

EDUCATIONAL MATERIAL
OF DIGI4MSK - VOLUME 4

4. Understanding and Supporting Musculoskeletal Health Literacy



Series authors

Víctor Doménech-García¹, Julia Blasco-Abadía¹, Kieran O'Sullivan², Lara Coyne², Mary O'Keeffe^{3,4}, Nathan Skidmore^{3,5}, Zsófia Nagy^{3,6}, Thorvaldur Skuli Palsson^{7,8}, Steffan Wittrup McPhee Christensen^{9,10}, Morten Hoegh⁹, Alice Baroncini¹¹, Domenico Compagnone¹¹, Pedro Berjano¹¹, Lisa Zauber¹², Pablo Bellosta-López¹.

¹ Universidad San Jorge. Campus Universitario, Autov. A23 km 299, 50830. Villanueva de Gállego, Zaragoza, Spain.

² School of Allied Health, University of Limerick, Ireland.

³ European Pain Federation EFIC, Brussels, Belgium.

⁴ School of Public Health, Physiotherapy and Sports Science, University College Dublin, Dublin, Ireland.

⁵ Department of Sport, Exercise and Rehabilitation, Northumbria University, UK.

⁶ Rétköz Health Center, Budapest, Hungary.

⁷ Department of Clinical Medicine, Aalborg University, Aalborg Denmark.

⁸ Department of Physiotherapy and Occupational Therapy, Aalborg University Hospital, Denmark.

⁹ Department of Health Science and Technology, Aalborg University, Aalborg, Denmark.

¹⁰ Department of Physiotherapy, University College of Northern Denmark, Aalborg, Denmark.

¹¹ IRCCS Ospedale Galeazzi-Sant'Ambrogio, Milan, Italy.

¹² Research & Development Department, SYNYO GmbH, Vienna, Austria.

Volume lead: Mary O'Keeffe^{3,4}, Nathan Skidmore^{3,5}, Zsófia Nagy^{3,6}.

Digi4MSK — Erasmus+ Project No. **101111708**

Led by **San Jorge University (Spain)** with partners: **SYNYO (Austria)**, **European Pain Federation (EFIC®)**, **Aalborg University (Denmark)**, **University of Limerick (Ireland)**, **VITECO** and **IRCCS Ospedale Galeazzi – Sant'Ambrogio (Italy)**, **INP** and **Irudigital (Spain)**.

Learn more: <https://digi4msk.eu/>

© January 2026. Digi4MSK. Licensed under CC BY 4.0.

<https://creativecommons.org/licenses/by/4.0/>



doi: <https://doi.org/10.54391/20.500.14888/1930>



Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them. ERASMUS-EDU-2022-PI-ALL-INNO: Project n.101111708

Disclaimer:

This document has been developed within the framework of a European project for educational and informational purposes only. The content is not intended to replace clinical judgment, professional guidelines, or institutional protocols. It does not constitute medical advice, diagnosis, or treatment. Healthcare professionals should rely on their own expertise, clinical experience, and applicable standards of care when making decisions. Neither the authors nor the project partners assume any responsibility for actions or decisions taken based on the information provided in this material.

Transparency statement:

Generative AI tools were used to assist with drafting, editing, and adapting original raw material created by the DIGI4MSK consortium. All AI-generated outputs were reviewed, verified, and refined by the authors.

Synopsis

Digi4MSK is an Erasmus+ project that develops learning resources to improve how professionals communicate about musculoskeletal health and implement evidence-based self-management. This resource synthesizes high-quality research into concise, actionable guidance for everyday practice. Each volume offers structured summaries, tools, and examples to support shared decision-making, health literacy-sensitive communication, and safe, person-centred care across musculoskeletal conditions.

These free educational materials are designed to be used and adapted by healthcare professionals, educators, and researchers worldwide for training and clinical education purposes. Please retain proper attribution to the Digi4MSK consortium and indicate any modifications. For licensing information and permitted uses, see the “Credits & Licensing” page.

The first four volumes include: the requirements for the implementation of self-management, general principles of self-management, excluding serious pathology in musculoskeletal pain, and assessment of a patient’s readiness in terms of motivation and health literacy.

Volume 4 — Understanding and supporting musculoskeletal health literacy

This volume focuses on a second key element for the implementation of self-management: musculoskeletal health literacy—what it is, why it matters, and how to assess and support it in practice. It reviews key domains (accessing, understanding, appraising and applying health information), highlights available tools, and identifies gaps for future measurement. Practical strategies help align communication with patients’ needs to enhance safe self-management.

Keywords: health literacy, assessment tools, communication, appraisal, application, MSK education.

Index

4.	Understanding and Supporting Musculoskeletal Health Literacy.....	5
4.1	Overview.....	5
4.2	Objectives.....	5
4.3	Introduction: Foundations and evaluation of Musculoskeletal Health Literacy	6
4.3.1	What is health literacy?	6
4.3.2	Health literacy and musculoskeletal pain.....	6
4.4	Specific Health Literacy domains	8
4.4.1	Understanding Information.....	8
4.4.2	Accessing Information.....	8
4.4.3	Information Appraisal.....	8
4.4.4	Applying Information	25
4.5	Key health literacy tools and their applications	26
4.5.1	Health Literacy Instruments in specific groups with MSK pain	27
4.5.2	The need for a new tool evaluating musculoskeletal health literacy	29
4.6	Summary of key messages	34
	References.....	35

4. Understanding and Supporting Musculoskeletal Health Literacy

4.1 Overview

Health literacy is a key factor in how people understand, evaluate, and act on health information. In musculoskeletal (MSK) care, it directly influences whether patients can engage with advice, follow exercise programmes, and make informed decisions about pain management.

Low health literacy can make even well-designed self-management programmes difficult to follow. Patients may struggle to interpret medical language, apply instructions correctly, or recognise when to seek help. Conversely, when information is clear, accessible, and personally meaningful, patients are more likely to stay engaged and benefit from self-management approaches.

For clinicians, recognising and addressing health literacy is essential to ensure that self-management strategies are inclusive, effective, and sustainable. This chapter explores the main dimensions of health literacy relevant to MSK care, introduces simple ways to assess it in practice, and outlines strategies to bridge literacy-related barriers in patient communication and intervention design.

4.2 Objectives

The general objective of this module is to recognize the role of health literacy in the success of self-management programs and develop the ability to assess and address literacy-related barriers in patients with musculoskeletal pain. The specific learning objectives are:

- *Explain how health literacy influences patient outcomes, decision-making, and adherence in the context of musculoskeletal pain self-management.*
- *Identify key domains of health literacy relevant to MSK care (e.g., ability to understand, appraise, and apply health information) and their relationship with patient readiness for self-management.*
- *Apply valid and feasible tools or screening strategies to assess a patient's health literacy level prior to initiating a self-management program.*

4.3 Introduction: Foundations and evaluation of Musculoskeletal Health Literacy

4.3.1 What is health literacy?

Health literacy is a key determinant of individual and collective health, influencing people's ability to make informed decisions, to navigate the health system and to adopt healthy behaviours.

There are several formal definitions of health literacy. For example, Kwan defined it as the degree to which people are able to access, understand, appraise and communicate information to engage with the demands of different health context in order to promote and maintain good health across the life course (Kwan et al., 2006). Another more recent definition is the one provided by Nutbeam et al: Health literacy is a construct involving knowledge and skills that dictates the motivation and ability to find, understand, appraise and apply health information (Nutbeam & Kickbusch, 1998).

Individuals with low education and socioeconomic status are more likely to have inadequate health literacy (Adams et al., 2013; Brandstetter et al., 2020; Sørensen et al., 2012), which in turn has an impact on health. An adequate level of HL is necessary for maintaining healthy behaviours and therefore good health outcomes (Visscher et al., 2018). Studies have demonstrated that low HL is associated with poor health outcomes, more hospitalizations (Baker et al., 2002; Berkman et al., 2011; Mitchell et al., 2012), a lack of prevention strategies and behaviours (Adams et al., 2013; Chen et al., 2013; Jovanić et al., 2018; O'Hara et al., 2018; Thomson & Hoffman-Goetz, 2012), high mortality (Bostock & Steptoe, 2012; Fabbri et al., 2020).

4.3.2 Health literacy and musculoskeletal pain

HL might also play an important role within the context of musculoskeletal pain. For example, in a cohort of 1890 patients with musculoskeletal pain, it was shown that inadequate HL (assessed by the Short Test of Functional Health Literacy in Adults (Baker et al., 1999), was associated with older age, lower education, comorbidities, lower physical function and higher pain intensity (Lacey et al., 2018). After adjusting for potential confounders such as age, gender, mental health and comorbidities, the inadequate health literacy still significantly explained patients with low HL benefiting less from primary care over time. In another example, adults older than 60 years with low HL show higher prevalence of arthritis (Kim,

2009). Interestingly, healthcare professionals in the field of musculoskeletal pain often find it more challenging to manage patients with low health literacy, particularly when communication about pain is limited (Adams et al., 2016). More importantly for the context of Digi4MSK, poor self-management of chronic noncommunicable diseases (Olesen et al., 2017) such as chronic musculoskeletal pain and musculoskeletal disorders (Mackey et al., 2016) are also associated with low HL.

While it is believed that an adequate level of HL is necessary to engage in healthy behaviours, it may not be sufficient, as there are other important aspects such as public health policies that matter. In general, this context raises the need for healthcare professionals to receive training in assessing the health knowledge of patients with musculoskeletal pain.

Traditionally, the measurement of health literacy has focused on questionnaires that assess subjective perceptions of an individual's ability to understand, process and use health-related information.

Considering the Health Literacy model from Nutbeam at the beginning of the 21st century, (Nutbeam, 2000), HL can be divided into 3 levels:

- 1. Basic/functional literacy** - sufficient basic skills in reading and writing to be able to function effectively in everyday situations.
- 2. Communicative/interactive literacy** - more advanced cognitive and literacy skills which, together with social skills, can be used to actively participate in everyday activities, to extract information and derive meaning from different forms of communication, and to apply new information to changing circumstances.
- 3. Critical literacy** - more advanced cognitive skills which, together with social skills, can be applied to critically analyse information, and to use this information to exert greater control over life events and situations.

A comprehensive review of the studies reveals a diverse range of tools employed to assess HL and its implications for patients with chronic pain. These tools include validated instruments like the Short Test of Functional Health Literacy in Adults (S-TOFHLA), Newest Vital Sign (NVS), Health Literacy Questionnaire (HLQ), and condition-specific tools as the Health Literacy in Chronic Pain (HLCP) instrument. The choice of HL measurement tool varies based on the study objectives and the specific dimensions of HL being investigated, such as functional literacy, eHealth literacy, and medication knowledge.

4.4 Specific Health Literacy domains

4.4.1 Understanding Information

The domain of healthcare understand domain refers to the individual's ability to comprehend fundamental health-related information. In the Digi4MSK project, on many occasions, this information particularly pertains to musculoskeletal health, which may include medical terminology such as the name of pathologies, physiological concepts, diagnostic labels, treatment explanations and self-management instructions. Additionally, the information can be delivered verbally or written, in the clinical context, or via educational materials such as videos, text or videos. Some examples of the core competencies in this domain include: 1) Recognizing key musculoskeletal vocabulary (e.g., "chronic pain," "flare-up," "inflammation"), 2) Understanding the purpose and expected outcomes of treatment options (e.g. addressing one physiological process such as peripheral sensitization and hyperalgesia, or reducing an unhealthy behaviour such as avoidance, 3) Differentiating between types of pain (e.g., acute vs. chronic), 4) Comprehending symptom trajectories and the role of activity in recovery (e.g., being active can reduce the negative impact of pain relapses).

4.4.2 Accessing Information

Healthcare access refers to an individual's ability to identify, with appropriate health resources, health information, or digital resources such as teleconsultations or pain management apps. In MSK health, this means knowing how to seek guidance from general practitioners, specialists such as physiotherapists. Some core examples may include 1) understanding when and where to seek different types of care, 2) knowing how to access rehabilitation services or educational programs, 3) access to digital resources containing reliable information about musculoskeletal health, 4) utilizing digital platforms such as exercise apps.

4.4.3 Information Appraisal

Healthcare appraisal refers to the capacity to critically evaluate health information from various sources (online or offline) by assessing its quality, credibility, bias, and applicability. It reflects a person's ability to judge relevance, trustworthiness, and evidence basis of information related to causes of MSK disorders, pathologies, prognosis and treatment options. The core competences of this domain include 1) Differentiating between evidence-based and anecdotal or commercially biased content, 2) assessing the risk and benefits of recommended

therapies (surgery vs conservative treatment), comparing treatment options and questioning the necessity of diagnostic imaging, and 3) recognizing signals of misinformation such as miracle cures or fear-inducing language.

Importance and consideration of Information appraisal:

In the digital age, the internet has become a primary resource for individuals seeking health information, including guidance on MSK conditions. This causes a growing reliance on online resources to understand symptoms, explore treatment options, and manage pain. Information appraisal, in the context of MSK health literacy, refers to the ability of an individual to critically evaluate the quality and reliability of health information. This is particularly important, not only in general health, but for MSK health.

The importance of recognizing and understanding how the quality of online MSK information influences health outcomes is a critical factor in supporting patients through effective self-management. As reliance upon the internet as a source of MSK health information increases, the accuracy, reliability, applicability, and clarity of freely available online resources significantly impact individuals in various ways. High-quality information empowers individuals to make informed decisions, whilst poor-quality content leads to unnecessary health complications, delays in appropriate care, and the stagnation of effective self-management skills.

Wide variability and credibility

Online MSK resources range from high-quality, evidence-based materials provided by reputable healthcare organizations to unverified low-quality advice on public forums, blogs or social media. Being able to distinguish between these sources helps individuals avoid harmful or ineffective recommendations.

Risk of inaccurate or misinformation

Some resources oversimplify complex MSK conditions or promote unsubstantiated claims, such as “quick fixes”. Having the ability to appraise information ensures that individuals are able to recognize poor information and differentiate this will scientifically support guidance.

Bias and commercial interests

A significant portion of online MSK health content is influenced by marketing or financial motives. Websites may promote products, treatments, or therapies without transparent evidence of their efficacy for the management of MSK conditions. Critical appraisal skills help individuals recognize and filter commercially influenced information. While online information offers convenience and accessibility, it also presents unique challenges that make appraisal skills in this context essential. One of which is that whilst offering a wealth of resources, the quality of such information in the management of MSK conditions is highly variable. Identifying and addressing challenges with the process of developing an individual's capacity to effectively appraise information poses several challenges:

Overabundance of content

Alongside the variability of quality, the sheer volume of MSK health information online can make it difficult to identify credible sources and pathways of information.

Generalized advice

Many resources provide broad recommendations that may not be suitable for every individual, and certainly not every MSK condition. For instance, exercise advice meant for general fitness may not address the specific needs for those with MSK pain.

Inconsistent Evidence

Not all information is supported by robust clinical evidence. Individuals must assess whether the claims are backed by scientific research or are anecdotal. A healthcare professional should aim to address a patient's ability to effectively appraise MSK health information. Individuals should possess several competencies which will enable them to effectively appraise health information independently:

- **Assess the source:** Look for information provided by reputable organizations, such as medical institutions, government health departments, or peer-reviewed publications.
- **Check for evidence:** Be able to determine whether the information is supported by peer-reviewed scientific literature (e.g., clinical studies, systematic reviews, or expert

consensus). Be able to recognize when a claim is being made, and that the references do not substantiate these claims, or there are no references at all.

- **Identify bias:** Evaluate whether the information has alternative motives (e.g. commercial) such as promoting specific health-related products or treatments without transparent evidence.
- **Consider relevance:** Ensure that the information addresses the specific MSK needs and is not overly generalized or unrelated to the individual's condition.
- **Seek professional validation:** When in doubt, take action to assist in the validation of information quality. For example, discuss online information and findings with a qualified healthcare professional to confirm their accuracy and applicability to the individual's clinical case.

Online information often influences the choices patients make regarding their health, and poor-quality content can have harmful consequences, such as **misleading patients**. Inaccurate, unevidenced, or incomplete information may cause individuals to misunderstand their symptoms, overestimate the severity of their conditions, and may cause them to fail to recognize when professional intervention is necessary. For example, patients experiencing MSK pain might incorrectly attribute mild symptoms based on unreliable sources, delaying a more serious diagnosis which requires alternative intervention and prognosis.

The poor-quality content can also delay appropriate care by downplaying or intervening with the need for professional medical assessment. This could result in a postponement of clinical assessments, evidence-based treatments which may exacerbate their condition and potentially negatively impact the prognosis. Additionally, misguided advice can encourage individuals to adopt strategies that are ineffective or even harmful, such as inappropriate exercises, unsafe dietary changes, or reliance upon unverified and sometimes dangerous "miracle cures". High-quality online MSK health information plays a vital role in empowering individuals to take control of their health. Accurate and reliable content supports information decision-making and fosters confidence in self-management. High-quality resources help individuals better understand their condition, symptoms, and available treatment options. This clarity enables them to approach their health informatively and proactively.

Reducing the burden on healthcare systems

The impact of low-quality MSK health information extends beyond individual concerns, also having significant implications for public health. Reliable and accessible information regarding MSK health influences population-level outcomes by reducing the burden on healthcare systems and can positively influence digital literacy. These broader impacts highlight the necessity of prioritizing the provision of high-quality resources as part of not only an individuals' treatment, but also as part of broader public health strategies.

Accurate information helps individuals distinguish between conditions that can be self-managed and those requiring professional attention. By addressing minor issues independently, people reduce unnecessary visits to general practitioners and specialists, easing pressure on already overburdened healthcare systems.

Criteria for assessing quality health information:

Assessing online resources includes using a set of pre-defined criteria that a resource (e.g. online website) has to meet, to be considered high quality. A significant barrier to using these tools is the lack of motivation, desire, knowledge and time to assess online criteria (Eysenbach & Köhler, 2002). Here we provide examples of principles which are often featured in tools which are used to assess the quality of online content.

Transparency and credibility

These concepts are foundational for evaluating health information. This principle emphasizes the importance of identifying trustworthy sources to ensure accuracy and reliability.

- Key elements to assess:

- **Author credentials:** Resources should clearly indicate the credentials / qualifications of the authors or contributors, ensuring they have relevant expertise the area.
- **Evidence to support claims:** Reliable resources should provide references to peer-reviewed research, clinical guidelines, or evidence-based studies that clearly support the claims which have been made.

- **Disclosure and clarity of conflicts:** Any conflicts of interest, such as financial ties with products, pharmaceutical companies or commercial entities, should be disclosed clearly and transparently.
- **Reputable organizations:** Content hosted or endorsed by well-known and reputable institutions (e.g. government health departments, academic medical centres) is more credible than individuals of perceived importance or opinion pieces.

Balance and objectivity

This principle focuses on the impartiality of the health information presented, ensuring a fair representation of information, treatment options, benefits and risks.

- Key elements to assess:

- **Balanced view of options:** High-quality health information should present multiple treatment pathways (e.g. mainstream medical options, lifestyle interventions, and alternative therapies) encompassing a broad biopsychosocial approach to MSK disease management, without heavily favouring one specifically, unless supported clearly by evidence.
- **Risk and benefit analysis:** Information should include both the advantages and potential drawbacks of treatments, allowing users to make informed decisions.
- **Avoidance of promotional content:** Content should clearly distinguish between evidence-based materials and promotional or commercial content, which may bias recommendations.

Comprehensiveness

Comprehensiveness refers to the depth and breadth of the information provided, ensuring that there is an understanding of the various health concerns, treatment options, and decision-making processes.

- Key elements to assess:

- **Coverage of all treatment options:** Comprehensive MSK health information should address not only mainstream medical treatments, but also alternative therapies, and even the option of no treatment, where appropriate. This ensures that users can explore the full spectrum of available choices.

- **Recognition of gaps and inconsistencies:** High-quality resources should identify and acknowledge areas where evidence is limited or inconclusive, rather than overgeneralizing or making unsupported claims.
- **Adequate depth of coverage:** Information should go beyond superficial descriptions to explain the mechanisms, intended outcomes, and evidence supporting each treatment option. For example, an MSK-related health resource should detail exercises, pharmacotherapies, and surgical interventions with their indications and contraindications clearly outlined and described.

Clarity and accessibility

Providing clarity and accessibility of information emphasizes the importance of making health information understandable and usable for the broad audience, including those with varying levels of MSK health literacy.

- Key elements to assess:

- **Use of clear language:** Medical jargon should be minimized, or if used, thorough explanation with simple terms replacing complex texts should be used.
- **Readable format:** information should be presented in an organized, coherent, and easy to follow structure, using headings, bullets points, shorter sentences, and visual aids where appropriate.
- **Accessibility features:** Resources should account for diverse audiences, including those with visual, cognitive, and/or physical impairments.
- **Alternatives to tradition online format:** resources should be accessible via a manner of different online forms. The options to download a simplified version or providing the same information in alternative audio, or visual formats is beneficial.
- **Impact of health literacy:** Content creators should consider the user's and target audiences health (and reading/writing) literacy levels, and design materials that promote understanding and engagement.

Currency of information

Currency refers to the timeliness of health information, which is crucial in a field like MSK self-management where evidence, guidelines, and treatments evolve rapidly.

- **Key elements to assess:**

- **Publication and review dates:** Resources should include visible timestamps indicating when the content was created, reviewed, and/or updated.
- **Impact of outdated information:** using outdated information can lead to poor decision-making or reliance on ineffective treatments. For example, older MSK guidelines may lack insights from more recent clinical trials, expert consensus, or advancements in technology.
- **Ongoing updates:** High-quality platforms should regularly review and update their content to reflect current research, clinical guidelines, and patient needs.

Encouragement of shared decision making

Shared-decision making is a collaborative process in which patients and healthcare providers work together to make informed decisions about treatments and care plans. This concept should not only be embedded in the treatment processes, but additionally in MSK-related health resources.

- Key elements to assess

- **Empowering patients:** High-quality online resources can empower individuals by equipping them with the knowledge and confidence to actively participate in care decisions.
- **Tools for engagement:** Information should highlight resources or tools that facilitate shared decision-making, such as question prompts and risk calculators.
- **Context of shared decision-making:** Content should frame health decisions as a partnership, emphasizing that patients' values, preferences, and unique circumstances are integral to the decision-making process.

Overall, these principles provide a structured approach to evaluating and improving the quality of online MSK health information. By recognizing and adhering to these principles, creators of online content can ensure their materials are trustworthy, accessible, and impactful for both healthcare professionals and patients.

Tools and methods to assess the quality of online MSK health information:

Although there are many tools which have been developed to assist in the appraisal of online health information, the most common reported in the literature are Journal of the American Medical Association (JAMA) score (Silberg et al., 1997); Health On the Net Foundation (HON) code(Boyer et al., 1998); and Discern Criteria(Charnock et al., 1999). The following table details the criterion and the respective purpose and evaluation criteria for each tool.

Criterion		Description	Purpose	Evaluation
JAMA	Authorship	Identifies author(s) and their credentials.	Ensures the content is created by qualified experts.	1 point if clear, 0 if not.
	Attribution	References or sources provided.	Verifies claims are supported by credible evidence.	1 point if included, 0 if not.
	Disclosure	Discloses conflicts of interest or financial relationships.	Promotes transparency and identifies potential biases.	1 point if disclosed, 0 if not.
	Currency	Indicates publication or last update date.	Ensures information is up-to-date.	1 point if provided, 0 if not.
HON	Authority	Health advice provided by professionals or clearly labelled as opinion.	Establishes content authority and trustworthiness.	Must define qualifications.
	Complementarity	Supports, not replaces, professional advice.	Reinforces that online content supplements, not substitutes, medical care.	Should explicitly state this.
	Privacy	Protects user data and confidentiality.	Ensures compliance with privacy standards.	Clear privacy policy required.

Criterion		Description	Purpose	Evaluation
	Attribution	Includes reliable references and publication dates.	Verifies credibility and currency of content.	References must be cited.
	Justifiability	Claims backed by evidence.	Prevents exaggerated or unsupported health claims.	Evidence-based claims mandatory.
	Transparency	Provides clear contact details for accountability.	Builds user trust in the content.	Contact information must be available.
	Financial Disclosure	Discloses funding sources and sponsorships.	Identifies potential financial biases.	Required disclosure of funding.
	Advertising Policy	Separates advertising from editorial content.	Clarifies distinction between ads and impartial information.	Ads must be clearly marked.
DISCERN	Reliability	Consistent, unbiased, and trustworthy information.	Ensures transparency and trustworthiness.	Scored 1 (low) to 5 (high).
	Information Quality	Clear, accurate, and balanced content.	Validates usefulness for informed decision-making.	Scored 1 to 5.
	Treatment Options	Evidence-based descriptions of treatments with pros/cons.	Provides comprehensive understanding of available options.	Scored 1 to 5.
	Balanced Presentation	Impartial discussion of risks, benefits, and alternatives.	Promotes objectivity and prevents bias in health advice.	Scored 1 to 5.

Each of these tools can play a significant role in assessing the quality of online health information. However, their strengths and limitations make them suitable for different contexts and purposes. It is valuable to evaluate these tools and understand where each might be best suited.

The JAMA score is a straightforward and practical tool that focuses on the four criteria of: authorship, attribution disclosure and currency. Its relative simplicity makes it accessible to both healthcare professionals and general users who need a quick evaluation of online content. The focus on transparency ensures that users can identify whether the information comes from credible sources and whether potential biases are disclosed. However, the JAMA score's narrow scope is a notable limitation, nor does it account for user accessibility or relevance of content. These omissions mean that JAMA score is best suited as a baseline evaluation tool, rather than a comprehensive assessment tool.

The HON Code, in contrast, provides a robust set of ethical principles designed to establish trust and integrity in online health content. Its emphasis on critical aspects such as privacy, financial disclosure, and the separation of advertising from editorial content makes it particularly effective promoting transparency. Despite this, the HON code does not include a scoring system, making it less practical for comparative evaluations. While it is excellent for ensuring ethical standards, it does not assess user accessibility, clarity, or decision-making support.

Finally, the DISCERN tool offers a more comprehensive approach, focusing not only on the reliability of information, but also on its quality and balance. By evaluating treatment options, risks, benefits, and alternatives, it empowers users to make informed decisions about their health. This makes DISCERN particularly valuable for individuals seeking detailed and actionable information about treatment choices. Unlike the JAMA and HON code, DISCERN uses a structured questionnaire with a five-point scale, allowing for nuanced evaluations. However, the DISCERN tool can be time consuming and requires a degree of health literacy or expertise to apply effectively. This reiterates the importance of understanding the literacy levels of an individual with MSK to ascertain whether the DISCERN tool would be appropriate. It is also more focused decision-making content, making it less suited for general-purpose health information.

How to assess a patient's ability to find and evaluate quality online content:

In today's digital age, patients increasingly turn to the internet for health information. While this trend can empower patients, it also presents challenges, such as navigating misinformation and appraising the quality of resources. Healthcare professionals play a vital role in guiding patients to develop the skills necessary to evaluate online MSK health content critically. Here is a guide that provides actionable strategies to assess and enhance your patients' digital health literacy. In addition to the content of this chapter, here are some resources that can be useful to develop critical thinking on health resources: <https://thatsclaim.org/health/> and better approaching clinical consultations and therapy proposals: https://www.choosingwisely.org.au/resources/consumers-and-carers/5questions_Tipsheet—For Reporting on Drugs, Devices and Medical Technologies.

Understanding and sharing the importance of digital HL.***Definition and Relevance***

Digital Health Literacy: The ability to search for, understand, critically evaluate, and apply health information obtained from digital platforms.

Significance in MSK Health: MSK conditions often involve self-management and long-term care. High-quality online information can help patients make informed decisions about treatment options, lifestyle changes, and preventive care. Highlighting, where you believe that the patient is able to understand, the differences between HL and digital HL will encourage the emphasis and importance of being aware of their own capacity regarding online habits.

Differentiating digital Health Literacy from 'general' Health Literacy:

HL addresses general comprehension of health information across all formats, while eHL focuses specifically on digital platforms. Both are critical for MSK patients who may rely on online resources to understand complex conditions and treatments.

Assessing Digital Health Literacy

Using Validated Tools

eHealth Literacy Scale (eHEALS): A validated questionnaire assessing patients' confidence in finding and evaluating online health content. Incorporate MSK-specific questions to increase relevance.

Interactive Scenarios: Ask patients to search for information about a common MSK condition (e.g., safe exercises for arthritis) and observe their process to identify gaps in skills or understanding.

Clinician-Led Evaluations

During consultations, ask open-ended questions like:

“What information have you found online about your condition?”

“How did you determine that the information was trustworthy?”

This approach helps identify whether patients use reliable sources and apply critical thinking skills. You can then provide immediate feedback regarding the quality of the source, how the information is reported and highlight and encourage critical thinking regarding the information and source.

Introduce Evaluation Tools:

Use resources like ‘That’s a Claim’ [<https://thatsaclaim.org/health/>], which teaches patients to evaluate online health claims critically. This interactive tool can also be incorporated into educational sessions.

Adopting a Patient-Centred Approach

The Choosing Wisely Framework

Encourage patients to use the following 5 Questions:

- What are the benefits?
- What are the risks?
- Are there simpler or safer options?
- What happens if I do nothing?
- What are the costs?

These questions empower patients to make evidence-based decisions about their care and evaluate the online content they encounter. Encourage patients to use these questions when accessing online information to assist with information appraisal.

Tailoring Your Approach

Build Trust and Empathy: Patients may feel overwhelmed by conflicting information. Reassure them that this is normal.

Use Plain Language: Explain medical concepts clearly and avoid jargon. For example, when discussing MSK treatments, focus on terms like “benefits” and “risks” instead of technical terminology which might be reported in the online information such as indications / contraindications.

Addressing Common Barriers

Immediately address, where possible, identified barriers to patient digital HL. Identification of such barriers is critical to developing a plan to assist in the increase in patient HL.

Identifying challenges the patient faces

Information Overload: The vast volume of online content can make it hard for patients to identify reliable sources. (Solution: Teach patients efficient search techniques, such as using specific keywords or filters to refine results.)

Low Health Literacy: Patients may struggle to understand medical jargon. (Solution: Provide user-friendly resources, like illustrated guides or simplified articles.)

Limited Digital Skills: Patients may lack experience using digital devices or navigating websites. (Solution: Offer basic digital literacy training or recommend local resources that can help, which are provided in formats which the patient is most comfortable with.)

Psychological Barriers

Fear or anxiety about encountering alarming information online can deter patients from engaging with digital resources. Help patients view online research as an empowering tool, not a source of stress.

Case studies and practical examples:

What does a typical patient journey look like?

Understanding the typical journey of a patient seeking online MSK information allows clinicians to pinpoint where specific barriers, biases, and opportunities for intervention and education arise. This journey often involves multiple stages, influenced by personal motivations, cognitive biases, social influences, and digital literacy skills. Here is an example of a patient journey highlighting key behaviours, barriers and opportunities that clinicians should take to address these.

1. Initial Trigger: Symptom Onset or Concern

What Happens: The journey begins with a physical symptom (e.g., back pain, joint stiffness) or external triggers (e.g., a friend's suggestion, workplace ergonomics program). Patients may seek to self-manage or validate concerns before consulting a healthcare provider.

Key Behaviours: Asking peers or family for advice. Ignoring mild symptoms until they worsen.

Barriers: Social advice may lack evidence and perpetuate myths (e.g., "rest is the best cure for all back pain"). Cultural or individual stigma about seeking care (e.g., associating MSK pain with aging and inevitability).

Clinician Opportunities: Provide accessible materials for early symptoms, such as pamphlets on common MSK conditions with advice on when to seek care. Equip community leaders, such as workplace HR or fitness instructors, with accurate MSK information to counteract myths.

2. First Search: Informal, Unstructured Online Exploration

What Happens: The patient enters a general query into a search engine (e.g., "knee pain remedies" or "best exercises for back pain").

They may stumble upon low-quality health blogs, marketing-heavy websites promoting products (e.g., supplements, devices), or social media influencers sharing anecdotal "cures."

Key Behaviours: Patients skim top results, often favouring websites with engaging visuals or emotional language. Confirmation bias leads them to trust content aligning with preconceived notions (e.g., "exercise makes arthritis worse").

Barriers: Information overload and difficulty distinguishing credible sources. Preference for quick fixes or overly simplified answers.

Clinician Opportunities: During consultations, teach patients how to assess website credibility including checking for authorship by experts, looking for citations of peer-reviewed studies, and avoiding sites with aggressive sales tactics or exaggerated claims.

Share a list of trusted websites tailored to MSK health (e.g., NHS Inform, MedlinePlus, Arthritis Foundation).

3. Social Media and Peer Influences

What Happens: Patients turn to social media platforms (e.g., Facebook groups, TikTok, Instagram) for personal stories or community advice. They encounter a mix of helpful tips, misinformation, and anecdotal experiences.

Key Behaviours: Engaging with posts that are visually appealing or emotionally relatable. Sharing their own symptoms to crowdsource advice.

Barriers: Viral posts often prioritize sensationalism over evidence-based content. Algorithms reinforce echo chambers, showing similar content repeatedly.

Clinician Opportunities: Discuss the limitations of social media health advice during appointments. Explain the importance of cross-referencing with reputable sources. Suggest following certified health professionals or organizations on social media for balanced insights. Collaborate with MSK health influencers to create evidence-based content that resonates with patients.

4. Encountering News Articles

What Happens: Patients encounter articles in news outlets or online aggregators (e.g., Google News) reporting on new MSK treatments or research findings. These articles may oversimplify or exaggerate scientific studies for broader appeal.

Key Behaviours: Trusting articles from recognizable news sources without evaluating their accuracy. Focusing on attention-grabbing headlines and ignoring nuanced content.

Barriers: Headlines often misrepresent the scope or validity of research (e.g., "Breakthrough Cure for Arthritis!"). Patients may feel disillusioned if treatments mentioned are inaccessible or ineffective.

Clinician Opportunities: Explain how to interpret news articles critically, focusing on the differences between early research and clinical application, the importance of peer-reviewed studies, and provide tools like tipsheets for assessing medical claims (e.g., the Commonwealth Fund guide).

5. Consulting Organizational or Workplace Materials

What Happens: Patients may access resources provided by workplaces, insurers, or health campaigns, such as brochures or ergonomic guides. These materials often include generic advice but may lack personalized or actionable steps.

Key Behaviours: Individuals may skim materials without applying recommendations and feel unclear about next steps or remain sceptical of their relevance.

Barriers: Overgeneralized information may not address individual needs or conditions.

Patients may not know how to adapt advice to their circumstances (e.g., home-based ergonomics for remote work).

Clinician Opportunities: Collaborate with organizations to develop tailored, user-friendly MSK resources and offer workshops, webinars or other forms of information to complement written materials.

6. Seeking Professional Consultation

What Happens: Patients present to a healthcare provider after encountering mixed or confusing information. Preconceived notions from prior research will likely influence their expectations or scepticism.

Key Behaviours: Sharing printouts, screenshots, or summaries of what they've found online and will seek validation for or refutation of their discoveries.

Barriers: Misconceptions from poor-quality information may create tension between patients, clinicians and health systems / processes. Unrealistic expectations for treatments or outcomes may also dominate the expected prognosis.

Clinician Opportunities: Validate the effort patients put into researching their condition which will foster trust and collaboration. Use these moments to correct misinformation and guide patients to reliable, evidence-based resources alongside offering practical examples of how they can apply credible online information to their care plan.

Key takeaways for clinicians:**- Proactively identify and address barriers**

During consultations, discuss the common pitfalls of online research and provide tips for identifying trustworthy sources.

- Empower with education and other tools

Share created or curated resources and teach patients how to critically appraise websites, social media, and news articles whilst being aware of behavioural strategies to empower patients and address psychological barriers.

- Leverage behavioural insights

Use models, like the health belief model, to identify barriers and tailor the design and implementation of education and interventions to positively influence patient motivations and behaviours.

- Foster ongoing education

Continuously encourage patients to bring their findings to future appointments for discussion and to assist in the refinement of their appraisal and access strategies.

By understanding the typical journey that your patients might have undertaken, considering they may appear to you at any point during this process, you can effectively intervene at key points to guide patients toward developing skills related to appraising information, improving their digital literacy and self-efficacy regarding MSK management.

4.4.4 Applying Information

Information apply refers to the individual's ability to use acquired health information, knowledge and guidance to make decisions and perform actions that support therapeutic objectives, health behaviours and eventually health outcomes. In the MSK context, it means incorporating clinical advice and self-management strategies into ones' daily life, such as engaging into a healthier lifestyle with more valued (physical) activities. Specifically, it might involve the competencies of 1) translating verbal or written guidance into practical behaviours, 2) adhering to and modifying movement routines, 3) using self-monitoring tools to guide physical activity, and 4) applying problem-solving skills in response to pain flare-ups, treatment setbacks or uncertain musculoskeletal health-related information.

4.5 Key health literacy tools and their applications

Short Test of Functional Health Literacy in Adults (S-TOFHLA): consists of 36 items that assess reading comprehension and numeracy skills using a Likert-scale approach. Widely used in cross-sectional studies, it measures functional HL and has been pivotal in examining the association between HL levels and pain outcomes. For instance, research on patients with chronic musculoskeletal pain identified that individuals with inadequate HL reported higher pain severity and greater reliance on opioids. Conversely, adequate HL was associated with reduced kinesiphobia but showed no significant differences in psychosocial factors like pain interference. Clinically, the S-TOFHLA aids in identifying patients who may benefit from tailored educational interventions (Baker et al., 1999).

- Newest Vital Sign (NVS): is a 6-item tool that uses a nutritional label interpretation task to evaluate HL, scored on a numerical scale. It has been employed in studies exploring pain management knowledge, demonstrating that patients with low HL had significantly poorer knowledge on pain medications compared to those with adequate literacy. Furthermore, inadequate HL correlated with higher pain severity, emphasizing the need for targeted educational interventions. Its simplicity and quick administration make the NVS particularly useful in clinical settings (Weiss et al., 2005).
- Health Literacy Questionnaire (HLQ) ([Factsheet HLS19-Q12.pdf](#)): comprising 44 items across nine domains, uses a combination of Likert and categorical responses to provide a multidimensional assessment of HL. It has been applied in workplace interventions for musculoskeletal pain, particularly among blue-collar workers. A single-arm trial utilizing the HLQ highlighted improvements in pain management through structured communication and organizational readiness for HL initiatives. Its broad applicability allows clinicians to address both individual and organizational HL challenges (Osborne et al., 2013).
- The eHealth Literacy Scale (eHEALS) is a questionnaire designed to assess an individual's ability to access, understand, and apply health-related information from digital sources. It consists of 8 items that evaluate key aspects of health literacy in the digital age, including the ability to seek out online health information, confidence in understanding and using it, and the capacity to apply this information to make informed health decisions. The scale is widely used in research and health interventions to identify gaps in digital health literacy and to inform strategies aimed at improving public health outcomes (Milanti et al., 2025).

- The Health Literacy Management Scale (HeLMS): a comprehensive tool consisting of 29 items designed to assess health literacy in terms of a person's ability to access, understand, appraise, and use health information in practical healthcare settings. It evaluates various domains, including communication with healthcare providers, managing health conditions, understanding health information, and navigating healthcare systems. The HeLMS is applicable in both clinical and research contexts, helping to identify individuals at risk of low health literacy and guiding the development of targeted interventions to improve patient outcomes (Jordan et al., 2013).

4.5.1 Health Literacy Instruments in specific groups with MSK pain

Assessing musculoskeletal health literacy - **defined in Digi4MSK as the ability to find, understand, appraise, and apply information related to MSK health** - is key to modern musculoskeletal care. It allows us to tailor education, enhance adherence, combat misinformation, and bridge gaps in care, as well as developing skills necessary for healthy behaviours. For clinicians and researchers alike, incorporating literacy assessments into our practice isn't just an academic task; it's a practical move toward improving the quality, efficiency, and empowerment of patients in one of the most challenging areas of health (Hill et al., 2015).

Several studies have focused on the validation of HL tools to ensure their reliability and applicability across diverse populations with musculoskeletal pain conditions:

- Health Literacy assessment instrument for patients with chronic pain (HLCP): a rigorous validation process confirmed the HLCP's suitability for chronic pain patients. This tool's comprehensive framework aligns with the unique needs of this population, addressing functional, interactive and critical dimensions of health literacy. It consists of 41 items (Chen et al., 2023).
- Musicians' Health Literacy Questionnaire (MHL-Q19): consists of 19 items evaluated on a Likert scale and demonstrated acceptable reliability, making it a valuable resource for assessing HL in post-secondary music students (Guptill et al., 2022).
- Low Back Pain Knowledge Questionnaire (LBPKQ): is a 16-item tool designed to assess knowledge about low back pain, including its causes, management, and common misconceptions. It identifies gaps in understanding to enhance education for patients and healthcare professionals. Applicable in research, clinical settings, and educational

programs, it is useful for individuals with low back pain, healthcare providers, and students. Its validation in multiple languages supports its use across diverse cultural contexts (Maciel et al., 2009).

- The Pain Knowledge Questionnaire for Children (PKQ-CH): is a 20-item tool developed as part of an educational intervention study using a film to improve pain knowledge in adolescents aged 10 to 15. It assesses their understanding of pain, including general concepts, management, and attitudes, and helps identify areas requiring further education. The questionnaire is a practical tool for evaluating the effectiveness of educational programs aimed at enhancing pain literacy in this age group (Wager et al., 2018).

As highlighted above, and consistent with the findings of the HLS-EU Consortium (Sørensen et al., 2013), many existing tools predominantly focus on functional literacy, such as reading and numeracy, while overlooking the broader dimensions of health literacy.

The existing tools that comprehensively cover all the levels of HL, have the common characteristic that their question scores are formulated to ascertain the respondent's self-perception of his or her abilities and difficulties. While this provides valuable information, it also poses some critical limitations.

They provide insight into how patients perceive their interaction with the healthcare system, providing key information on their level of trust and perceived barriers. In addition, they cover broad dimensions such as trust, social support and digital skills, enriching the assessment beyond technical competencies. Their applicability in diverse settings and heterogeneous populations is particularly valuable in contexts where perceived barriers may be more relevant than objective competencies.

However, these instruments also face significant limitations. The most important of these is their self-reported nature: because they are based on subjective perceptions, they may not accurately reflect an individual's actual abilities. The subjectivity of responses may not accurately reflect the patient's actual abilities, as perceptions may be influenced by emotions or previous experiences. Factors such as overestimation of ability, social desirability or

ignorance of one’s own deficit can distort the results. Because they do not directly assess practical skills, such as text comprehension or health problem solving, they lack objective measurement. This gap between what a person thinks they know and what they actually know or are able to do, calls into question the predictive validity of these instruments, especially when they are used to design educational interventions or public health policies. In addition, social bias may lead respondents to provide socially acceptable answers, affecting the accuracy of the results obtained.

ADVANTAGES	LIMITATIONS
User perspective: They capture how patients perceive themselves in their interaction with the healthcare system, which is essential to understand their level of trust and perceived barriers.	Subjectivity: Responses may not reflect actual skills. A patient might overestimate or underestimate his or her abilities, influenced by emotions or previous experiences.
Broad dimensions: These questionnaires cover aspects such as trust, social support, and digital skills, which enriches the assessment landscape.	Lack of objective assessment: They do not directly measure practical skills such as text comprehension or health-related problem solving.
Applicability in diverse settings: They are useful in heterogeneous populations and contexts where objective competencies may not be as relevant as perceived barriers.	Social bias: Respondents may tend to respond in a socially desirable way, influencing the accuracy of the results.

4.5.2 The need for a new tool evaluating musculoskeletal health literacy

Considering this circumstance, together with the need to have a less generic tool that is applicable to people suffering from musculoskeletal pain, Digi4MSK has created a new health literacy questionnaire on musculoskeletal health, the Musculoskeletal Pain Literacy Questionnaire (MSK-PLq), that addresses these two limitations and moves away from self-reporting and adopts a more objective and functional approach.

Since self-management is one of the fundamental aspects for an adequate quality of life in chronic pathologies, including musculoskeletal pain (Healey et al., 2023), this questionnaire has focused on the evaluation of all levels of HL based on related competences to be able to perform a correct self-management of the musculoskeletal condition (functional literacy, interactive literacy, and critical literacy) which we have divided into 6 domains (Healthcare Understand, Healthcare Access, Healthcare Appraise, Healthcare Apply, Healthcare Digital, and Healthcare Beliefs). In this way, it aims to assess not only what people think they know, but what they actually know (e.g. basic knowledge about common diseases or medicines), how they access reliable information (e.g. identifying appropriate sources) and how they use it (e.g. interpreting medical instructions or making lifestyle choices).

This approach allows for a more accurate identification of the educational and communication needs of the population, facilitating the development of tailored, evidence-based interventions. It also allows for more reliable comparisons between groups and contexts, assessing the impact of health campaigns and contributing to the reduction of literacy-related health inequalities.

Scoring system and interpretation of the MSK-PLq

The MSK-PLq is a self-administered tool made up of 20 items, neatly divided into six distinct domains: Healthcare Understand (items 1–4), Healthcare Access (items 5–7), Healthcare Appraise (items 8–10), Healthcare Apply (items 11–13), Healthcare Digital (items 14–16), and Healthcare Beliefs (items 17–20). Each item is rated on a four-point Likert scale: Strongly agree, Agree, Disagree, and Strongly disagree, plus an “I don't know” option for all items.

The MSK-PLq takes a unique approach to scoring, aiming to pinpoint any misunderstandings or gaps in musculoskeletal health knowledge and skills. Depending on the nature of each item, either agreeing (Strongly agree / Agree) or disagreeing (Strongly disagree / Disagree) can be seen as incorrect. If a response is deemed incorrect, a weighted penalty comes into play: mildly incorrect answers (Agree or Disagree, based on the item) score 1 point, while strongly incorrect responses (Strongly agree or Strongly disagree) score 2 points. Responses that fall into a grey area—neither clearly correct nor incorrect—are scored as 0, indicating neutrality or partial understanding. Interestingly, if someone chooses “I don't know,” that item gets a score of 1, recognizing uncertainty or lack of knowledge without labelling it as a misconception.

When interpreting the MSK-PLq, both domain-level analysis and a total cumulative score are considered. Each domain can be examined individually by adding up the scores of its items, helping to pinpoint specific areas where a respondent might struggle with MSK health literacy. This targeted insight is particularly valuable for customizing educational interventions or communication strategies to meet individual needs. Additionally, a total score across all 20 items can be calculated, providing a broad overview of musculoskeletal health literacy. Higher scores indicate a greater number of misconceptions or knowledge gaps, while lower scores indicate better overall understanding and literacy. The tool thus allows for both individual-level assessment and population-level comparisons in research, clinical practice, or educational settings.

Potential applications and presentation of the final extended version

The MSK-PLq serves as a versatile tool that finds its place in various areas like clinical practice, education, and research. In a clinical setting, it acts as a screening tool to gauge how well someone understands musculoskeletal health. This is crucial for healthcare providers as it helps them spot patients who might have misconceptions or lack vital information about their conditions—like the importance of physical activity, what pain really means, or how imaging plays a role. With these insights, healthcare professionals can tailor their educational approaches, ensuring they communicate information effectively, select the right resources, and facilitate better shared decision-making.

When it comes to public health and health education, the MSK-PLq can aid in crafting targeted interventions and awareness campaigns. By pinpointing common gaps or misunderstandings within specific groups or environments, educators and policymakers can create materials that directly address these issues, ultimately enhancing outreach and improving health outcomes. In the realm of research, this questionnaire allows for a quantitative look at musculoskeletal health literacy across different populations, professions, or cultural backgrounds. It can be utilized in observational studies, clinical trials, or program evaluations to explore the links between literacy and various outcomes, such as self-management behaviours, engagement with digital health tools, or adherence to treatment plans. Plus, its detailed structure enables a nuanced analysis of different literacy components, making it a valuable resource for assessing the effectiveness of educational programs or digital tools in specific areas like appraisal, access, or digital navigation.

Finally, the MSK-PLq can be integrated into digital health platforms or e-learning environments as part of a screening or profiling mechanism, helping to personalize content delivery based on a user's literacy profile, such as the Digi4MSK digital platform. This approach will boost the relevance and effectiveness of online musculoskeletal health education by ensuring that the complexity and format of the content align with individual needs.

The extended version of the 20-item questionnaire is presented below.

Musculoskeletal Pain Literacy questionnaire: MSK-PLq

Please select how much you agree or disagree with each of the following statements.

When we mention pain, we refer to pain in muscles, bones and joints. For example, neck pain, back pain, shoulder pain, hand pain, hip pain, knee pain, etc.

#	Item	Strongly agree	Agree	Disagree	Strongly disagree	I don't know
1	Pain is always a sign of an injury that has not healed.					
2	Poor posture is the most common cause of pain.					
3	When pain happens, most people should stop all light activities to avoid more damage.					
4	Over-the-counter pain killers cannot cause side effects.					
5	Online consultations can often work just as well as in-person visits for treating pain.					
6	Mental health support can be beneficial for some people with pain.					
7	Online resources can give useful tips for managing pain.					
8	Scans (MRI or X-ray) are always necessary to diagnose the cause of pain.					
9	Healthcare professionals are the only ones who should decide on the best treatment for pain.					
10	In the long term, what the person actively does is an important element of the treatment.					
11	Exercise plans to manage pain should be done exactly as recommended.					
12	Ergonomic changes at work or home, such as adjusting chair or workstation, are the key to manage pain.					
13	If pain flares, it is important to stop all activity.					
14	It is safe to rely on social media as the main source for advice on managing pain.					
15	Apps and websites can help guide people with pain to manage things on their own.					
16	The number of followers a health influencer has always shows how good their advice is for pain management.					
17	"Chronic pain" means that the pain is going to last forever.					
18	Older people should always see a doctor when they feel pain.					
19	People's beliefs and traditions can affect how they manage pain.					
20	Exercise always makes pain worse and should be avoided when people are in pain.					

4.6 Summary of key messages

This chapter emphasizes the importance of health literacy (HL) in supporting patient readiness for self-management in musculoskeletal (MSK) care. It introduces the core HL domains—understand, access, appraise, and apply—and their practical implications. The chapter also reviews current HL assessment tools, highlights their limitations, and presents the newly developed Musculoskeletal Pain Literacy Questionnaire (MSK-PLq), which aims to offer a more objective, multidimensional evaluation. Overall, it underscores the need for clinicians to assess and address HL as a routine part of MSK care.

- **Health literacy impacts self-management outcomes**
Low HL is linked to greater pain, lower function, and reduced treatment adherence in MSK conditions.
- **Four HL domains are central in MSK care**
These include the abilities to understand, access, appraise, and apply health information in clinical and everyday contexts.
- **Digital and appraisal skills are critical**
Patients must be able to judge the quality of online MSK information, which varies widely in accuracy and reliability.
- **Existing tools have limitations**
Widely used instruments often rely on self-reported abilities and may not capture real-world skills or behavioural competence.
- **The MSK-PLq addresses key gaps**
This new tool evaluates actual knowledge and functional ability across six MSK-specific domains, including beliefs and digital literacy.
- **Clinicians must actively support HL**
Routine assessment, tailored education, and digital guidance are essential to improve MSK self-management and reduce misinformation.

References

- Adams, J., Ballinger, C., Lowe, W., Rowley, C., Lueddeke, J., Armstrong, R., Protheroe, J., & Nutbeam, D. (2016). I42 Personal Impact of Lower Levels of Health Literacy on Living with a Musculoskeletal Disease: A Qualitative Interview Study. *Rheumatology*, 55(suppl_1), i8-i9.
- Adams, R. J., Piantadosi, C., Ettridge, K., Miller, C., Wilson, C., Tucker, G., & Hill, C. L. (2013). Functional health literacy mediates the relationship between socio-economic status, perceptions and lifestyle behaviors related to cancer risk in an Australian population. *Patient Educ Couns*, 91(2), 206-212. <https://doi.org/10.1016/j.pec.2012.12.001>
- Baker, D. W., Gazmararian, J. A., Williams, M. V., Scott, T., Parker, R. M., Green, D., Ren, J., & Peel, J. (2002). Functional health literacy and the risk of hospital admission among Medicare managed care enrollees. *Am J Public Health*, 92(8), 1278-1283. <https://doi.org/10.2105/ajph.92.8.1278>
- Baker, D. W., Williams, M. V., Parker, R. M., Gazmararian, J. A., & Nurss, J. (1999). Development of a brief test to measure functional health literacy. *Patient Education and Counseling*, 38(1), 33-42. [https://doi.org/10.1016/s0738-3991\(98\)00116-5](https://doi.org/10.1016/s0738-3991(98)00116-5)
- Berkman, N. D., Sheridan, S. L., Donahue, K. E., Halpern, D. J., & Crotty, K. (2011). Low health literacy and health outcomes: an updated systematic review. *Ann Intern Med*, 155(2), 97-107. <https://doi.org/10.7326/0003-4819-155-2-201107190-00005>
- Bostock, S., & Steptoe, A. (2012). Association between low functional health literacy and mortality in older adults: longitudinal cohort study. *BMJ*, 344, e1602. <https://doi.org/10.1136/bmj.e1602>
- Boyer, C., Selby, M., Scherrer, J. R., & Appel, R. D. (1998). The Health On the Net Code of Conduct for medical and health Websites. *Comput Biol Med*, 28(5), 603-610. [https://doi.org/10.1016/s0010-4825\(98\)00037-7](https://doi.org/10.1016/s0010-4825(98)00037-7)
- Brandstetter, S., Atzendorf, J., Seelbach-Göbel, B., Melter, M., Kabesch, M., & Apfelbacher, C. (2020). Sociodemographic factors associated with health literacy in a large sample of mothers of newborn children: cross-sectional findings from the KUNO-Kids birth cohort study. *Eur J Pediatr*, 179(1), 165-169. <https://doi.org/10.1007/s00431-019-03483-9>
- Charnock, D., Shepperd, S., Needham, G., & Gann, R. (1999). DISCERN: an instrument for judging the quality of written consumer health information on treatment choices. *J Epidemiol Community Health*, 53(2), 105-111. <https://doi.org/10.1136/jech.53.2.105>
- Chen, J. Z., Hsu, H. C., Tung, H. J., & Pan, L. Y. (2013). Effects of health literacy to self-efficacy and preventive care utilization among older adults. *Geriatr Gerontol Int*, 13(1), 70-76. <https://doi.org/10.1111/j.1447-0594.2012.00862.x>
- Chen, S., Cao, M., Zhang, J., Yang, L., Xu, X., & Zhang, X. (2023). Development of the health literacy assessment instrument for chronic pain patients: A Delphi study. *Nurs Open*, 10(4), 2192-2202. <https://doi.org/10.1002/nop2.1468>

- Eysenbach, G., & Köhler, C. (2002). How do consumers search for and appraise health information on the world wide web? Qualitative study using focus groups, usability tests, and in-depth interviews. *BMJ*, *324*(7337), 573-577. <https://doi.org/10.1136/bmj.324.7337.573>
- Fabbri, M., Murad, M. H., Wennberg, A. M., Turcano, P., Erwin, P. J., Alahdab, F., Berti, A., Manemann, S. M., Yost, K. J., Finney Rutten, L. J., & Roger, V. L. (2020). Health Literacy and Outcomes Among Patients With Heart Failure: A Systematic Review and Meta-Analysis. *JACC Heart Fail*, *8*(6), 451-460. <https://doi.org/10.1016/j.jchf.2019.11.007>
- Guptill, C., Slade, T., Baadjou, V., Roduta Roberts, M., de Lisle, R., Ginsborg, J., Rennie-Salonen, B., Ackermann, B. J., Visentin, P., & Wijsman, S. (2022). Validity and reliability of the Musicians' Health Literacy Questionnaire, MHL-Q19. *Frontiers in Psychology*, *13*, 886815. <https://doi.org/10.3389/fpsyg.2022.886815>
- Healey, E. L., Lewis, M., Corp, N., Shivji, N. A., van der Windt, D. A., Babatunde, O. O., Simkins, J., Bartlam, B., Rowlands, G., & Protheroe, J. (2023). Supported self-management for all with musculoskeletal pain: an inclusive approach to intervention development: the EASIER study. *BMC Musculoskeletal Disorders*, *24*(1), 474. <https://doi.org/10.1186/s12891-023-06452-4>
- Hill, C. L., Appleton, S. L., Black, J., Hoon, E., Rudd, R. E., Adams, R. J., & Gill, T. (2015). Role of Health Literacy in Self-Reported Musculoskeletal Disorders. *Arthritis*, *2015*, 607472. <https://doi.org/10.1155/2015/607472>
- Jordan, J. E., Buchbinder, R., Briggs, A. M., Elsworth, G. R., Busija, L., Batterham, R., & Osborne, R. H. (2013). The health literacy management scale (HeLMS): a measure of an individual's capacity to seek, understand and use health information within the healthcare setting. *Patient Education and Counseling*, *91*(2), 228-235. <https://doi.org/10.1016/j.pec.2013.01.013>
- Jovanić, M., Zdravković, M., Stanisavljević, D., & Jović Vraneš, A. (2018). Exploring the Importance of Health Literacy for the Quality of Life in Patients with Heart Failure. *Int J Environ Res Public Health*, *15*(8). <https://doi.org/10.3390/ijerph15081761>
- Kim, S. H. (2009). Health literacy and functional health status in Korean older adults. *J Clin Nurs*, *18*(16), 2337-2343. <https://doi.org/10.1111/j.1365-2702.2008.02739.x>
- Kwan, B., Frankish, J., & Rootman, I. (2006). *The development and validation of measures of "health literacy" in different populations*. Institute of Health Promotion Research, University of British Columbia). <https://blogs.ubc.ca/frankish/files/2010/12/HLit-final-report-2006-11-24.pdf>
- Lacey, R. J., Campbell, P., Lewis, M., & Protheroe, J. (2018). The Impact of Inadequate Health Literacy in a Population with Musculoskeletal Pain. *Health Lit Res Pract*, *2*(4), e215-e220. <https://doi.org/10.3928/24748307-20181101-01>
- Maciel, S. C., Jennings, F., Jones, A., & Natour, J. (2009). The development and validation of a Low Back Pain Knowledge Questionnaire - LKQ. *Clinics (Sao Paulo)*, *64*(12), 1167-1175. <https://doi.org/10.1590/s1807-59322009001200006>

- Mackey, L. M., Doody, C., Werner, E. L., & Fullen, B. (2016). Self-Management Skills in Chronic Disease Management: What Role Does Health Literacy Have? *Med Decis Making*, 36(6), 741-759. <https://doi.org/10.1177/0272989x16638330>
- Milanti, A., Norman, C., Chan, D. N. S., So, W. K. W., & Skinner, H. (2025). eHealth Literacy 3.0: Updating the Norman and Skinner 2006 Model. *J Med Internet Res*, 27, e70112. <https://doi.org/10.2196/70112>
- Mitchell, S. E., Sadikova, E., Jack, B. W., & Paasche-Orlow, M. K. (2012). Health literacy and 30-day postdischarge hospital utilization. *J Health Commun*, 17 Suppl 3, 325-338. <https://doi.org/10.1080/10810730.2012.715233>
- Nutbeam, D. (2000). Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century. *Health Promotion International*, 15(3), 259-267. <https://doi.org/10.1093/heapro/15.3.259>
- Nutbeam, D., & Kickbusch, I. (1998). Health promotion glossary. *Health promotion international*, 13(4), 349-364.
- O'Hara, J., McPhee, C., Dodson, S., Cooper, A., Wildey, C., Hawkins, M., Fulton, A., Pridmore, V., Cuevas, V., Scanlon, M., Livingston, P. M., Osborne, R. H., & Beauchamp, A. (2018). Barriers to Breast Cancer Screening among Diverse Cultural Groups in Melbourne, Australia. *Int J Environ Res Public Health*, 15(8). <https://doi.org/10.3390/ijerph15081677>
- Olesen, K., AL, F. R., Joensen, L., Ridderstrale, M., Kayser, L., Maindal, H. T., Osborne, R. H., Skinner, T., & Willaing, I. (2017). Higher health literacy is associated with better glycemic control in adults with type 1 diabetes: a cohort study among 1399 Danes. *BMJ Open Diabetes Res Care*, 5(1), e000437. <https://doi.org/10.1136/bmjdr-2017-000437>
- Osborne, R. H., Batterham, R. W., Elsworth, G. R., Hawkins, M., & Buchbinder, R. (2013). The grounded psychometric development and initial validation of the Health Literacy Questionnaire (HLQ). *BMC Public Health*, 13, 658. <https://doi.org/10.1186/1471-2458-13-658>
- Silberg, W. M., Lundberg, G. D., & Musacchio, R. A. (1997). Assessing, controlling, and assuring the quality of medical information on the Internet: Caveant lector et viewer--Let the reader and viewer beware. *Jama*, 277(15), 1244-1245.
- Sørensen, K., Van den Broucke, S., Fullam, J., Doyle, G., Pelikan, J., Slonska, Z., Brand, H., & Consortium Health Literacy Project, E. (2012). Health literacy and public health: A systematic review and integration of definitions and models. *BMC Public Health*, 12(1), 80. <https://doi.org/10.1186/1471-2458-12-80>
- Sørensen, K., Van den Broucke, S., Pelikan, J. M., Fullam, J., Doyle, G., Slonska, Z., Kondilis, B., Stoffels, V., Osborne, R. H., & Brand, H. (2013). Measuring health literacy in populations: illuminating the design and development process of the European Health Literacy Survey Questionnaire (HLS-EU-Q). *BMC Public Health*, 13(1), 948. <https://doi.org/10.1186/1471-2458-13-948>

- Thomson, M. D., & Hoffman-Goetz, L. (2012). Application of the health literacy framework to diet-related cancer prevention conversations of older immigrant women to Canada. *Health Promot Int*, 27(1), 33-44. <https://doi.org/10.1093/heapro/dar019>
- Visscher, B. B., Steunenberg, B., Heijmans, M., Hofstede, J. M., Deville, W., van der Heide, I., & Rademakers, J. (2018). Evidence on the effectiveness of health literacy interventions in the EU: a systematic review. *BMC Public Health*, 18(1), 1414. <https://doi.org/10.1186/s12889-018-6331-7>
- Wager, J., Stahlschmidt, L., Heuer, F., Troche, S., & Zernikow, B. (2018). The impact of a short educational movie on promoting chronic pain health literacy in school: A feasibility study. *Eur J Pain*, 22(6), 1142-1150. <https://doi.org/10.1002/ejp.1202>
- Weiss, B. D., Mays, M. Z., Martz, W., Castro, K. M., DeWalt, D. A., Pignone, M. P., Mockbee, J., & Hale, F. A. (2005). Quick assessment of literacy in primary care: the newest vital sign. *Ann Fam Med*, 3(6), 514-522. <https://doi.org/10.1370/afm.405>



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.