



## RESEARCH ARTICLE OPEN ACCESS

# Establishing a Research Agenda for Physiotherapy in Portugal: A Delphi Study

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## ABSTRACT

**Background:** As physiotherapy research advances, identifying knowledge gaps and setting priorities is crucial for enhancing its efficiency in national and international collaborations. This study aimed to establish a physiotherapy research agenda in Portugal by integrating perspectives from physiotherapists and users of physiotherapy services.

**Methods:** An online two-round Delphi study was conducted from April to August 2024 with two panels: physiotherapists and users of physiotherapy services. Participants rated 66 research priorities in the two rounds using a four-point Likert scale (1 = not important, 4 = very important), with 13 new priorities introduced in the second round. These priorities were organized into nine research categories identified from a prior scoping review: (1) (cost)effectiveness; (2) service delivery; (3) education, professional development and quality; (4) measurement instruments; (5) mechanisms behind disability, physiotherapy treatments and patient classification; (6) patients' needs, expectations, experience and context; (7) prognostic outcomes and responses to therapy; (8) decision-making strategies; and (9) technology and big data. Consensus was defined as a cut-off median score of  $\geq 3.25$ .

**Results:** A total of 479 physiotherapists and 70 users of physiotherapy services participated in Round 1 with final retention rates of 64% and 43%, respectively. The final 'Top 10' priorities focused on three research categories: researching optimal service delivery models, structures, and processes ( $n = 5$ ); establishing the (cost)effectiveness of different physiotherapy interventions ( $n = 3$ ); and exploring the best models of physiotherapy education, professional development, and quality ( $n = 2$ ).

**Conclusions:** This study established a physiotherapy research agenda for Portugal, focusing on (cost)effectiveness, service delivery, education, professional development, and quality, integrating the perspectives of physiotherapists and users of physiotherapy services. The final priorities provide a foundation for future research and policy development.

Eduardo Cruz and Cristina Jácome, senior authors, contributed equally to this work.

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## 1 | Introduction

Physiotherapy plays a significant role in enhancing the functioning and health-related quality of life through the prevention and treatment of numerous conditions. It became a crucial component of healthcare with increasing recognition of its importance within multidisciplinary healthcare teams (Dean 2009; Kelly et al. 2023). The profession's evolution and recognition have been driven by research advances in diagnosis, intervention, measurement methods, and technology (Owens et al. 2020; Tikhile and Patil 2024), as evidenced by the exponential growth of physiotherapy research publications in recent decades (Jesus et al. 2020; Stevens-Lapsley et al. 2023). To further enhance the efficiency of physiotherapy research in national and international collaborations, as well as to guide evidence-based policy decisions, it is essential to identify knowledge gaps and set future research priorities.

Research agendas offer clear and forward-looking perspectives for advancing the physiotherapy profession (Stevens-Lapsley et al. 2023). In the last few years, country-specific research agendas were developed tailored to their unique national contexts (Rankin et al. 2012; Stevens-Lapsley et al. 2023). A mixed-methods study from Switzerland identified five generic research priorities, incorporating insights from various stakeholders, including representatives of patient organizations (Nast et al. 2016). The Chartered Society of Physiotherapy (CSP) established an agenda in 2012 using the Delphi method (Rankin et al. 2012). This agenda focused on key priorities within specific physiotherapy fields, such as neurology and musculoskeletal care, while actively incorporating input from users of physiotherapy services. In 2020, the CSP, in collaboration with the James Lind Association, used a multi-stage methodology to identify the top 10 generic research priorities relevant to all physiotherapy specialties, once again incorporating input from users of physiotherapy services (Rankin et al. 2020). The most recent American Physical Therapy Association agenda (2023), developed through multiple iterative steps, also addressed six categories of generic research priorities but did not incorporate the perspectives of service users (Stevens-Lapsley et al. 2023).

Agendas that align research with the needs and perspectives of patients and healthcare professionals enhance the translation of research into daily clinical practice (Chalmers et al. 2014; Gleadhill et al. 2023). Therefore, country-specific priorities that consider both the experiences of local physiotherapists and the needs of users of physiotherapy services are crucial for addressing real-world needs and challenges while accounting for cultural and contextual factors. A recent scoping review summarized previous research agendas to map a global research agenda for physiotherapy (S Souto-Miranda et al. 2024). This resource provides a comprehensive framework to guide the development of research agendas tailored to each country's unique circumstances.

Currently, there is no research agenda for physiotherapy in Portugal. It is critical to establish consensus-based and contextually relevant research priorities that draw on insights from both physiotherapists and users of physiotherapy services. By identifying relevant priorities within the Portuguese context, this study may contribute to future European and global

collaborations addressing shared challenges, guide evidence-based policies and support updated global frameworks for advancing the physiotherapy profession. Therefore, this study aimed to identify physiotherapy research priorities tailored to the Portuguese context, integrating the perspectives of both physiotherapists and users of physiotherapy services.

## 2 | Methods

### 2.1 | Study Design

This was an online two-round Delphi study with two stakeholders' panels: physiotherapists and users of physiotherapy services. Delphi was chosen as it is widely used in health research to achieve consensus (Boulkedid et al. 2011; Iqbal and Pipon-Young 2009), and has been previously used to produce physiotherapy research agendas (Nast et al. 2016; Rankin et al. 2012; Rushton and Moore 2010; Soma et al. 2009). This study was conducted between April and August 2024 and received approval from the Ethics Committee of the Faculty of Medicine of the University of Porto (Reference 233/CEFMUP/2024) as well as from the Data Protection Officer of the Portuguese Physiotherapists Order (May 21, 2024). Before agreeing to participate, each participant received detailed information about the study. Online informed consent was obtained from all participants before any data collection. This study followed the reporting guidelines for Delphi methodology in health sciences as outlined by Spranger et al. (Spranger et al. 2022).

### 2.2 | Eligibility Criteria

Physiotherapists needed to be registered in the Portuguese Physiotherapists Order (~10,000) (Gabinete de Estudos e Planeamento (GEP), 2023). Users of physiotherapy services needed to be adults who were (i) being treated or had been treated in the past by a physiotherapist for a specific health condition or (ii) caregivers of children being treated or had been treated in the past by a physiotherapist. No exclusion criteria were defined.

### 2.3 | Recruitment Strategies

To ensure a successful participation rate, which in online surveys is known to be low (Fan and Yan 2010; Wu et al. 2022), different strategies were employed for both stakeholder's panels. All registered physiotherapists in the Portuguese Physiotherapists Order received an e-mail invitation to participate in the study along with regular e-mail reminders. A group of 145 physiotherapists involved in specific working groups/research networks of the Order also received text message reminders. Users of physiotherapy services were recruited through (i) e-mail invitation to Portuguese patient associations and (ii) direct invitation from physiotherapists participating in the Delphi, allowing the snowball technique. A minimum of 30 participants in each stakeholder panel were targeted based on literature recommendations (Nasa et al. 2021).

## 2.4 | Data Collection

### 2.4.1 | Survey Design and Pilot Testing

The initial section of the survey included an explanation of the study and the informed online consent. Physiotherapists and users of physiotherapy services first provided demographic information, including sex, age, education level and district of residence. Education levels were reported differently for the two panels. Physiotherapists reported their education levels as graduate degree, Master degree, or Doctoral degree. Users of physiotherapy services were selected from the following categories: 9th grade or lower, secondary education completed, and graduate (including Bachelor's) or higher. Physiotherapists were additionally asked to report their professional role (physiotherapy practitioner, researcher, leader/manager, or mixed roles, such as part-time researcher working also as a physiotherapy practitioner), years of professional experience, and area (s) of practice/expertise. Users of physiotherapy services also indicated the specific health condition(s) for which they were treated.

Survey structure was based on a prior scoping review that summarized a global physiotherapy research agenda into a list of 551 priorities across nine research categories (S Souto-Miranda et al. 2024): (1) (cost)effectiveness; (2) Service delivery; (3) Education, professional development and quality; (4) Measurement instruments; (5) Mechanisms behind disability, physiotherapy treatments and patient classification; (6) Patients' needs, expectations, experience and context; (7) Prognostic outcomes and responses to therapy; (8) Decision-making strategies; and (9) Technology and big data. Two authors (SS-M and CJ), experienced in content analysis and Delphi studies (Marques et al. 2022; Nabergoj Makovec et al. 2022; S. Souto-Miranda et al. 2023), selected five to ten of the broadest and most representative priorities of each research category to incorporate into the survey, resulting in a total of 66 priorities. A maximum of ten priorities per nine research categories were chosen to build a feasible online survey and promote participant engagement as it is known that longer surveys have lower response rates (Gargon et al. 2019). The 66 priorities were then translated from English to Portuguese and a lay language explanation was added (IS, SS-M, and CJ). The translation was tested and reviewed by fellow authors (EC, DP, FR), including MJC, a user of physiotherapy services.

All participants viewed all 66 priorities and respective lay language explanations in the same order. Participants were asked to rate each research priority on a 4-point Likert scale—1 (“not important”), 2 (“somewhat important”), 3 (“important”) and 4 (“very important”). The use of a 4-point Likert scale was chosen to avoid a neutral midpoint, thereby encouraging participants to make a definitive choice and enhance the clarity of the consensus (Akens et al. 2005; Taylor 2020). An option of “non-applicable” was provided as some participants could have difficulties in forming an opinion on a particular priority (Biggane et al. 2019). However, its use was discouraged to ensure that most participants provided substantive ratings whenever possible to maximize data completeness. Participants also had a designated space for free-text general comments and suggestions for additional priorities.

The survey was implemented on the Microsoft Forms platform (Microsoft Corporation, Redmond, WA, USA) and pre-tested with a small group of physiotherapists ( $n = 4$ ) and users of physiotherapy services ( $n = 2$ ) to ensure comprehensibility, clarity and feasibility (COSMIN 2019). Participants completed the survey on the designated platform, after which short interviews were conducted to gather feedback. Key questions addressed: (1) question clarity (e.g., “Were any terms or instructions confusing?”), (2) ease of use of response formats (e.g., Likert scales), (3) survey logical flow, and (4) technical functionality. Based on feedback, minor wording adjustments were made to eliminate ambiguity, and the final version was refined accordingly.

### 2.4.2 | Round 1

The first round of the Delphi was available from May 24 to June 13, 2024. Physiotherapists received an initial e-mail invitation and regular reminders to engage in the study. They were also asked to disseminate the study among users of physiotherapy services. Portuguese patient associations were initially contacted via e-mail to invite their members to participate and then contacted by phone to clarify any questions about the study. A follow-up e-mail reminder was also sent to patient associations.

### 2.4.3 | Round 2

A content analysis of all suggestions received in Round 1 was performed (IS, SS-M and CJ), and 13 new priorities were proposed and validated by the remaining authors (ER, FR and DP). This round, available from July 2 to July 23, 2024, used the same 4-point Likert scale for the original 66 priorities and 13 newly suggested priorities. During Round 2, participants had access to panels' scores from Round 1 in two ways:

- i. The e-mail inviting participants to Round 2 included both the aggregated results per stakeholder panel and a unique and secure link to access individual results.
- ii. The survey contained a figure illustrating the aggregated results per stakeholder panel (Supporting Information S1: Figure 1).

This exposure to the opinions of other participants aimed to enhance consensus (Mc Laughlin 1969). In Round 2, a cut-off median score of  $\geq 3.25$  was used to achieve consensus in both the physiotherapists and the users of physiotherapy services panels (Hsu and Sandford 2007). To minimize attrition during Round 2, regular reminders were sent to all invited physiotherapists. Portuguese patient associations were also notified by e-mail about the ongoing Round 2 and were encouraged to keep their engagement with participants of the first round.

## 2.5 | Data Analysis

We performed descriptive data analysis using measures of central tendency and variability [mean and standard deviation (SD), median and 25th and 75th percentiles (p25-p75)] as well as

absolute and relative frequencies. These measures were used to describe the characteristics of participants in each stakeholder panel. The districts of residence were grouped according to the European statistical nomenclature NUTS II–Nomenclature of Territorial Units for Statistics (Eurostat 2024), and the specific health conditions reported by users of physiotherapy services were labeled according to the areas of physiotherapy practice (musculoskeletal, neurology, cardiorespiratory, etc.). Medians and 25th and 75th percentiles were also used to describe the Likert-scale ratings for each priority within each stakeholder panel. The mean Likert-scale ratings were then used to rank the consensual research priorities, and to identify the three top priorities within each research category. Statistical analysis was conducted using Microsoft Excel for Office 365 (Microsoft Corporation, Redmond, WA, USA) and IBM SPSS Statistics for Windows Version 29.0.2.0 (IBM Corp, Armonk, NY, USA). The level of significance was set at 0.05.

### 3 | Results

#### 3.1 | Participants

Figure 1 presents a flow diagram illustrating the Delphi process. A total of 479 physiotherapists and 70 users of physiotherapy services responded to Round 1 with 307 (64% retention) physiotherapists and 30 (43% retention) users of physiotherapy services also participating in Round 2.

Participants' characteristics are shown in Table 1. Most participants from both panels were female (68.1% and 62.9%). Almost half of physiotherapists (45.3%) had postgraduate degrees, and most users of physiotherapy services had a higher education degree or higher (64.3%). The geographical distribution of both stakeholder panels was highest in the North, Center, and Lisbon regions. About half of the physiotherapist panel comprised practitioners (52.4%), followed by those with a mixed role profile (35.5%). The most frequently reported areas of practice were musculoskeletal and neurological physiotherapy (74.6% and 40.6%), which were among the most reported conditions for which users of physiotherapy services had been treated (70.0% and 22.9%) (Table 1). No statistically significant differences were

observed in participants' characteristics between the two rounds (Supporting Information S1: Table 1).

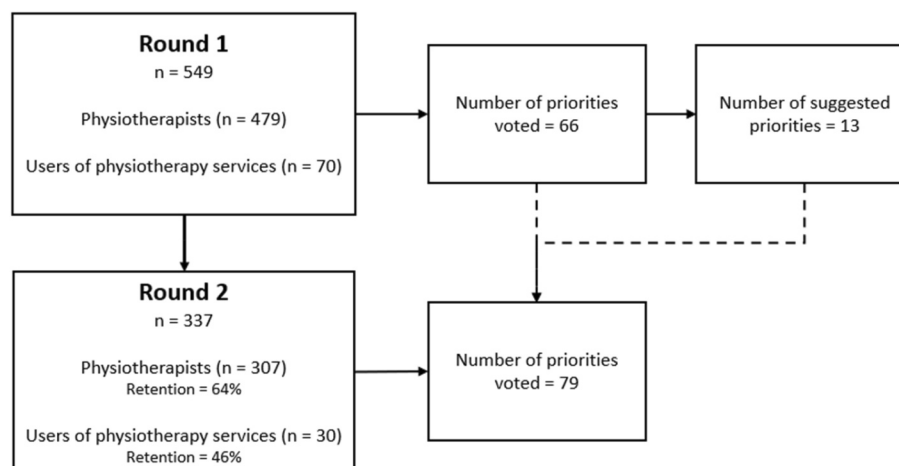
#### 3.2 | Research Priorities

In Round 1, twenty priorities belonging to eight of the nine research categories met the established cut-off for both stakeholder panels, as shown in Supporting Information S1: Table 2. After Round 2, ten priorities from three research categories met the cut-off establishing the final “Top 10”: 5 related to optimal service; 3 with (cost)effectiveness and 2 with physiotherapy education, professional development, and quality (Table 2). Two of the new suggestions introduced in Round 2 entered the final “Top 10”. The mean Likert-scale ratings of the top 10 questions ranged from 3.3 to 3.7. Table 3 displays the three top priorities by research category. The full final ranking list of the 79 priorities is available in the Supporting Information S1: Table 3.

### 4 | Discussion

This study identified the Top 10 research priorities for physiotherapy in Portugal, addressing key questions regarding (cost) effectiveness, service delivery, education, professional development, and quality. These priorities are derived from the input of physiotherapists and users of physiotherapy services, ensuring a comprehensive agenda with meaningful and agreed value that can drive future developments in the field of physiotherapy.

Establishing the (cost)effectiveness of different physiotherapy interventions aligns with previous studies that emphasize the importance of examining the costs and benefits of interventions to guide clinical decision-making and secure physiotherapy's recognition as an integral part of multidisciplinary care (APA 2020; APTA 2023; Wouterse et al. 2023). This research category reflects global trends in healthcare (APA 2020; APTA 2023; García-Moreno et al. 2022; Jung et al. 2022) and is central in published agendas, such as APTA and CSP (Nast et al. 2016; Rankin et al. 2020; Stevens-Lapsley et al. 2023). By prioritizing cost-effectiveness, physiotherapists may contribute to more sustainable healthcare systems and address outcomes



**FIGURE 1** | Flow diagram of the Delphi process.

**TABLE 1** | Characteristics of participants in Round 1 ( $n = 549$ ).

	Physiotherapists $n = 479$	Users of physiotherapy Services $n = 70$
Age (mean, SD)	39.8 (10.6)	50.9 (17.3)
Female ( $n$ , %)	326 (68.1)	44 (62.9)
Education level ( $n$ , %)		
9th grade completed or less	—	5 (7.1)
Secondary education completed	—	20 (28.6)
Graduate degree (including bachelor)	262 (54.7)	45 (64.3)
Master degree	159 (33.2)	—
Doctoral degree	58 (12.1)	—
NUTS II ( $n$ , %) <sup>a</sup>		
North	131 (27.3)	24 (34.3)
Center	128 (26.7)	24 (34.3)
West and Tejo Valley	10 (2.1)	1 (1.4)
Lisbon Metropolitan area	117 (24.4)	15 (21.4)
Setúbal Peninsula	43 (9.0)	3 (4.3)
Alentejo	16 (3.3)	1 (1.4)
Algarve	15 (3.1)	0
Azores, Autonomous region	10 (2.1)	1 (1.4)
Madeira, Autonomous region	9 (1.9)	1 (1.4)
Professional role ( $n$ , %) <sup>a</sup>		
Physiotherapy practitioner	251 (52.4)	—
Researcher	50 (10.4)	—
Leader/manager	6 (1.3)	—
Mixed roles	170 (35.5)	—
Years of experience (mean, SD) <sup>a</sup>	17.0 (10.7)	—
Area of practice ( $n$ , %) <sup>a</sup>		
Musculoskeletal & Orthopedics	358 (74.6)	49 (70.0)
Neurology	195 (40.6)	16 (22.9)
Geriatrics	187 (39.0)	0
Sports	153 (32.0)	0
Cardiorespiratory	134 (27.9)	3 (4.3)
Well-being, health Promotion, and Protection	132 (27.3)	0
Pediatrics	92 (19.2)	0
Oncology	55 (11.4)	0
Women's, Men's, and Pelvic health	53 (11.0)	2 (2.9)
Occupational health and Ergonomics	45 (9.3)	0
Palliative care	37 (7.6)	0
Aquatic	37 (7.5)	0
Other	43 (9.0)	0

Abbreviations: NUTS, Nomenclature of Territorial Units for Statistics; SD, standard deviations.

<sup>a</sup>Two physiotherapists with missing data.

valued by users of physiotherapy services. Therefore, given its foundational role in policymaking, the observed high ranking of priorities within this research category was expected. Furthermore, the insufficient evidence on the cost-effectiveness of interventions of physiotherapy practice in Portugal likely

contributed to this high ranking, as physiotherapists may struggle to advocate for their role in healthcare systems without such evidence. Also, as expected, priorities from the research category related to service delivery ranked highly. Establishing effective models and processes is crucial given the increasing



**TABLE 2** | Top 10 priorities achieving the cut-off established (median  $\geq 3.25$ ) in both panels ranked by mean Likert-scale ratings ( $n = 337$ ).

Rank	Research category	Priority	Physiotherapists	Users of physiotherapy services	All
			Median (p25-p75)	Median (p25-p75)	Mean (SD)
1	(Cost)effectiveness	Explore the role of physiotherapy in keeping people with specific conditions out of hospital, for example, those with respiratory problems, mobility problems or at risk of falls	4.0 (4.0, 4.0)	4.0 (3.0, 4.0)	3.7 (0.5)
2	Service delivery	Explore the role of physiotherapy in the prevention and promotion of health, as well as in the management of chronic disease	4.0 (3.0, 4.0)	4.0 (3.0, 4.0)	3.6 (0.6)
3	Service delivery	Define which physiotherapy interventions that have been proven to be effective need to be (better) implemented, and/or which physiotherapy interventions that have been proven to be ineffective need to be (better) de-implemented in daily practice	4.0 (3.0, 4.0)	4.0 (3.0, 4.0)	3.5 (0.7)
4	(Cost)effectiveness	Explore the role of physiotherapy in improving patient discharge plans from hospitals	4.0 (3.0, 4.0)	3.5 (3.0, 4.0)	3.5 (0.7)
5	Service delivery	Determine the effects of dose (frequency, duration, intensity) and timing of interventions provided by the physiotherapist	4.0 (3.0, 4.0)	3.5 (3.0, 4.0)	3.4 (0.7)
6	Service delivery	Investigate the optimum staffing ratios and reasonable waiting times in relation to effective service delivery (service provision)	4.0 (3.0, 4.0)	4.0 (3.0, 4.0)	3.4 (0.7)
7	(Cost)effectiveness	Ascertain, when health problems are developing, at what point is physiotherapy most/least effective for improving patient results compared to no physiotherapy; explore factors affecting this	4.0 (3.0, 4.0)	3.5 (3.0, 4.0)	3.4 (0.7)
8	Education, professional development, and quality	Evaluate methods to enhance adherence to evidence-based/recommended practice guidelines	4.0 (3.0, 4.0)	3.5 (3.0, 4.0)	3.4 (0.7)
9	Service delivery	Investigate whether the coordination of physiotherapy and other interventions (e.g., surgical, pharmacological) affect patient outcomes, and, if so, what is the optimal pattern of intervention	4.0 (3.0, 4.0)	3.5 (3.0, 4.0)	3.3 (0.8)
10	Education, professional development, and quality	Identify definitions and indicators of excellence in physiotherapy education	4.0 (3.0, 4.0)	3.5 (3.0, 4.0)	3.3 (0.8)

Note: p25-p75: 25th and 75th percentiles.

pressure on healthcare systems to provide high-quality care and enhance patient experience (Adams et al. 2023; Westby et al. 2016; Yinusa and Faezipour 2023). In line with this, the APTA and CSP research agendas, along with the mixed-methods study from Switzerland, have already highlighted service optimization, access, and workforce development as key priorities (Nast et al. 2016; Rankin et al. 2020; Stevens-Lapsley et al. 2023). The inputs from both physiotherapists and users

of physiotherapy services in our study further underscore these concerns, emphasizing the importance of service delivery research in the Portuguese context. The third research category related to physiotherapy education, professional development, and quality reflects the increasing recognition of the need to continuously improve educational frameworks and professional development in physiotherapy. As an ever-evolving profession, physiotherapy professionals are expected to engage in

**TABLE 3** | The three top priorities within each research category, ranked by mean Likert-scale ratings ( $n = 337$ ).

Research category	Research priority	Likert scale ratings mean (SD)
Cost(effectiveness)	1 Explore the role of physiotherapy in keeping people with specific conditions out of hospital, for example, those with respiratory problems, mobility problems or at risk of falls	3.7 (0.5)
	2 Conduct a cost-benefit analysis of the provision of physiotherapy services	3.5 (0.7)
	3 Evaluate the impact of physiotherapy service delivery models on economic and patient/client outcomes and consumer choice	3.5 (0.7)
Service delivery	1 Explore the role of physiotherapy in the prevention and promotion of health, as well as in the management of chronic disease	3.6 (0.6)
	2 Define which physiotherapy interventions that have been proven to be effective need to be (better) implemented, and/or which physiotherapy interventions that have been proven to be ineffective need to be (better) de-implemented in daily practice	3.5 (0.7)
	3 Determine the effects of dose (frequency, duration, intensity) and timing of interventions provided by the physiotherapist	3.4 (0.8)
Education, professional development and quality	1 Evaluate methods to enhance adherence to evidence-based/recommended practice guidelines	3.4 (0.8)
	2 Establish the extent to which physiotherapists deliver services in accordance with best evidence/recommended guidelines for specific conditions and its impact on outcomes	3.3 (0.8)
	3 Identify definitions and indicators of excellence in physiotherapy education	3.3 (0.9)
Measurement instruments	1 Develop and test a minimum set of measures to evaluate the process and clinical outcomes for specific conditions and populations	3.2 (0.8)
	2 Provide evidence to guide the selection and interpretation of measurement instruments for specific purposes, conditions, and populations	3.2 (0.8)
	3 Develop new measures or refine existing ones to evaluate the impact of physiotherapy on activity, participation, and quality of life	3.1 (0.8)
Mechanisms behind disability, treatments and patient classification	1 Investigate the physiological effects of different physiotherapy treatments. Determine the mechanisms by which physiotherapy interventions modify disease and age-related or injury-induced changes in normal cellular structure and function using appropriate human and animal models	3.3 (0.8)
	2 Investigate the factors that modify the response to physiotherapy interventions	3.2 (0.8)
	3 Develop and evaluate effective patient/client classification methods to optimize clinical decision making for physiotherapist management of patients/clients	3.2 (0.8)
Patients' needs, expectations, experience and context	1 Investigate if/how waiting times for physiotherapy affect patient and service outcomes	3.3 (0.8)

(Continues)

TABLE 3 | (Continued)

Research category	Research priority	Likert scale ratings mean (SD)
Prognostic outcomes and responses to therapy	2 Investigate what approaches are effective for enabling parents, relations or carers to support physiotherapy treatment or to help patients to manage their own health problem	3.2 (0.8)
	3 Explore approaches that enhance effective communication in physiotherapy, particularly in the interactions between the physiotherapist and the patient, family/caregiver, and the interdisciplinary team	3.2 (0.8)
	1 Evaluate the influence of treatment type, frequency, intensity and length on socioeconomic and patient relevant outcomes (e.g., improvement of autonomy in older age, reduction of work absence and improvement of quality of life)	3.3 (0.8)
	2 Investigate the prognosis following best practice physiotherapy in different health conditions	3.2 (0.8)
	3 Determine which tests and measures should be used to predict the physiotherapy services patients will require upon discharge from inpatient care to achieve maximum function	3.2 (0.8)
Decision-making strategies	1 Develop and test the effectiveness of decision support tools to facilitate evidence-based physiotherapist decision making	3.3 (0.8)
	2 Investigate effective strategies to promote shared decision-making between physiotherapists and patients, with the aim of increasing patients' active participation in the process of choosing and managing their treatment, ensuring that their preferences and values are considered	3.2 (0.8)
	3 Investigate how physiotherapists decide what to include in their treatment plans and/or when to refer on	3.2 (0.8)
Technology and big data	1 Implement an electronic system for recording results in physiotherapy to better characterize clinical practice and the outcomes achieved; and to identify the facilitators and barriers to recording in clinical practice	3.3 (0.9)
	2 Create aggregated, harmonized datasets from multiple ongoing studies and/or legacy data from previous research studies using common data elements and share data with other researchers for further secondary analysis	3.00 (0.9)
	3 Explore the potential role of “big data”, collected by technological devices, in monitoring health and physical functioning in specific patient groups, or in early detection of disease in health people	2.3 (0.9)

Abbreviation: SD, standard deviation.

continuous learning, stay updated with the latest evidence, and deliver care that aligns with best practices and quality standards. Previous studies have shown that structured and ongoing professional development is fundamental to enhance clinical decision-making and implement evidence-based practices,

leading to optimal patient outcomes and experience (Filipe et al. 2014; Zou et al. 2023). Similar to our study, both APTA and CSP prioritize professional development in their research agendas (Rankin et al. 2020; Stevens-Lapsley et al. 2023), while the study from Switzerland specifically highlighted the need to



prioritize physiotherapy education at the undergraduate/bachelor level (Nast et al. 2016). Our findings reflect a common perspective of our stakeholders on the importance of providing physiotherapists with appropriate entry-level education and ongoing professional development. Ultimately, the alignment of these three research categories with existing literature and recent physiotherapy research agendas (Rankin et al. 2020; Stevens-Lapsley et al. 2023) underscores the relevance of our study not only to contribute to discussions on advancing physiotherapy within the Portuguese context but also to support future global initiatives for a still much-needed response.

Our two-round Delphi study used a median cut-off score of  $\geq 3.25$  for both panels, which ensured that the perspectives of physiotherapists and users of physiotherapy services were equally considered in determining the “Top 10” research priorities. This criterion, supported by previous studies (Hsu and Sandford 2007; Rankin et al. 2012), highlights the value of combining professional knowledge with user experiences to create a relevant and balanced research agenda. However, this criterion was not used in previous physiotherapy research agendas (Nast et al. 2016; Rankin et al. 2012; Stevens-Lapsley et al. 2023). Patient and public involvement (PPI) is highly encouraged in research nowadays, as it plays a vital role in ensuring that users’ expectations, needs, and preferences are met throughout the development of actions and interventions. Without adequate integration of PPI, research programs may struggle to achieve significant users’ impact and support value-based physiotherapy practices (Arumugam et al. 2023; Brett et al. 2014). The PPI component in our study was also ensured by the participation of a user of physiotherapy services who was actively involved in every stage of the Delphi process. In the era of digital health, the unexpectedly low ranking of technology- and big data-related priorities—with the highest-ranked item in this category appearing only in the 27th position overall—was a notable finding. This pattern was particularly pronounced among service users, where the top technology priority ranked 51st, compared to 26th among physiotherapists. The panels comprised mainly frontline physiotherapists and service users, whose perspectives are naturally shaped by day-to-day practice realities, where technological implementation lags behind research innovation. In addition, participants may have viewed technology primarily as a tool for supporting (cost-)effectiveness research rather than as a standalone research priority. This finding highlights an important disconnect between technological potential and current clinical adoption, suggesting the need for enhanced implementation strategies to bridge this gap.

A clear strength of this study was the implementation of strategies to enhance participation and mitigate the common challenge of attrition in Delphi studies (Fan and Yan 2010; Wu et al. 2022). Strategies such as regular e-mail reminders and provision of feedback between rounds were implemented, as recommended in the literature, to enhance retention rates (Hall et al. 2018). Additionally, text message reminders sent to physiotherapists from specific working groups/networks of the Portuguese Physiotherapists Order supported the efforts to address participation while also helping to gather a heterogeneous group of physiotherapists with diverse professional roles, thus contributing to a broader range of perspectives within the physiotherapy community. Despite the observed attrition, this

study surpassed the minimum recommended sample size for both panels (physiotherapists  $n = 307$ , users of physiotherapy services  $n = 30$ ) and together surpassed the cut-off of 80 participants, which has been recently shown to result in more than 80% replicability of findings (Manyara et al. 2024). Also, no significant differences were found within stakeholders across rounds, ensuring that the findings remain stable and representative—an important characteristic in Delphi studies (Nasa et al. 2021). Other strengths of this study were: (i) the use of lay language to accommodate varying levels of expertise and education levels among participants; (ii) the diverse representation of participants from across Portuguese regions; and (iii) a survey built based on a previously available framework (S Souto-Miranda et al. 2024) that integrates research categories from previous physiotherapy research agendas.

Some limitations need also to be acknowledged. A possible limitation of this study is related to the length of the survey and consequent potential for participant fatigue. As the “Top 10” priorities were exhibited early in the survey, this positioning could affect the careful evaluation of later items. Nonetheless, including a broad range of priorities was essential to capture the full scope of the physiotherapy field, as identified in the scoping review (S Souto-Miranda et al. 2024). As previously mentioned, the featured research categories were consistently recognized in international agendas (despite order of presentation or survey length) as crucial topics for advancing physiotherapy research. Therefore, these questions are likely the most important ones with the need for a rapid response. Moreover, the online survey and the short duration of each round may have introduced response bias, favoring participants with higher digital literacy, as our sample primarily consisted of young participants with a high level of education. Future research agendas should consider broader recruitment strategies and longer response periods to mitigate this effect. In addition, responses from users of physiotherapy services were collected without differentiation between patients and caregivers. We acknowledge that patients and caregivers may have distinct perspectives, and future research agenda studies would benefit from stratified sampling to capture these differences.

## 5 | Implications for Physiotherapy Practice

Our findings have significant implications for practice and professional policy. If implemented successfully, this research agenda can guide research funding, scientific and curriculum development, professional training, and much-needed policy changes, aligned with physiotherapists and users’ needs. Nonetheless, it is important to recognize that this agenda encompasses generic and transversal research priorities in different areas of physiotherapy practice. Future studies should focus on specific areas within physiotherapy practice, such as musculoskeletal, cardiorespiratory, or neurologic care, to enable more specific research efforts.

In conclusion, this study established a physiotherapy research agenda for Portugal, focusing on (cost)effectiveness, service delivery, education, professional development, and quality, combining the expertise of physiotherapists with the lived

experiences of users of physiotherapy services. The identified priorities provide a robust foundation for future research efforts that can enhance physiotherapy national practice and professional policy and guide global initiatives, ultimately contributing to more effective, equitable, and user-centered physiotherapy services.

### Author Contributions

S.S.-M., F.R., D.P., N.C., E.C. and C.J. contributed to conceptualization, methodology and design of the study. I.S., M.J.C. and C.J. contributed to data collection. I.S., S.S.-M. and C.J. contributed to data analysis. IS drafted the original manuscript. S.S.-M., F.R., D.P., M.J.C., N.C., E.C. and C.J. critically revised the manuscript for relevant intellectual content. All authors have read and agreed to the published version of the manuscript.

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### Ethics Statement

The study received ethical approval from the Ethics Committee of the Faculty of Medicine, University of Porto (Reference 233/CEFMUP/2024).

### Consent

All participants received detailed information about the study, and informed consent was obtained before any data collection.

### Conflicts of Interest

The authors declare no conflicts of interest.

### Data Availability Statement

The datasets generated and/or analyzed during the current study are not publicly available but are available from the corresponding author on reasonable request.

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## Supporting Information

Additional supporting information can be found online in the Supporting Information section.