to get them to see the whole picture of the patient. I emphasise the topic related to the patient's quality of life because students often look little at this aspect”. (P12, man, 53, clinical expert and lecturer)</p> <p>“When I talk to the students about their role as physiotherapists in palliative care, I tell them, ‘just like a democracy or a state is judged by how it treats the underrepresented, the poorest or the incarcerated, the quality of a healthcare system is judged by how it treats people at the end of their life.’” (P10, man, 35, clinical expert and lecturer)</p>

7 | THEME 4: ‘CLINICAL REASONING AND COMPETENCIES IN ONCOLOGY REHABILITATION EMBEDDED IN UNCERTAINTY’

According to our participants, students must acquire different oncology rehabilitation competencies. Participants highlighted the importance of making students competent in assessment, goal setting and personalised treatment choices developing clinical reasoning competencies. Moreover, there is a need for empathy and effective communication skills, both verbal and not verbal. Participants emphasised the incredible power of words and ‘touch’ of physiotherapists in the therapeutic relationship with people with cancers. The oncology physiotherapist must acquire interpersonal skills to work in a multifaceted team in which patients' family members and caregivers are also part. According to the participants, developing all these skills must be embedded in the uncertainty of the rehabilitation pathway of the person with cancer. This is possible by training students to use flexible clinical reasoning, considering that patients' statuses can change quickly and unexpectedly. In listing the core competencies, participants reiterated the impossibility of their complete acquisition in entry-level education, outlining the importance of an advanced education degree pathway to deepening the knowledge and skills only “tasted” in BSc as described in Theme 5.

8 | THEME 5: ‘ADVANCED EDUCATION DEGREE SKILLS: FROM APPETISER TO THE MAIN COURSE’

All participants agreed on the need for advanced education degrees to qualify expert physiotherapists in oncology rehabilitation. A structured advanced education degree would make it possible to go “from the appetiser served by the entry-level education to the main course” (P8). According to participants, advanced education degrees should allow for learning specialised skills related to managing cancers and bone metastases, advanced manual (e.g., lymphology), and exercise skills. They reported that physiotherapists should be able to handle the intensity, dosage, and frequency of exercise. Our

participants proposed a master's degree with other healthcare professionals to foster knowledge exchange among professionals working in the oncology field. In addition, they hypothesised that a master's degree should provide students with soft skills such as communication and organisational management skills. The participants highlighted that physiotherapists should learn about the different contexts of the health service organisation to design improvement projects for managing people with cancer. Therefore, advanced education degrees should offer a wide range of skills that allow oncology physiotherapists to understand the importance of their role. A role that is becoming paramount thanks to scientific studies but needs concrete action by physiotherapists to become relevant. This reflection led to the creation of Theme 6.

9 | THEME 6: ‘A CALL TO ACTION FOR PHYSIOTHERAPISTS: PREVENTION—DIAGNOSIS—SURVIVORSHIP & END OF LIFE’

Participants in focus groups discussed the journey to becoming an experienced oncology physiotherapist, emphasising the importance of spreading awareness about the role of physiotherapy in all stages of cancer care, from prevention to end of life. Participants often addressed the topic of ‘prevention’. Some participants emphasised the importance of the physiotherapist's role in primary prevention by promoting a healthy lifestyle based on exercise. Others highlighted the importance of physiotherapy assessment in secondary prevention to suspect possible oncological diseases to other professionals. Then, participants emphasised that rehabilitation care should be early, even from diagnosis.

Moreover, rehabilitation care is gaining a pivotal role in the oncology pathway during adjuvant pharmacological therapies. Therefore, the role of physiotherapists cannot be limited to the post-surgical management of oncological disease but becomes crucial throughout the care. The need for ongoing rehabilitation care continues throughout the survivorship phase of people with cancer. Participants emphasised the role of physiotherapists in providing

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patients with physical, informational, and emotional support. Finally, participants reflected upon the delicate part of the physiotherapist in palliative care. Some examples were strategies to sensitise students to recognise the rehabilitative significance of caring for patients at the end of life. The common thread in this sixth and final theme is the need for action to debunk taboos and myths related to people with oncological diseases. Participants deemed fundamental a clear call to change the cultural paradigm of oncology rehabilitation from 'if there is an oncological disease, I can't do anything to 'if there is an oncological disease, I can do a lot'.

10 | DISCUSSIONS

The present study explored the skills and competencies of physiotherapists in 'Oncology Rehabilitation', from entry-level education to advanced education degrees. The results showed that entry-level education should include oncological rehabilitation to help students discover their professional inclinations towards this field. Perceiving that something is helpful in the present moment will allow students to make informed decisions and pursue their goals within this field (Priniski et al., 2018). By fostering a sense of personal usefulness and identification with the topic, students can gain a deeper understanding of their professional identity within the realm of oncology rehabilitation (Priniski et al., 2018).

Our participants highlighted that the hours assigned to the oncology rehabilitation course are insufficient to cover all the necessary topics to become an expert, as reported elsewhere (Stuiver et al., 2019). Lecturers should structure the oncology rehabilitation courses to give students a taste of oncology rehabilitation, fostering their curiosity. The learning path in oncology rehabilitation can be seen - as in other fields - as a library that students fill with what they are interested in the most (Theme 2). The main topics that should be part of this library regard the significant oncological diseases of rehabilitation interest, such as breast cancer, lung cancer, urogenital cancers, and head and neck cancers. In addition, knowledge about oncology therapies' side effects, such as surgery, chemotherapy, radiation therapy, hormone therapy, and immuno-oncology, must be provided. Among the many side effects of oncology therapies described in the literature (Magasi et al., 2022), students must have some basic knowledge about fatigue, oncology pain (and related red flags), lymphedema and bone metastases management (Bausewein et al., 2008; Board & Harlow, 2013; Bunting, 1995; Larun et al., 2017; Mayer & Engle, 2022).

In addition, our participants reported a clear need for students to practice the acquired knowledge. As Dewey pointed out, 'learning by doing is essential for students (Dewey John, 1938). In the rehabilitation, the best expression of learning by doing is through placement (Theme 3). Students must attend placements to see first-hand the management of people with oncological diseases. However, upon analysing participants' feedback, we have discovered that placements in the specific field of oncological rehabilitation are often unfeasible due to the limited number of facilities offering such services. As a

result, there are only a few available positions for students. One possible solution was to address or at least mitigate this issue reported by our participants. They said we should prioritise students genuinely interested in pursuing this path (as discussed in "A Road Not for Everyone" from theme 1). Another option reported in the literature could be to provide educational tools and tutorials based on simulation, allowing students to experience the complexity of oncological rehabilitation (Bizama et al., 2022; Paulus et al., 2022; Tuttle & Horan, 2019). Moreover, different online training strategies have been recognised as effective in enhancing education and competence in this field (Dennett et al., 2022). Examples include the 'Cancer Exercise Toolkit' and the 'iPOEG Toolkit' for paediatric specialisation (Wurz et al., 2021). These resources provide comprehensive online training modules and resources that can support physiotherapists in acquiring the necessary knowledge and skills in oncological rehabilitation. By leveraging these online tools, aspiring practitioners can enhance their expertise and contribute to improving patient care in oncology. However, our interviewees reported the placements as pivotal to answering the question, "Is this the right road for me?".

Then, the university must provide students with competencies to perform excellent clinical reasoning. Specific to oncology rehabilitation, physiotherapists need to know how to deal with uncertainty (Theme 4). People with oncological diseases are often characterised by a quick and unexpected clinical status change (Schieroni M. P., 2017). Hence, physiotherapists must be able to modify the rehabilitation programme quickly based on these changes. The importance of communication and interpersonal skills in oncology was also emphasised. Communication skills are paramount in oncology because physiotherapists may have to deal with complex topics such as death. Some students are more inclined to be effective communicators than others, but "communication has to do with key skills that must be learned" (Silverman et al., 2016).

Moreover, verbal and non-verbal communication has a non-specific effect per se that is added to the specific one of the delivered interventions (Rossettini et al., 2018). Therefore, students should be equipped with the knowledge and ability to integrate effectively the physical communication conveyed through their hands ("the power of hands") with effective verbal communication ("the power of words") (Geri et al., 2019; Testa & Rossettini, 2016). However, they also need to possess the ability to effectively collaborate and communicate with other healthcare professionals and caregivers (D'Alimonte, McLaney, & di Prospero, 2019). The oncology rehabilitation curriculum should facilitate the development of a shared language among various healthcare practitioners to promote comprehensive patient care (Knoop et al., 2017). Furthermore, oncology rehabilitation is often a prolonged process that may involve home-based care, and physiotherapists must be able to train caregivers to provide adequate care (van Roij, Brom, Sommeijer, van de Poll-Franse, & Raijmakers, 2021).

All the skills needed to become physiotherapists experienced in oncology rehabilitation cannot be acquired in depth in entry-level education. Thus, the need for advanced education degrees was

outlined by our participants. Therefore, we asked them to identify which skills should be included in an advanced education degree programme (Theme 5). Analysis of the results revealed the need to implement soft skills in multi-professional environments, manual skills, particularly in the management of lymphedema, and the physiology of exercise. Oncology therapies and related side effects benefit from a collaborative, interprofessional approach to people with oncological disease care (Knoop et al., 2017). Thus, our participants pictured a master's degree with healthcare professionals other than physiotherapists to foster knowledge exchange among those working in the oncology field. Collaboration with other healthcare professionals in a master's degree could also allow for implementing different soft skills (e.g., communication, relationship, organisational and managerial) (D'Alimonte et al., 2019). Several international healthcare professional organisations promoted interprofessional education as part of redesigned healthcare systems (van Diggele, Roberts, Burgess, & Mellis, 2020) and educational accreditation standards (Chartered Society of Physiotherapy, 2023; Commission on Accreditation in Physical Therapy Education, 2023; Grymonpre et al., 2021). This promotion stemmed from interprofessional education to improve interprofessional teamwork, patient care quality, and health-related outcomes (van Diggele et al., 2020). Altogether, the competencies and skills mentioned by our interviewees in this study for advanced education degree courses are in line with those reported in the American Board of Physical Therapy Specialties in oncology (American Physical Therapy Association (APTA), 2016).

Then, exercise assumes a vital role in managing, preventing and treating oncological diseases. Physical activity might prevent many types of cancer and improve longevity among survivors of cancer or those facing these diseases (Patel et al., 2019). Different guidelines have been implemented on this matter but only for survivors of cancer (K. L. Campbell et al., 2019). Exercise in people with cancer can be seen as a real medicine ("Exercise Medicine") that needs a clear and defined prescription (Hayes et al., 2019). Therefore, oncology physiotherapists must understand their crucial role from prevention to end of life (Theme 6). According to our participants, the courses in oncology rehabilitation might further foster physiotherapists' awareness of their pivotal role in promoting active lifestyle habits in society. Once the diagnosis is established, a cultural paradigm shift is necessary from "I have cancer, I must rest" to "I have cancer, I must exercise". Additionally, physiotherapists play a delicate and vital role in the end-of-life phase. They provide simultaneous palliative care that supports patients, their families, and their social networks in accepting prognosis and coping with incurability (SICP, 2013). The critical role of physiotherapists has been studied by Vira et al. They showed that physiotherapy helps alleviate the symptoms experienced by people with advanced cancer, improving their HRQoL (Vira et al., 2021).

The limitations of this study must be acknowledged. First, the focus groups only included physiotherapists, neglecting the perspectives of other healthcare professionals involved in oncology rehabilitation. The focus groups did not delve into the ethical considerations in this field, particularly about end-of-life and therapeutic

persistence, which should be explored in future studies. An additional limitation of our study is its single-country focus, specifically on Italy, which may not account for potential variations in the organisation of physiotherapy education across different countries. Nevertheless, various European countries share a similar education and healthcare system, which might facilitate the transferability of our results. Finally, all participants included were white men/women carrying out their professional activities in northern Italy. This trend is particularly important to highlight since meanings attached to education might be influenced by gender, ethnicity, living area, and working background (Bailey & Graves, 2016; Battista et al., 2023; Seeleman et al., 2009).

The results of our study describe the physiotherapists' training in oncology rehabilitation as a journey. As travellers, the students begin their journey during entry-level education to discover whether oncology rehabilitation may interest them. After building up a library of essential knowledge and competencies through lectures and placements, the students' journey must continue with advanced education degrees and acquiring advanced skills. Finally, their journey ends with a call to action: physiotherapists need to be aware that they play a crucial role in caring for people with oncological diseases from prevention to end of life. Our results can be a practical aid tool for lecturers and course leaders in planning and defining the educational objectives of any-level oncology rehabilitation courses. Finally, our study might represent a first step in determining the core curriculum of physiotherapists in oncology rehabilitation. Future research should create a shared physiotherapist's core curriculum in oncology rehabilitation.

11 | IMPLICATION FOR PHYSIOTHERAPY PRACTICE

This study has significant implications for improving physiotherapy curricula in oncology rehabilitation, positively impacting the skills and competencies of practitioners in this paramount field.

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CONFLICT OF INTEREST STATEMENT

The authors declare that there are no conflicts of interest regarding the publication of this article.

DATA AVAILABILITY STATEMENT

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

ETHICS STATEMENT

The study was performed in respect of the Declaration of Helsinki and reported following the COREQ. Ethical approval was obtained from the Ethics Committee for University Research (CERA: Comitato Etico per la Ricerca di Ateneo), University of Genova (Approval date: 19/05/2022; CERA 2022.32).

CONSENT TO PARTICIPATE

Informed consent was obtained from all the individual participants included in the study.

CONSENT TO PUBLISH

The authors affirm that human research participants provided informed consent for publication.

STUDY REGISTRATION

Not applicable.

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