



Non-pharmacological Management of Pain in the Elderly

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Abstract

Pain in the elderly is an increasing problem with increasing life expectancy resulting in many people living for longer with a range of age-related debilitating and painful conditions. Management of pain in the elderly can be complex due to increasing fragility, cognitive impairment and the presence of comorbidities and polypharmacy. Non-pharmacological methods of pain relief would appear to offer a solution to many of these problems. Overall the evidence for the effective use of many non-pharmacological therapies in pain management for the elderly is limited. Most effective measures appear to be those which support self-help, those which provide distraction and promote exercise and the use of superficial heat/cold. There is limited evidence to support the use of most complementary and alternative medicines (CAMs) including dietary supplements, and the role of psychological therapy is limited to improvements in mood states such as anxiety and depression. However due to the low incidence of adverse events, any non-pharmacological therapy which is perceived as offering some relief from suffering by the individual may have personal value.

4.1 Introduction

The extent of pain experienced by the elderly is difficult to estimate, although recent figures from the United States Institute of Medicine (2011) suggest over 116 million American adults suffer from persistent pain. In the United Kingdom (UK), The

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British Geriatric Society (2013) estimates the prevalence of current pain in the total elderly population as between 20 and 46%, with the incidence of chronic pain in the elderly living in the community between 25 and 76% increasing in the residential care home population to 83–93%. Although these figures should be treated with caution as they are subject to numerous methodological difficulties, it is clear that pain in the elderly is a huge problem and with the predicted global rise in the elderly population is unlikely to improve (Schofield 2016).

Causes of pain in the elderly are easier to establish due to the prevalence of age-related degenerative diseases, arthritis, osteoporosis and peripheral vascular disease (Takai et al. 2010), and fall into three common body areas: the back, leg/knee, hip and other joints.

The impact of poorly managed pain is also easier to identify, resulting in reduced quality of life, poor sleep and altered social activities (Brown et al. 2011) as well as slower cognitive function, increased psychological distress and a greater risk of developing a mood disorder such as anxiety and depression (Keefe et al. 2013). The difficulty of managing pain in the elderly is also compounded by age-related increases in comorbid medical conditions, polypharmacy and the increased risk of developing a form of cognitive impairment, specifically dementia (Bruckenthal et al. 2016).

This has led some authors to reject the current medical model that is so dominant in Western health care as unsuited to the treatment of persistent/chronic pain conditions, citing as evidence its failure to recognise the presence of pain without pathology, the ineffectiveness of many pharmacological interventions, their unwanted side effects and the need to take into account the multidimensional psychosocial factors which are integral to each individual's pain experience (Brown et al. 2011; Keefe et al. 2013).

This complex picture in part explains the difficulties of effectively managing pain in the elderly population. These failings in pain management have led many pain sufferers, carers and researchers to explore alternative approaches to obtaining effective relief. Tse et al. (2012) identified over 70% of residents in a sample of six residential care homes already used non-pharmacological measures to gain relief. Figures obtained by Bruckenthal et al. (2016) on use of alternative pain relief methods in the community similarly suggest 73% of people over 50 already using some form of complementary therapy specifically to reduce or treat a painful condition.

The recognition of the need to seek alternative non-pharmacological approaches to the management of pain in the elderly is clear and appears to be growing (Tobias et al. 2014), and this chapter aims to identify and explore some of the non-pharmacological approaches which may offer some relief to elderly pain sufferers.

4.2 Self-Management of Pain

Although many elderly people experiencing pain would like more attention paid to their pain by medical staff (Karttunen et al. 2014), most of the alternative or non-pharmacological pain interventions currently available require a degree of self-management. Information about self-management choices appears limited; Geilser

and Cheung (2015) found most people using these approaches obtained very little information about them from health-care professionals and instead information was largely gained from family and friends; consequently education for self-management may play an important role in relieving pain in the elderly.

Reid et al. (2008) in an evidence review of 27 educational programmes concluded that they may be of benefit to older people with chronic pain, whilst more recently Platts-Mills et al. (2016) and Wilson et al. (2015) both reported on the effectiveness of educational self-management programmes for older people experiencing musculoskeletal pain, resulting in an increase in personal confidence to manage their own pain and reduction in pharmacological dependency. However The British Geriatric Society (2013) in a review of a range of self-management approaches concluded that the long-term effectiveness of these programmes was unclear and only those with longer-term support which are not delivered in isolation were likely to demonstrate improvements in pain relief and function.

Self-management may take many forms, but as an example, Porcheret et al. (2007) identified the two commonest self-management interventions recommended for the elderly with knee pain as exercise and weight loss, with self-care in these two areas as a more important aspect of knee pain management than medical or pharmacological interventions. This is supported in the most recent recommendations by the UK-based National Institute for Health and Care excellence (NICE) guidance (2014) on “Osteoarthritis: care and management” which advocates local muscle strengthening exercise as the core treatment for knee pain.

4.3 Distraction

Distraction as a means of minimising pain is based on the simple premise that a person has limited capacity to process information, and therefore by focusing attention on one thing, e.g. watching television or listening to music, they are able to pay less attention to other things such as pain. This distraction can be both external, so focusing on something outside of the person, and internal using some form of mental distraction such as guided imagery/relaxation (McCaffery and Pasero 1999).

Distraction can take many forms including individual self-developed activities which the person has found work for them; more formal distraction techniques such as relaxation, exercise and use of music; or more therapeutic therapies including specific psychological interventions to support the development of cognitive processes which move attention away from the person’s pain.

It is important to note that many of the different non-pharmacological methods of relieving pain included in this chapter involve an element of distraction, including exercise, most complementary therapies and most psychological therapies. From available literature on these methods, it’s currently unclear how much of the identified positive effect on pain relief is as a consequence of the intervention/therapy, or more simply as a distraction from the pain, and the role of distraction should always be considered when assessing the efficacy of most non-pharmacological pain interventions.

The efficacy of distraction as a means of reducing pain is variable across individuals and circumstances. Most studies focusing on distraction as the sole method of pain relief concentrate on turning attention away from episodes of brief procedural pain, and its value in the elderly and those with long-term and chronic pain is unclear. In chronic pain its usefulness has been closely linked to the individual pain sufferers' propensity to catastrophise their condition under the premise that people who are more prone to catastrophise their pain are likely to be paying more attention to it, and therefore the effect of distraction is more pronounced (Schreiber et al. 2014).

The use of music is one of the most commonly reported specific distraction methods with some evidence to support its use both for the reduction of pain and the management of anxiety and depression (Guetin et al. 2012; Bruckenthal et al. 2016; Quach and Lee 2017). Korban et al. (2014) used relaxing music to investigate its effect on people experiencing neuropathic pain. Thirty participants listened to 60 min of music via headphones. Pain scores at 30 and 60 min post-intervention showed a reduction in pain intensity which had a positive cumulative effect. It is generally considered to be low cost and with minimal adverse reactions, making music distraction suitable for use in most environments.

When considering non-pharmacological interventions for pain relief, distraction is a useful adjunct; however, it may have limited effect on people with cognitive impairment through an inability to focus their attention elsewhere. Additionally there is a danger that a person who can be distracted from their pain no longer looks like someone who is in pain, and this can lead to doubts about their pain from family, friends and carers. Furthermore it is possible that whilst distracted the person with pain may be more active than normal and this can lead to an increase in their pain symptoms once the distraction is removed (McCaffery and Pasero 1999).

4.4 Exercise and Increase in Physical Activity

The most commonly reported non-pharmacological self-management technique to relieve pain in the elderly is an increase in exercise and physical activity. Physical inactivity is common in the elderly population and can by itself lead to increased levels of disability and reduction in quality of life independent of any underlying medical conditions.

Two recent Cochrane reviews by Fransen et al. (2015) and Geneen et al. (2017) have both looked at the impact of physical activity on knee pain caused by osteoarthritis and chronic pain in general.

When focusing on knee pain, Fransen et al. (2015) identified 54 studies from which they were able to extract data, of which 44 were deemed high-quality trials. Findings for immediate post-treatment pain relief on a 100-point scale in the exercise groups indicated a reduction of 12 points, with physical function improved by 10 points and quality of life by 4 points on a similar 100-point scale. In the 12 studies which included 6-month follow-ups, these findings were sustained with a reduction in knee pain of 6 points and an improvement of 3 points on similar 100-point scales for physical function. The review concluded that the overall effectiveness of

exercise on pain in the immediate post-treatment period was moderate, with a small longer-term sustained effect.

Although this moderate to small finding could be considered disappointing, importantly Fransen et al. note that this effect size is directly comparable with the use of non-steroidal anti-inflammatory drugs (NSAIDs) for the same condition, and given the low report of adverse effects of exercise as opposed to the many adverse effects associated with taking long-term NSAIDs (National Institute for Health and Care Excellence 2014), exercise should not be excluded as a minimally important clinical treatment.

Geneen et al. (2017) focused on systematic reviews of chronic pain and the effectiveness of different types of physical activity for reducing pain severity, improving quality of life, physical function and the acceptability to the health-care user. They identified 21 reviews covering 381 studies, across a range of specifically named painful conditions, e.g. osteoarthritis. Findings from the review suggested that individually delivered programmes have a greater effect than class- or home-based exercise programmes, with implications for planning of future exercise activities/programmes.

For pain severity 18 out of the 21 reviews reported improvements in the participant's experience, whilst 14 studies reported improved physical function, with mixed results for overall quality of life. From these findings Geneen et al. were able to conclude that although the quality of the studies was highly variable with some inconsistency in effects, the lack of adverse events meant on balance exercise was likely to have a positive effect on pain severity, physical function and quality of life.

Importantly Geneen et al. were able to identify that although exercise may result in short-term soreness due to undertaking increased physical activities, this rapidly subsided. Additionally exercise quickly became acceptable to the participants and was unlikely to cause any additional harm to people with chronic pain who may have been fearful of exercise exacerbating existing painful conditions.

Neither of these two Cochrane reviews looked specifically at the elderly population although it's likely that given the range of medical conditions included in these studies, many older people were involved. The lack of focus specifically on the elderly population is a common criticism (The British Geriatric Society 2013), and National Institute for Health and Care Excellence (2014) highlights the lack of data focusing on the very elderly calling for much more extensive research in this area to be undertaken.

Although findings from these two Cochrane reviews are useful at supporting the use of exercise as a non-pharmacological means of reducing pain. When considering the implementation of exercise in clinical practice, some practitioners may feel that more detail is required. Exercise regimes vary considerably and are led by a variety of practitioners, from physiotherapists to volunteers, and take place in a range of environments from community settings to exercise in the home, as well as group activities of varying sizes and one-to-one exercise programmes. Perhaps opportunistically Ambrose and Golightly (2015) suggest this lack of specificity could be positive, allowing for considerable freedom and flexibility when prescribing or providing active physical activity for those with chronic pain.

Those studies which do focus on the older population tend to be based on the elderly living in some form of residential care or specialist elderly community, as well as a specific form of exercise.

Patel et al. (2011) and Park et al. (2017) both focus on the use of yoga in elderly retirement community residents. There are many types of yoga; Patel et al. state their study used a 12-week beginner's class in Iyengar yoga, whilst Park et al. used an 8-week programme of chair yoga. Both studies found that participants in the programme reported many benefits, including decreased pain, although the long-term sustainability of these improvements could not be ascertained.

Similar studies have also been carried out using Tai Chi as the exercise modality either as class-based or one-to-one interventions (Bris mee et al. 2007; Tsai et al. 2013; Tse et al. 2014). Again these studies all report positive improvements in pain reduction in the participants who undertook the Tai Chi classes, with minimal adverse effects.

Unfortunately most of these studies use small sample sizes and focus on specific populations and/or conditions which make it difficult to generalise from their findings. In an attempt to reach some conclusions about the efficacy of Tai Chi as a pain relief intervention, Hall et al. (2017) undertook a systematic review focusing on its effectiveness at relieving pain in musculoskeletal conditions. Overall they concluded that the poor quality of most of the 15 trials they reviewed made definitive conclusions difficult and there was very little evidence of long-term effects. They were however able to establish that Tai Chi was more effective in relieving pain in the groups which received this intervention than the no treatment or usual treatment groups, although whether this was as a direct result of the Tai Chi was unclear.

When considering exercise as a primary non-pharmacological intervention for pain management, it's clear that the evidence base is currently limited, although it is highly suggestive that exercise in some form can bring about short-term if not long-term improvements in participants' self-reported pain levels, as well as a range of other positive improvements in general quality of life. The range of exercise options appears extensive with no specific programme as yet having more benefit than another. The key components appear to be programmes that support increasing strength, whilst promoting flexibility and endurance, and programmes which improve balance can also reduce the risk of falls (The British Geriatric Society 2013).

Self-management, specifically personal motivation, is essential for any exercise programme to be effective, and subsequently this means it's important that the chosen form of exercise is tailored to the individual need, but also where possible to personal preference (The British Geriatric Society 2013).

4.5 Complementary Therapies

When considering non-pharmacological pain interventions, there is a common association with a range of complementary/alternative therapies. There is no common definition of what a complementary/alternative therapy is, but the US National Center for Complementary and Integrative Health (NCCIH) considers

complementary therapies to be “When a non-mainstream practice is used together with conventional medicine” and alternative therapies, “When a non-mainstream practice is used instead of conventional medicine” (National Health Service 2016).

In the UK the House of Lords Select Committee (2000) on Complementary and Alternative Medicine (CAMs) divided CAMs into three groups. Group 1 is the most organised and professional bodies for which there is some research available to demonstrate their effectiveness; this includes osteopathy and acupuncture. Group 2 includes areas which have limited professional regulation although there is some evidence they may be complementary to conventional medicine, e.g. massage, meditation and counselling, and Group 3 includes areas which lack regulation and have no evidence base to support their use, e.g. crystal therapy, dowsing and kinesiology.

The use of CAMs is difficult to quantify. Bruckenthal et al. (2016) suggest that 31% of middle-aged and older adults have used complementary health approaches, with this rising to 43% in the 65–70 age group, whilst Yang et al. (2013) found around a third of patients with knee osteoarthritis used some form of CAMs for pain relief. The most common CAMs generally used appear to be herbs and dietary supplements; in Yang et al.’s study, this was glucosamine, followed by chiropractic, massage and yoga. For those people using CAMs specifically for pain relief, the most commonly reported were similar: yoga, massage, thermotherapy and activity pacing (Bruckenthal et al. 2016).

4.6 Massage

Massage is included within the House of Lords Group 2 classification due to the very diverse nature of what constitutes massage and the training for those who practice it. In most forms it generally involves the manual manipulation of muscle, connective tissue, tendons and ligaments with the aim of improving individual health/well-being (Cooil 2005; Bruckenthal et al. 2016). Massage is thought to provide pain relief through a combination of physiological reactions, the responses of the skin to touch and friction causing vasodilation and stimulation of the lymphatic system, the physical elongating and stretching of soft tissues and the analgesic effect caused by stimulating free nerve endings (Cooil 2005). Massage can also be considered an instinctive reaction to pain through the simple almost reflex response of rubbing a painful area in order to make it feel better.

The British Geriatric Society (2013) suggests that massage has demonstrable benefits for pain relief, advocating the use of slow-stroke massage and “tender touch” as improving both chronic pain, reducing anxiety and promoting sleep; however the evidence base remains uncertain. Bronfort et al. (2010) in an evidence-based review of manual therapies in the UK found little to support the use of massage in those with knee osteoarthritis or fibromyalgia, although there was some evidence to support its use in relieving pain in those with chronic low back and neck pain. A recent systematic review and meta-analysis of the effectiveness of soft tissue massage for shoulder pain found only poor-quality evidence indicating a limited effect (Van den Dolder et al. 2014), whilst Nelson and Churilla (2017) in a

systematic review of massage therapy in arthritis were unable to do identify any pain-relieving effect.

It's unclear if the use of aromatherapy oils enhances the massage experience although many reported studies using massage appear to use some form of scented oil (Bruckenthal et al. 2016). Cino (2014) used aromatherapy and non-aromatherapy hand massage on a group of residential care adults, all of whom had some form of chronic pain. Reported findings indicated a positive decrease in pain scores for all those receiving the hand massage regardless of the use of aromatherapy oil. However a similar study by Nasiri et al. (2016) comparing lavender oil with almond oil and a non-massage group for people with osteoarthritis of the knee found only the group who had received the lavender oil massage experienced observable pain relief. However the effect was limited to the immediate period post-massage and 4 weeks after the intervention the effect was no longer significant.

General conclusions appear to be that soft tissue massage, as opposed to deep tissue massage, is safe to use in the elderly population and can have positive short-term effects on reducing pain although the evidence base is limited and lacks methodological rigour (McFeeters et al. 2014; Shengelia et al. 2013).

4.7 Herbal Remedies/Dietary Supplements

There are a large variety of herbal remedies available with claims to help alleviate pain, many of which can be considered as dietary supplements and hence excluded from the strict regulatory processes which control pharmacological preparations. The commonest non-medical over-the-counter preparations used for the management of pain tend to be either glucosamine or chondroitin. In spite of the long-standing acceptance of their use for pain relief usually in arthritic conditions, general research in their use is limited, their overall efficacy is unclear and there are a number of concerns with their regulatory status (Wirth et al. 2005; Bruyere and Altman 2016; Bruckenthal et al. 2016).

Glucosamine is thought to have an impact on proteoglycans which are a key component in cartilage although how this brings about pain reduction is unknown (Reid et al. 2012). Although initial research in the use of glucosamine appeared promising, in recent years where it is available on prescription, its use has declined as a consequence of the availability of newer independent trials and specific best practice guidance on the treatment of osteoarthritis which have all cast doubt on its efficacy (Galvin et al. 2013; National Institute for Health and Care Excellence 2014; Runhaar et al. 2017).

Chondroitin is commonly used in combination with glucosamine and is thought to act by providing joint lubrication to protect cartilage and improve compressive resistance. Again its exact method of action is difficult to determine, and more recent and robust clinical trials have cast doubt on its usefulness to effect meaningful pain relief (Reid et al. 2012).

There is however some evidence that suggests when both glucosamine and chondroitin are used in combination they may have a beneficial effect on pain relief

(Provenza et al. 2015). When two recent related trials used combined glucosamine and chondroitin compared with celecoxib (an NSAID), they reported this combination to have a similar if not slightly more beneficial effect on pain relief than the NSAID, with few adverse effects (Sawitzke et al. 2010; Hochberg et al. 2016).

Other ingested herbal preparations/dietary supplements are also available but it is out with the scope of this chapter to consider them all. Evidence for the efficacy of many of these preparations is poor and the mechanisms of action are unknown.

There are also a range of herbal preparations which can be used topically that also claim to have pain-relieving properties. Of these many are related to the use of aromatherapy massage and are considered in this chapter under the Sect. 4.6. Other topical methods of herbal application are less commonly reported although in a small study Chen et al. (2015) looked at the efficacy of a cocktail of Chinese herbs used as part of a therapeutic bath by people with knee osteoarthritis. Overall they concluded that in spite of the variance in use, herbal knee baths did provide pain relief with no reported adverse effects and could be a useful alternative treatment method.

Overall the evidence for herbal remedies/dietary supplements remains poor. Little data is available specifically on the elderly and most evidence is small scale and of poor quality, with the value of these interventions for pain relief failing to achieve more than the comparator placebo effect in many studies.

4.8 Acupuncture

Acupuncture fits within the House of Lords Group 1 classification as it has a long history of use, some professional regulation and a growing body of research-based evidence on its use. It can be described as a technique for balancing flows of energy or “chi” within the body that run through channels known as meridians. It involves the use of needles to stimulate nerves, muscles and connective tissues, and it is presumed that its pain-relieving properties are caused by this direct nerve stimulation which may result in raised levels of endorphin. However its actual physiological impact is unclear, and there are few studies which focus specifically on its use in the elderly population. As with other CAMs, there is also considerable variation in how it is actually practised (Ali 2005; The British Geriatric Society 2013; Bruckenthal et al. 2016).

In common with most CAMs, the evidence base for the use of acupuncture to relieve pain, particularly in the elderly, is limited with a range of poor-quality trials and contradictory findings. Schiller et al. (2016) compared two different types of acupuncture with a sham for patients with osteoarthritis and reported significant reductions in pain for both acupuncture groups. Taylor et al. (2013) reported on a meta-analysis of the cost-effectiveness of acupuncture for low back pain and concluded when used as an adjunct to standard care it had a considerable cost-benefit, although this was not the case when acupuncture was used as a stand-alone treatment. However Hinman et al. (2014) in a trial of acupuncture for chronic knee pain concluded for patients over 50 it was of no benefit for pain relief over a sham intervention.

Overall it appears that acupuncture as a means of pain reduction is safe to use with minimal adverse effects but has limited research evidence to support its short- and long-term efficacy (Shengelia et al. 2013).

4.9 Relaxation

The use of specific relaxation methods has a long history which has moved from informal relaxation approaches to more formal relaxation techniques. Relaxation can be defined as a state of freedom from anxiety combined with relief of skeletal muscle tension. It's generally considered to be useful for the relief of pain as an adjunct to standard treatment and not as a stand-alone therapy and may be useful as a coping strategy when dealing with both acute and chronic pain states (McCaffery and Pasero 1999). It has strong crossovers with distraction (see above) and guided imagery (see below).

4.10 Guided Imagery

Guided imagery is a form of focused relaxation which uses imagined visualisations of pleasant imagery to distract attention away from current unpleasant or painful sensations and may be useful as a technique to augment an individual's coping resources (The British Geriatric Society 2013; Bruckenthal et al. 2016). As in common with most non-pharmacological pain management interventions, the evidence base for its efficacy in the elderly is limited.

However available studies do suggest it may be of benefit, with early work by Baird and Sands (2004) indicating that guided imagery linked to progressive muscle relaxation could result in a significant reduction in pain in those suffering from osteoarthritis, with similar findings indicated in a 2010 follow-up study (Baird et al. 2010). Giacobbi et al. (2015) undertook a systematic review which identified seven previous RCTs that has used guided imagery and progressive relaxation on a range of arthritic conditions; although there was a high range of variation in the techniques used and length of exposure to participants, all studies reported statistically significant improvements in a range of outcomes including pain, anxiety, depression and quality of life.

Given the minimal adverse effects of such an intervention, it's generally considered a safe and acceptable adjunctive intervention to support the non-pharmacological management of pain.

4.11 Transcutaneous Electrical Nerve Stimulation

Transcutaneous electrical nerve stimulation (TENS) has been studied extensively since it was first developed in the 1960s. It consists of the application of electrical stimulation to the skin through surface electrodes. The stimulation can be high or

low frequency with high frequency also known as conventional TENS as it is most commonly used. It can be used in isolation or in combination with acupuncture where low-frequency TENS is mainly used. Additionally the frequency pulses can be continuous or in bursts. TENS units are small and portable and suitable for use in a variety of environments, and they are also cheap to purchase for use without medical supervision (Coil 2005).

Pain relief is thought to be achieved by the stimulation of free nerve endings under the skin producing an analgesic effect in the gating mechanism of the spinal cord and through a subsequent increase in endogenous opiates in response to this stimulus (Coil 2005).

In common with other CAMs, the evidence base for the use of TENS in general as well as specifically in the elderly is limited with some suggestion that age-related changes can reduce its use in this population (The British Geriatric Society 2013). Additionally recent reviews have cast doubt on its overall efficacy in any age group for the relief of pain. A 2009 Cochrane review (Rutjes et al. 2009) which included 18 trials of TENS for knee osteoarthritis concluded that there was no evidence to support the benefit of TENS for pain reduction over sham, regardless of the type of stimulation used. This is echoed in the 2009 NICE report on the treatment of low back pain which specifically advises against the use of TENS for this condition.

Interest in the use of TENS continues with Simon et al. (2015) conducting a study specifically comparing the effect of TENS on different age groups. They found responses to pain relief were similar across all ages although noted that TENS amplitude was higher in the older age groups than the younger in order to produce the same degree of relief, whilst the 2014 NICE report on osteoarthritis continues to recommend the use of TENS as a non-pharmacological pain management intervention.

4.12 Use of Temperature

The use of different temperature states to relieve pain is also known as cryotherapy or thermotherapy. The commonest types of heat therapies include the use of ice packs, and hot water bottles, now being replaced by thermal products such as micro-wavable bean bags, gel packs and temperature-controlled wraps. These collectively are known as superficial thermotherapy and can be considered helpful as an adjunct to conventional medical pain management. Method of effect is generally considered to be as a consequence of the physiological changes which occur when the body is exposed to change in temperature; this includes changes in metabolic rate, haemodynamic effects such as vasodilation/vasoconstriction and an analgesic effect caused by the superficial stimulation of free nerve endings in superficial (skin-based) temperature therapies (Coil 2005).

Although research in this area is small scale, reported findings suggest that the use of superficial thermotherapy can produce a therapeutic level of pain relief. In a study using alternate day heat applications for osteoarthritic knee pain, Yildrum et al. (2010) reported significant improvements in pain and disability, which are

supported by similar findings in the later work of Petrosfsky et al. (2016). Arankalle et al. (2016) in a small study using alternating hot and cold compresses for the treatment of heel pain also reported positive findings for both pain relief and foot function in the alternating compresses experimental group.

When considering the use of heat, a further emerging field is the development of deep heat therapy using microwave diathermy focused on specific areas of pain; evidence for its use is currently limited, but it has potential to provide an additional pain management adjunct (Bruckenthal et al. 2016).

The use of cold as a treatment in its own right is less commonly reported; however Giemza et al. (2014, 2015) report on two small trials using whole-body cryotherapy for the relief of lower back pain and identified significant pain relief and improved function in the experimental groups exposed to daily whole-body cryotherapy of a temperature of $-100\text{ }^{\circ}\text{C}$ for 1–3 min. This method claims to use the body's own physiological reaction to cold to stimulate clinical pain relief. This interest in whole-body cryotherapy has emerged from the field of sports medicine but as yet robust studies on its utility for pain relief in any age group are minimal.

When considering the use of temperature change, there is some evidence to suggest that both superficial cryotherapy and thermotherapy can be useful in reducing inflammation and oedema with consequent relief of pain and improvement in function. Superficial thermotherapy is generally considered to be a cheap and practical method to use with few adverse risks, suitable to a range of environments (Coolil 2005). Evidence for the efficacy of more complex thermotherapy methods although promising is currently limited.

4.13 Psychological Interventions

It has long been accepted that the individuals' experience of pain contains many elements, physiological, emotional, sociocultural and spiritual, and that the subjective experience of pain is moulded by a range of psychological factors. The pain experience is also closely linked to individual mood states such as anger, depression and anxiety commonly recognised as the biopsychosocial model (Dallob et al. 2005; Keefe et al. 2013; The British Geriatric Society 2013). This understanding underpins much of the current research into the impact of psychological interventions/therapies in the management of pain. These psychological interventions can take many forms, and this chapter will consider the two most commonly reported: mindfulness and cognitive behavioural therapy (CBT).

4.14 Mindfulness

Mindfulness can be defined as a form of meditation where the individual pays intentional awareness to the present moment in a non-judgemental moment-by-moment manner (Bruckenthal et al. 2016). Evidence of its effectiveness in the elderly

population is limited; however Keefe et al. (2013), The British Geriatric Society (2013) and Bruckenthal et al. (2016) all suggest it may have some positive benefit on pain reduction/acceptance, stress reduction and improved function. Morone et al. (2008) in a qualitative study of 28 adults all over 65 years of age describe positive results including immediate improvements in well-being which were sustained beyond the period of meditation.

4.15 Cognitive Behavioural Therapy

Cognitive behavioural therapies (CBT) use a range of psychosocial techniques in an attempt to alter beliefs and attitudes, increase a person's perceptions of control over their situation and try to modify any dysfunctional thought patterns. When used for pain, CBT focuses on specific patterns of behaviour and how these may have altered by exposure to pain and stress. The emphasis in CBT therapy is in working with the individual to support modifications in behaviours and way of thinking which enable them to develop more resilient coping strategies or to live with their pain in a better way. Skills taught may include relaxation, activity pacing, problem solving, distraction and changing negative thought patterns (The British Geriatric Society 2013; Keefe et al. 2013; Ehde et al. 2014; Bruckenthal et al. 2016).

Evidence to support the use of CBT in the elderly is available, although studies use a variety of different CBT modalities in a number of different settings such as residential care homes, community settings and Internet-based programmes, which make direct comparison difficult. Overall conclusions seem to suggest that CBT can be effective in reducing pain as a small to medium effect (Keefe et al. 2013), however its more significant effects are a positive improvement in areas such as depression, anxiety and self-efficacy (Nash et al. 2013; The British Geriatric Society 2013; Ehde et al. 2014).

This finding is supported by National Institute for Health and Care excellence (2009) who recommends the use of CBT as a treatment for adults with physical ill health who also suffer from severe to mild depressive symptoms. However when CBT is used specifically as a pain management modality, current NICE guidance is less favourable, with no reference to CBT in the 2014 NICE guidance on osteoarthritis and the National Institute of Health Care Excellence (2016) guidance on the treatment and management of back pain with or without sciatica only recommending its use as an adjunct to other treatment modalities.

Consequently the impact of psychological therapies as an effective pain management intervention in the elderly is difficult to determine. Reporting of adverse side effects from psychological interventions appears limited, and there is some evidence to support their use on the wider biopsychosocial aspects of the individuals' pain experience, particularly anxiety and depression, but evidence of their effectiveness in decreasing the intensity of the actual pain experience is currently unclear.

Conclusion

This chapter has considered a range of non-pharmacological therapies which could be utilised to support the management of pain in the elderly. Those reviews include self-management programmes, distraction, exercise and complementary and psychological therapies.

Priorities when planning to use a non-pharmacological pain management intervention based on the available evidence are as follows:

1. Self-management—encouraging and supporting individual pain sufferers to take responsibility for and learn to manage their own pain through some form of education.
2. Exercise—in all forms providing they meet an individual's preference and work to build strength and flexibility.
3. Distraction—reducing or diverting an individual's attention away from their own painful experience. This could include guided imagery, relaxation or massage as a distraction technique.
4. Use of superficial temperature changes—either hot or cold.

However it's important to add that these non-pharmacological therapies should be used as an adjunctive and not a primary treatment for the management of pain.

Interventions of limited or no proven value for pain management include most CAMs with the exception of those which may promote distraction and relaxation and psychological therapies except where they may be useful as an adjunctive treatment when comorbidities of depression and anxiety are present.

There are current limitations in the evidence base:

- Research specifically on the elderly population in any non-pharmacological pain intervention is limited.
- Where research evidence is available, most of it is of moderate to poor quality with small-scale studies lacking both internal and external validity.
- Where systematic reviews and meta-analysis have been available, results are generally inconclusive.
- Where research is available, it focuses on a limited range of medical conditions, mainly osteoarthritis and musculoskeletal conditions.
- There is no specific evidence of non-pharmacological pain management practices being used in the elderly with cognitive impairment or dementia.
- There is a need for larger, high-quality trials across the full range of non-pharmacological therapies.

This does not mean that non-pharmacological therapies should be dismissed out of hand, simply that the evidence base for most of them is weak and narrowly focused. Without exception all of the non-pharmacological therapies report minimal adverse reactions which means they may still have some value as an adjunctive treatment to both the individual pain sufferer and the health-care practitioner involved in the man-

agement of pain. The key to successful non-pharmacological management of pain is its adjunctive use, meeting the individual pain sufferer's preference and their personal experience of the value of the chosen therapy to relieve their suffering.

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