



HELPE

Health Literacy in Physiotherapy Education

Health Literacy Interventions

Health Literacy Training Methods in Physiotherapy Education
and Clinical Practice



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Introduction

Health literacy (HL) is a multi-level understanding of the factors behind one's own health and how it can be effectively influenced. HL is related to the ability to obtain, understand, appraise, and apply health information (Institute of Medicine (US) Committee on Health Literacy, 2004). Limited HL can lead to poorer health behaviours and higher socioeconomic costs (Hersh et al., 2015). Therefore, health professionals should be able to support the development of their clients' HL skills. This can be achieved with providing adequate training methods aiming to improve the HL in clients. These interventions should be specific to the particular client group and individually designed. They should not just deliver health knowledge but rather actively involve and motivate clients to be able to take decisions and actions which promote health. Physiotherapists have a unique and expanding role in global health work due to their broad scope of practice. Besides providing direct patient care, physiotherapists act as educators for example in prevention and management of several diseases and life-style-related conditions, injury prevention, and infection control. Because of the physiotherapist's increasing role as health provider, it is important to know how to guide clients, as well as stakeholders, using reliable and accurate health information and interventions so that they can make informed decisions about their own health (Briggs & Jordan, 2010). When done efficiently, these interventions can help empower people to make evidence-based decisions that will improve the health status and consequently save community costs (Berkman et al., 2011).

The skills needed to effectively understand HL can be for example interaction, co-operation, self-development, the ability to set goals and observe critically and seek guidance and support (Sørensen et al., 2012). These skills are widely needed in everyday life but also in the work of different health professionals in the field (Coleman et al., 2013). Still many health professionals do not have sufficient competencies to support the development of HL for their clients. Same in physiotherapy students, as they need to understand their own future role and responsibility as a patient educator and to increase the HL understanding of patients and themselves.

Although the physiotherapists' role is important in increasing HL knowledge, appropriate training methods in physiotherapy education are not sufficiently established or such training is not used systematically to increase HL competence in students and in clinical practise with different client groups. The development of health literacy skills can be supported, for example by using roleplay, shared discussion and by combining different approaches to active learning. On one side the teaching staff in the physiotherapy departments should apply these educational methods, on the other side physiotherapy students and professionals should be aware of the HL training interventions which they can apply for enhancing the HL in their clients.

Aim

The aim of this work was to identify and describe training methods and educational interventions aiming to improve health literacy in clients and HL competencies in physiotherapy students and professionals.

Methods

Design

For this study we performed a literature review following the methodological framework described by Arksey and O'Malley (Arksey & O'Malley, 2005) with the improvements of Levac (2010). This framework includes six phases: (1) identifying the research question; (2) identifying relevant studies; (3) selecting studies; (4) charting the data; (5) collating, summarising and reporting the results; and (6) consulting with the key stakeholders.

Search question identification

Regarding this first step we established the following research question:

What kind of training/interventions are described in the literature to improve health literacy competences of physiotherapy students and clients?

Identification of relevant studies

To identify documents related to the research question, we performed an electronic search in several databases, which included Pubmed, CENTRAL, Embase, CINAHL, PsycINFO, PEDro, Eric.

A search equation was designed by an information specialist for each database using the keywords "Health literacy", "Physical therapy", "Education" and "Competences". Each specific search equation can be seen in Appendix A.

Study selection

Study selection was performed by pairs of authors using Rayyan web-based software. Once all results were introduced and duplicates removed, authors decided articles inclusion, first by title and abstract and after reading the full text, using the following criteria:

Inclusion criteria

- 1) Studies describing interventions to improve Competences- knowledge, attitude, skills related to attributes to health literacy. Attributes to health literacy considered were 1a) Capacity- promote navigation, *overcome barriers healthcare system, (access)*, enabling Self- management, shared decision, support behaviour change, empowerment, 1b) Comprehension (*understand*) – effective patient-provider interaction- patient education, 1c) Communication- (*understand, appraise, apply health information*) patient centred communication, gathering, providing (comprehensible) information, cultural sensitivity (intercultural communication)
- 2) Include physiotherapists, physiotherapy students and/or clients.
- 3) Articles in English, Spanish, German, Dutch and Finnish

Exclusion criteria

Articles before 1998 were excluded since health literacy was acknowledged by the WHO as an important asset in the Health Promotion Glossary that year.

Data charting

Data of the included studies was extracted using a specific form designed for the project. Aim of the study, participants characteristics, and interventions characteristics (settings, aim, modalities, duration and components).

Result summary

We used a narrative synthesis of the results using a flowchart and tables to summarize the selection process and to describe the interventions characteristics. Interventions were divided into the ones involving clients and the ones involving students.

Stakeholder consultation

A stakeholder consultation was organised by each of the collaborating institutions. Participants included physiotherapy students, physiotherapy teachers, physiotherapy clinicians, clients or members of organizations that worked with clients with inadequate health literacy, education experts and experts in health literacy.

Meetings were held online and consisted in a short introduction of the project and presentation of the preliminary results. After that attendees were divided in small groups and asked their opinion and reflections regarding educational activities needed in physiotherapy education to address health literacy. To finish the session each of the small groups shared their results with the others and a final short discussion was held.

During the session, participants and organizers took notes of the ideas and considerations that appeared during the session. All the information was later summarized in a final standardized report by each participating institution.

Results

Study inclusion

We identified 691 results through our database search and after removing duplicates, 176 articles were screened by title and abstract and 82 - by full paper. Finally, we included 38 articles describing interventions to improve health literacy competencies in physiotherapy clients and students. Details of the inclusion process can be seen in Figure 1.

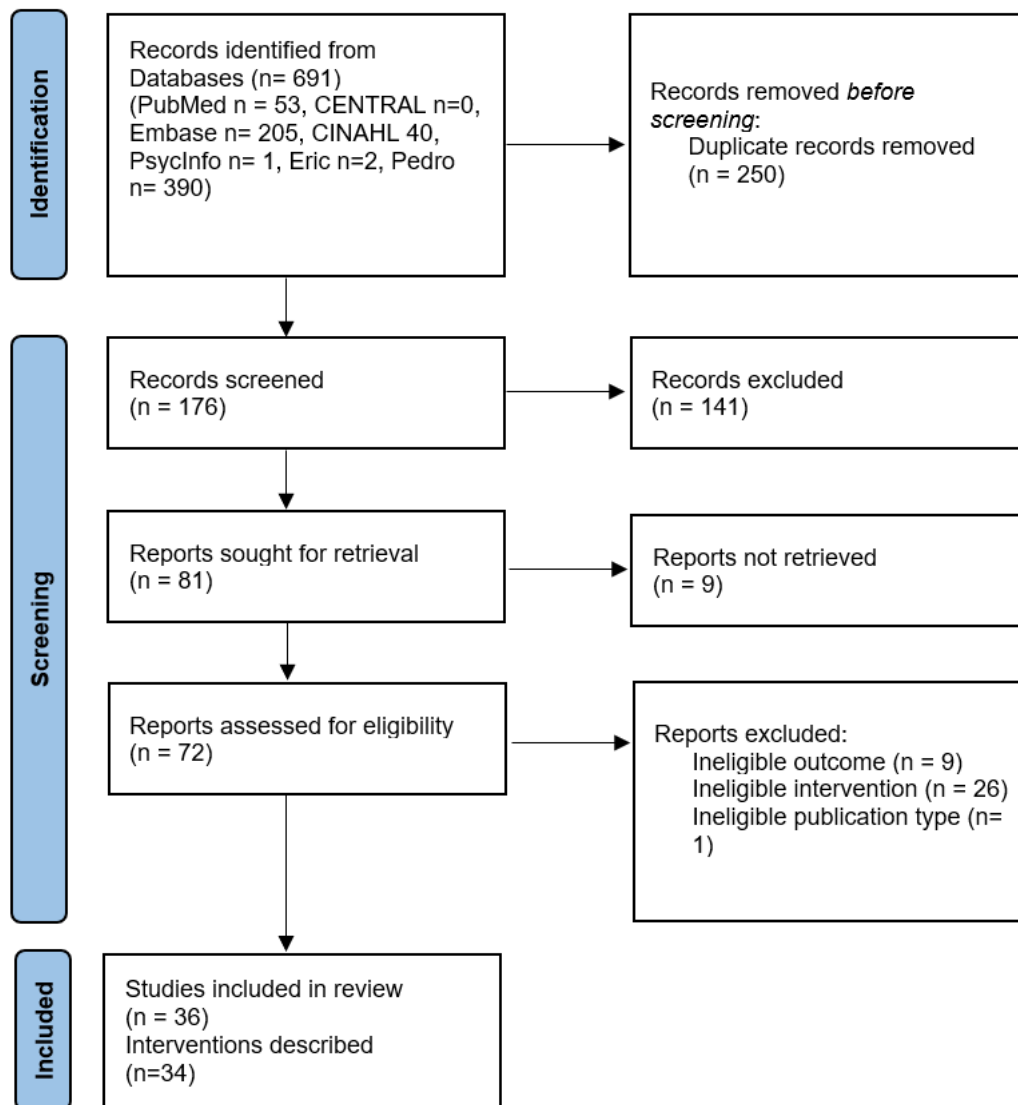


Figure 1: Flow chart

HL training methods involving clients

We identified 26 articles reporting 24 interventions to improve health literacy in clients. Characteristics of each intervention involving clients are detailed in Table 1.

Most of the trials aimed to improve health literacy in specific health conditions including respiratory diseases (Gagne et al., 2017; Goldbeck & Babka, 2001; Macy et al., 2011; Perneger et al., 2002), heart diseases (Eckman et al., 2012; Fredericks et al., 2010; Glatz et al., 2014; Meng et al., 2016), hypertension and high blood pressure (Wu et al., 2019), diabetes (Hill-Briggs et al., 2011; Mohamed et

al., 2013; Muller et al., 2017; Rahaman et al., 2018), post-operative hip surgery (Dallimore et al., 2017), knee arthroscopy (Molano Bernardino et al., 2015), arthritis (Branch et al., 1999; John et al., 2013), osteoporosis (Nielsen et al., 2008; Nielsen et al., 2010), fibromyalgia (Musekamp et al., 2019), cancer (Huang et al., 2020; Meraviglia et al., 2013), and pregnancy (Fredriksen et al., 2016). Only three studies (2 interventions) specifically targeted populations with limited HL including older adults (Reijneveld et al., 2003; Uemura et al., 2018; Uemura et al., 2020) and immigrants (Assantachai et al., 2006).

Most of the interventions took place in the health care setting which the participants were attending. This included welfare services, clinics and hospitals. Regarding interventions not targeting any specific health condition, they were performed in local communities. Finally, some interventions were carried out online.

Intervention modalities included group or individual face-to-face educational sessions, some of them complemented with materials such as manuals, booklets, videos, presentations, flipcharts and patient books. Several trials reported that sessions included role-play, problem solving and discussions. A few interventions reported a previous knowledge evaluation to tailor the content. The sessions ranged from 1 to 8 in a period from one week to 6 months and a periodicity from once a week to once a month. We also found some self-educational strategies which included manuals, booklets, videos or web-based discussion forums.

Most interventions included knowledge about a specific health condition and health promotion strategies. Some studies also taught participants to perform specific rehabilitation exercises, self-management and medication use.

Table 1: Interventions for clients

Author, year	Population included	Setting	Duration	Learning modality and materials	Learning outcomes
Goldbeck & Babka, 2001	Families with children with cystic fibrosis (Parents and children)	Outpatient clinic	Three or four, once a month	Multi-family groups, parents and children separately. Lessons, group discussions and role-play-sessions.	Genetics, pulmonary symptoms, gastrointestinal symptoms, medicine, chest physiotherapy, nutrition and psychosocial issues.
Perneger et al., 2002	Hospitalized patients with asthma	Not specified	Three 75-minute sessions within 3 weeks	Group sessions. Illustrated information.	Asthma symptoms, peak flow meter use, inflammation and bronchospasm, medication use, individualized self-management plan use.
Macy et al., 2011	Parents with their asthmatic child	Emergency department	Single session	Video or written asthma materials.	Basic facts about asthma, roles of medications, and patient skills.
Gagné et al., 2017	Adults with asthma	Tertiary care centre	Single session	Individual session. Tailored to the patient specific context. Verbal information, pictograms and kinaesthetic materials.	Information on asthma diagnosis, physiopathology, medication use and environmental control.

Eckman et al., 2012	Adult patients with coronary artery disease	Hospital	Single 40-minutes session	Information booklet or video/DVD, scheduled appointment with their doctor or nurse and questionnaires	Description of the process of shared decision making; basic information about coronary artery disease; steps patients can take to manage coronary artery disease, medication information, and recommendations for diet and exercise;
Glatz et al., 2014	Patients with heart failure	Two rehabilitation clinics	Six 1-hour modules	Small groups. Power point presentation, booklet.	Knowledge about heart failure and disease friendly behaviour implementation.
Meng et al., 2016	Chronic heart failure patients	Cardiac rehabilitation clinics	Five sessions of 60-75 minutes	Small groups. Presentations, flipcharts, and two patient booklets.	Heart failure disease and treatment knowledge, self-management behaviours and medication adherence.
Wu et al., 2019	People over 50 years with hypertension and high blood pressure	Local hospital	Four 2-hour health promotion sessions within 1 month	Video, booklet and daily activities. Face-to-face consultations with a nurse or physician. 15-minute physical activity program and experience-sharing.	Health promotion skills, hypertension and high cholesterol prevention, vicarious experiences, verbal persuasion, and physiological and emotional self-evaluation.
Hill-Briggs et al., 2011	Patients with type 2 diabetes and suboptimal blood sugar,	Clinic	Nine sessions during 3 months	Problem solving therapy. Materials and workbook.	Awareness of cardiovascular risk factors; knowledge of clinical targets for A1C, blood pressure, and cholesterol; and self-management behaviours of taking

	blood pressure, or cholesterol control				medication, self-monitoring, healthy eating, and getting regular physical activity.
Mohamed et al., 2013	Patients with type II diabetes	Diabetes Association	Four sessions	<p>Group sessions.</p> <p>Educational programme based on empowerment and health belief model utilizing counselling techniques.</p> <p>Interactive sessions with an educational toolkit.</p>	Diabetes self-management skills: Diabetes aetiology, signs, symptoms and complications, diet and portion control, exercise and energy expenditure, coping skills, attitudes and practices.
Muller et al., 2017	Patients with type II diabetes	Online	Single session	<p>Online session.</p> <p>Tailored plain-text and interactive Web-based interventions.</p>	<p>Knowledge of physical activity benefits, advice on selecting physical activities, advice on planning</p> <p>physical activity, success stories, access to further</p> <p>information about undertaking physical activity.</p>
Rahaman et al., 2018	Patients with type II diabetes	Outpatient department	Single session	<p>Face-to-face session.</p> <p>Audio-visual display and a pamphlet.</p>	Glycaemic control, dietary advice, exercise, medications, and foot care.

Dallimore et al., 2017	Postoperative hip surgery patients	Public hospital	During hospitalization	Ipad (multimedia) or booklet (static images).	Evidence-based exercises specific to hip surgery, hip precaution advice, and general advice on how to transfer safely on and off a bed and chair.
Molano et al., 2015	Knee arthroscopy patients	Public hospital	-----	Website with educational videos.	Isometric knee exercises, parenteral administration of low molecular weight heparin and surgical dressing and wound care.
Branch et al., 1999	Patients with arthritis	Clinic	Two days	Face-to-face	Rheumatic disease pathophysiology, nutritional guidelines, psychosocial aspects of chronic illness, components of physical therapy including exercise and pain management, and components of occupational therapy including exercise, joint protection, and energy conservation. The training session also included discussions of cultural diversity and cross-cultural differences in disease perceptions, as well as interviewing and listening skills.

John et al., 2013	Rheumatoid arthritis participants	Hospital research unit	8 weeks	Small-group cognitive behavioural education intervention or information leaflet.	Behavioural change with regard to modifiable cardiovascular diseases risk factors.
Nielsen et al., 2008 and 2010	Patients with Osteoporosis	Not reported	Three sessions a day for 4 weeks	Group sessions. Tailored to the individual patient's background and needs.	Osteoporosis knowledge, medication use, diet, fall prevention, fractures and pain, and physical exercises.
Musekamp et al., 2019	Patients with fibromyalgia	Rehabilitation clinics	Six sessions, within 21-28 days, plus one optional	Group sessions.	Self-management and transfer into everyday life through action planning.
Meraviglia et al., 2013	Low-income cancer survivors	Not specified	Six weekly classes and 2 months follow-up support	Group classes Individual counselling either in person or through telephone calls.	Knowledge about cancer, cancer survivorship, surveillance, smoking cessation, stress management, physical activity, nutrition, and spiritual growth.
Huang et al., 2020	Breast cancer patients	Hospital	Four daily sessions	Face to face sessions. Teach-back, discussions, consultation tailored to the patient's individualized goals and values.	Surgical wound care and postoperative exercise, physical complications prevention, return-to-work training and mental health education.

				Educational materials tailored according to patient needs.	
Fredriksen et al., 2016	Pregnant women and mothers	Online	-----	Open Web-based discussion forums	-----
Assantachai et al., 2006	Aged 50 years or more.	Hospital and communities	One 1-hour session	Group teaching supplemented by a video program. Booklet and an audiotape for self-study. Mind-mapping technique.	Natural course of some common diseases among older adults, and how to detect and prevent them. Quadriceps-strengthening exercise and Cawthorne-Cooksey head-and neck-balance exercise.
Uemura et al., 2018 and 2020	Older adults	Rural community	Once a week for 24 weeks	Active learning strategy involving learners in higher-order thinking (e.g., evaluation, synthesis) and activities (discussion, presentation, planning).	Exercise, diet and nutrition, and cognitive activity for health promotion in older age.

Reijneveld et al., 2003	Elderly first generation immigrant	Welfare services	Eight 2-hour sessions	Group sessions with a manual with figures.	Successful aging, exercise and health, nutrition, physical and mental resistance and endurance, safety in and around the home, and symptoms related to aging.
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HL training methods involving physiotherapists

We identified 8 articles targeting physiotherapists including postgraduate students (Basheti et al., 2014; Bird et al., 2020; Keogh et al., 2018; Kerssens et al., 1999; Maltinsky & Swanson, 2020; Wilson et al., 2020), master students (Hale et al., 2006) and second year undergraduate students (Domenech et al., 2011). Characteristics of each intervention involving physiotherapists are shown in Table 2.

Most of the interventions for postgraduate physiotherapists aimed to improve professionals education and behaviour change skills and to deliver self-management and exercises to patients, however, only one specifically mentioned HL (Bird et al., 2020) and another only aimed to improve correct use of inhalers (Basheti et al., 2014). One intervention only aimed to review rehabilitation skills and use technology for communication with the hospital (Wilson et al., 2020).

Interventions involving students aimed to improve their attitudes, confidence, skills and communication abilities during patients' examination and to change students' beliefs and attitudes and recommendations given to the patients.

Interventions for postgraduates took place in their workplace while student interventions took place in the University.

Interventions ranged from 2 to 8 sessions which included small group lectures, specific educational modules and practical workshops. Some sessions included manuals, clinical cases and discussion activities.

Table 2: Interventions for physiotherapy students

Author, year	Population	Setting	Duration	Learning modality and materials	Learning outcomes
Domenech et al., 2011	Undergraduate physiotherapy students	University	Two 3-hour sessions, 1 week apart	Group sessions. Discussion of a clinical case with assistants of patients.	Biopsychosocial model of back-pain. concepts and the relation among pain, structural damage, and disability, fear avoidance model, role of psychosocial factors, yellow flags and the recommendations to assess psychosocial factors.
Hale et al., 2006	Master students	University	Not reported	Group sessions. Presentations, audio-visuals, class discussion, hands-on laboratory sessions, and practice scenarios.	Patient interviewing and screening, physical exam and related exam equipment, relationship between diabetes and associated visual change, diabetes standard care and prevention of related ophthalmic diseases, equipment for visually impaired persons, working on multidisciplinary health care teams.
Kerssens et al., 1999	Physiotherapists (postgraduate)	Private practice	Seven 4-hour sessions	Group sessions. Case study, manual based training.	Communication and adherence enhancing skills.

Basheti et al., 2014	Community health workers	Public and private hospitals	Two 2-hour sessions	Educational workshop and group discussions.	Asthma knowledge and inhaler technique skills
Keogh et al., 2018	Physiotherapists (postgraduate)	Primary care clinics	Two days	Small-group lectures. Pre-reading materials, group discussion, self-reflection, video examples, role-play, micro-teaching activities, peer and facilitator feedback.	Communication strategies
Bird et al., 2020	Physiotherapists (postgraduate)	Physiotherapy clinic	Three sessions	1 face-to-face and 2 videoconferences. Workshop training programs.	Vignettes from client data as the basis for activities including the co-design of health literacy solutions, individual practices, focusing on communication, designing resources, and workplace audit tools.
Maltinsky & Swanson, 2020	Health-care professionals (including physiotherapists)	Scottish NHS Area Health Boards	Two days, two weeks apart	Face-to-face. Didactic and activity-based learning, practice-based simulations, role plays, and visual prompts, drawing on reflective adult learning principles. Manual	Behaviour change skills
Wilson et al., 2020	Community health workers	Rural hospital	Two 7-hour sessions	Group sessions. Lectures, demonstrations, practice and group discussions	Rehabilitation and using technology for communication

Stakeholder consultation

In total 5 online stakeholder's meetings were held, each one was organized by the corresponding project partner institution. Details regarding the number and profile of attendees in each meeting can be found in Appendix B.

Since the number of articles identified regarding interventions to clients was much larger than the ones targeting physiotherapy students, we decided to focus on this last group during the stakeholder's meeting. To do so, participants were asked about the competencies that needed to be improved in the current physiotherapy students, in order to deal with patients with limited HL, and about the educational activities required in the current physiotherapy curricula to address this issue.

Meetings revealed similar results as those found in the literature, but also provided additional perspectives into the methods for developing HL skills. A summary of the main results from the meeting can be found in Table 3.

Regarding knowledge, general health topics such as health promotion and self-management, as well as communication theories were referred. Also, it was summarized that specific HL content was not currently included in most physiotherapy programs.

Regarding skills, stakeholders highlighted the importance of encountering skills as a base of each therapeutic situation. Those aren't merely communication abilities and empathy but related more to a respectful encounter with the client, active listening, being a friend while maintaining professionalism and consideration of the client's wishes. Further, stakeholders pointed out that physiotherapists should have really wide scope of encountering skills for individual client considering his/her specific background. In addition, various not so widely considered characteristics of physiotherapists were accounted, such as pedagogical competence and the ability to plan and develop individualised learning strategies.

Participants in the meeting also emphasized on the need of engaging students into the subject to keep them motivated, and on the benefit of the involvement of all teachers and practical tutors in student's learning process. The possibility for a progressive content that should be spread along the curricula with a liaison to other modules, was also discussed. Finally, it was also remarked that the special needs of vulnerable populations, such as immigrants who do not speak the language of the corresponding country of residence, should be also considered as a learning outcome when developing training methods for improving HL competencies in physiotherapy education.

Table 3: Stakeholder consultation results

Knowledge	Skills	Format	Further remarks
Health education	Interview skills (active listening, asking for needs, comfortable environment,..)	Problem solving	Engage and motivate students
Healthy lifestyle		Clinical cases	Content along the curricula, not only a single module
Self-management	Communication and pedagogic skills (teach back method, how to re-assure patients, avoid nocebo effect,...)	Simulations	Use emotion to strengthen the message
Communication theories		Role-playing	Encourage interaction between agents who become part of the student's learning in practical environments.
HL specific knowledge (concerns, recognise patients with LHL,...)	Recognizing and treating patient with LHL.	Gamification	Detect and link the theoretical knowledge of the curricula of the degree with the practical situations that occur in the external centres
		Ethical dilemmas	
	Adjustment to patients needs	Video analysis	Training of the practical tutor to define the practical care action model
	Critical thinking	Audio-visual resources	
	Belief and emotion management	Involve real patients (expert patients)	Continuing education of academic teachers
	Interdisciplinary approach	Reflection of the activities	Incorporate perspectives and evidence to improve the quality of life and health outcomes
	Use of audio-visual tools		Integrate social media as a source of information
	Intercultural competences		It might be necessary to practice with immigrants that do not speak the language of the country

Discussion

Knowledge and awareness of health literacy is important in physiotherapy clinical practice since many client groups have been identified to have insufficient HL which limits the effectiveness of the therapy process. Therapeutic relationships should be based on trust and equal cooperation. Clients should be able to make their own decisions as a result of an informed, therapist-supported, empowering process. Nevertheless, physiotherapists face barriers in communication with those clients, due to the lack of acquired HL competencies during their studies. In this work we identified training methods and strategies to improve HL in clients and to develop HL competencies in physiotherapy students and professionals.

Training strategies to improve HL in clients

Target groups for interventions strengthening the HL are predominantly patients with chronic conditions and in the postoperative stages. The necessity of addressing these patients is determined by the emergency of self-management and care which they need in the outpatient settings or at home for a prolonged period of time. Patients with chronic diseases, and in rehabilitation stages need to develop specific skills in order to manage the prescribed activities, for example change in habits and behaviour and physical activity adaptations. On the other hand, literature on HL interventions with regard to physiotherapy involving vulnerable groups such as elderly or individuals with migration background are relatively scarce.

While the HL in aged individuals is influenced by cognitive and physical decline and multimorbidity, the HL level in migrants is impacted by other factors, such as insufficient spoken and written language skills, social isolation, cultural background. Indeed, all these factors result in decreased ability to acquire, comprehend, follow and use health information in order to take health and disease-related decisions and actions. Importantly, these limitations need specific training interventions considering and targeting the peculiar characteristics of the corresponding client group.

Such intervention and modality specificity can be observed for example in studies on older individuals (Uemura et al., 2018; Uemura et al., 2020) applying HL training in the form of active learning, involving cognitive training and activities such as discussion and planning, group interventions supplemented by a videos booklets and audiotapes for self-study, and mind-mapping techniques. These learning modalities target cognitive and social skill improvements, at the same time teaching the contents in a more feasible way. Similarly, the teaching methods for migrant population are for instance based on group sessions for overcoming the social and communication barriers and information is provided using figures for better comprehension (Reijneveld et al., 2003). Generally, the training interventions and modalities for patients with chronic disease (diabetes, asthma, heart disease, arthritis) target better awareness of the condition and good self-management skills. The training methods are variable, including group- as well as individual sessions, face-to-face and phone consultations and online platforms, workshops and demonstrations. The teaching method should be adjusted to the personal and the social characteristics of the individual client as well as to his/her compliance. Professional physiotherapists and PT students should acquire more knowledge and training in such specific methodological strategies in order to provide an effective therapy to the specific client group. The aim should be developing appropriate HL interventions accounting the cognitive, social, financial, cultural, and educational status of clients.

Another consideration for physiotherapists and students regarding educating clients in HL is the settings in which such education can take place, as well as the number of sessions required to teach

the HL-related skills. Studies showed that interventions targeting specific disease were carried out in clinics, hospitals and rehabilitation centres, while others, focusing on general health, prevention and aging, were performed in local communities and online. The disease specificity and the settings can predetermine to a certain extent also the number of sessions of these training interventions. While training sessions related to HL in general health and performed in communities, could be scheduled for a longer time with less or higher frequency, those performed in the hospitals and clinics have a shorter duration due to the limited stay of the patient in the respective clinical settings, but also due to insufficient personal and time resources. Therefore, it is important that namely the physiotherapists who spend regularly a substantial amount of time with the client, could incorporate the corresponding HL training interventions in their therapy program. Additionally, the advantage of using technologies such as online guidance, videos or web-based discussion forums where applicable, enables performing interventions for improving client's HL for a prolonged passage of time and with higher number of sessions without frequent supervision and direct guidance by therapists.

Training strategies to develop HL competencies in PT students and professionals

The number of interventions identified to develop HL competencies for physiotherapy professionals and students was much lower than those for clients. Also, we identified more interventions including active physiotherapists, taking place in their working place, rather than targeting students in an academic setting, suggesting that the HL skills development took place rather during the professional practice and less during the education. The training interventions on students at the university were performed both, on undergraduate and on master students and included up to 2 sessions (Domenech et al., 2011). The findings suggest a lack of consistent program in the physiotherapy education which addresses development of particular set of HL skills corresponding to the study year/study semester and the level of the students' knowledge. The HL training should start in the university program and continue over the entire professional life in order to be adequate to the actual sociodemographic and health changes.

The training interventions for physiotherapists targeted developing of communication and behavioural skills and strategies and adherence techniques, also implementing technologies. In contrast, neither interventions involving students covered developing HL competencies in a complex manner. Instead, they were focused on improving the skills in treating a specific health condition such as low back pain and diabetes. These results indicate insufficient attention being drawn on HL in the current physiotherapy education plans. The outcomes of the stakeholder meetings emphasised on broader spectrum of HL competencies such as the need of obtaining interview, communication and pedagogic skills, ability to recognize and consider the LHL in the therapy process, appropriate belief- and emotion management, interdisciplinary approach and intercultural competencies. These suggestions should be considered as learning aims when designing HL educational programs.

Both, the training interventions for physiotherapists and for students were held mostly in groups. Group educational sessions enable developing of more complex didactic scenarios, consider different perspectives and allow providing and receiving of multiple feedback. The HL training methods for physiotherapists included various modalities: workshops, lectures, reading materials, group discussion, self-reflection, video examples, role-play, micro-teaching activities, peer and facilitator feedback, activity-based learning, practice-based simulations, role plays, and visual prompts. The education modalities for students consisted of strategies to engage them actively such as clinical cases, class discussions, practice scenarios and the involvement of real patients. The consultation with

stakeholders also pointed to the need of offering students an active role to increase their engagement, and proposed other learning strategies such as gamification, simulations, reflective diaries and project learning. Stakeholders also highlighted the need of including HL content in the physiotherapy curricula in systematic way considering the study level and the specificity of the study modules. ,

Finally, both the results from the literature review and from the stakeholder's meetings did not reveal enough the role of the digital tools for designing training interventions, as well as the importance of training methods focusing particularly the developing digital HL competencies in physiotherapy students and professionals.

Conclusion

Systematic use of HL training strategies is the only way to improve HL level in clients. Physiotherapy professionals should be competent in implementing HL interventions on diverse client groups in an individual way. For this purpose, they need to obtain respective HL competencies. These should be initially established and developed already during their university education and further, be constantly upgraded during their professional practise. More efforts and more complex educational approaches in the physiotherapy education are required in order to strengthen health literacy in clients. The last should involve not simply transmission of health information, but also developing confidence and independence, capability of informed actions and successful self-management. Effective student's education can be achieved with a gradual and evidence-based buildout of HL competencies including students' motivating and technology-based approaches.

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Appendix A: Search equations

Pubmed

("Health Literacy"[Major] OR "Health Knowledge, Attitudes, Practice"[Major] OR "health literacy"[ti] OR "health illiteracy"[ti] OR "eHealth literacy"[ti] OR "e-Health literacy"[ti] OR "dementia literacy"[ti] OR "stroke literacy"[ti] OR "medical literacy"[ti] OR "nutrition literacy"[ti] OR "food literacy"[ti] OR "health knowledge"[ti] OR "health comprehen*"[ti] OR "health skill*"[ti] OR "health attitude*"[ti] OR "Patient Education as Topic"[Major] OR "patient educat*"[ti] OR "patient train*"[ti] OR "Health Promotion"[Major] OR "health promotion"[ti] OR "promotion of health"[ti])

AND

("Physical Therapy Specialty"[Major] OR "Physical Therapists"[Major] OR "physiotherap*"[ti] OR "physio therap*"[ti] OR "physical therap*"[ti])

AND

("Education"[Major] OR "educat*"[ti] OR "teach*"[ti] OR "train*"[ti] OR "Learning"[Major] OR learn*[ti] OR "workshop*"[ti] OR program*[ti] OR school*[ti] OR instruct*[ti] OR intervention*[ti])

AND

("Clinical Competence"[MeSH] OR competen*[tiab])

Embase

('health literacy'/exp/mj OR 'attitude to health'/exp/mj OR 'health literacy':ti OR 'health illiteracy':ti OR 'eHealth literacy':ti OR 'e-Health literacy':ti OR 'dementia literacy':ti OR 'stroke literacy':ti OR 'medical literacy':ti OR 'nutrition literacy':ti OR 'food literacy':ti OR 'health knowledge':ti OR 'health comprehen*':ti OR 'health skill*':ti OR 'health attitude*':ti OR 'patient education'/exp/mj OR 'patient educat*':ti OR 'patient train*':ti OR 'health promotion'/exp/mj OR 'health promotion':ti OR 'promotion of health':ti)

AND

('physiotherapy'/exp/mj OR 'physiotherapist'/exp/mj OR 'physiotherap*':ti OR 'physio therap*':ti OR 'physical therap*':ti)

AND

('education'/exp/mj OR 'educat*':ti OR 'teach*':ti OR 'train*':ti OR 'learning'/exp/mj OR learn*:ti OR 'workshop*':ti OR program*:ti OR school*:ti OR instruct*:ti OR intervention*:ti)

AND

('clinical competence'/exp OR competen*:ti,ab,kw)

CINAHL Plus with Full Text

(MM "Health Literacy" OR MM "Health Knowledge" OR MM "Attitude to Health+" OR MM "Patient Education+" OR MM "Health Promotion+" OR TI ("health literacy" OR "health

illiteracy" OR "eHealth literacy" OR "e-Health literacy" OR "dementia literacy" OR "stroke literacy" OR "medical literacy" OR "nutrition literacy" OR "food literacy" OR "health knowledge" OR "health comprehen*" OR "health skill*" OR "health attitude*" OR "patient educat*" OR "patient train*" OR "health promotion" OR "promotion of health"))

AND

(MM "Physical Therapy+" OR MM "Physical Therapists" OR TI ("physiotherap*" OR "physio therap*" OR "physical therap*"))

AND

(MM "Education+" OR TI ("educat*" OR "teach*" OR "train*") OR MM "Learning+" OR TI (learn* OR "workshop*" OR program* OR school* OR instruct* OR intervention*))

AND

(MH "Clinical Competence+" OR TI competen* OR AB competen*)

PsycInfo

(MM "Health Literacy" OR MM "Mental Health Literacy" OR MM "Health Knowledge" OR MM "Health Attitudes" OR MM "Public Health Attitudes" OR MM "Client Education" OR MM "Health Promotion" OR TI ("health literacy" OR "health illiteracy" OR "eHealth literacy" OR "e-Health literacy" OR "dementia literacy" OR "stroke literacy" OR "medical literacy" OR "nutrition literacy" OR "food literacy" OR "health knowledge" OR "health comprehen*" OR "health skill*" OR "health attitude*" OR "patient educat*" OR "patient train*" OR "health promotion" OR "promotion of health"))

AND

(MM "Physical Therapy" OR MM "Physical Therapists" OR TI ("physiotherap*" OR "physio therap*" OR "physical therap*"))

AND

(MM "Education" OR MM "Academic Settings" OR MM "Academic Specialization" OR MM "Adult Education" OR MM "Bilingual Education" OR MM "Client Education" OR MM "Coeducation" OR MM "Consumer Education" OR MM "Counselor Education" OR MM "Curriculum" OR MM "Death Education" OR MM "Distance Education" OR MM "Education Policy" OR MM "Educational Degrees" OR MM "Educational Financial Assistance" OR MM "Educational Placement" OR MM "Educational Programs" OR MM "Educational Quality" OR MM "Educational Reform" OR MM "Educational Standards" OR MM "Elementary Education" OR MM "Environmental Education" OR MM "Family Life Education" OR MM "Grade Level" OR MM "High School Education" OR MM "Higher Education" OR MM "Homework" OR MM "Middle School Education" OR MM "Multicultural Education" OR MM "Nontraditional Education" OR MM "Nursing Education" OR MM "Paraprofessional Education" OR MM "Personnel Training" OR MM "Preschool Education" OR MM "Private School Education" OR MM "Public School Education" OR MM "Religious Education" OR MM "Remedial Education" OR MM "School Attendance" OR MM "School Enrollment" OR MM "School Graduation" OR MM "School Readiness" OR MM "School Retention" OR MM "School Transition" OR MM "Secondary Education" OR MM "Social Work Education" OR MM "Special Education" OR MM "STEM" OR MM "Student Admission Criteria" OR MM "Student Records" OR MM "Teacher Education" OR

TI ("educat*" OR "teach*" OR "train*") OR MM "Learning" OR MM "Adult Learning" OR MM "Animal Learning" OR MM "Blended Learning" OR MM "Cat Learning" OR MM "Cognitive Hypothesis Testing" OR MM "Collaborative Learning" OR MM "Conditioning" OR MM "Cooperative Learning" OR MM "Discrimination Learning" OR MM "Electronic Learning" OR MM "Experiential Learning" OR MM "Extinction (Learning)" OR MM "Foreign Language Learning" OR MM "Generalization (Learning)" OR MM "Generation Effect (Learning)" OR MM "Habituation" OR MM "Implicit Learning" OR MM "Incidental Learning" OR MM "Intentional Learning" OR MM "Interference (Learning)" OR MM "Learning Management Systems" OR MM "Learning Rate" OR MM "Learning Schedules" OR MM "Mastery Learning" OR MM "Maze Learning" OR MM "Mnemonic Learning" OR MM "Nonverbal Learning" OR MM "Observational Learning" OR MM "Organizational Learning" OR MM "Overlearning" OR MM "Perceptual Learning" OR MM "Probability Learning" OR MM "Problem Based Learning" OR MM "Rat Learning" OR MM "Relearning" OR MM "Retention" OR MM "Reward Learning" OR MM "Rote Learning" OR MM "School Learning" OR MM "Self-Regulated Learning" OR MM "Sequential Learning" OR MM "Serial Learning" OR MM "Skill Learning" OR MM "Social Emotional Learning" OR MM "Social Learning" OR MM "Spatial Learning" OR MM "Spontaneous Recovery (Learning)" OR MM "State Dependent Learning" OR MM "Transfer (Learning)" OR MM "Trial and Error Learning" OR MM "Verbal Learning" OR TI (learn* OR "workshop*" OR program* OR school* OR instruct* OR intervention*)

AND

(DE "Competence" OR DE "Professional Competence" OR TI competen* OR AB competen*)

Pedro

Advanced search, field "Title only", Option: " match all search terms (AND)"

Search term	number of refs April 23 ^o 2021
"Health literacy"	15
"Health illiteracy"	0
"health knowledge"	2
health comprehen*	17
health skill*	6
health attitude*	7
patient educat*	188
Patient train*	30
health promotion	125
TOTAL	390

Eric

(DE "Patient Education" OR DE "Health Promotion" OR (TI ("health literacy" OR "health illiteracy" OR "eHealth literacy" OR "e-Health literacy" OR "dementia literacy" OR "stroke literacy" OR "medical literacy" OR "nutrition literacy" OR "food literacy" OR "health knowledge" OR "health comprehen*" OR "health skill*" OR "health attitude*" OR "patient educat*" OR "patient train*" OR "health promotion" OR "promotion of health"))))

AND

(DE "Physical Therapy" OR TI ("physiotherap*" OR "physio therap*" OR "physical therap*"))

AND

(DE "Education" OR DE "Academic Education" OR DE "Adult Education" OR DE "Aging Education" OR DE "Alcohol Education" OR DE "Allied Health Occupations Education" OR DE "Consumer Education" OR DE "Drug Education" OR DE "General Education" OR DE "Health Education" OR DE "Comprehensive School Health Education" OR DE "Outcome Based Education" OR DE "Public Education") OR TI ("educat*" OR "teach*" OR "train*") OR DE "Learning" OR DE "Active Learning" OR DE "Adult Learning" OR DE "Associative Learning" OR DE "Paired Associate Learning" OR DE "Aural Learning" OR DE "Cooperative Learning" OR DE "Discovery Learning" OR DE "Discrimination Learning" OR DE "Electronic Learning" OR DE "Experiential Learning" OR DE "Field Experience Programs" OR DE "Internship Programs" OR DE "Job Shadowing" OR DE "Service Learning" OR DE "Incidental Learning" OR DE "Intentional Learning" OR DE "Interference (Learning)" OR DE "Lifelong Learning" OR DE "Mastery Learning" OR DE "Multisensory Learning" OR DE "Nonverbal Learning" OR DE "Perceptual Motor Learning" OR DE "Observational Learning" OR DE "Prior Learning" OR DE "Problem Based Learning" OR DE "Rote Learning" OR DE "Second Language Learning" OR DE "Sequential Learning" OR DE "Serial Learning" OR DE "Student Centered Learning" OR DE "Symbolic Learning" OR DE "Transfer of Training" OR DE "Transformative Learning" OR DE "Verbal Learning" OR DE "Visual Learning" OR DE "Workplace Learning" OR TI (learn* OR "workshop*" OR program* OR school* OR instruct* OR intervention*))

AND

(DE "Competence" OR DE "Minimum Competencies" OR DE "Teacher Competencies" OR TI competen* OR AB competen* OR DE "Interpersonal Competence")

Appendix B: Stakeholder Attendees

Profile of participants	Spain	Austria	Netherlands	Finland	Germany
Physiotherapy students	0	1	3	1	2
Physiotherapy clinicians	1	1	3	1	2
Physiotherapy teachers	2	3	4	1	2
Clients or clients representatives	1	2	3	0	2
Education experts	2	0	2	0	0
Experts on HL	2	0	3	1	3
Others	0	0	1	0	0