

The Lived Experiences of Post-Operative Pain Management for Patients with Fibromyalgia

Molly Evans¹, Kate Cheetham² and Dr Carolyn Lees²

¹ Nursing BN Graduate; ² Department of Nursing, School of Health Sciences

This review introduces an initial understanding of fibromyalgia and then focuses on the lived experiences of post-operative pain management for patients with fibromyalgia; this is a specific period within fibromyalgia patients' healthcare journey that has not been identified within research. Most research on fibromyalgia is related to overall, day-to-day pain within fibromyalgia or specific pharmacological or non-pharmacological outcomes following specific surgery. This review relates to post-operative pain management when undergoing non-fibromyalgia related surgery and how various factors contribute to fibromyalgia patients' pain. It highlights the reduced pain assessments and management pathways available specific to fibromyalgia pain and new acute surgical pain. If further research was to be undertaken, then a blanket post-operative surgical pathway could be introduced specifically for fibromyalgia patients to improve their surgical experience and reduce symptoms and co-morbidities from being exacerbated during the post-operative period. This research could also promote the education of healthcare professionals and introduce new guidance and pathways to help individualise pain plans for all fibromyalgia patients in the pre-operative periods to prepare for the post-operative stage. Having a wider knowledge base of pain assessments, management and analgesia for fibromyalgia patients will allow them to be assessed correctly with a personalised pain plan that relates to their individual pain instead of being based on the surgical procedure undertaken. It will also help decrease the stigmatism around fibromyalgia, as due to limited knowledge biases have been identified leading to fibromyalgia patients feeling isolated and misjudged. Many nurses have highlighted the importance of the wider knowledge of fibromyalgia, and many would like to increase their knowledge to improve overall patient experience and quality of care provided.

Abstract

Fibromyalgia syndrome (FMS) is a chronic syndrome causing widespread pain with physical and psychological symptoms. There is no pain assessment or management plan in place for FMS patients following surgery. Multimodal approaches have been trialled in the treatment of FMS and personalised pain plans may help promote improvement of post-operative experiences. Multiple factors identified can negatively affect and exacerbate FMS symptoms during the post-operative period, increasing post-operative pain. We aimed to review the literature and highlight the knowledge gap associated with post-operative pain management in fibromyalgia patients who are undergoing non-fibromyalgia related surgery. The review also allowed FMS pain to be explored further, as it is known for having one of the greatest impacts on a patient's quality of life. The literature review identified four themes which are explored within this article. These themes showed a multitude of factors that can increase or cause an exacerbation of FMS pain and symptoms. Nursing knowledge and beliefs are identified and the significance of having a basic knowledge of fibromyalgia when caring for these patients. The basis of this literature review is directed at improving the assessment and management of post-operative pain in FMS patients and enhancing nursing knowledge and understanding to improve FMS patients overall surgical experience.

Background

Fibromyalgia Syndrome (FMS) is a non-progressive pain disorder defined as a chronic condition with widespread pain and various tender point across the body (Marcus & Deodhar, 2011; Poindexter, 2017). The symptoms of FMS affect physical and mental wellbeing and range from increased sensitivity, extreme tiredness, anxiety and depression (Noble, 2012; Axelsson *et al.*, 2020; National Health Service, 2020). The types of pain reported in fibromyalgia have been observed as having a hypersensitivity to surroundings (Burgmer *et al.*, 2009), hyperalgesia and allodynia as well as centralised pain (Arnold *et al.*, 2016). FMS can be treated but not cured as it is a chronic condition (Jahan *et al.*, 2012). Fibromyalgia affects an estimated 2 - 4.5 % in the United Kingdom (Fibromyalgia Zone, 2020) and is more prevalent in women than men (Newmann & Buskila, 2003; Pogatzki-Zhan, 2009; Chen & McKenzie-Brown, 2015). Fibromyalgia is treated using a multimodal approach, with pharmacological and non-pharmacological interventions (Brummet & Clauw, 2011). Visual analogue scales and numeric rating scales assess post-operative pain in FMS patients, and pain scores managed through pharmacological approaches

(Haefeli & Elfering, 2006). However, most analgesics provide minimum pain relief to FMS patients (Arnold *et al.*, 2016; Institute for Quality and Efficiency in Healthcare, 2018). By exploring the experiences of post-operative pain management in FMS patients it is anticipated that better post-operative care can be achieved (Hughes *et al.*, 2016). Uncontrolled pain costs the NHS an estimated £20 million annually due to prolonged hospital stays and complications (Soni *et al.*, 2020). Some post-operative complications can result in reduced mobility and readmissions (Donnally *et al.*, 2018). This literature review has attempted to synthesise and engage with the evidence relating to post-operative pain management in fibromyalgia patients and the impact it has on care to inform academic and professional debate in this area.

Search Strategy

Scopus, Medline and CINAHL were the most relevant databases for locating papers appropriate for this literature review as they provide health professionals access to a range of international resources relevant to clinical research (Phelps, Fisher & Ellis, 2007; EBSCO, 2020). The

search strategies in Table 1 demonstrate the flow of the research for each database.

After reading the abstracts, irrelevant papers were excluded from the literature search. The Critical Appraisal Skills Programme (CASP) tool was applied, to systematically review the research to judge relevance, trustworthiness, and value (Mhaskar *et al.*, 2009; Gerrish & Lacey, 2010; Critical Appraisal Skills Programme, 2018). Fifteen research papers were appropriate, six of these articles were duplicates from the three databases. An additional two articles were found from the reference lists of two of the fifteen articles; these were hand-searched and included. Seventeen articles for the literature review provided primary data (Salkind, 2010). Of the seventeen articles identified, five adopted a qualitative approach, ten adopted a quantitative approach and two used mixed methodologies. Using the CASP tool (CASP, 2018), the literature was reviewed, and four themes occurred. The identified themes were: pain assessments, factors associated with fibromyalgia that impact pain, pharmacological and non-pharmacological, pre-existing nursing knowledge and beliefs.

Pain assessments

Pain assessments were a common theme within the literature and included the use of visual analogue scales and numeric rating scales. These assessments allow pain to be managed, along with selecting appropriate pain relief (Littlejohns & Vere, 1981; Koneti & Jones, 2016). However, evidence on the assessment and management of post-operative pain in FMS patients is limited. Some research suggests the use of phenotyping, which is identifying unique patient traits (Paracha, Obaid & Ali, 2017), to map individual characteristics to produce optimal treatments. Phenotyping involves multiple self-report pain and psychological questionnaires (Edwards *et al.*, 2018). For example, the American College of Rheumatology (ACR) criteria and Symptom Severity Scale (SSS) are diagnosis tools that were used in studies to predict the amount of opiates required post-operatively (Brummett & Clauw, 2012; Janda *et al.*, 2015). These studies found that the higher the fibromyalgia score, the more opiates were required post-operatively (Brummett *et al.*, 2013; Janda *et al.*, 2015). The use of questionnaires determined contributing factors like pain severity and widespread pain (Abilin *et al.*, 2017).

Table 1. The search strategy used when searching Scopus, Medline and CINAHL.

Scopus Database		Results	
Search Number	1	Fibromyalgia* OR "Muscular Rheumatism" OR "Fibrositis"	19,205
	2	"Post-operative pain" OR "Postoperative pain" OR Post operat*	167,515
	3	#1 AND #2	292
	4	Limitations Applied: English, to reduce translator bias (Kirkpatrick & Teijlingen, 2009). Within the last 10 years, due to the modification of the American College of Rheumatology (ACR) (Wolfe <i>et al.</i> , 2010; Wolfe <i>et al.</i> , 2011).	131
Medline Database		Results	
Search Number	1	Fibromyalgia OR Muscular Rheumatism OR Fibromyalgia Syndrome (Included multiple term)	8506
	2	Postoperative pain OR Post-operative pain OR postoperative care	97,588
	3	#1 AND #2	20
	4	Limitations Applied: English, to reduce translator bias (Kirkpatrick & Teijlingen, 2009). Within the last 10 years, due to the modification of the American College of Rheumatology (ACR) (Wolfe <i>et al.</i> , 2010; Wolfe <i>et al.</i> , 2011).	18
CINAHL Database		Results	
Search Number	1	Fibromyalgia OR Fibromyalgia Syndrome OR FMS OR FM	10,495
	2	Post operative OR post-operative OR Postoperative OR Post surgery	192,910
	3	#1 AND #2	127
	4	Limitations Applied: English, to reduce translator bias (Kirkpatrick & Teijlingen, 2009). Within the last 10 years, due to the modification of the American College of Rheumatology (ACR) (Wolfe <i>et al.</i> , 2010; Wolfe <i>et al.</i> , 2011).	57

Multiple studies have highlighted the significance of personalised pain plans when managing FMS (Brummett *et al.*, 2013; Bruehl, 2015; Janda *et al.*, 2015). The British Pain Society found early referrals, chronic pain investigations and holistic care benefited these pain plans (Lee *et al.*, 2014). Personalised pain plans are patient specific to direct appropriate pain relief treatments. These plans use pain algorithms, evolved from genetic and clinical phenotyping to predict analgesic responses (Bruehl, 2015). Pain can then be managed, with individualised phenotypes and characteristics rather than predetermined surgical care plans (D'Apuzzo *et al.*, 2012; Brummett *et al.*, 2013; Janda *et al.*, 2015). Personalised pain plans promote patient involvement, allowing patient control, reducing stress and anxiety (Noble, 2012). However, Umeh & Puddephatt (2017) found that those with a mental health diagnosis were more likely to be offered personalised plans than those with FMS.

Factors associated with fibromyalgia that impact pain

Symptoms associated with fibromyalgia can be exacerbated following surgery, with an increase in pain intensity if appropriate pain management is not considered. Anxiety and depression are a co-morbidity of fibromyalgia, with FMS patients at risk of developing either

or both due to lack of specific receptors (Galvez-Sanchez, Duschek & Reyes del Paso, 2019). Researchers have taken the presence of anxiety and depression as a possible marker for worsening pain. Some studies asked participants to complete The Hospital Anxiety and Depression Scale (Brummett *et al.*, 2013). Pogatzki-Zahn *et al.* (2009) found when managing acute pain in fibromyalgia patients, anxiety contributed to high pain scores causing a higher post-operative expectation of pain and hypervigilance increasing long-term pain perception post-operatively. Elevated anxiety levels associated with fibromyalgia led to differences in analgesic efficiency and pain intensity (Bruehl, 2015). Anticipation of pain, attention to pain, and emotional aspects to pain were highlighted in different parts of the brain, with a study by Burgmer *et al.* (2009) reporting pain processing and altered brain activity in FMS patients.

Thermoregulation is a mechanism which allows the body to self-regulate its temperature. It is a type of homeostasis that preserves the body's internal state (Osilla, Marsidi & Sharma, 2020). Cold environments can cause an exacerbation of FMS, due to an inability to regulate body temperature (Brusselmans *et al.*, 2015; NHS, 2020). An operating theatre is a cold environment that can contribute to post-operative hypothermia in fibromyalgia patients leading to increased pain highlighting the need for peri-operative warming (Noble, 2012; Larson, Pardo & Pasely, 2015). Jeschonneck *et al.* (2000) suggested lower skin temperatures around FMS patients 'tender points' correlated with reduced blood flow causing lower temperatures. This focuses on cold 'tender points' being intensified due to cold environments and inadequate warming procedures.

Hyperalgesia is an increased sensitivity to pain in either the peripheral or central nervous system (Treede, 2013). Hyperalgesia in fibromyalgia is due to patients having alterations within the nervous system leading to 'abnormal' pain processing (Sluka & Clauw, 2016). Hyperalgesia can lead to higher pain levels, increased post-operative complications, longer hospital stays and high readmission rates (Donnally *et al.*, 2019). Morsy (2016) found that FMS patients reported more Post Dural Puncture Headaches due to their central abnormal hypersensitive pain processing while Karahan *et al.* (2014) reported hyperalgesia can be overlooked by healthcare professionals due to insufficient knowledge.

Pharmacological and non-pharmacological

Research supports the use of various medications and their effectiveness in FMS pain post-operatively. Pregabalin and gabapentin are anticonvulsants that are collectively gabapentanoids, used for epilepsy. However, gabapentanoids have become increasingly popular to treat post-operative pain (Johansen, 2018; Mathieson *et al.*, 2020). Gabapentanoids block calcium channels reducing neurotransmission to reduce neuropathic pain (Pogatzki-Zahn *et al.*, 2009; Noble, 2012). Studies by Hauser *et al.* (2009), Brummett & Clauw (2011) and Morsy *et al.* (2016) stated the effectiveness of gabapentanoids for treating post-operative pain in fibromyalgia patients. Pogatzki-Zahn *et al.* (2009) found the use of gabapentanoids post-

operatively can reduce anxiety due to the drugs anxiolytic effects. However, analgesia tolerance is a concern of many FMS patients prescribed gabapentanoids (Ashe *et al.*, 2017). Patients have expressed unsatisfactory results of gabapentanoids due to debilitating side effects and inadequate pain relief (Pogatzki-Zahn *et al.*, 2009; Cooper *et al.*, 2017).

The effectiveness of opiates in FMS is unclear. The use of weak opiates like tramadol have been effective in FMS patients post-operatively (Hughes *et al.*, 2016). Strong opiates like morphine, oxycodone and fentanyl should be avoided due to fibromyalgia patients having central nervous system abnormalities. FMS patients have low endogenous opioid receptors causing ineffective opiate responses (Harris *et al.*, 2007; Janda *et al.*, 2015). Studies looking at lower-extremity joint arthroplasties found there was a significant difference in fibromyalgia and non-fibromyalgia opiate consumption, leading to inadequate pain management (D'Apuzzo *et al.*, 2012; Brummett *et al.*, 2013), suggesting FMS patients require more post-operative opiates. Studies highlight a concern around prescribing opiates and the risk of opiate-induced hyperalgesia (Brummett & Clauw, 2011). Bruehl (2015) found a 29% higher opiate requirement post-operatively in fibromyalgia patients, highlighting the effectiveness of personalised pain plans when administering opiates. As-Sanie *et al.* (2017) agreed by stating a personalised multimodal approach in post-operative analgesia can be beneficial.

Depressive disorders are common within fibromyalgia, and research shows the use of anti-depressants such as serotonin norepinephrine reuptake inhibitors (SNRIs) to be an effective treatment method (Simonsen *et al.*, 2006; Hauser *et al.*, 2012). SNRIs have been found to reduce pain (Hughes *et al.*, 2016; NICE, 2020). Wright *et al.* (2011) found the effectiveness of duloxetine in FMS by diminishing pain and increasing physical function. Pogatzki-Zahn *et al.* (2009) supported the benefits of anti-depressants due to their anti-hyperalgesia effects. Wang *et al.* (2015) found duloxetine used centrally and peripherally reduced post-operative hyperalgesia and allodynia. Duloxetine also reversed thermal hypersensitivity linking to temperature control, reducing post-operative hypothermia (Wang *et al.*, 2015). However, Donnally *et al.* (2019) found an increase in post-operative anaemia in FMS patients and one explanation was pre-operative administration of duloxetine, which is known to increase the risk of operative bleeding (Roose & Rutherford, 2016; Donnally *et al.*, 2019). The use of anti-depressants can benefit sleeping patterns, as many FMS patients experience poor sleep patterns (Brummett & Clauw, 2011). Sleep disturbances post-operatively can result in an increased sensitivity to pain (Dolan *et al.*, 2016) and setbacks during recovery (Su & Wang, 2018).

Non-pharmacological treatments have shown positive effects in fibromyalgia patients (Sueiro Blanco *et al.*, 2008). Treatments like cognitive behavioural therapy (CBT), meditation, group therapy, yoga, acupuncture, and aerobic exercises, have found to be a 'beneficial experience' (Ashe *et al.*, 2017, p.5; Poindexter, 2017). These interventions can be delayed by the peri-operative period, which has shown to negatively affect FMS patients with anxiety and

depression, due to an increased awareness and anticipation of pain (Burgmer *et al.*, 2009). However As-Sanie *et al.* (2017) found that patient diaries documenting daily pain and analgesics taken post-operatively was beneficial to the patient's mental health. Not being able to attend these treatments due to surgery can lead to post-operative complications or readmissions (Donnally *et al.*, 2019). Fibromyalgia patients who are physically active as part of their ongoing treatment prior to surgery, can benefit from post-operative early mobilisation (Noble, 2012).

Pre-existing nursing knowledge and beliefs

A study by Hughes *et al.* (2016) found that nurses wanted more specific education, around FMS diagnosis. Around 76% of nurses in one study reported their knowledge was based on self-education rather than trust education (Hughes *et al.*, 2016). Ashe *et al.* (2017) explored nurses understanding of patient perspectives and the impact of nurse understanding to support FMS patients and create a positive environment. Acceptance from nurses is significant for fibromyalgia patients (Poindexter, 2017). Removing personal biases can prevent patients from feeling ignored or abandoned (Menzies, 2016). Providing reassurance to patients and applying personalised pain plans can ensure FMS pain is managed (As-Sanie *et al.*,

2017). However, poor acceptance and knowledge of fibromyalgia has left patients feeling misunderstood and within the perioperative period this self-imagery can affect reported pain levels (Brummett & Clauw, 2011; Poindexter, 2017). Ashe *et al.* (2017) found that patients experienced a lack of empathy from practitioners, due to a contested authenticity of their condition. These experiences created invisibility and stigmatisation around fibromyalgia (Ashe *et al.*, 2017). A lack of awareness around fibromyalgia can lead to subconscious bias when providing care causing increased patient pain levels and poor patient experiences (Hughes *et al.*, 2016).

Implications for clinical practice

Evidence appears to suggest that personalised pain plans for FMS patients can improve post-operative management (Brummett & Clauw, 2011; Bruehl, 2015). Although some studies consider the patient experience whilst receiving medical treatment, there is limited research focusing on fibromyalgia patients experiencing post-operative pain. What is clear is that implementing the evidence will enhance clinical assessments and provide adequate education to improve the FMS patient experience.

References

- Ablin, J.N., Berman, M., Aloush, V., *et al.* 2017. Effect of Fibromyalgia symptoms on outcome of spinal surgery. *Pain Medicine*, 18(4), 773-780.
- Arnold, L.M., Choy, E., Clauw, D.J., *et al.* 2016. Fibromyalgia and Chronic Pain Syndromes: A white paper detailing current challenges in the field. *The Clinical Journal of Pain*, 32(9), 737-746.
- As-Sanie, S., Till, S.R., Mowers, E.L., *et al.* 2017. Opioid prescribing patterns, patient use and postoperative pain after hysterectomy for benign indications. *Obstetrics and Gynaecology*, 130(6), 1261-1268.
- Ashe, S.C., Furness, P.J., Taylore, S.J., Haywood-Small, S. & Lawson, K. 2017. A qualitative exploration of the experience of living with and being treated for Fibromyalgia. *Health Psychology Open*, 4(2), 1-12.
- Axelsson, E., Hedman-Lagerlof, M., Hedman-Lagerlof, E., Ljotsson, B. & Andersson, E. 2020. Symptom preoccupation in Fibromyalgia: Prevalence and correlates of Somatic Symptom Disorder in a self-recruited sample. *Psychosomatics*, 61(3), 268-276.
- Broderick, J.E. & Ross, J.A. 2005. Is there evidence for surgery triggering the onset of Fibromyalgia Syndrome? *Journal of Musculoskeletal Pain*, 3(3), 19-25.
- Bruhl, S. 2015. Personalised Pain Medicine: Pipe Dream or Reality? *Anaesthesiology*, 122(5), 967-968.
- Brummett, C. M., Janda, A.M., Schueller, C. M., *et al.* 2013. Survey criteria for fibromyalgia independently predict increased postoperative opioid consumption after lower-extremity joint arthroplasty: a prospective, observational cohort study. *Anaesthesiology*, 119(6), 1434-1443.
- Brummett, C.M. & Clauw, D.J. 2011. Fibromyalgia: A primer for the anaesthesia community. *Current opinion in Anaesthesiology*, 24(5), 532-539.
- Brusselmans, G., Nogueira, H., Schampelaere, E. D., Devulder, J. & Crombez, G. 2015 Skin temperature during cold pressor test in Fibromyalgia: An evaluation of the autonomic nervous system. *Journal of the Belgian Society of Anaesthesia and Reanimation*, 66(1), 19-27.
- Burgmer, M., Pogatzki-Zahn, E.M., Gaubitz, M., *et al.* 2007. Altered brain activity during pain processing in fibromyalgia. *Neuroimage*, 44(2), 502-508.
- Chen, J.F. & McKenzie-Brown, A.M. 2015. The Epidemiology and Prevalence of Fibromyalgia (FMS). *Fibromyalgia*, 1-21.
- Cooper, T.E., Derry, S., Wiffen, P.J., Moore, R.A. & Cochrane Pain, Palliative and Supportive Care Group. 2017. Gabapentin for fibromyalgia pain in adults. *The Cochrane Database of Systematic Reviews*, 1. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6465053/> (Accessed: 26 October 2020)
- Critical Appraisal Skills Programme. 2018. *CASP: Checklist*. [Online] Available at: <file:///C:/Users/user/OneDrive/Documents/Nursing%20YR2/NURS224/CASP.pdf> (Accessed: 26 October 2020).
- D'Apuzzo, M.R., Cabanela, M.E., Trousdale, R.T. & Sierra, R.J. 2012. Primary Total Knee Arthroplasty in patients with Fibromyalgia. *Orthopaedics*, 35(2), 175-178.
- Dolan, R., Huh, J., Tiwari, N., Sproat, T. & Brennan, J.C. 2016. A prospective analysis of sleep deprivation and disturbance in surgical patients. *Annals of Medicine and Surgery*, 6, 1-5.
- Donnally, C.J., Vakharia, R.M., Rush, A.J., *et al.* 2018. Fibromyalgia as a predictor of increased postoperative complications, readmission rate, and hospital costs in patients undergoing posterior lumbar spine fusion. *Spine*, 44(4), 233-238.
- EBSCO. 2020. *CINAHL Complete*. [Online] Available at: <https://www.ebscohost.com/nursing/products/cinahl-databases/cinahl-complete> (Accessed: 26 October 2020).
- Edwards, R.R., Dworkin, R.H., Turk, D.C., *et al.* 2018. Patient phenotyping in clinical trials of chronic pain treatments: IMMPACT recommendations. *Pain*, 157(9), 1851-1871.
- Fibromyalgia Zone. 2020. *Fibromyalgia: Who Is Affected?* [Online] Available at: <http://fibromyalgia.zone/index.php?page=about-us> (Accessed: 26 October 2020).
- Galvez-Sanchez, C.M., Duschek, S. & Reyes del Paso, G.A. 2019. Psychological impact of fibromyalgia: current perspectives. *Psychology Research and Behaviour Management*, 12, 117-127.
- Gerrish, K. & Lacey, A. 2010. *The Research Process in Nursing*, 6th Edition, John Wiley & Sons, Incorporated, pp. 79-82.
- Haefeli, M. & Elfering, A. 2006. Pain Assessment. *European Spine Journal*, 15(1), 17-14.
- Harris, R.E., Clauw, D.J., Scott, D.J., *et al.* 2007. Decreased central m-opioid receptor availability in fibromyalgia. *The Journal of Neuroscience*, 27(37), 10000-10006.
- Hauser, W., Bernardy, K., Uceyler, N. & Sommer, C. 2009. Treatment for fibromyalgia syndrome with gabapentin and pregabalin – A meta-analysis of randomised controlled trial. *Pain*, 145(1-2), 69-81.
- Hauser, W., Wolfe, F., Tolle, T., Uceyler, N. & Sommer, C. 2012. The role of antidepressants in the management of Fibromyalgia: A systematic review and meta-analysis. *Central Nervous System Drugs*, 26(4), 297-307.
- Hughes, L., Adair, J., Feng, F., Maciejewski, S. & Sharma, H. 2016. Nurse Practitioners' education, awareness and therapeutic approach for the management of Fibromyalgia. *Orthopaedic Nursing*, 35(5), 317-322.
- Institute for Quality and Efficiency in Healthcare. 2018. *Medication for the*

- treatment of fibromyalgia.* [Online] Available at: <https://www.ncbi.nlm.nih.gov/books/NBK492992/> (Accessed: 26 January 2022).
- Jahan, F., Nanji, K., Qidwai, W. & Qasim, R. 2012. Fibromyalgia Syndrome: An overview of Pathophysiology, Diagnosis and Management. *Oman Medical Journal*, 27(3), 192-195.
- Janda, A., As-Sanie, S., Rajala, B., et al. 2015. Fibromyalgia Survey Criteria Are Associated with Increased Postoperative Opioid Consumption in Women Undergoing Hysterectomy. *Anesthesiology*, 122(5), 1103-1111.
- Jeschonnek, M., Grohmann, G., Hein, G. & Sprott, H. 2000. Abnormal microcirculation and temperature in skin above tender points in patients with fibromyalgia. *British Society of Rheumatology*, 39(8), 917-921.
- Johanson, M. E. 2018. Gabapentinoid use in the United States 2002 through 2015. *JAMA International Medicine*, 178(2), 292-294.
- Karahan, A.Y., Kucuksarac, S., Soran, N., et al. 2014. Nurse's knowledge of neuropathic pain. *Neurology International*, 6(3), 5492.
- Kirkpatrick, P. & Teijlingen, E.V. 2009. Lost in translation: reflecting on a model to reduce translation and interpretation bias. *The Open Nursing Journal*, 3, 25-32.
- Koneti, K.K. & Jones, M. 2016. Management of acute pain. *Surgery*, 34(2), 84-90.
- Larson, A.A., Pardo, J.V. & Pasley, J.D. 2015. Review of overlap between thermoregulation and pain modulation in Fibromyalgia. *The Clinical Journal of Pain*, 30(6), 544-555.
- Lee, J., Ellis, B., Price, C. & Baranowski, A.P. 2014. Chronic widespread pain, including fibromyalgia: a pathway for care development by the British Pain Society. *British Journal of Anaesthesia*, 112(1), 16-24.
- Littlejohns, D. & Vere, D. 1981. The clinical assessment of analgesic drugs. *British Journal of Clinical Pharmacology*, 11(4), 319-332.
- Marcus, D. & Deodhar, A., 2011. *Fibromyalgia: A Practical Clinical Guide.* 1st edition, New York: Springer, pp.9-20.
- Mathieson, S., Lin, C.W.C., Underwood, M. & Eldabe, S. 2020. Pregabalin and Gabapentin for pain. *British Medical Journal*, 369, m1315.
- Menizes, V. 2016. Fibromyalgia Syndrome: Current consideration in symptom management. *The American Journal of Nursing*, 116(1), 24-32.
- Mhaskar, R., Emmanuel, P., Mishra, S. et al. 2009. Critical appraisal skills are essential to informed decision-making. *Indian Journal of Sexually Transmitted Diseases and AIDS*, 30(2), 112-119.
- Morsy, K.M., Osman, A.M., Shaaban, O.M. & El-Hammady, D.H. 2016. Post Dural Puncture Headache (PDPH) in Fibromyalgia after caesarean section: A comparative cohort study. *Pain Physician Journal*, 19, 871-867.
- National Health Service. 2020. *Fibromyalgia: Overview.* [Online] Available at: <https://www.nhs.uk/conditions/fibromyalgia/> (Accessed: 20 October 2020).
- National Health Service. 2020. *Fibromyalgia: Symptoms.* Available at: <https://www.nhs.uk/conditions/fibromyalgia/symptoms/> (Accessed: 28 October 2020)
- National Institute for Health and Care Excellence. 2020. *Antidepressant Drugs: Overview.* [Online] Available at: <https://bnf.nice.org.uk/treatment-summary/antidepressant-drugs.html> (Accessed: 29 October 2020).
- Newmann, L. & Buskila, D. 2003. Epidemiology of Fibromyalgia. *Current Pain and Headache Reports*, 7, 362-368.
- Noble, K.A. 2012. Fibromyalgia and Surgery. *Journal of PeriAnaesthesia Nursing*, 27(4), 278-282.
- Osilla, E.V., Marsidi, J.L. & Sharma, S. 2020. *Physiology, Temperature Regulation*, 1st edition. Treasure land (FL): StatPearls Publishing.
- Paracha, R., Obaid, A. & Ali, A. 2017. *Progress and Challenges in Precision Medicine*, 1st edition, Academic Press, pp.55-77.
- Phelps, R., Fisher, K. & Ellis, A. 2007. *Organising and managing your research*, 1st Edition, London: SAGE.
- Pogatzki-Zahn, E.M., Englbrecht, J.S. & Schug, S.A. 2009. Acute pain management in patients with fibromyalgia and other diffuse chronic pain syndromes. *Anaesthesiology*, 22(5), 627-633.
- Poindexter, K.H.C. 2017. *Nursing Management of Fibromyalgia Syndrome.* *MedSurg Nursing*, 26(5), 349-351.
- Roose, S. & Rutherford, B.R. 2016. Selective Serotonin Reuptake Inhibitors and Operative Bleeding Risk: A Review of the Literature. *Journal of Clinical Psychopharmacology*, 36(6), 704-709.
- Salkind, N.J. 2010. *Primary Data Source.* *Encyclopaedia of Research design.* [Online] Available at: <https://methods.sagepub.com/reference/encyc-of-research-design/n333.xml> (Accessed: 27 October 2020).
- Simonsen, T., Aarbakke, J., Kay, I., et al. (2006) *Illustrated pharmacology for nurses*. London: Hodder Arnold, pp. 140-144.
- Sluka, K.A. and Clauw, D.J. 2016. Neurobiology of fibromyalgia and chronic widespread pain. *Neuroscience*, 338, 114-129.
- Soni, A., Santos-Paulo, S., Segerdahl, A., et al. 2020. Hospitalisation in fibromyalgia: A cohort-level observational study of in-patient procedures, costs and geographical variation in England. *Rheumatology*, 59(8), 2071-2081.
- Su, X. & Wang, D.X. 2018. Improve postoperative sleep: what can we do? *Current Opinion in Anaesthesiology*, 31(1), 83-88.
- Sueiro Blanco, F., Estevez Schwarz, I., Ayan, C., Cancela, J. & Martin, V. 2008. Potential benefits of non-pharmacological therapies in Fibromyalgia. *The Open Rheumatology Journal*, 2, 1-6.
- Treede, R.D. 2013. *Hyperalgesia.* *Encyclopaedia of Pain.* DOI: https://doi.org/10.1007/978-3-642-28753-4_1806.
- Umeh, K. & Puddephatt, J.A. 2017. Personalised care plans in patients with chronic pain disorders: educational implications from a population-based study. *International Journal of Health Promotion and Education*, 56(1), 248-261.
- Wang, C.F., Russell, G., Strichartz, G.R. & Wang, G.K. 2015. The local and systematic actions of Duloxetine in allodynia and hyperalgesia using a rat skin incision pain model. *Anaesthesia and Analgesia*, 121(2), 532-544.
- Wolfe, F., Clauw, D., Fitzcharles, M., et al. 2010. The American College of Rheumatology Preliminary Diagnostic Criteria for Fibromyalgia and Measurement of Symptom Severity. *Arthritis Care & Research*, 62(5), 600-610.
- Wolfe, F., Clauw, D.J., Fitzcharles, M.A., et al. 2011. Fibromyalgia Criteria and Severity Scales for Clinical and Epidemiological Studies: A Modification of the ACR Preliminary Diagnostic Criteria for Fibromyalgia. *The Journal of Rheumatology*, 38(6), 1113-1122.
- Wright, C.L., Mist, S.D., Ross, R.L. & Jones, K.D. 2011. Duloxetine for the treatment of fibromyalgia. *Expert review of Clinical Immunology*, 6(5), 745-756.

Insider Insights Podcast

New episodes published at
insiderimprint.com
 and on YouTube

INSIDER
 INSIGHTS

PODCAST