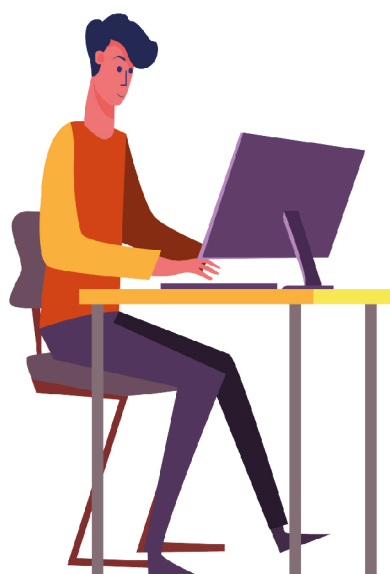


Recommendations for implementation of the topic musculoskeletal disorders in the occupational health and safety postgraduate programmes at European Universities





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Introduction

Historically, the role of professionals specialized in occupational health and safety (OHS) has emerged from the need to protect employers working in major risk industries such as nuclear plants and large-scale chemical industries in Europe. More recently, a few studies highlighted that the range of activities linked to safety management responsibilities includes monitor and prepare reports, inspection and auditing, regulatory compliance, emergency response, incident investigation, hazard and risk assessment, and training. Additionally, there are some supplementary non-safety related duties, such as including environmental responsibility.

Considering that work-related musculoskeletal disorders (WRMD) are a major burden worldwide, adding up to 1.3 billion cases, more than 100 million years loss of disability-adjusted life years and that such disorders are common causes of disability and sick leave, this topic is highly relevant to OHS professionals. In EU Member States for which data are available, a large majority of all workers report complaints related to musculoskeletal disorders as their most serious work-related health problems. The percentage of workers reporting such complaints as their most serious health problem ranges from 40 % in Luxembourg to 70 % in Czech Republic and Finland. Furthermore, more than half of workers with musculoskeletal disorders reported taking time off work in a 12-month period. In the EU, 26 % of workers with musculoskeletal long-lasting disorders, that is lasting over 3 months, combined with other health problems report more than 8 days of absence per year.

Higher Education Institutions (HEI) have a key role in disseminating and increasing accessibility to the most up-to-date evidence available regarding the impact and management of musculoskeletal disorders, to facilitate translation of knowledge to implementation in practice. This way, the Knowledge Alliance Prevent4Work for Preventing Work-Related Musculoskeletal Disorders has elaborated this document with the most recent and relevant knowledge within the topic. HEI that offer courses within OHS as well as graduation and post-graduation courses for health professionals that work within the area, may benefit from the recommendations presented here.

The main goals of this document are:

- 1.** To describe the gaps in the current formal university-based postgraduate programs for occupational health and safety across Europe.
- 2.** To recommend content within the musculoskeletal disorders to postgraduate programs for occupational health and safety
- 3.** To facilitate the implementation in their curricula of the most up-to-date and relevant evidence-based knowledge for reducing the impact of Work-Related Musculoskeletal Disorders.

Current coverage of the topic in postgraduation courses for occupational health and safety across Europe

To describe the current framework of postgraduation courses that cover the topic of understanding and reducing the impact of musculoskeletal disorders, the partner institutions within Prevent4Work have carried out a systematic search. The search strategy included online public information of post-graduation programs offered within Europe by accredited educational institutions. A free-text search with the following search terms was performed: "Occupational health" OR "Occupational safety" OR "occupational pain" AND postgraduate OR Master's OR diploma. Additional free-text searches were performed using keywords derived from what the initial search strategy provided.

The search has identified 56 occupational health and safety postgraduate programs across Europe. The courses identified are offered in English, Spanish, French, German, Romanian and Portuguese. Most of them do not require a healthcare background from applicants. Instead, each institution assesses their applicants based on the previous experience with working within occupational health and safety.

As a rule, the courses aim to decrease the impact of work-related accidents and illnesses. This way, most of the subjects focus on assessment, management, and improvement of work environmental hazards, risks and danger such as of mechanical, chemical, biological and psychological nature. Most courses also approach organizational, legal, strategic, and personal factors that influence risk perception, behaviour, and risk response and how these factors affect wellbeing and can contribute for healthier workplaces. Additionally, other topics offered by most courses are ergonomics and applied psycho-sociology.

One master program in Occupational Hygiene has in its description a course that includes introduction to musculoskeletal disorders, the nature of work-related musculoskeletal injuries, in particular upper limb disorders and low back injuries. Additionally, another course proposes a broader multidisciplinary perspective that includes occupational pain and lastly one program included stress related problems.

However, the vast majority of the programs do not include in their course descriptions topics covering important aspect of occupational health and safety such as: musculoskeletal disorders, its implications to sick leave nor strategies for re-integration into work.

Reducing the impact of musculoskeletal disorders: towards a comprehensive approach

Work-related Musculoskeletal Disorders

The term work-related musculoskeletal disorder (WRMD) refers to health problems affecting the muscles, tendons, ligaments, cartilage, vascular system, nerves or other soft tissues and joints of the musculoskeletal system, which are caused or aggravated primarily by work itself; they affect mostly the low back area and the neck and shoulders, with less occurrences at the upper limb and the lower limbs. Such disorders are mostly cumulative disorders as a result of repeated long-term exposure to work hazards.

Musculoskeletal disorders are the most prevalent work-related health problems identified by European workers and worldwide and its socioeconomic impact can be measured in relation to the large proportion of working days lost every year as well as years living with disability. Such negative consequences have short-and long-term negative impact that affect not only the individual worker, but also the family, the worker's organisation, public health systems and society.

Low back pain (LBP) is the most prevalent musculoskeletal disorders and leading global cause of years living with disability. It occurs in all ages and while almost everyone will only experience a few episodes in a lifetime, many people will deal with recurrent or long-lasting low back pain. The beliefs, assumptions, and myths commonly believed regarding the causes of low back pain contribute to making back pain the leading cause of disability and sick leave in the World. People in the working-age population have a higher prevalence of disabling LBP, which likewise is the leading cause of sick leave and early retirement in Europe. Neck pain comes in second place in the ranking of the world's most common musculoskeletal complaints, and it is estimated that two out of three adults will be affected by neck pain at some point in their life. This disorder it is strongly associated with a loss of life quality, loss of work productivity and increased disability.

Another implicit consequence of musculoskeletal disorders is the limitation of social activity and the reduction of expectations regarding how people live their lives. In industrialized countries, it has been shown that people with disabling LBP live in fear and concern about their pain. This affects both family and social relationships influencing work capacity and reducing the ability to obtain income. In other words, part of the problem seems to be how society manages pain-related disability. Eventually, most people with chronic pain find a new normal which they can live with to balance their life with their pain.

Concurrently, the initiatives for reducing the impact of such disorders have focused largely on improving ergonomic conditions and by modifying the physical demands to workers. Nevertheless, the prevalence of musculoskeletal disorders has remained constantly high in recent years. That may be explained in part by the fact that people are living and working longer and therefore are being more exposed to the risk factors for developing WRMDs. However, efforts focusing on modifying the physical loads and its shortcoming impact may relate to the multifactorial nature of WRMDs underpinned by physical, organisational, psychosocial, sociodemographic and individual factors. In many developed countries increased attention is being paid to the effects of psychosocial

factors on the health and well-being of workers.

Therefore, strategies for addressing WRMD require not only an inclusion of multifactorial approaches but a re-examination of the topic. This means, that it is imperative that the OHS professionals understand that work-related postures and activities represent part of many other contributing factors to the onset and persistence of WRMD. Moreover, an effective approach must take into account the multidimensional nature of WRMDs and ensure a better collaboration between the organisation, OHS experts and workers, focusing on strategies to assure workability instead of solely focusing on prevention and management. In this context, it has been demonstrated that non-threatening approaches directed to education and individualised advice may be an essential piece in managing the impact of WRMD and reduce absenteeism.

Contemporary health care practices as well as legislation may very well be part of the problem rather than the solution. When musculoskeletal pain is reduced to being a matter of cause-and-effect between body strain and pain (i.e., strain-led degeneration of the body equals pain), it will place the person (e.g., an employee on sick leave), in a state of disability, frailty, and dependence. Altogether, these factors lead to higher direct and indirect costs than pathologies such as cancer or cardiovascular diseases for the individuals, the companies and the society as a whole.

Characteristics and risk factors for musculoskeletal pain

Most information available in the literature within this topic refers to LBP, since as described above, it is the global leading cause of years living with disability. This way, the examples presented in this document will be, to a good extent, based on studies related to low back pain and can be extrapolated to other long-lasting musculoskeletal disorders.

Traits, characteristics, or exposures that are associated with an increased risk of suffering from musculoskeletal pain can be considered a risk factor for the onset of pain. In this context, the most likely risk factor of having a new event of low back pain in the future is the existence of a previous event of low back pain. Likewise, higher levels of pain intensity, psychological distress, and accompanying pain in the leg or multiple body parts are considered predictors for persistent pain and developing disabling low back pain.

While biophysical factors (e.g., tissue damage or pathologies) may be the underlying cause of specific presentations of musculoskeletal, it is estimated for example that 80-95% of low back pain episodes are "non-specific" meaning that it is not possible to establish a link between any single factor (e.g., tissue degeneration) and disabling pain. This means that, in the majority of cases, musculoskeletal pain cannot be attributed to a specific underlying damage or pathological changes (e.g., in muscles, joints or discs).

Notably, people who present with comorbidities (such as asthma, headache, and diabetes) or health conditions (such as poor mental health, psychological distress, and depression) are considered to have an increased risk of developing disabling LBP compared to those who do not. Similarly, lifestyle factors such as sedentarism, smoking, and obesity, are associated with both the incidence of a new event of low back pain and the development of persistent and disabling low back pain.

How are psychosocial risks and musculoskeletal disorders connected?

As pointed out earlier, the current accepted models to understand musculoskeletal disorders are based on the biopsychosocial model developed by Engel (1977) and more recently adapted to understanding long-lasting musculoskeletal disorders. Over the last two decades our understanding of the causes of musculoskeletal pain has changed considerably. For example, we now know that persistent or long-lasting pain in the back, neck or other areas of the body is complex and likely caused by a wide range of factors including our beliefs, past experiences, and expectations. That means, while many things may aggravate the pain, it is unlikely that changing a single factor in our life will make the pain go away.

Evidence shows that psychological factors seem to have a strong influence in negative coping strategies, which in turn complicate its management and consequences on life, specifically at work. Unlike genetic and most biophysical factors however, it is possible to change coping strategies, beliefs and behaviours instead and therefore this is considered essential in the management of chronic, disabling musculoskeletal pain.

Workers face psychosocial risks at work and outside work. The individual stress response or reaction to risk factors is seen as a key factor in the link between work-related risk factors (which can be physical, psychosocial or organisational) and disorders. This underlines why interventions must take place at occupational and individual level or in combination, as described below.

According to findings from a report by EU-OSHA musculoskeletal disorders are directly related to psychosocial risk factors at work such as, low social support, low level of job control, which includes a lack of decision-making authority, poor job satisfaction, work-life conflicts, adverse social behaviour, such as discrimination, harassment, and bullying. Considering the latter, verbal abuse, unwanted sexual attention, bullying and unclear work instructions were linked to disorders in the back, lower and upper limbs. On the other hand, having a say at work, work-satisfaction, fair treatment at work and being able to take a break when necessary were negatively correlated, in other words protective factors to the development of upper limb problems.

Working with musculoskeletal pain - best practices in the workplace

Research clearly shows that musculoskeletal pain is likely to influence work capacity for many people, to some extent, this can be offset by adjustments in the workplace (e.g., increased flexibility in the planning of the workload). What is also important is that while such disorders are likely to influence productivity, work is generally not the direct cause of work disability. For sure there is no question that extreme workloads or work-related accidents can cause tissue damage, however the evidence shows that situations like these only play a minor role in the development of long-lasting, disabling musculoskeletal pain.

The working role in health and well-being

Work can be considered therapeutic for most people and what positive health related effects it may have to start working or to stay at work even with pain as opposed to not work at all the overall message is that worklessness is not necessarily the solution to work-related pain and that work is a resource for most people. In our modern society, the workplace is not only a source of financial income, but it also constitutes the core of our social network. The social aspects of work, unlike the financial aspects, do not depend on whether the job is paid or not, rather it seems to depend on the feeling of belonging to a group of like-minded people or peers, furthermore for many people work is an essential part of their identity and social status.

It is important to note that, while work seems generally good there are some aspects that can pose a health risk. These include physical as well as mental well-being and safety issues. For instance, bullying sexism or job insecurity are likely to have negative consequences for the employee, which potentially could impact both their mental and physical health. Therefore, the work-related benefits on health should be considered a spectrum with strong individual differences, although, in dichotomous terms, work is more healthy than unhealthy. Work is unlikely to be a highly prevalent cause of pain in most cases and experts argue that paid or unpaid, but meaningful, employment is good for most people.

Unemployment on the other hand, is associated with overall mortality including ultimately death due to cardiovascular disease and suicide furthermore unemployment is associated with a high number of musculoskeletal complaints long-standing illness and disability, poorer well-being and distress, as well as higher hospital admission rates and medication consumption. Some evidence suggests that the connection between unemployment and the negative effects on health is related to poverty and financial anxiety as well as to the psychological impact of being without a job. It is important to clarify though, that unemployment does not necessarily have a negative impact on all people, in fact, 5-10% seem to have improved health and well-being from unemployment. In this context, research suggests that family and social support as well as social capital education and the desire or expectancy of re-employment can have a strong impact in the association of unemployment and poorer physical and health conditions.

The literature on acute and chronic pain show that people who are unemployed are more likely to suffer from pain, however there are a few ways to interpret this association. Firstly, it is assumed that work provides most adults with substantial needs including financial and social needs, but importantly work also carries the risk of the opposite and may have a negative impact on health and mood for some people. Another important consideration to take into account is how health impacts our choices regarding work. For instance, if our general health

influences the way we are able to maintain work and productivity it could also have an influence on our employment. Similarly, general health is likely to influence whether we feel pain so, even though pain and employment status seem to go hand in hand in most people, they are not necessarily causally related. It is very relevant though to know that health, work, and general well-being are likely to affect each other both positively and negatively, while the interactions between health, well-being and work have often been viewed through the lens of negative effects on work and health.

Working with musculoskeletal pain

As described earlier, in the introduction of this document, musculoskeletal pain is very common and likely to interfere with work for many people. In contrast to common beliefs, work is unlikely be the main cause of this pain, although, it is important to note that, for some, it may be an aggravating factor.

Around the turn of the millennia, pioneers in work-related pain documented that pain was not the only problem that kept employees on sick leave from returning to their work. They highlighted that, factor such as mood beliefs and barriers at the workplace, could delay or even reduce the ability to return to work at all from their understanding of absenteeism a focus on so-called biopsychosocial factors has spread into all aspects of pain management while other aspects were forgotten.

People who are unemployed and suffer from persistent musculoskeletal pain often feel vulnerable or at risk of hurting themselves during vocational training or a new job. While it may seem rational to avoid work when pain is temporarily aggravated during attempts of re-employment, it is important to understand that increased pain during normal workload does not equal physical damage to the body. In fact, people with musculoskeletal pain who are helped to be re-employed are more likely to experience less pain and less disability and to report higher quality of life compared to those who remain off work. Therefore, it should be a top priority to support people who are employed to remain at work despite pain. This may, in some cases, require adjustments to work routines for the individual as well as education of the entire organization to avoid unnecessary sick leave and pain related stigmatization as well as implementing return to work programs and policies.

In contrast to common beliefs, it seems that the benefits of working despite having pain outweigh its potential harms. Evidence shows that, working compared to not working is associated with higher quality of life for most people this may relate to the fact that unemployment is associated with a wide range of negative consequences including poor general health and increased mortality. Thus, people who suffer from persistent musculoskeletal pain do not need to quit or avoid working, instead, they should find a way to continuing at work and managing the pain. However, even though there are millions of people across the world who are able to work despite pain, there is still the need to understand how to best support those who cannot. Anyway, it is clear that leaving the workforce is unlikely to reduce pain or improve general health.

The recent literature shows that most ergonomic interventions will not reduce the amount of people with work-related pain nor benefit the majority of those already suffering from pain. This corroborates with the current understanding that pain in the body is the result of multiple factors and not simply physical strain on musculoskeletal structures. It is important to highlight

though, that some people may benefit from resting their arms and elbows on the desk and changing their computer mouse. Furthermore, frequent breaks throughout the workday may also improve discomfort for some people.

Experts suggest the following for supporting the management of work-related pain:

1. Move around throughout the day to avoid staying in any position for a prolonged period of time.
2. Rather than staying in the same position you can try to 1) get up and walk around for a few minutes every hour and 2) change your position every half-hour or if you feel any discomfort.

Being on sick leave can sometimes be necessary, but at the same time it's also a risk factor, for a range of negative side effects such as unemployment and increased disability. Fortunately, there are some things that can be done to prevent these negative consequences of sick leave. The literature shows that workplace interventions can reduce the time it takes for a worker with musculoskeletal pain to return to work compared with usual care, furthermore, optimizing the workplace management of employees on sick leave is associated with a reduction in pain and an increase in functional status.

Return-to-work interventions

In the recent years, significant progress has been made regarding work-related musculoskeletal disorders and return to work interventions that have a positive impact on workability. Getting back into the workforce after a period of unemployment could be therapeutic in the sense that general health well-being and distress seem to improve after re-employment, yet the benefits of re-employment may depend on job security as well as individual satisfaction with and desire to keep the new job.

Workplace interventions can reduce the time it takes for a worker with musculoskeletal pain to return to work compared when compared to usual care. Return-to-work interventions carried out in the workplace are more effective on than workplace linked interventions such as exercise provided by such as with usual care. The authors suggest that the main difference that can explain the better outcomes in interventions carried out at the workplace may be the elements that involve incorporating workplace adaptations and support from work-organization. Such interventions optimizing the workplace management of employees on sick leave are associated with a reduction in pain and an increase in functional.

A recent literature review has investigated the effectiveness of workplace interventions in the rehabilitation of musculoskeletal disorders. The results show that, when the workplace initiate or support strengthening training for employees with physically demanding work, it has the potential to reduce musculoskeletal pain. Physically demanding jobs are typically found in construction, health care, slaughterhouses etc but the definition used in this study means that the results can be extrapolated to any job that involves loading of the whole body, for instance lifting, standing, walking, or bending or loading on specific body parts such as pulling, pushing or having a high number of repetitions. Interestingly, the authors conclude that participation in ergonomics a mix of interventions or stress management, does not seem to have any effect on the amount of musculoskeletal pain symptoms, prevalence or discomfort experienced by the

worker. The evidence indicates that the best thing a workplace can do to reduce musculoskeletal disorders for people with physically demanding jobs is to help them do physical strengthening exercises. Additionally, the authors observed that the effects from exercise can be expected after a few months and highlighted that the physical activity should be continued in order to be effective over time.

In order to optimize return to work after sick leave experts suggest the following:

- 1.** ensure that the worker is an active part of the solution from the beginning and possibly involved in the rehabilitation prior to the first day of returning to work.
- 2.** the worker and the supervisor rank the obstacles for returning to work in a formalized way such as a company policy.
- 3.** make an action plan for returning to work that allows for fast-track or partial return to work even when it means making temporary adjustments to equipment, the workstation, or the workflow.
- 4.** make it possible for all stakeholders to meet and to facilitate only work based interventions.
- 5.** provide relevant assessment to rule out serious pathology; six, provide education about how to manage pain and how to gradually return to work.
- 6.** prevent conflicting advice by coordinating the management plan between all stakeholders.
- 7.** on this pain is expected to vanish within a week, focus on return to work, not on pain reduction.

While the positive effects of re-employment may depend on the individual's resources and motivation, re-employment in itself can have positive effects for the majority of people with pain, with evidence showing that the benefits of re-employment may already occur within one year and they tend to be sustained for years thereafter.

Community action

As pointed out in the previous sections, education is an important part of preventing and managing musculoskeletal disorders in the workplace. This section will present a few educational resources that are publicly available and aim to contribute to reducing the impact of musculoskeletal disorders.

The European Union has adopted a series of directives to protect workers and improve health and safety at work. The European Agency for Safety and Health at Work has recently published some updated educational resources directed to both organizations, OHS experts and workers. The resources present articles, pamphlets and guidelines based on the current health recommendations and contains tips for employers and workers, with examples of successful workplace programs and links to more useful and reliable sources of information.

Source Information	Information available	Access
European Agency for Safety and Health at Work	Guides and fact sheets related to work-related pain. Some fact sheets are available in various European languages.	LINK
European Agency for Safety and Health at Work	Healthy Workplaces Lighten the Load 2020-22	LINK
European Agency for Safety and Health at Work Napó films	Learn musculoskeletal health with a smile :) "Napó in Lighten the load 2021"	LINK
European Agency for Safety and Health at Work	Priority area - "Sedentary work"	LINK
European Agency for Safety and Health at Work	OSHWiki article in the spotlight: "Psychosocial risk factors for MSDs and prevention"	LINK
Prevent4Work	Educational short videos about neck pain, low back pain & pain and work.	LINK

Prevent4Work	Massive Online Open Course "Pain at Work: Myths and Facts."	LINK
Prevent4Work	P4Work learning platform	LINK
Prevent4Work	P4Work app	LINK

Current evidence for health-care practices

Some people suffering with persistent musculoskeletal disorders learn to balance their life and feel that their pain has almost gone away. Others constantly need to balance the resources on a regular basis, which can often be a long and very stressful process. In this context, healthcare professionals have been developing the comprehension of their role in this transition. In the first phase of the management of chronic pain focus is on the individual and on daily focus. This could include a plan for managing physical activity throughout the day as well as structuring daily activities to avoid exacerbation of the symptoms. In the later stages, many people would try and return to activity which they previously could not manage, which may include a gradual increase in activities such as work hours and expanding the social network throughout the rehabilitation. It is important to strengthen social networks by allowing for and supporting social activities such as hobbies, work and sport, but also by educating the patient about their pain in order to counteract on the risk of stigmatization from people who may not know what persistent pain is.

It can be observed the overuse of “low-value care” and the scarcity of “high-value care” across the world regardless the income-level of the studied country. Low-value care consists of health-care interventions with very low or no benefit for the patient. It can even become harmful if it keeps the patient away from high-value care. The latter are offered in some countries, while in others they are costly and/or only rarely available to people with persistent pain.

Availability of high-value care can thus be an organizational problem that requires attention at the highest levels: policymakers and influential leaders.

Low-value care interventions

Imaging and low back pain

A pure biomedical view of low back pain assumes that there is an anatomical source of pain as the main underlying mechanism: When body tissues are exposed to either very intense stimuli or damage, it will lead to a subsequent inflammatory process, which will sensitize the so-called nociceptive nerve fibres in the tissue.

While both acute and degenerative changes in the tissues can be easily identified by imaging techniques such as magnetic resonance imaging or ultrasonography, there is not a direct relationship between tissue damage and how much pain the patient is in. There is little indication that changes in the spinal anatomy should have any predictive value in regards with future pain and disability. Basically, Imaging is relevant only in the case of suspicion of a serious pathology since changes in the spine are as normal as any other change to the body (e.g., wrinkles as we age).

Surgery

Lumbar spine fusion is a frequently used surgical intervention for different conditions of the low back tissues, presumably associated with LBP. However, there is a lack of evidence supporting its use when compared to more conservative non-invasive treatments such as multidisciplinary rehabilitation. Moreover, it is a costly procedure

associated with potentially serious adverse effects. When the evidence for lumbar spine fusion was reviewed, the authors concluded that more evidence was required in order to recommend this surgery and that patients should be informed about the potential benefits and harms for the individual problem.

Much like the case for imaging, the assumption that there is a linear relationship between tissues that can be operated on and pain, is flawed. In fact, the majority of studies that have looked at the effect of surgery on chronic low back pain show no superior effect compared to placebo. It is worth to mention, that surgery sometimes aggravates the pain condition (e.g., via damage to nerves)

"Regenerative" therapies

New therapies aiming at repairing damaged discs such as stem cell or platelet-rich plasma injections have emerged and are used as a treatment for LBP and other long-lasting musculoskeletal disorders, seemingly showing positive results. Many of these studies were not powered enough to generalize the positive effects of these therapies and had further limitations such as the absence of long-term follow-up and non-randomization of study participants. However, considering the multifactorial nature of such condition, even though there is some evidence that these therapies could regenerate body structures, such therapies would have a limited effect on pain and disability for a significant number of patients.

Pharmacotherapy

Although in the past, paracetamol has been considered a recommended drug for musculoskeletal disorders' treatment, recent evidence of its non-effectiveness in acute low back pain has led guidelines from 2016 and 2017 to recommend against its routine use. In the 2016 UK guideline, non-steroidal anti-inflammatory drugs (NSAIDs) were considered an option only after weighting potential risks such as toxicity for the gastrointestinal, liver, and renal systems.

While opioid-based treatments have proven highly valuable in the management of some cases of acute pain (e.g., immediately after surgery), the long-term use of opioids for long-lasting pain is not only problematic, but it may even increase the problem. Prescription of opioids in LBP care is a key example of unnecessary and harmful treatment. Evidence indicates that adding opioids to non-steroidal anti-inflammatory drugs does not improve outcomes for people with LBP.

Furthermore, it has been shown that a pharmacologic treatment for chronic LBP based on opioids is no more effective than other pharmacological options with more severe adverse effects. In addition to the intrinsic side effects of opioids (e.g., constipation), it has been shown that long-term use of opioids is associated with greater disability.

In short, the use of any kind of opioid-based treatment is not recommended as first-line treatment and even in the case of second-line treatment opioids should only be used in individual patients by careful selection of a pain specialist. Most importantly, opioids should not be substituted with other pharmacological treatments in patients with chronic, disabling LBP, rather high-value care treatments should be considered.

In some western countries, the prescription of cannabinoids for the treatment of pain has increased in recent years. However, as with opioids, the continuous use of cannabinoids is related to poorer pain outcomes measures and other variables in the long-term. The biennial review of pain recently published by Buchbinder R. et al. recommended against a potential incipient prescribing epidemic of cannabinoids.

High-value care interventions

For a treatment to be considered high-value care, it must have a positive net effect on the patient (i.e., the benefits must outweigh the risks). In the long term, it is reasonable to consider that high-value care will reduce the astronomical economic burden, which LBP currently poses via the prevention of overmedicalization and the use of unnecessary and costly diagnostic and interventional or surgical procedures.

For low back pain, specifically, high-value care includes: exercise therapy, active lifestyle and behavioural therapies. Numerous clinical guidelines have made several recommendations after reviewing the evidence of the many treatments for LBP. In general, contemporary guidelines advocate for reducing the reliance on pharmacological and biomedical approaches for managing LBP. In these recommendations, the active role of patients and their function are the cornerstones of the management, avoiding pharmacology should be avoided as first-line treatment.

Persistent pain

When pain lasts for more than 3 months and becomes “persistent” or long lasting, exercise and gradual activity become important treatment modalities intended to improve function and avoid further disability development. Interestingly, current evidence does not show larger effect sizes for any particular types of exercise. Therefore, exercise type selection should be based on individual criteria such as each person’s specific needs, context and physical capacity and abilities.

The role of passive therapies in the treatment of persistent LBP is controversial. Two different thoughts: Guidelines are suggesting that these may have a role within a multimodal rehabilitation framework for both acute and persistent low back pain, while others illustrate the poor-quality evidence for their use and the lack of effectiveness in promoting active pain coping. Some examples of passive therapies are manual therapy, acupuncture, external orthotic devices, electrotherapy.

Different types of manual therapy seem to be equally effective treating persistent neck pain, which may indicate that the choice of techniques depend more on preference and less on the pain. Additionally, there is strong evidence to support that manual therapy does not need to be focused on the painful or in the painful area to have effect this was especially clear in the case of chronic pain and works best when combined with exercise or usual care rather than when it’s used on its own.

Psychological therapies

Some guidelines also include the combination of physical and psychological treatments for persistent LBP. Examples of psychological treatments recommended as adjunctive treatment options: Cognitive behavioural therapy, relaxation, stress reduction via mindfulness-based interventions.

The evidence for cognitive behavioural therapy to manage persistent neck pain is sparse but considering its effect in comparable pain conditions it is now recommended as a primary intervention and some evidence suggests that cognitive behaviour therapy can be relevant in combination with other treatments for some people with neck pain.

Self-management

Self-management can be defined as “the individual’s ability to manage the symptoms, treatment, physical and psychological consequences, and lifestyle changes inherent in living with a chronic condition”. This approach suggests an interactive collaboration between the professional and the patient and can be sub-divided into the following components.

Problem-solving: A process that starts with problem identification and continues throughout intervention towards the solution of such problem(s), with a consensus patient-clinician (e.g., physiotherapist) For example, a patient suffering from long-lasting pain, in collaboration with health-care professional(s), can describe the problem(s) that need to be solved through the chosen management strategy and agree upon relevant goals, which can objectively or subjectively be quantified to evaluate progress.

Resource utilization: A process of measuring and deciding how patient’s resources, such as objects, conditions, or personal characteristics, could be integrated into the treatment. For example, for a person who is comfortable with using technology, it could be useful to use mobile applications that allow the monitoring of physical activity levels during the day.

Goal-setting and Action planning: A process of establishing individual goals of importance for learning and problem-solving related to the patient’s condition and the act of managing these goals throughout an established timeframe with the individual modifications.

Tailoring: a process of determining the specific content the patient will receive, the contexts surrounding the content and through which channels the content will be delivered. For example, an office worker that is suffering from chronic LBP, it could mean using an alarm clock going off every hour as a reminder to get up and move (e.g., to get a glass of water).

Decision-making: A process based on professionals’ experiences in relevant contexts, frames of reference, and individual capabilities, which acknowledge the patient’s preferences for the choice of treatment or management plan.

In some cases, the pain persists despite any attempts to follow good practices. In these cases, high-value care will focus on the patient’s ability to manage life with pain.

Self-administered strategies such as rest, heat and distraction have empirically been shown to be valuable for a wide range of patients and should be part of the advice for all patients (i.e., finding the methods that work for them). It is though very important that the person in treatment is aware of that such methods cannot “treat” an underlying cause of back pain. Rather, they are scientifically supported methods to reduce pain intensity. As such, these strategies are best used when the person is experiencing pain and only to the extent that the patients experience them as effective.

Furthermore, health-care professionals should be able to provide structured support (e.g., action plans and goal setting) for the patient to further endorse self-management. Additionally, self-management should be targeted towards decreasing disability,

avoiding the assumption that pain equals harm and preventing dependence on expensive and inefficient treatments, at the same time autonomy is promoted. One of the main goals the healthcare professional has is to support patients in taking responsibility for monitoring and managing their own condition.

While self-management is very important, many people require additional support as well. Consequently, it should be considered part of the patient's overall treatment, but not the only intervention. In essence, this means that statements such as "you must learn to live with the pain" should be replaced with a well-structured action plan including shared-decision making between the patient and the health-care professional(s).

Healthcare professionals should keep in mind that musculoskeletal pain is strongly associated with a sedentary lifestyle as well as general poor health (e.g., from smoking or obesity). Therefore, and to the extent that the patient is motivated for change, professionals should include education on "healthy lifestyle choices" such as to remain active and functional (e.g., work) as well as advice on secondary support (e.g., support programs for people who want to stop smoking) a part of the strategy for the self-management of pain and disability.

Walking programs

People with persistent pain can benefit from a walking program, which is associated with positive changes in metabolic parameters and psychological status. It is considered a non-specific type of physical activity that provides a general aerobic activation as well as the activity of several large muscle groups. This type of physical activity is safe and associated with an increase in patient satisfaction and adherence to treatment.

Walking as a therapeutic intervention is as effective in reducing pain and disability in people with LBP in the short and long-term effects as a pharmacological treatment but without any of the risks or side effects. If a walking program is combined with other types of activities such as mind-body therapies (e.g., yoga or mindfulness) or strength training, it shows further beneficial effects on cognitive function, strength, balance, and flexibility.

Since the health benefits from walking on mortality seem to flatten out after approximately 10,000 steps a day and walking does not appear to have any negative consequences for people with persistent pain, the advice is also that they accumulate a minimum of 10,000 steps throughout the day. In this context a pedometer is a valuable tool to support the user to calculate the number of steps and increases compliance. When a pedometer is not available, it is recommended to walk 30 minutes a day, five days a week.

Mind body therapies

As already mentioned, there is no evidence indicating that one specific type of exercise is better than others. Other types of individual or group-based physical activities such as Tai Chi or Yoga may also alleviate pain intensity and improve functional disability. The practice of yoga can bring the patient several physical and mental benefits such

as pain relief, posture stability, mental wellness, improvements in flexibility and mobility, body awareness. Some evidence suggest that the practice of yoga or Tai-Chi or for about 40-60 minutes twice a week, persistent LBP patients might improve disability and reduce pain intensity.

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Aerobic and resistance training

Most patients can benefit from a combination of aerobic and resistance training. Depending on their individual problems, the health professional may prescribe a higher or lower dosage of exercise and intensity. In general, a full-body workout with multi-joint exercises offers more benefits than specific exercises in a single plane of movement.

The literature evidence supports the use of strengthening training and other exercises to reduce work-related neck pain as well as chronic neck pain of non-specific or traumatic origin. Another study reviewed the effectiveness of education as an intervention for non-specific neck pain according to their results education does not seem to be effective for acute or chronic neck pain as a standalone treatment. However, they found that the content of education differed substantially between the studies from biomedical to contemporary pain science-based education and that the results may not represent the effect of modern pain education approach which is recommended by the guidelines.

The recommendation is to combine aerobic and strength-training exercises, but always in agreement with the person's preference, while bearing in mind that, actually, doing exercises seem more important than which exercises are being prescribed.

Digital interventions

E-health is defined as "the practice of health-care supported by the information technologies in the process of prevention, treatment, promotion, and maintenance of health".

Digital interventions are an effective way for patient self-management.

This method has demonstrated benefits in short and intermediate terms because of its accessibility, scalability, availability, cost-effective delivery, and the ability to personalize and tailor the content to meet users

Unfortunately, most of the educational material that is available to the public focuses on biomechanical aspects such as ergonomics rather than adopting a comprehensive multidimensional approach for understanding musculoskeletal pain. However, it is important to highlight in particular that educational resources can positively influence absenteeism and pain-related loss of workability.

Action Proposals - Translating evidence into practice

The well-renowned scientific journal, The Lancet, has published an update series with potential solutions for improving important identified deficiencies in the management of LBP at a global scale.

Ten proposed actions to improve care for low back pain:

- 1.** health care funders should stop paying for ineffective and harmful test and treatments, and commission research on those that are unproven.
- 2.** new test and treatments should not be marketed, introduced into practice or publicly reimbursed, before they have been adequately tested for safety, efficacy, and cost-effectiveness.
- 3.** health and social services should work with employers to provide support that stimulates early return to work, and work conditions that are adapted to employee capacity.
- 4.** patients should be taught to self-manage low back pain and seek care only when really needed.
- 5.** widespread and inaccurate beliefs about low back pain in the population and among health professionals should be challenged, and a focus put on reducing the impact of low back pain on people's lives rather than seeking medical treatment for a cure.
- 6.** clinical pathways care plans and other standardized tools for managing low back pain should be redesigned to integrate with health and occupational care but only after establishing their comparative effectiveness and cost-effectiveness.
- 7.** payments systems and legislation should be changed to encourage delivery of the right care.
- 8.** the world health organization should support new public policies and urgent political action to ensure strategies are put in place to reduce global disability from low back pain as a priority.
- 9.** research and funding bodies should invest in an intensified research effort to address gaps in the understanding of low back pain, as well as implementation research to determine how best to put existing knowledge and evidence to use.
- 10.** journals and the media should have greater editorial and peer reviewer oversight to ensure that trial results are accurately portrayed and do not reflect unwarranted belief in the efficacy of new (or established but unproven) therapies.

Barriers to this implementation should be investigated for each case, such as, the lack of knowledge of a target group of clinicians, the fear of not ruling out serious pathology and the clinicians' willingness of fulfilling patients' expectancies.

An alternative explanation to why clinical guidelines are not being implemented into clinical practice as intended, is that it has not been widely described how evidence-based interventions (e.g., exercise and patient education) should be implemented.

According to Hurley et al., 2019, there is preliminary evidence indicating that e-learning training programmes for physiotherapists about how to deliver group-based interventions in primary care for LBP patients can be feasible and effective.

Despite the intentions of these programmes to prioritize high-value care over traditional care, the superiority of these programmes still needs to be evaluated.

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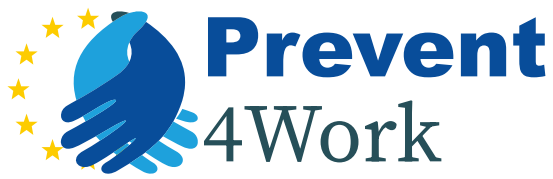
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