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REVIEW ARTICLE

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Fostering the discussion of planetary health in occupational therapy and physiotherapy

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Abstract

Introduction: Occupational therapists and physiotherapists aim to promote health, prevent various diseases and help people in their rehabilitation processes. So far, there is a paucity of understanding of the big picture of how the new paradigm of planetary health (PH) is connected to the education and practice of these professionals.

Methods: This research aimed to address this gap by investigating and deploying a bibliometric analysis to elucidate the pivotal role of occupational therapists and physiotherapists in addressing PH challenges. The ultimate goal is to construct a comprehensive framework crosschecking the bibliometric analysis and the collection of 10 case studies selected by experts to outline how best practices in occupational therapy and physiotherapy, related to the three pillars of sustainability and the UN's Sustainable Development Goals (SDGs), can contribute to increasing PH.

Results: The bibliometric analysis revealed four major research strands: 1) enhancing patient care and quality of life; 2) integrating sustainability in health care and rehabilitation; 3) professional development and clinical competence; and 4) evidence-based practice and quality improvement. Moreover, further temporal analysis revealed how the topic evolved, from advancing evidence-based practice and clinical effectiveness, exploring the strengthening of health care and person-centred practices, to connecting the topic to aspects also predicted by the SDGs, such as integrating environmental and climate concerns in therapy and addressing psychological and self-care impacts on health. The case studies confirmed this trend, and a framework of PH in occupational therapy and physiotherapy through the lens of the SDGs was developed to support future research and practitioners in advancing this research field.

Conclusions: Occupational therapists and physiotherapists are essential players in public health and can integrate sustainability at every level of

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practice, from using resources during therapy sessions to advocating for more sustainable lifestyles.

PLAIN LANGUAGE SUMMARY

Occupational therapists and physiotherapists aim to promote health, prevent diseases and help people recover. However, there is uncertainty about how they could contribute to the planetary health paradigm in their education and practice. This research aimed to investigate the role of occupational and physiotherapists in addressing planetary health challenges, utilising a bibliometric analysis and case studies to show how best practices can improve planetary health. The analysis showed four ways that a contribution can be made: 1) improving patient care and quality of life, 2) integrating sustainability in health care and rehabilitation, 3) developing clinical competence and professional skills, and 4) using evidence-based practices and quality improvement. The research also shows that the topic evolved from evidence-based practice and clinical effectiveness to connecting the topic to aspects predicted by the Sustainable Development Goals. The case studies confirmed this trend, and a framework of planetary health in occupational therapy and physiotherapy was developed. In conclusion, occupational therapists and physiotherapists play an essential role in planetary health and can integrate the paradigm into every level of practice, by using resources during therapy sessions and advocating for more sustainable lifestyles.

KEYWORDS

climate change, occupational therapy, physiotherapy, planetary health, sustainable development goals

1 | INTRODUCTION: THE IMPORTANCE OF PLANETARY HEALTH IN OCCUPATIONAL THERAPY AND PHYSIOTHERAPY

Planetary health (PH) can be briefly defined as "the health of human civilisation and the state of the natural systems on which it depends" (Horton & Lo, 2015). In other words, PH is characterised by the relationship between human-caused disruptions of Earth's natural systems and the impact on human health (Whitmee et al., 2015). Since the term was coined, a movement towards shifting away from the understanding of Cartesian aspects of public health and providing space for a more systemic concept considering the environmental, economic and social systems has advanced the aspect of how taking care of the natural systems and its connections to human health took place (Horton et al., 2014; Horton & Lo, 2015). Therefore, while public health focuses on disease prevention and prolonging life and health promotion through organised societal efforts (Acheson, 1988), PH is based on a holistic assumption in which the health of a community is intrinsically linked to global health (see. Horton et al., 2014; Myers, 2017; Redvers, 2021).

Key Points for Occupational Therapy

- Physiotherapists and occupational therapists have significant potential in addressing planetary health challenges.
- Incorporating sustainability into the practices can have positive effects, such as fostering environmental responsibility.
- To better integrate sustainability practices, professionals in these fields may explore and develop new therapies, technologies, or interventions.

It is already widely recognised in the literature that healthcare procedures could contribute to climate change and environmental degradation considering carbon emissions, waste production, plastic pollution, toxic waste and other factors that directly impact environmental

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sustainability (Sherman et al., 2020). However, it remains uncertain whether healthcare professionals are aware of the pivotal role that health care plays in contributing to PH. For example, one previous study with health professionals from Africa highlighted that most participants were unaware of the meaning of "environmental sustainability in practice" but agreed that a lack of knowledge related to "environmental sustainability in the healthcare sector has an impact on our environment". Nonetheless, the authors reported that approximately 58% of the professionals disagreed that the healthcare sector was taking care of environmental sustainability during their procedures (Lister et al., 2022).

The World Health Organisation (WHO) recently indicated four different PH strategies directly related to the health community. These strategies included I) the education of professionals to identify and minimise climate change, II) developing strategies, III) training professionals to take action about PH in the health sector, and IV) protecting the health of future generations (WHO, 2021). Since then, researchers have started discussing PH in several fields, especially human health. For example, one field has explored the possible impacts of human action in jeopardising the environmental system, compromising the achievement of sustainable development goals (SDGs) and how this could negatively affect human health. For example, human action can promote climate change, increase the incidence of tropical diseases (Booth, 2018; Tidman et al., 2021) or even increase air pollution, endangering human health and leading to or aggravating cases of acute respiratory distress syndrome (ARDS) (Booth, 2018; Estrella et al., 2019).

Given the importance of the field, scholars have been inclined to study the connection between PH and health care practices, for example, from nursing and medicine to dentistry and nutrition education and training (Duane et al., 2019; Hemler & Hu, 2019; Kurth, 2017; Omrani et al., 2020). In addition, recent literature has recognised the importance of considering the PH paradigm in the training of future health professionals since they are the ones who will face several public health challenges connected to the planetary crisis (Shaw et al., 2021). On the other hand, this is due to the analysis of the pedagogical and political plans of undergraduate and postgraduate programs in specific countries. This can be attributed to how health programs can embrace essential competencies and concepts such as interconnectedness within nature, systems thinking and complexity, equity and social justice, the Anthropocene and health, movement building and plan changes, as well as the need for anthropogenic changes at a planetary scale (Guzmán et al., 2021).

Most recently, PH has started to be discussed in other professions, such as occupational therapy and physiotherapy. The literature regarding the role of PH, occupational therapists and physiotherapists in clinical practice is scarce. However, the intrinsic relationship between the topics arises from the activities/responsibilities led by these professionals. From this perspective, occupational therapists and physiotherapists recognise that an active lifestyle is essential for health promotion and disease prevention. Blue and green spaces (i.e., water activities or outdoor exercises, in considering parks and public spaces) suggest the practice of physical activities, which can improve physical and mental well-being and increase the amount of physical activity (Feng et al., 2021). For the population to enjoy these spaces and their benefits, preserving biodiversity and the ecosystem's health is essential. In turn, occupational therapists and physiotherapists can develop and plan appropriate spaces that allow the integration of communities, cities and ecosystems (Palstam et al., 2022). Moreover, these professionals have an active and vital role in the care of patients admitted to intensive care units, where it is easy to notice the constant need for consumption of energy for machines that are connected for 24 hours, despite the usage of disposable materials or even the need for cleaning or incineration of materials that were already used.

These critical aspects could contribute to PH since they have specific roles in human health, contributing to the health of the present and future generations. For example, Maric and colleagues argue about the importance of professionals moving beyond the standard practices related to the interventionism of health care (Maric et al., 2021; Maric & Nicholls, 2022) and adopting what is called environmental physiotherapy, which is based on ecological awareness and multispecies justice. In addition, the literature also states the importance of considering sustainable development aspects (e.g., climate change, ecological crisis) in occupational therapy education and practice, with concepts such as ecologically sustainable occupational therapy and eco-social occupational therapy, where authors agree on the importance of professionals guaranteeing ecology and social justice through occupation (Hudson & Aoyama, 2008; Lieb, 2022).

Despite the evident importance of occupational therapists and physiotherapists in contributing to sustainability challenges and their connection to the PH paradigm, this field has not yet been fully explored by researchers since there is a lack of understanding of how these professions are connected to PH and sustainable development when compared with the advanced research conducted in medicine and nursing. Therefore, this paper aims to address this gap by performing an investigation deploying bibliometric analysis based on the co-occurrence of terms and case studies drawn from the literature.

The findings of this paper are twofold. First, the authors were able to elucidate the pivotal role of occupational therapists and physiotherapists in addressing

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PH challenges. Second, from the results of the bibliometric analysis and the case studies, a comprehensive framework was built to outline how occupational therapy and physiotherapy are related to the three pillars of sustainability and how the SDGs can contribute to improving PH.

2 | METHODS

To address the paper's goals, the authors conducted a bibliometric assessment of the literature to understand what the literature has broadly covered about occupational therapy and physiotherapy and how it is connected to PH and other related concepts. In the second stage, the authors conducted an expert-driven literature review by judiciously identifying a set of 10 recent studies published in top journals, which could contribute to deepening the discussion exclusively on the education and practice of these professions and further connections to PH. Subsections 2.1 and 2.2 outline the data collection and data analysis strategies used in this paper.

Positionality statement: As a diverse interdisciplinary author team, with different cultural, socio-economic, and educational backgrounds, we acknowledge that our personal experiences may shape our interpretation of data and influence our analysis. Nonetheless, we aim to remain objective during the research process, as well as when interpreting our findings.

2.1 | Data collection strategy

The authors created the search string presented in Table 1 to collect the data. The search string was created into two blocks of questions. The first block considered terms related to the professions of occupational therapy and physiotherapy and further connections to the training and practice of these professions. The second block of terms, in turn, is associated with PH and sustainable development aspects.

After applying the search string, the authors selected papers published in English and those directly connected to this study's research goal. The final sample used to conduct the bibliometric analysis included 419 papers (Table 1).

It is worth considering that creating an ideal search string (Eustachio et al., 2023; van Eck & Waltman, 2014) was a process that involved 10 experts in matters related to sustainable development, PH, occupational therapy and physiotherapy moving back and forth to identify the best terms that could lead to finding significant results.

To collect data (scientific documents), the authors adopted the Scopus database since it is one of the most complete academic databases, with more than 17 million researcher profiles, 90 million curated documents and 7,000 publishers accessed. Moreover, Scopus also comprises other databases, such as Pubmed, and has 20% more coverage than Web of Science (see Falagas et al., 2008; Scopus, 2023; The University of Auckland, 2023).

Finally, from the sample of 419 papers identified, the authors selected 10 articles considered worthy of exploring case studies to deepen the discussion of the possible streams between occupational therapy and physiotherapy in the context of PH and sustainability.

TABLE 1 Search strategy.

Database	Search string	Entries
Scopus	TITLE-ABS-KEY ((“physiotherapy” OR “physiotherapist*” OR “physical therapy” OR “physical therapist*” OR “occupational therapy” OR “occupational therapist*” OR ((“physical therapy” OR “physiotherapy”) W/3 (“rehabilitation” OR “clinical practice” OR “clinical” OR “education” OR “modalit*”))) AND (“planetary health” OR “sustainability” OR “sustainable development goals” OR “SDG*” OR “climate change”))	419

2.2 | Data analysis strategy

The authors relied on the co-occurrence of terms for the bibliometric analysis. This quantitative technique is commonly used when researchers aim to reduce the complexity of a research field and discover emerging trends by revealing possible research strands in the literature (Mejia et al., 2021).

The co-occurrence technique is related to the frequency with which two or more terms co-occur in a text, such as a paper's title, keywords or abstract. This facilitates a systematic content analysis with different clusters. The output of this technique is the co-occurrence map (Figure 1), where the size of the nodes represents the frequency with which a term appears in a specific section, and the width of the connection represents the connection strength between the terms. Finally, the closer a term (or node) appears to each other, the greater the co-occurrence frequency, generating a thematic cluster (Tijssen & Van Raan, 1994; van Eck & Waltman, 2011; van Eck & Waltman, 2017).

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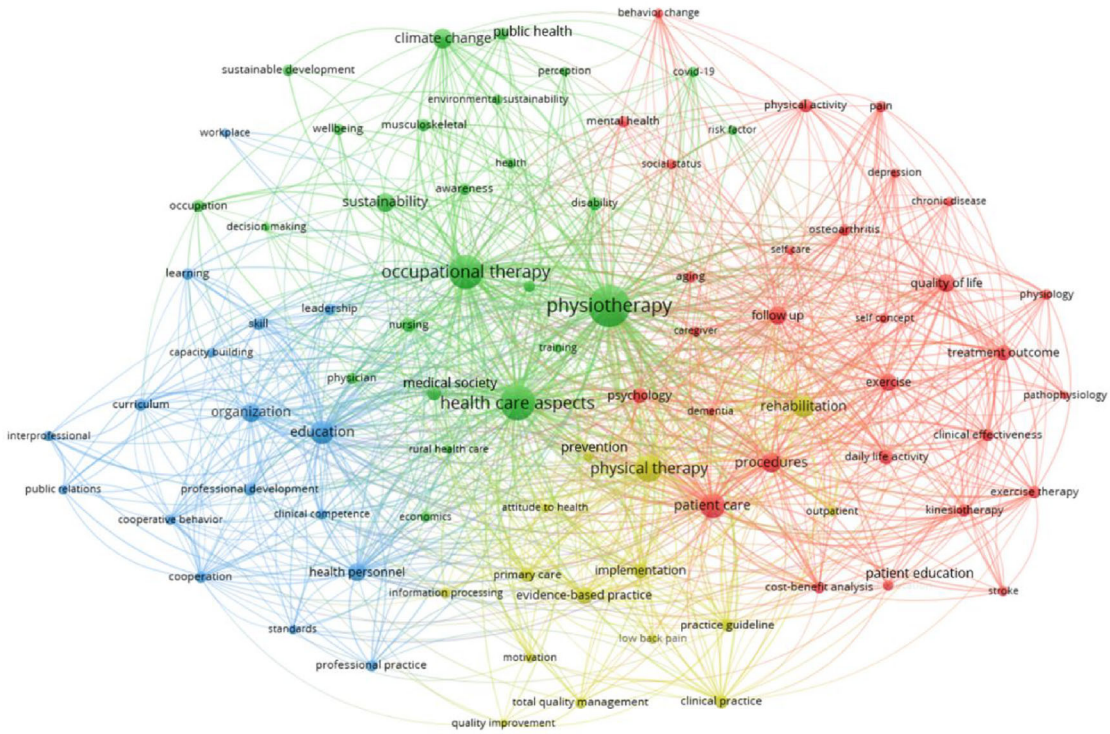

Cluster 1	Cluster 2	Cluster 3	Cluster 4
Enhancing patient/person care and quality of life	Integrating sustainability in health care and rehabilitation	Professional development and clinical competence	Evidence-based practice and quality improvement

FIGURE 1 Co-occurrence of terms health care aspects, occupational therapy and physiotherapy.

All the papers selected were exported into a single Excel spreadsheet and uploaded to VOS viewer software (VOSviewer, 2023) to perform the analysis. Before producing the final output, the authors used the Thesaurus Excel file ("replace by" file) to standardise different synonym terms, generating a cleaner graph (Figure 1). This Excel file is composed of two columns, the first one stating all keywords given in the analysis and the second one containing the standardised terms that researchers opted to replace in the first column (van Eck & Waltman, 2014).

In addition to the bibliometric analysis, the authors selected 10 case studies from the sample of papers identified after applying the search string (Table 1) and conducted an expert-driven review of the literature to make the following discussion tangible and complement the results from the bibliometric analysis.

Finally, in the last stage, the results were cross-checked against the results from the co-occurrence analysis to produce the framework of PH in occupational therapy and physiotherapy and through the lens of the SDGs. This process of organising the information gathered from the literature reviews was based on some papers published in the sustainable development field (Leal Filho et al., 2024).

3 | RESULTS AND DISCUSSION

3.1 | Bibliometric analysis

The results of the co-occurrence analysis revealed four main clusters that can be seen as research directions in which scholars have investigated the intersection of PH with occupational therapy and physiotherapy. The results are shown in Figure 1, showing an emphasis on 1) enhancing patient care and quality of life, 2) integrating sustainability in health care and rehabilitation, 3) professional development and clinical competence, and 4) evidence-based practices and quality improvement.

3.1.1 | Red cluster: enhanced patient/person care and quality of life

The red cluster is the largest in number of terms (28 nodes). This cluster focuses on improving patient care and enhancing quality of life through occupational therapy and physiotherapy interventions (Kalkdijk-Dijkstra et al., 2020; Quehenberger et al., 2014; Yim et al., 2015).

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It includes research related to patient education (Galán-Martín et al., 2019; Weber et al., 2023); exercise therapy (Sadural et al., 2022; Subramanian, 2017); treatment outcomes; and clinical effectiveness (Gbiri & Akumabor, 2023; Lo et al., 2017; Naylor et al., 2018; Van Criekinge et al., 2017). Topics such as psychological well-being; chronic disease management (De Maeseneer et al., 2022; Harrison et al., 2015; Houchen et al., 2009); physical activity (Johnson et al., 2022; Krops et al., 2018; Paim et al., 2022); and behaviour change (Johnson et al., 2022; Shikako et al., 2023) are explored to better understand how therapeutic interventions positively impact patients' lives.

3.1.2 | Green cluster: integrating sustainability in health care and rehabilitation

The green cluster has the second greatest number of terms (22 nodes). This cluster centres on integrating sustainability principles in health care and rehabilitation practices. It involves research on various aspects, such as environmental sustainability (Lieb, 2022; Stanhope et al., 2023); public health; climate change (Garcia Diaz & Richardson, 2021); and the SDGs (Banerjee & Maric, 2023; Palstam et al., 2022). Additionally, it addresses healthcare decision-making; well-being (Maric & Nicholls, 2022); and the impact of sustainable practices on musculoskeletal (McKenzie et al., 2022) and rural health care (Allen et al., 2015; Johnston et al., 2016; Kim et al., 2021). Scholars in this cluster investigated ways to align healthcare practices with sustainable development objectives.

3.1.3 | Blue cluster: professional development and clinical competence

This cluster has 16 nodes, and it focuses on the professional development and clinical competence of health personnel in the context of occupational therapy and physiotherapy (Clark et al., 2019; Murebwayire & Yusuph Abiodun, 2021; Nozedar & O'Shea, 2023; Wagman et al., 2020). It includes topics related to education (Hess & Rihtman, 2023; Olsen & Jentoft, 2023; Pollard et al., 2020; Wagman et al., 2020); leadership, curriculum and cooperative behaviour (Lewis & Gill, 2023; Mayer et al., 2023). Scholars in this cluster explored how to enhance the skills and knowledge of health professionals, foster interprofessional cooperation, and improve the quality of professional practice in the field.

3.1.4 | Yellow cluster: evidence-based practice and quality improvement

Yellow Cluster has 15 nodes, and it revolves around evidence-based practice and quality improvement in the context of occupational therapy and physiotherapy (Ataman et al., 2022; Maas et al., 2017; Perraton et al., 2017). It encompasses research on prevention; practice guidelines; clinical practice; and total quality management (Baroni et al., 2023; Moore et al., 2021; Perraton et al., 2017; Sadural et al., 2022; Tawiah et al., 2021; van Bochove-Waardenburg et al., 2023). Scholars in this cluster investigated the use of evidence-based approaches, implementation of guidelines, and continuous quality improvement to enhance the effectiveness and efficiency of therapeutic interventions.

In summary, the four clusters identified in the co-occurrence analysis represent research avenues within the domain of PH in occupational therapy and physiotherapy. These clusters provide valuable insights into the different aspects and directions of research at the intersection of the PH and therapy disciplines.

After the thematic analysis of these four clusters, it was also possible to observe how the discussion around these themes evolved over time. Figure 2 shows the temporal development of these clusters, and the following sub-items discuss them.

3.1.5 | 2016–2017 cluster: advancing evidence-based practice and clinical effectiveness

In 2016, research in this cluster focussed primarily on advancing evidence-based practice and clinical effectiveness in occupational therapy and physiotherapy (Coppack et al., 2016; van der Wees et al., 2016). Scholars have explored topics related to curriculum development; cooperative behaviour; cooperation; and professional development (Martins, 2016; Miller, 2016). The cluster also included investigations into the economic aspects of therapy interventions and the use of information processing and cost–benefit analysis to improve clinical decision-making (Hartl, 2016). Throughout 2016, there was an emphasis on understanding the physiological and pathophysiological aspects of therapy outcomes, especially in the context of aging. The findings suggest that researchers in this period were dedicated to establishing evidence for therapeutic approaches and understanding the factors influencing clinical effectiveness, providing a solid foundation for evidence-based practice.

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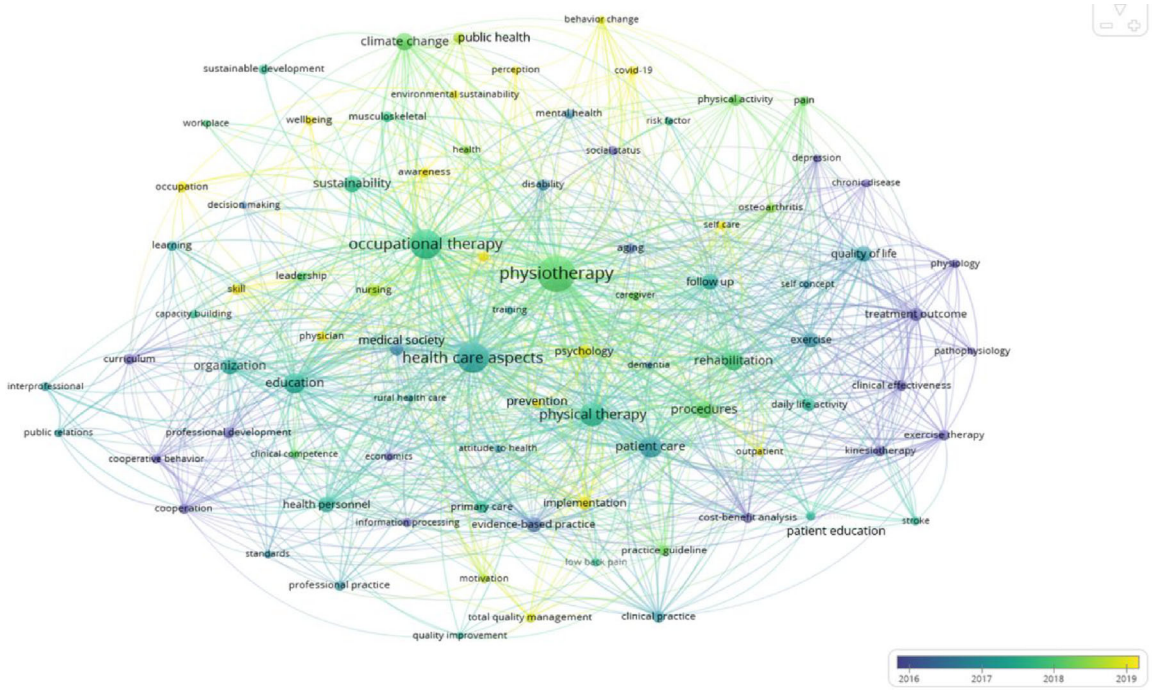

2016-2017	2017 – 2018	2018-2019	2019 or later
Advancing evidence-based practice and clinical effectiveness	Strengthening health care and patient/person-centred practices	Integrating environmental and climate concerns into therapy	Addressing psychological and self-care impacts on health

FIGURE 2 Temporal cluster through co-occurrence of terms health care aspects, occupational therapy and physiotherapy.

3.1.6 | 2017–2018: strengthening health care and patient/person-centred practices

In 2017, research in this cluster centred on strengthening healthcare practices and focusing on patient-centred care in occupational therapy and physiotherapy (Chu & Cheung, 2017; Helewa et al., 2017). Topics such as organisation, education, and healthcare aspects were investigated to improve the quality of patient care. Scholars have also examined patient attitudes towards health; primary care interventions; and the impact of clinical practice on quality improvement and follow-up procedures (Chu & Cheung, 2017; Cipriani, 2017; Davies, 2017; Maas et al., 2017). Additionally, studies have explored patient education and self-concept as crucial aspects of enhancing the quality of life of them. The emphasis on patient/person-centred care and quality improvement in this period indicates a shift towards addressing patients' needs and experiences in therapy settings.

3.1.7 | 2018–2019: integrating environmental and climate concerns into therapy

The research focus in 2018 shifted towards integrating environmental and climate change considerations in occupational therapy and physiotherapy (Söderlund, 2018). This cluster included studies related to physiotherapy; rehabilitation; physical activity; and pain management, focusing on their environmental implications and the impact of climate change (Smith et al., 2018; Storr et al., 2018). Leadership and clinical competence have also been investigated in the context of environmental challenges and climate change adaptation (Kent et al., 2018; Neiterman et al., 2018; Söderlund, 2018; Storr et al., 2018). The findings suggest that researchers in this period recognised the importance of aligning therapy practices with the SDGs and addressing environmental concerns.

3.1.8 | 2019 or later cluster: addressing psychological and self-care impacts on health

In 2019, research in this cluster primarily addressed the impacts of psychological and preventive approaches on occupational therapy and physiotherapy health. Scholars have investigated psychology; nursing; skill development; occupation; and well-being to understand the broader psychological aspects of therapy outcomes (Maindet et al., 2019; McEwen et al., 2019; O'Connor et al., 2019; Shire et al., 2019). The cluster also included studies on

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prevention strategies; self-care; outpatient care, and promoting wellness and preventive approaches (Boey & Warren, 2019; Hansen et al., 2019; Hurley et al., 2019). Additionally, the impact of awareness, perception, public health, and behaviour change on therapeutic outcomes was explored. The emergence of COVID-19 as a prominent theme in this period indicates a shift towards understanding the implications of the pandemic for therapy practices and patient well-being.

Overall, the evolution of research themes from 2016 to 2019 revealed an increasing focus on evidence-based practices and clinical effectiveness for patient/person-centred care by adding environmental considerations and psychological impacts on health. The increasing attention given to sustainability and climate change in Cluster 3 indicates a growing awareness of PH concerns within therapy disciplines. Additionally, the emergence of COVID-19-related research in Cluster 4 highlights the adaptability of therapy research to address contemporary health challenges. These changes signify the dynamic nature of occupational therapy and physiotherapy research, reflecting a response to evolving societal needs and priorities.

3.2 | Case studies

The 10 articles presented in Table 2 were selected from an initial sample of 419 papers. These are recent articles published between 2019 and 2023 in top journals, which can contribute significantly to the deepening of the discussion on the education and practice of occupational therapy and physiotherapy and their connections with PH and sustainability. In cases 1 to 6, there are articles from the field of physiotherapy, except for case 4, which addresses the healthcare education area in general, and cases 7 to 10, which are from the occupational therapy field. When relating the cases to the first cluster classification, we can connect the red cluster with cases 1, 5 and 7; with the green cluster, cases 2, 3, 6, and 8; with the blue cluster 3, 4, 7 and 9, and with the yellow cluster, cases 8 and 9. The countries included in the references in the cases are the US (Lieb, 2022; Toner et al., 2021), Australia (Astell-Burt et al., 2022; Stanhope et al., 2023), the UK (Hess & Rihtman, 2023; Pollard et al., 2020; Reagon, 2022; Walpole et al., 2019;) and Norway (Maric et al., 2021; Maric & Nicholls, 2022).

Human health largely depends on the stability of the natural environment, which is destabilised because of human activity (Maric & Nicholls, 2022). In practice, a PH approach offers a way to prevent further destabilisation of the natural environment, reducing the environmental footprint of the healthcare system while also strengthening the resilience of the population and healthcare systems to ecological and climate change (Toner et al., 2021; Walpole et al., 2019).

Various initiatives and interventions have been established to introduce the concept of PH into the practice and education of occupational therapy and physiotherapy. For example, the Environmental Physiotherapy Agenda 2023 calls for action for physiotherapy education institutions to include PH in their curricula; by 2021, more than 300 individuals, 25 global health organisations and more than 26 physiotherapy educational institutions had committed to doing so (Maric et al., 2021). In the same vein, the Sustainable Healthcare Education Network established three learning objectives for sustainable healthcare education: a) examining interactions between the environment and human health, b) promoting knowledge and skills to improve the environmental sustainability of healthcare systems, and c) emphasising the duty of health professionals to protect and promote health and the dependence of human health on local and global environments (Walpole et al., 2019). However, clinical educators at the faculty and dean level often resist the implementation of PH in curricula, as they are frequently either not aware of its importance or tend to focus on treatment rather than prevention (Walpole et al., 2019). As a result, no strategies or skills for environmental and sustainability policy implementation within occupational therapy education have been widely established (Hess & Rihtman, 2023).

As professional norms are often heavily based on the culture from which a profession emerges (Lieb, 2022), special attention should be given to the cultural and societal ideals that underpin occupational therapy and physiotherapy to gain a better understanding of how cultural and societal ideals influence decision-making. Modern Western healthcare philosophy is heavily influenced by Western values such as individualism, mastery of the environment, capitalism and materialism, which perpetuate environmental degradation and might act as a barrier to implementing sustainability in therapeutic practice (Lieb, 2022). Modern health care sees the human body as separate from its surroundings and nature as something to be exploited for human benefit (Maric & Nicholls, 2021). Some authors take this discussion even further by arguing that most current understandings of PH are still based on Western ethics, basing human flourishing on capitalising from nature, risking remaining extractive and damaging to the environment (Maric & Nicholls, 2021). Nonetheless, non-Western ethics often combines three key elements: a) the interdependence of humans and the environment, b) environmental stewardship and c) a balance among all living beings.

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TABLE 2 Case studies on occupational therapy and physiotherapy in the context of PH.

Case	Title of the case study	Short description	Implications	Country (first author)	References
1	Nature prescriptions for community and planetary health: Unrealised potential to improve compliance and outcomes in physiotherapy.	The paper deals with the importance of nature prescriptions, also known as "nature-based social prescriptions", carried out by physiotherapists as preventive support to improve the physical and mental condition of the patient. The paper emphasises the potential of green and blue spaces as cost-effective, sustainable settings for physical activity and social interaction while providing several psychological health benefits.	It assigns the physiotherapist the role of putting the patient in contact with nature, inserting it as the fourth pillar for a healthy life alongside physical activity, diet and sleep. However, it concludes that a robust, evidence-based system is needed to get people with no time for nature to recognise the benefits of nature's prescription from their differences in motivation and needs.	Australia	(Astell-Burt et al., 2022)
2	Environmental physiotherapy and the case for multispecies justice in planetary health.	The world is marked by unprecedented environmental degradation, causing governments, policymakers, and health professionals to articulate the PH as a priority agenda that considers multispecies justice. The engagement with the SDGs indicates that physiotherapy has a role in sustainable development, environmental sustainability, and environmental stewardship, and it is recognised as a low-carbon profession. Drawing on ethical theories and recent developments, the article argues against human exceptionalism, highlighting nature enmeshed in symbiotic planetary existence from a non-anthropocentric solidarity.	Current aspects of health practice need to be replaced with new ones, or there needs to be a radical restructuring. Physiotherapy should be a cheap form because it is essential for basic interaction. The different types of physiotherapy play a crucial role for people to contribute equally to ecosystem health. There is a need to move away from the conventional view and see movement as embedded in the environment. Boundaries for touch in the occupational context should be considered more porous to achieve effective restructuring. A staged change process is needed, which can take place at the micro level and on national and international scales.	Norway	(Maric & Nicholls, 2022)
3	A progress report on planetary health, environmental and sustainability education in physiotherapy.	The editorial addresses the launch, in March 2020, of a global call – Environmental Physiotherapy Agenda 2023 (EPT Agenda 2023), made to physiotherapists and educational institutions that integrate planetary health, environmental and sustainability into their entry-level programs. It is a collaborative project to develop and share knowledge and experiences about relevant competencies, learning outcomes, content, methods, obstacles and solutions related to the international physiotherapy profession.	At the time of writing, more than 300 people, 25 global health organisations, and more than 26 PH educational institutions worldwide have committed to EPT 2023. Some tangible changes are: a) the international and public health modules begin to integrate indigenous knowledge and the role of the natural environment in approaches to planetary health. B) nature's prescription, with outdoor exercise and exposure to green spaces c) reduction of the environmental footprint and promotion of sustainable practices d) education in pulmonary PT increasingly includes teaching about pollution and its impact on chronic diseases.	Norway	(Maric et al., 2021)

(Continues)

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TABLE 2 (Continued)

Case	Title of the case study	Short description	Implications	Country (first author)	References
4	Sustainable healthcare education: Integrating planetary health into clinical education.	The paper clarifies that the need for health professionals to work preventively in education and awareness of PH has increased; however, there is a lack of space for this approach in the curricula and faculty expertise. In the last 10 years, the sustainable health education network has brought ways to include PH literacy in clinical training based on learning objectives that link the relationship between ecosystems and human health to the skills needed to reduce the environmental impacts of health systems and include ecological considerations in clinical ethical reasoning.	The sustainable healthcare education network has implemented changes: The inclusion of sustainable health learning objectives in the UK national medical curriculum and the objectives being adopted by nursing educators in Europe and medicine in the US. Specialities such as green nephrology, sustainable psychiatry, and sustainable primary care were also included. In addition, individual institutions have made PH education clinically relevant by publishing case studies and teaching materials and developing educational activities and approaches.	UK	(Walpole et al., 2019)
5	Prescribing active transport as a planetary health intervention – Benefits, challenges and recommendations.	The paper highlights the issue of insufficient physical activity and its associated mortality and comorbidities. They demonstrate how physiotherapists can promote active transport as a planetary health intervention. It presents benefits and challenges for individual and population health and environment (including infrastructure), with direct implications for physiotherapy practice.	For active transport to be an intervention option, physiotherapists need to be educated on this topic, and awareness needs to be created. Advocating for better infrastructure and more green space is also necessary. E-bikes and bike-sharing facilities must be made more accessible, especially for those who cannot afford them. Accessibility to active transportation should also be physically and financially secured. The global disease burden can be reduced, and environmental integrity can be improved if barriers and challenges are reduced.	USA	(Toner et al., 2021)
6	Physiotherapy and ecosystem services: Improving the health of our patients, the population, and the environment.	The paper discusses how physiotherapists can concurrently improve patient care, population health, and ecosystem health. It explores the connection between the health benefits and mitigation of urbanisation effects through ecosystem services provided by healthy natural environments and the role of physiotherapists in this context. The purpose of this article is to introduce this concept to physiotherapists.	The environmental physiotherapy agenda serves as a call to action to include environmental physiotherapy in the education of physiotherapists. It is a new development in this profession. Understanding the role of ecosystem services for human health is of high importance. Physiotherapists need a trained broad perspective to recognise the impact of ecosystem services on their patients. How the environment can be used directly or indirectly to improve patients' health should be considered.	Australia	(Stanhope et al., 2023)

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TABLE 2 (Continued)

Case	Title of the case study	Short description	Implications	Country (first author)	References
7	Sustainability in occupational therapy practice, education and scholarship.	The editorial emphasises the environmental context's important implications on occupational performance and human health and well-being. While unsustainable lifestyles contribute to climate change, they negatively affect human health and quality of life. Sustainability needs to be implemented in occupational therapy practice and education.	Human occupation plays a crucial role in climate change and sustainability issues, leading to severe adverse effects on human health and quality of life. In addressing patient occupation and interaction with the environment to restore health, occupational therapy needs to implement a sustainability aspect into practice and teaching to address this interrelationship of human activity and well-being and the environment.	UK	(Pollard et al., 2020)
8	Occupational therapy in an ecological context: Ethics and practice.	Occupational therapy practices based on Western cultural values such as individualism, mastery of the environment, capitalism, and consumerism might perpetuate unsustainable lifestyles and occupations, posing a threat to the environment by depleting resources and promoting climate change.	Non-Western ethics often combine crucial elements such as valuing interdependence over individualism, environmental stewardship and a balance among all life forms. By embracing non-Western philosophies and ways of thinking, occupational therapy might be reshaped towards a more sustainable practice.	USA	(Lieb, 2022)
9	Moving from theory to practice in occupational therapy education for planetary health: A theoretical view.	There remains a lack of easily implemented strategies for translating environmental and sustainability policy into practice within occupational therapy education. In this paper, three "doing" skills that contribute to the implementation of planetary health in occupational therapy education are presented. The first involves rethinking essential forms of clinical reasoning and introducing environmental and sustainability reasoning. The second skill focuses on bidirectional questioning for climate-just, person-centred care. The third explores interprofessional educational collaboration for the environment. The aim is to close the gap between theory and practice.	Occupational therapists should reconsider and question existing worldviews and perspectives. Otherwise, the uneven burden on people leads to exclusion and oppression. In health promotion and disease prevention, the focus should be on collective societal issues. The openness of healthcare professionals, such as occupational therapists, to cross-disciplinary environmental and sustainability education is essential. The meaning of person-centred care and ethics for non-maleficence and justice should also be reconsidered. It is necessary to equip learners with skills to work collaboratively together.	UK	(Hess & Rihtman, 2023)
10	Occupational therapists must embrace rapid change for a sustainable future.	The author emphasises the need for rapid action and calls on people, particularly occupational therapists, to act now. When the threat is not tangible, people often react with indifference. During World War II, occupational therapists rehabilitated veterans with creativity and alternative thinking. This ability is also needed now.	Because of their existing focus on behaviour change, prevention, and environmentally friendly occupations, occupational therapists have an excellent position to contribute to the fight against climate change. Additionally, environmentally friendly lifestyles need to be promoted, and universally accessible green spaces and resources need to be used wisely.	UK	(Reagon, 2022)

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Nature should be established as the fourth pillar of health in addition to physical activity, diet and sleep, as it presents an opportunity to combat health inequity by offering free and accessible health benefits, supporting sustainable behavioural change in patients (Astell-Burt et al., 2022). Behavioural changes are often quite complex and are related to individual patient health, the patient's environment, available infrastructure, the economy and societal demands. Adopting a PH concept in everyday practice might support health professionals in taking these factors into account when prescribing behaviour changes (Toner et al., 2021). Moreover, Stanhope et al. (2023) argued that professionals should employ a broader view of their everyday practices, considering the environment and patient health as well as the impact that human actions have on the environment, to capitalise on ecosystem services to improve patient health and public health and to reduce the burden of the healthcare system on the environment (Stanhope et al., 2021).

To enable a person to participate in meaningful occupational participation, occupational therapists need to consider sustainability and threats to the environment arising from human activity in their practice (Pollard et al., 2020). Hess and Rihtman (2023) proposed occupational therapy education to introduce environmental reasoning (i.e., assessing a proposed intervention or treatment on its environmental costs) and sustainable reasoning (i.e., assessing a proposed intervention or treatment on environmental, social and financial aspects) in combination with classical clinical reasoning to help introduce flexibility to clinical decision making to enable occupational therapists to implement sustainability in daily practice and address the health implications of climate change (Hess & Rihtman, 2023). However, climate change is only one dimension of sustainability and includes topics such as resource use, equity, and balance in life experiences (Pollard et al., 2020).

Physiotherapists are ideally positioned to drive this shift towards PH by educating and raising awareness among patients and other practitioners (Toner et al., 2021; Walpole et al., 2019). Two applied examples of introducing sustainability into everyday practice are offered by Astell-Burt et al. (2022) and Toner et al. (2021). Astell-Burt et al. (2022) examined how physiotherapists could prescribe time in nature in the form of public green and blue spaces as a cost-effective and environmentally friendly way to improve physical activity and compliance in patients while also offering the potential for further health benefits to be explored (Astell-Burt et al., 2022). Similarly, Toner et al. (2021) used active transport (such as walking, biking, and skating) as a means to prescribe patients more physical activity in an environmentally friendly way and an opportunity to advocate for infrastructure development towards more open green spaces, active transport routes and less motorised streets (Toner et al., 2021). Practitioners need to integrate sustainability at every level of practice, from the use of resources during therapy sessions to advocating for more sustainable lifestyles and helping sustainable community development towards more accessible green spaces and sustainable occupations (Reagon, 2022).

4 | DISCUSSION: TOWARDS THE INSERTION OF PH IN OCCUPATIONAL THERAPY AND PHYSIOTHERAPY EDUCATION AND PRACTICE

Although scientific events involving different institutions are increasing the need for PH implementation in health practice (Maric et al., 2021), there is still scarce evidence about the adaptation of activities related to PH in health practice. A South African study involving various health professionals identified barriers to implementing PH practices, including issues with knowledge, finances, time, resources, costs, accessibility of sustainable materials and equipment, and team dynamics (Lister et al., 2022). However, there are some recommendations that occupational therapists and physiotherapists are already integrating into their practice to increase the concept of PH (Maric et al., 2021); for example, I) education of the population in primary care to change some lifestyle habits, such as stopping smoking, changing their diet, starting outdoor physical activities, and developing strategies that include talking with patients about the risk of developing new pandemics in association with climatic changes (Maric et al., 2021; Toner et al., 2021; Walpole et al., 2019); II) minimising waste materials and adopting measures that include reduce-reuse-recycle (Chan et al., 2020; Smith et al., 2020); and III) organising scientific conferences with health professionals to discuss strategies to increase PH measures during clinical and research practice (McLean et al., 2020). These conferences should involve management and executives from health corporations to discuss the practical implementation of job design and infrastructure changes and assess their impact on cost savings.

It is expected that the search for SDGs will contribute to improving PH. Figure 3 presents a framework highlighting how the best practices in occupational therapy and physiotherapy related to the three pillars of sustainability and the SDGs can contribute to increasing PH.

The relationship between the best practices of occupational therapy and physiotherapy professionals in each pillar of sustainability and the SDGs to which they must

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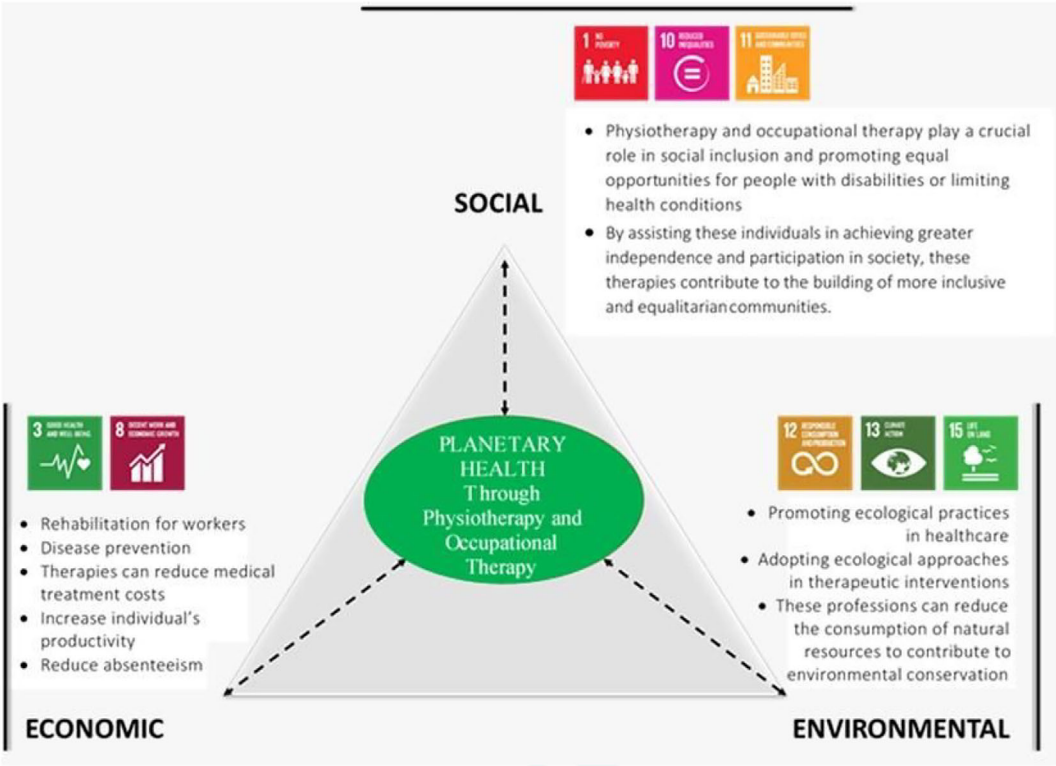

FIGURE 3 Increasing planetary health in occupational therapy and physiotherapy through the SDGs´ lens.

contribute is evident (Figure 3). In this regard, in the social dimension, the best practices of occupational therapy and physiotherapy play a crucial role in enhancing social inclusion and fostering equal opportunities for individuals with disabilities (Simó and Townsend, 2015; Palstam et al., 2022). By aiding these individuals in obtaining increased independence and active engagement in society, occupational therapy and physiotherapy actively contribute to the achievement of SDGs 1 (no poverty), 10 (reduced inequalities), and 11 (sustainable cities and communities). Regarding the environmental dimension, the effective implementation of occupational therapy and physiotherapy might contribute to enhancing sustainable practices in health care by adopting ecological approaches during interventions (Banerjee & Maric, 2023; Reagon, 2022; Stanhope et al., 2023). Examples include incorporating eco-friendly materials and equipment in rehabilitation settings, implementing energy-efficient practices within therapy facilities, and promoting telehealth options to reduce the carbon footprint associated with travel to and from healthcare appointments (Harkey et al., 2020; Barnerjee and Maric, 2023). Therefore, these actions might contribute to SDGs 12 (responsible consumption and production), 13 (climate action), and 15 (life on land). Finally, concerning the economic dimension, appropriate occupational therapy and physiotherapy play a significant role in enhancing workers' rehabilitation, preventing disease, reducing medical treatment costs, improving individual productivity, and minimising absenteeism (Johnston et al., 2016; Palstam et al., 2022; Prall & Ross, 2019). These results contribute to achieving SDGs 3 (good health and well-being) and 8 (decent work and economic growth).

In this sense, the results from bibliometric analysis and the integration of PH into occupational therapy and physiotherapy necessitate a comprehensive strategy that blends patient care enhancement with sustainability, professional development, and evidence-based practices. Therapists can augment patient well-being by incorporating interventions that not only improve physical health but also address psychological aspects and encourage eco-friendly lifestyles, emphasising exercise in natural settings and educating patients on environmental sustainability. Embracing sustainable practices within health care, such as using eco-friendly materials, reducing waste, and advocating for green initiatives, is crucial for minimising the environmental footprint of therapeutic interventions.

Additionally, continuous education in environmental ethics and the impacts of climate change, coupled with a commitment to evidence-based practices that consider environmental sustainability, is essential for professional development in PHs. Therapists should leverage innovative solutions such as telehealth to reduce carbon emissions and prescribe nature-based therapies that exploit the

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therapeutic potential of green spaces. Engaging in collaborative efforts with other healthcare professionals and policymakers is key to promoting a healthcare system that supports both individual health and the planet's well-being. By educating communities about the interconnectedness of health and the environment and advocating for infrastructural support for sustainable health care, occupational therapists and physiotherapists can significantly contribute to a healthcare paradigm that is resilient, environmentally conscious, and geared towards the long-term health of both individuals and the planet.

Therefore, Figure 3 underscores the significant role that occupational therapy and physiotherapy professionals can play in advancing sustainability and addressing critical global challenges outlined in the SDGs. By aligning their practices with these goals, they not only enhance societal well-being and promote economic growth but also make substantial contributions to environmental preservation. This integrated approach highlights the interconnectedness of these dimensions and emphasises the importance of interdisciplinary collaboration to achieve a more sustainable and healthier planet.

4.1 | Conclusions

This paper is an attempt to address the role of occupational therapists and physiotherapists in addressing public health challenges. The first tool, bibliometric analysis, provided insights into the background on the topic and the engagement of these two professional groups on the subject. The second method used case studies and illustrated how best practices in occupational therapy and physiotherapy, related to the three pillars of sustainability and the SDGs, can contribute to the field of public health.

The first conclusion that can be drawn from the study is that, in contrast, the contribution of occupational therapists and physiotherapists in addressing public health challenges is significant, but this potential is not currently being realised. There seems to be an overall lack of awareness about the key role they can play, and this is inhibiting their broader engagement.

In addition, even though the inclusion of a sustainability dimension may be advantageous to occupational therapists and physiotherapists, not enough is being done. However, incorporating sustainability into the practices of occupational therapists and physiotherapists can offer several advantages. Sustainability is a broad concept that encompasses environmental, social, and economic considerations, and integrating it into healthcare professions such as occupational therapy and physiotherapy can have positive effects in various ways. Some of them are:

1. Fostering environmental responsibility: Healthcare facilities can be significant contributors to environmental degradation because of the energy and resources they consume, as well as the waste they generate. By adopting sustainable practices, such as reducing energy consumption, minimising waste, and promoting eco-friendly products, occupational therapists and physiotherapists can reduce their environmental footprint and contribute to a healthier planet (Lieb, 2022; Maric et al., 2021; Maric & Nicholls, 2022; Stanhope et al., 2023; Walpole et al., 2019).
2. Cost Savings: Sustainability measures, such as energy-efficient lighting, equipment, and practices, can lead to cost savings for healthcare facilities. Occupational therapists and physiotherapists can help their organisations save money, which can then be reinvested in improving patient care or facility infrastructure. (Chan et al., 2020; Johnston et al., 2016; Palstam et al., 2022; Prall & Ross, 2019; Smith et al., 2020).
3. Patient/Person-Centred Care: Embracing sustainability can lead to patient-centred care models. By addressing the environmental and social determinants of health, therapists can offer more holistic care. For example, recommending exercise or activities that encourage outdoor engagement can promote both physical health and mental well-being. (Astell-Burt et al., 2022; Pollard et al., 2020; Toner et al., 2021)
4. Promotion of Active Lifestyles: Encouraging patients to engage in sustainable transportation methods such as walking, cycling, or using public transportation can contribute to reduced air pollution and improved community health. Occupational therapists and physiotherapists can promote these behaviours to enhance patients' overall well-being. (Astell-Burt et al., 2022; Feng et al., 2021; Reagon, 2022; Toner et al., 2021)

This paper has several limitations. The first is related to the scarcity of relevant literature for running bibliometric analysis. Second, the authors considered only articles in the English language, excluding a small sample of papers such as 10 studies published in German, six in French, five in Spanish, two in Portuguese, one in Turkish, one in Polish and one in Japanese. The third limitation is in the scope of the case studies, which focussed on a relatively small set that was based on scholarly opinion rather than implementation into practice. However, it is nonetheless illustrative of various settings. Another constraint inherent in bibliometric analysis is the inability to provide an exact enumeration of papers within each cluster identified; therefore, this study urges more research to be conducted in this field.

Despite these limitations, the results obtained offer valuable insights into the topic. Occupational therapists

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and physiotherapists are important players in public health and can integrate sustainability at every level of practice, from the use of resources during therapy sessions to advocating for more sustainable lifestyles.

A recommendation derived from the study is that special attention deserves to be directed towards cultural and societal ideals that underpin occupational therapists and physiotherapy and that these ideals be better integrated with sustainability practices. Professionals in these fields may explore and develop new therapies, technologies, or interventions that have a lower environmental impact or are more socially inclusive.

AUTHOR CONTRIBUTIONS

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CONFLICT OF INTEREST STATEMENT

None of the authors have a conflict of interest to disclose.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

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