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Are physiotherapists expected to be competent in digital health practice? Meta-synthesis of international physiotherapy practice competency standards

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ABSTRACT

Background: Digital health technology is progressively transforming physiotherapy practice. Despite a maturing body of literature relating to physiotherapy digital health capability, research examining digital health physiotherapy competency standards is both lacking and lagging.

Objective: Examine international professional practice competency standards for physiotherapists to identify themes common to digital health practice competency, published by international peak organizations governing physiotherapy practice.

Methods: Systematic meta-synthesis of international peak organization physiotherapy practice competency standards. The study was undertaken over nine stages. Competency statements related to digital health were extracted, and further coded into resultant themes.

Results: Eleven documents were analyzed. Fifty-two statements explicitly referenced digital health competency. Identified themes were as follows: 1) digital health data governance; 2) digital health data translation; and 3) digital health technologies. Where digital health-related competency statements do exist, they are skewed toward health information management activities.

Conclusions: Digital health practice is currently under-represented in competency standards for physiotherapists. Workforce advancement in light of the burgeoning impact of digital health will prompt further updates to professional competency standards set by our peak organizations. This will have a flow on effect, whereby education providers (e.g. universities and other professional development providers) should consider curriculum and training that prepares individuals for digitally enabled practice.

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Introduction

Physiotherapy practice continues to undergo major transformations in the face of new, evolving, and emerging digital health technologies (e.g. Internet, smartphones, wearables, and other digital devices) (World Confederation for Physical Therapy, 2020). As operationally defined by the World Physiotherapy/INTPROA (International Network of Physiotherapy Regulatory Activities), digital health physiotherapy practice refers to facets of service delivery, care support, and information provision using digital technologies. The intended purpose being to help make physiotherapy services effective through increased access to care, information availability, as well as supporting resourcing of

healthcare (World Confederation for Physical Therapy, 2020). Several examples of digital health use (Murray et al., 2016) in physiotherapy have been reported: remote telehealth interventions (Cottrell and Russell, 2020; Malliaras et al., 2021); self-management support via use of mobile applications (Devan, Farmery, Peebles, and Grainger, 2019; Merolli et al., 2021); and activity trackers and sensors supporting assessment and exercise rehabilitation (Ummels et al., 2020; Vallati et al., 2018). There is little doubt that the global disruption to physiotherapy in light of the COVID-19 pandemic may be an enduring catalyst for change to how the profession practices and workforce advancement into the future

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(Dantas, Barreto, and Ferreira, 2020; Greenhalgh, Wherton, Shaw, and Morrison, 2020; Malliaras et al., 2021; Merolli et al., 2021, 2022; Rossettini et al., 2021; World Confederation for Physical Therapy, 2020).

While knowledge of and research into physiotherapy practice competency standards exists (Dean et al., 2019; Skinner, Thomas, Reeve, and Patman, 2016) the research landscape into digital health in physiotherapy competency standards is both lacking and lagging. “Practice competency” in this context refers to expectations and standards that bring together clinicians, patients, academics, and learners under the umbrella of evidence-based practice expectations (Verma, Paterson, and Medves, 2006). As a consequence, there is limited and highly variable information on digital health physiotherapy competency standards to guide existing university curricula and continuing professional development needs (Davies et al., 2023). There has been some attempt in recent years to identify digital health practice competencies and capabilities in areas relevant to physiotherapy, with much of this research coming from Australia and the United Kingdom (UK) (Davies et al., 2021; Tack, 2020) as well as a handful of more general competency guidelines for digital health in the health professions (Brunner et al., 2018; Gadd et al., 2020; Nazeha et al., 2020). However, these are stand-alone in nature and not anchored in the professional competency standards that underpin physiotherapists’ registration expectations.

Unfortunately, at present, across international practice competency standards for physiotherapists there remains 1) a dearth of practice competencies regarding digital health practice, and 2) where reference is made, a significant gap between identifying relevant competencies and articulating what activities would demonstrate competency in real-world practice (World Physiotherapy, 2011). The overarching research question of the present study is as follows: *“What are the current competency expectations for physiotherapists in regard to digital health practice?”*. The objectives were to examine physiotherapy digital health practice guidelines in the context of international practice competency standards, and highlight aspects of digital health competency worthy of attention to the international physiotherapy community particularly in revisiting or setting competency standards in future (i.e. competency expectations set by peak organizations or associations such as those who write the standards documents analyzed in the present study) as well as guiding university education and professional development efforts.

Methods

The study follows the “Standards for reporting qualitative research: a synthesis of recommendations” (SPQR) (O’Brien et al., 2014). As the study reports on a meta-synthesis of international physiotherapy practice competency standards and does not involve direct study of human research participants, research ethics committee application was not applicable.

Qualitative approach and research paradigm

This study outlines a systematic and sequential meta-synthesis approach with results from each stage informing the next. The meta-synthesis method is highly appropriate as it aims to take analysis further (Lachal, Revah-Levy, Orri, and Moro, 2017) as it provides original insights and meaning from qualitative literature in health research. It is interpretive and useful in this study’s context when integrating information from a variety of heterogeneous but inter-related sources (Walsh and Downe, 2005). Meta-synthesis has been utilized in similar areas, such as examination of professional competency of the physiotherapy and occupational therapy workforces (Adam, Peters, and Chipchase, 2013) and has been successfully utilized to examine and interpret digital health competency expectations of allied health professionals (Butler-Henderson et al., 2020). The present study applied both deductive and inductive thematic content analysis (TCA) (Anderson, 2007; Pope, Ziebland, and Mays, 2000) to explore digital health-related competency themes constructed in earlier research involving the authors (KBH/MM).

Research characteristics, reflexivity, and context

Members of the research team are deliberately broad in expertise and background. They come from three countries: Australia, UK, and Ireland. Together, the authors have over 60 years of clinical physiotherapy experience, and over 40 years of university academic experience. Profiles include clinical physiotherapists (MM, OA); physiotherapy academics (MM, OA, KM, LR); and digital health and informatics experts (MM, KBH) and expertise in qualitative research (MM, KBH, OA, LR, KM) and meta-synthesis (MM, KBH, LR). While in-depth knowledge of the topic may predispose the authors to make certain assumptions about digital health competency within physiotherapy, the breadth and coverage of the research team provides ample knowledge, skills, and coverage to address the study objective. The team were aware of the risk of bias and

used their diverse backgrounds to be sensitive to and critically question their own and each others' assumptions.

Research design including sampling, data collection methods, units of study, data analysis, and enhancing trustworthiness

Step 1 was “digital health keyword identification.” It involved the identification of keywords pertaining to digital health and/or health informatics in order to be able to broadly detail the field of digital health within the documents to be examined (Butler-Henderson et al., 2020). Health informatics may be considered the scientific discipline of digital health, concerned with the interdisciplinary study of technology to support health care Medical subject headings (MeSH) from the United States National Library of Medicine (2020) were used. The MeSH terms utilized were as follows: 1) eHealth, with associated entry terms (i.e. telehealth, mobile health, mhealth), and 2) Health informatics (i.e. medical informatics) with associated entry terms (i.e. clinical informatics, computer science (medical), health informatics, health informatics technology, informatics (clinical), informatics (medical), information science (medical), medical computer science, and medical information science).

Given the intended grounding of this project specifically in physiotherapy and to augment this step, the authors further sourced keywords relating to digital health technology from the WCPT and INPTRA digital physical therapy practice taskforce report (World Confederation for Physical Therapy, 2020). The supplementary keywords are detailed in Table 1.

Step 2 was “sourcing international practice competency standards for physiotherapy practice”. Publicly available international physiotherapy competency standards were sourced (Figure 1). The authors first sourced practice available competency standards in the English language from regions exemplified in the WCPT/INPTRA digital physical therapy task force report as a base including Australia, Canada, United Kingdom, and

United States (World Confederation for Physical Therapy, 2020). The authorship team also leveraged their international networks and respective national member peak professional organizations to identify further standards. “Peak organizations” in this instance is a familiar Australasian term for an advocacy group or association; they exist to represent members, and offer professional standards (e.g. Australian Physiotherapy Association). As the focus of the present study was to examine individual clinical practice competency standards, documents specifically pertaining university program accreditation were not included. The same applied to whitepapers and position statements. Nine practice competency standards were identified across four geographic regions for analysis. These practice competency standards covered Europe (UK (Health and Care Professions Council, 2023); Ireland (CORU Physiotherapists Registration Board, 2019); Asia-Pacific (Australian Physiotherapy Association, 2023; Physiotherapy Board of Australia and Physiotherapy Board of New Zealand, 2015); North America (American Physical Therapy Association, 2020; Canadian Alliance of Physiotherapy Regulators, 2019, Federation of State Boards of Physical Therapy, 2006; National Physiotherapy Advisory Group, 2017); and Africa (South African Society of Physiotherapy, 2012). Given its global oversight of the profession and representativeness of the international physiotherapy community, further two documents published by World Physiotherapy were included: 1) (Standards of Physical Therapy Practice (World Physiotherapy, 2011); and 2) Quality Assurance Standards of Physiotherapy Practice and Delivery (European Region World Confederation for Physiotherapy, 2018). This was intended to serve as competency guidance for many nations where formal practice competency guidelines were not readily identifiable. A total of 11 major documents to analyze. The full list of competency standards and their respective origins can be seen in Supplemental File 1.

Step 3 was the “standardizing of competency levels”. As this work was a unique undertaking, there is no agreed upon approach to categorize or group

Table 1. Digital health physiotherapy practice keywords identified within WCPT/INPTRA digital physical therapy taskforce report (World Confederation for Physical Therapy, 2020).

Document	Associated digital health terms
WCPT/INPTRA digital physical therapy taskforce report	Artificial intelligence, Asynchronous, Audio, Broadband, Computer simulations, Connectivity, Database, Device, Digital communication, Digital consultations, Digital health, Digital interaction, Digital modalities, Digital Practice, Digital service, Digital Technologies, Digital tools, Digitally literate, Digitally-enabled, Document, Documentation, Electronic patient records, Email, Emerging technologies, Hardware, Information (and data), Innovation, Internet, Media, Phone (smart), Record, Remote monitoring, Robotics, Sensors, Social media, Software, Technologies, Technology platforms, Telecare, Telecommunication, Telehealth, Telemedicine, Telerehabilitation, Video, Video conferencing software, Video consultations, Video-based, Virtual reality, Wearable devices, Web 2.0

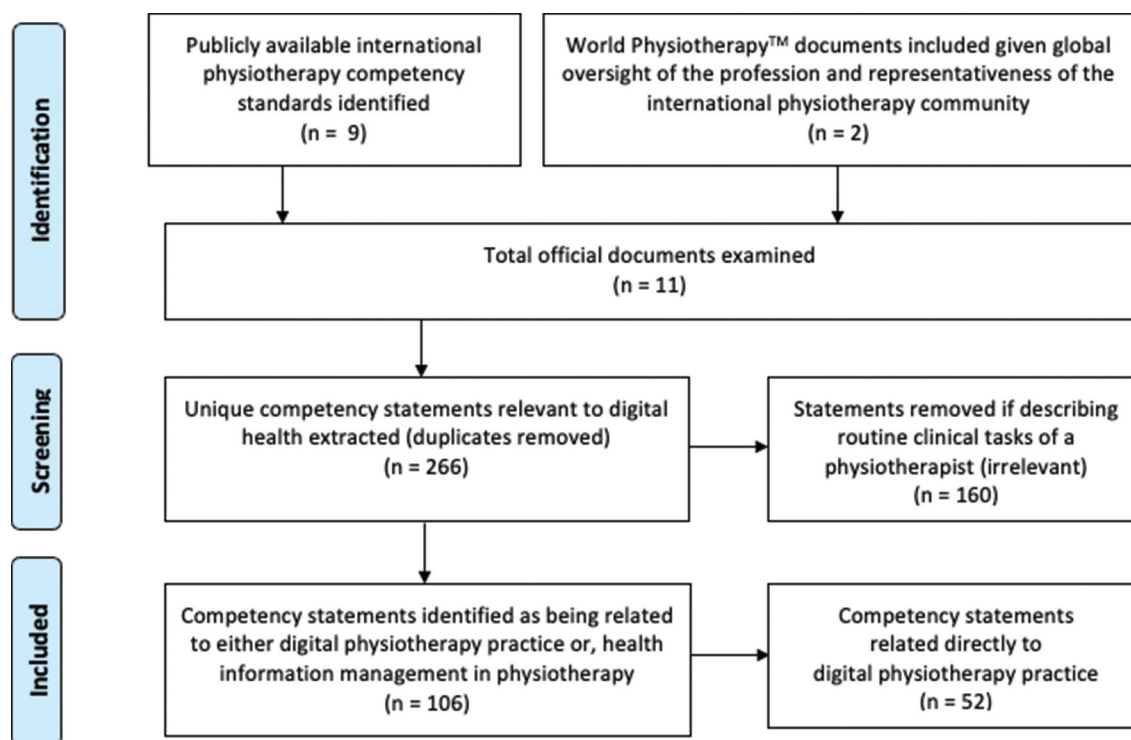


Figure 1. Study flow diagram.

competency standards within a given model. We developed a standard system to create greater homogeneity across the 11 documents analyzed so that competency statements may be comparable and contrasted (Butler-Henderson et al., 2020). Competency categorization varied widely across the international competency guidance documents. For example, groupings ranged from “role definition-key competencies-enabling components” (Australia/New Zealand); “domain-essential competencies-entry to practice milestones” (Canada); and “guideline-domain-sub domain” (WCPT). The authorship team reconciled the standardization into the following system of competency organization: “domain-key competencies-components” (e.g. communication-use communication tools and technologies effectively-employ assistive and augmentative devices to enhance communication). This provided a common nomenclature to enable competency statements across regional documents to be compared (Supplemental File 2).

Step 4 was “data extraction.” Competency statements from each of the 11 international documents were extracted according to the keywords identified in Step 1 (Supplemental File 3). “Statement” was defined as the entire sentence that contained one or more of the keywords. Lead author (MM) then reviewed and performed a final re-visit of all practice standards documents to ensure all keywords were identified. The competency statements (data) were exported into a Microsoft Excel

Spreadsheet. This data was represented alongside the document it came from, domain, key competency, and component which was the main competency statement.

Step 5 was “data cleaning.” The spreadsheet was reviewed for duplicates. A duplicate was identified where two or more keywords were seen in the same statement. These were removed. Data were then cleaned and analyzed against the study’s primary objective. Statements were coded by two investigators (MM/KBH) and then reviewed by the other authors. This coding schema applied followed that of similar research in this domain (Butler-Henderson et al., 2020): 1) Relevant to digital physiotherapy practice; 2) Relevant to health information management (HIM) but not directly to digital; and 3) Irrelevant, which included removing any statements that referred to routine clinical tasks that had no actual digital health connotations. Statements coded as “Relevant to health information management but not directly to digital” were kept to examine how many statements which relate to information management in the current state might foreseeably reflect digital practice.

Step 6 involved “deductive analysis of the competency statements.” Step 6 used TCA to organize the extracted data into related codes and themes. Using a deductive approach, these major themes were identified in complementary research examining digital health competency statements within allied health practice proficiency standards (Butler-Henderson et al., 2020):

data governance regarding how data is collected, stored, and used; data translation to information on how data is translated into meaningful information; digital technologies relating to technology use in the broader practical sense; and sub-themes (e.g. access and sharing, digital championing, and data analytics).

Step 7 involved “inductive analysis of the competency statements.” Not all statements examined in the present study fit comfortably under one of the sub-themes described in Step 6. Hence, the authors (MM/KBH) reviewed any non-coded statements and applied an inductive lens to identify any sub-themes latent within the statement to identify any new codes, to finally reconcile all statements.

Step 8 was the “final data classification.” Given the foreseeable implications of this work to education (university education and continuing professional development), each competency statement was further arranged according to 1) whether it was an “indicator” (pointer for something) or “cue” (signal for action), and 2) whether the statement represented “knowledge” or, “skill.” Knowledge-based competencies refer to understanding something. Whereas, skill-based competencies refer to applying, analyzing, or evaluating (Butler-Henderson et al., 2020). Consequently, statements were also given a Bloom’s level, which refers to “Bloom’s Taxonomy,” used to detail the underlying learning behavior expected for a given level (Anderson, Krathwohl, and Bloom, 2001). For example, knowledge of a concept is considered a lower level compared to higher level application or creation (Butler-Henderson et al., 2020; Jogerst et al., 2015). This task was performed by the lead author (MM) and author KBH given their expertise in these learning classifications.

Step 9 was “data analysis.” The final step in the analysis was to quantify the frequency of statements observed under each theme and sub-theme; this was performed in MS ExcelTM. Sub-analyses were conducted according to document origin, digital health relevance, competency type, and Bloom’s hierarchy.

Results

Summative reference to digital (health) physiotherapy practice was limited across the 11 international practice proficiency competency standards (Figure 1). After addressing duplicates, $n = 266$ unique statements were extracted. One-hundred and sixty statements were removed, as even though they may have contained a keyword, they were coded as routine clinical tasks of a physiotherapist (irrelevant) with little relevance to digital practice (e.g. “Identify, record, and answer questions

arising in daily work”). This left $n = 106$ competency statements identified as being related to either digital physiotherapy practice or HIM in physiotherapy for further analysis (Supplemental File 4). Fifty-two of 106 statements (49.06%) were related directly to digital physiotherapy practice (Figure 1). Competency statements were arranged by source document (region) and type (Table 2).

The Australian Physiotherapy Career Pathway Competence Framework Version 7.1 contained the greatest number of relevant statements in total ($n = 41$). The USA (FSBT and APTA documents) contained the least ($n = 1$ each). The Australian Physiotherapy Career Pathway Competence Framework (Version 7.1) contained the greatest number of digital-practice-related competency statements ($n = 24$).

Examination of three overarching themes

Supplemental File 5 provides an in-depth breakdown of all statements directly relating to digital health practice in physiotherapy ($n = 52$). Breakdown of digital health competency statements was as follows: digital health data governance ($n = 14$), digital health data translation ($n = 12$), digital health technologies ($n = 26$). Most competency statements refer to “skills” ($n = 42$). There was a mix of “cues” ($n = 26$) and “indicators” ($n = 26$). The majority of statements were situated at Bloom’s “apply” level ($n = 35$).

Digital Health Data Governance (Data)

The digital health data governance (“data”) theme refers to competency statements describing how health data is collected, stored, and used.

“Follow relevant policies regarding the appropriate use of electronic medical records”. (Australian Physiotherapy Association, 2023)

“Maintains and shares all documentation, correspondence, and records (eg paper, electronic) in compliance with applicable legislation and regulatory requirements including confidentiality and privacy standards” (Canadian Alliance of Physiotherapy Regulators, 2019)

There were 53/106 (50.00%) total statements across nine documents related to health data governance (digital or HIM). However, only 14/53 (26.41%) were specifically related to “digital health” data governance, across only four documents. These statements were further grouped according to the sub-themes of “Access and Sharing” (seven statements) and “Storage and Security” (six statements) (Supplemental File 5). 12/14 (85.71%) digital practice statements were considered “Skills”. Nine

Table 2. Frequency count of physiotherapy competency standards categorized according to digital practice or health information management context.

Country/Document	Digital health data governance (Data)	Digital health data translation (Information)	Digital Health Technologies	Total
	Digital Health Management (HIM)	Digital Health Management (HIM)	Digital Health (Technology)	
Australia: APA Physiotherapy Career Pathway Competence Framework Version 7.1	9	8	13	41
Australia/New Zealand: Physiotherapy practice thresholds in Australia and Aotearoa New Zealand	3	2	3	8
Canada: NPAG Competency Profile for Physiotherapists in Canada	3	1	4	9
Canada: Core Standards of Practice for Physiotherapists in Canada	7	1	1	16
ER_WCPT: Quality Assurance Standards of Physiotherapy Practice and Delivery	7	1	2	13
Ireland: Physiotherapists Registration Board Standards of Proficiency for Physiotherapists	2	0	1	3
South Africa: Standards of Practice of Physiotherapy (SOPP) in South Africa – The Legislation and Policy Environment	4	0	1	5
UK: HCPC Standards of Proficiency – Physiotherapists	2	1	1	7
USA: APTA Standards of Practice for Physical Therapy	0	1	0	1
USA: The Federation of the State Boards of Physical Therapy Standards of Competence	0	0	0	1
WCPT: Standards of Physical Therapy Practice – Guideline	2	0	0	2
TOTAL	39	15	26	106

considered “Cues”, compared to five at the “Indicator” level. Finally, six out of seven “Access and Sharing” related statements were judged to be Bloom’s “Apply” level (one at “Understand” level), whereas four out of seven “Storage and Security” statements were “Apply” level (two at “Understand” level).

Digital Health Data Translation (information)

The digital health data translation (“information”) theme refers to competency statements describing how health data is translated into meaningful information.

“Analyse and evaluate data available on their own practice outcomes to initiate improvements in service delivery and outcomes” (Australian Physiotherapy Association, 2023)

“Develops the knowledge, skills and abilities to communicate, manage knowledge, mitigate error and support decision-making utilizing information technology (informatics)” (Federation of State Boards of Physical Therapy, 2006)

Almost a quarter (27/106 (25.48%)) of the statements across eight documents related to the translation of data into information (digital or HIM). 12/27 (44.44%) were specifically related to digital health data translation across only three international documents. These statements were further organized into the themes of data analytics (one statement), digital championing (one statement), digital documentation (two statements), informatics to support research and evidence-based practice (two statements), participatory health (patient-centered care) (three statements), and working with digital health technology: communication and care (three statements) (Supplemental File 5). Eleven of 12 statements were considered Skills (91.67%). Six were considered “Indicators”, matched with six at the “Cue” level. Nine out of 12 statements were judged to be Bloom’s Apply level. One was at the “Analyze” and one at the “Create” levels.

Digital Health Technologies (technology)

The digital health technologies (“technology”) theme refers to competency statement describing technology use in a broader practical sense.

“Recognize the culture, level of language and technology proficiency, health literacy and comprehension ability of the client and relevant others and provide communication in accessible formats” (Physiotherapy Board of Australia and Physiotherapy Board of New Zealand, 2015)

“Use information and communication technologies appropriate to their practice” (Health and Care Professions Council, 2023)

Finally, 26/106 (24.52%) of the competency statements across eight documents related to the use of digital health technologies in physiotherapy practice (half of these found in the Australia: APA Physiotherapy Career Pathway Competence Framework (Version 7.1) document). Several sub-themes emerged relevant to this theme (Supplemental File 5): Digital championing (five statements); digital professionalism (seven statements); participatory health (patient-centered care) (eight statements); and working with digital health technology: communication and care delivery (six statements). Nineteen of 26 statements were considered “Skills”. Sixteen were considered “Indicators”, compared to 10 at the “Cue” level. Fifteen statements were at the Bloom’s Apply level, while six were classified as either Knowledge or Understand. A further four at the “Create” and one at “Evaluate” levels.

Commentary on Digital Physiotherapy Practice across all international Practice competency standards

Ten out of 11 international standards contained at least a single reference to digital physiotherapy practice in their competency statements. Only four documents included three or more digital practice statements: 1) Australia: APA Physiotherapy Career Pathway Competence Framework Version 7.1; 2) Physiotherapy practice thresholds in Australia and Aotearoa New Zealand; 3) NPAG Competency Profile for Physiotherapists in Canada; and 4) UK: HCPC Standards of Proficiency – Physiotherapists. Of these documents, 21/36 (58.33%) of digital health competency statements were from the Digital Health Technologies (Technology) theme, with 10 statements (27.78%) from the Digital Health Data Translation (Information) theme.

Discussion

This examination of international physiotherapy practice competency standards published in the English language indicates a dearth of practice competencies regarding digital health. The study identifies the following three primary focal areas for future attention: 1) A dearth of digital health competencies: Digital health-related competencies are rarely referenced in international professional physiotherapy competency standards; 2) Lack of clear guidance: Where digital health

is referenced, the associated competency statements are often heterogeneous or reference digital health in the general sense; and 3) Higher-order skill development warranted: Digital health competencies are mostly pitched at the level of skills, and situated at Level three (apply) and below on Bloom's taxonomy.

A Dearth of Digital Health competencies

A little less than 26% of sourced competency statements directly reference digital health practice in physiotherapy as part of the expected competency profile of physiotherapists. In a rapidly progressing digital age, this begs the question of whether physiotherapy graduates or, existing members of the physiotherapy workforce are currently well prepared for the advancements and challenges of an increasingly digital era (Davies et al., 2021, 2023; Merolli et al., 2022). This is in direct alignment with the findings by this study's authors (MM/KBH) examining digital health competencies within practice standards of Australian registered health professionals (Butler-Henderson et al., 2020).

Notably, because countries or regions have differing health systems, including the cultures and contexts in which they serve, and varying approaches to how physiotherapy is delivered, it is prudent to acknowledge that the aims of this study have not been to design or dictate a unified standard in digital health physiotherapy care. This is an area worthy of further attention in research to which the authors are currently engaging but beyond the scope of the present study. However, as a pivotal first step, it has provided the first and only synthesis of digital health practice in the context of formal physiotherapy competency expectations. It emphasizes the importance of digital health competency in the present age (Bichel-Findlay et al., 2023; Brunner et al., 2018; Nazeha et al., 2020) and offers a roadmap that may guide and support our professional associations in updating their competency standards, and universities in developing curriculum that supports higher-level learning of digitally supported practice.

The present study highlights that within existing physiotherapy practice competency standards globally, "health information management" is a key competency area. This has key connotations to education and continuing professional development, as health-related data and information is increasingly collected or documented, stored, secured, and shared electronically (Merolli et al., 2022). Arguably, this will only become of increased importance with greater adoption and integration of digital clinical systems (i.e. electronic health records) (Dinh-Le, Chuang, Chokshi, and Mann, 2019)

and more widespread availability and advances in generative artificial intelligence technologies (e.g. ChatGPT) (Eysenbach, 2023; Tack, 2019). The findings of this study showed that within physiotherapy practice competencies, "digital health data governance" is already the primary focus of extracted statements (53/106 (50.00%)) related to health information management or, digital health use specifically.

Lack of clear guidance

Interestingly, theme three refers to the broad practical application of "digital health technologies". Only around 25% of all competency statements make explicit reference to the practical use of digital health technologies in this regard (e.g. delivery of a digital intervention and virtual models of care). Most of those competency statements refer to digital health and technology in a general sense, not setting competency expectations to use specific technologies (e.g. "Recognize when the client's access to physiotherapy could be improved by resources such as technology and take action to facilitate that access when relevant") (Physiotherapy Board of Australia and Physiotherapy Board of New Zealand, 2015). Generalized statements such as this, while providing a useful signpost for digital health competency, are loosely interpreted and problematic. For instance, 1) a disconnect between competency and action: While digital health competencies are identified, they do not always readily describe the tangible clinical activities to be performed (Ten Cate and Taylor, 2021); and 2) limited reference to a raft of technological applications: Throughout all digital health competency statements analyzed, only two specific technologies are explicitly referenced: electronic medical records and social media. Highlighting the COVID-19 pandemic as one reference point, virtual models of care focusing on telehealth have been elevated to the top of the digital agenda for physiotherapists (Bennell et al., 2021; Dantas, Barreto, and Ferreira, 2020; Davies et al., 2021; Lee and Lee AC, 2020; Malliaras et al., 2021; Rausch et al., 2021). Interest and awareness around artificial intelligence and its potential and impact on physiotherapy is another area garnering increased attention (Eysenbach, 2023; Tack, 2019). Telehealth and artificial intelligence are just two select examples relevant to physiotherapy. Further attention to a range of technologies is warranted when considering the competency profile of physiotherapists to use digital health.

Higher-order skill development warranted

The present study also identified that near 80% of physiotherapy competency statements that are directly related to digital health practice ($n = 52$), are considered “skills”. Despite a mix, many statements describe lower orders of Bloom’s taxonomy (e.g. remember, understand, and apply). This has implications for education learning design and workforce development. Lower-order levels in this case involve more basic knowledge and comprehension, while higher-order levels refer to more complex activities such as analysis, synthesis, evaluation, and creation. Evidence of this in practice can be seen in research involving the first author into telehealth use by physiotherapists during the emergence of the COVID-19 pandemic (Malliaras et al., 2021). It indicated that while many physiotherapists quickly mobilized to technology-supported practice, several lamented their lack of skills and formal training in leveraging technology to its fullest potential outside of basic knowledge. In the context of the present study, many physiotherapists may not regularly engage with digital health at higher-order levels because it is not currently required within practice competency standards. To further complicate this area of scholarship even more, if digital health competency expectations were to grow, the current workforce would arguably be lacking sufficient mentors to support their advancement.

Limitations

The present study is not without its limitations. It is duly acknowledged that practice competency standards are likely to be updated and that digital health competencies will become more apparent over time. The hope is that the present seminal work will prompt further development of such competency standards. The HPCP (UK) released a snapshot report about their updates to the “standards of proficiency” to be put into effect from Sept 2023 (Health and Care Professions Council, 2023). The report goes to great length to emphasize physiotherapist’s growing need to be digital health literate and, hence, they provide more direct reference to digital health in updated competency standards.

Furthermore, a handful of documents continue to emerge detailing the importance of physiotherapists’ engagement with digital health. Despite such documents not being official competency standards and thus, not meeting inclusion criteria for analysis, it is important to acknowledge their existence as they too support greater visibility of digital health capability within the international physiotherapy workforce. For example, select documents

include reference to technology in the (World Physiotherapy, 2019) Standards of Physical Therapist Practice Policy Statement (World Physiotherapy, 2019) and information from the HPCP (UK) about engaging with technology (Health and Care Professions Council, 2022). This too is evident in APTA’s (USA) recent white paper, “The Digitally Enabled Physical Therapist: An APTA Foundational Paper” (American Physical Therapy Association, 2022). APTA aptly provides an overview of the current digital health landscape for its members, and advocates for the confident uptake and engagement with digital health technology by physical therapists.

The 11 competency documents that were analyzed in the present study represent a significant proportion of the global English-speaking physiotherapy workforce. However, while all endeavors were made to systematically search for professional organizations’ competency standards, it is possible that there are other select jurisdictional documents pertaining to practice competencies that were missed at Step 2 and not included in this study. While diligent care was taken to scour the international coverage of official practice competency literature tied to major peak organizations, it is possible that some were omitted. This is possible in large geographies where physiotherapy is regulated at the individual state level, not just nationally. Similarly, the documents examined are far more representative of developed countries, and the northern hemisphere compared to the southern. Several jurisdictions may not be represented and/or may not publish these documents in English.

Furthermore, as previously introduced, another key concept to delineate is that of the individual practice competency, the focus of this study, converse to university program accreditation (i.e. regulation of university curriculum). Similarly, there exists a raft of literature surrounding practice accreditation which refers to whether individual/physical centers or practices are meeting certain quality standards. While both “education accreditation” and “practice accreditation” are related to the present study and findings may inform future endeavors, these were not the focus here and, hence, literature and documentation specific to the accreditation of universities and individual practices, were considered outside the scope of this research.

Finally, as described above in “Research characteristics, reflexivity, and context”, the authors’ countries of origin may create some bias in interpretation of the practice standards. However, as indicated, the authors possess a high-level of expertise in the field and represent aspects of professionalism relevant to physiotherapy clinical practice, physiotherapy academia, and digital health academia, and industry engagement.

Conclusions

The present study highlights that digital health physiotherapy practice is currently under-represented in international professional competency standards. As the workforce continues to expand alongside rapid advancements in digital technology, it is prudent that peak organizations look to update their professional practice competency standards to reflect this. Over time, this will make clear the proficiency standards expectations for the use of digital health in practice. Similarly, universities and providers of continuing professional development would be wise to consider curriculum updates to prepare graduates, and better reflect knowledge and skills in digital health.

To further support progress in this area, work-in-progress by the authors aims to identify and describe universally standardized visible actions that help enact digital health competency in physiotherapy. This aims to help develop a clearer understanding of what digital health competency looks like in practice. Finally, the international physiotherapy community has the opportunity to band together and share knowledge and best practices surrounding digital health. Professional networks/communities, research projects, conferences, and other activities may assist in advancing digital health in physiotherapy.

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