REVIEWS AND DISCUSSION PAPERS

Effectiveness of early mobilisation versus laxative use in reducing opioid induced constipation in post-operative orthopaedic patients: an integrative review

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ABSTRACT

Objective: To explore which nursing intervention: early mobilisation versus laxative use, is more effective in reducing constipation in post-operative orthopaedic patients who require strong analgesia.

Background: The use of opioids to manage pain in orthopaedic patients causes post-operative constipation. Nursing interventions used to relieve constipation in patients post-operatively include encouraging patients to eat a high fibre diet, to increase their hydration, to mobilise and to use laxatives. However, varying results have been demonstrated on the effects of early mobilisation and laxative use, specifically in managing opioid-induced constipation.

Study design and methods: An integrative literature review was used to identify articles from online databases between January 2000 and June 2020. Grey literature was also utilised. Data were quality appraised, extracted, and thematic analysis was used to synthesise the results.

Results: The use of laxatives was effective in some studies, while some studies found laxatives to be either ineffective or partially effective. Most of the studies and grey literature recommended early mobilisation, however not in isolation, but in conjunction with other interventions including increased fibre, fluid intake and laxative use.

Discussion: Although the benefits of early mobilisation have been identified, it is not advocated for independently and is usually advocated for in conjunction with other interventions such as a diet high in fibre, increased water intake along with laxative use. Laxatives used as the first line of constipation treatment are not always effective. Multiple doses are often required as they may not deal with the underlying cause of opioid-induced constipation.

Conclusion: This study determined there is no clear evidence to support a singular course of action; early mobilisation or laxative use. Each intervention potentially contributes to preventing constipation therefore both interventions should be utilised concurrently.

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Implications for research, policy, and practice: Post-operative constipation is an ongoing problem in this subset of patients. However, there is always a need for reviewing current practices and re-educating and reminding patients and staff of the benefits of a multipronged approach. Practices recommended include discouraging bedpans, following protocols, documentation and having an open dialogue with patients. Further research is needed to examine the effectiveness of early mobilisation only in relieving constipation in post-operative orthopaedic patients and orthopaedic patients in general who require strong analgesia.

What is already known about the topic?
- The continuous use of opioids to manage pain post-operatively in orthopaedic patients results in opioid-induced constipation.
- The advice given currently advocates a mix of pharmacological and non-pharmacological interventions to relieve constipation.

What this paper adds:
- There is no evidence that either early mobilisation or laxatives are effective in preventing post-operative constipation.
- Both interventions should be utilised concurrently.
- Research addressing whether early mobilisation only can relieve constipation is needed.

Keywords: Exercise; mobility: opioid-induced constipation; bowel management protocols; patient education; orthopaedic; post-operative.

INTRODUCTION

Nurses have a major role in ensuring patient wellbeing through optimal post-operative recovery and ensuring that iatrogenic problems are minimised or avoided. Opioids are a potent form of analgesia used to relieve acute pain and are the most common analgesic in perioperative pain management.[1-6] Efficient post-operative pain control is essential for decreasing stress related to surgery and facilitating the full recovery of physical function.[7,8] Pain control is also important in preventing the development of chronic pain, a decreased quality of life and morbidity.[9-12] Pain management also reduces costs by promoting early discharge from hospital.[7,11] However, some common side effects reported by patients receiving opioids are gastrointestinal dysfunction such as nausea and vomiting, ileus formation and constipation.[1,13-15] Constipation is also associated with an increased cost of care and use of hospital resources. It can result in severe health consequences such as reflux, rectal pain and burning, nausea and vomiting, haemorrhoid formation, bowel obstruction and rupture.[16-21]

Constipation, in general, is a widely recognised gastrointestinal disorder that affects a patient's wellbeing, quality of life and activities of daily living.[22,23] The standard Rome III criteria defines constipation as needing to meet one of five distinct criteria: the passage of fewer than three stools per week; a feeling of inadequate evacuation or anorectal obstruction; straining during defecation; the need for manual techniques to promote defecation; or the passage of hard or lumpy stool.[24] There is no generally accepted definition of opioid-induced constipation (OIC). However, most definitions consider a recent history of opioid use, together with symptoms of constipation described by the Rome III criteria.[2,24-26] Opioid-induced constipation occurs when opioid agonists bind to the mu receptors in the enteric nervous system.[20,27,28] This, in turn, results in stimulation of fluid absorption, inhibition of water and electrolyte excretion and increased non-propulsive contractions, which cause delayed gastrointestinal transit and hard, sparse stools.[15,20,27-29] An increased occurrence of OIC is linked to increased opioid prescription, and as little as one dose of opioid can cause acute OIC in patients.[2,14,15,30] It is estimated that between 2-28% of the population experience constipation.[31-34] However, constipation occurs in 40% – 60% of post-operative orthopaedic patients.[35-38] Of patients who take opioids, between 40% to 95% will develop OIC.[1] Even with the use of laxatives, 40-64% of patients using opioids for noncancer pain will still experience OIC.[39] Due to the high prevalence of constipation, health professionals need to take appropriate measures to manage constipation or prevent it from happening in post-operative orthopaedic patients.

Early mobilisation after surgery has been shown to reduce the incidence of post-operative complications such as constipation and decrease health issues related to quality of life.[40,41] Studies have demonstrated that physical exercise in the form of walking, resistance exercises and running can speed bowel transit time.[42-45] Pharmacological (the use of laxatives) and non-pharmacological (encouraging early mobilisation, encouraging patients to increase their fibre and fluid intake) are nursing interventions that have been recommended for preventing or reducing constipation in patients post-operatively.[1,28,46] A combination of these interventions is most commonly used to treat OIC.[47-52]

There is evidence that each of these interventions in isolation is effective in reducing constipation.[40,53-55] However, varying results have been obtained from studies which examined the effects of early mobilisation and laxative use in the management of opioid-induced constipation.[56-58] Some studies have indicated a positive effect of both interventions

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on preventing or managing constipation,[1,2,37,40,41,43,44,54,59-63] while other studies have highlighted these interventions to have little or no effect in preventing or managing constipation.[64-72] It, however, appears that early mobilisation is not emphasised as much as the use of laxatives to relieve constipation.[73-75] With OIC being so prevalent in post-operative orthopaedic patients, it is imperative to understand what interventions are most effective.

METHOD

AIM

This review aimed to undertake an integrative approach to examine which nursing intervention (early mobilisation versus laxative use) is more effective in reducing constipation in post-operative orthopaedic patients who require strong analgesia.

METHODOLOGY AND REVIEW PROTOCOL

The available studies that met the inclusion and exclusion criteria exploring early mobilisation and the effects of laxatives on constipation consisted of quantitative and qualitative research. The quantitative studies were few; therefore, an integrative review approach was used to analysis the literature on the effects of the two interventions. An integrative literature review is a non-experimental method whereby researchers systematically analyse, summarise and draw conclusions about a topic through the examination, categorisation and thematic analysis of quantitative and qualitative research studies on the topic.[76-78] This methodology was used to explore a broad range of literature (observational studies, clinical experts, randomised controlled trials, qualitative research and any other form of relevant evidence) in the study area.[78,79] Online databases relevant to nursing and healthcare were searched. These included CINAHL, Cochrane, Scopus, PubMed, Medline and Google Scholar.

The search was restricted to studies published from January 2000 till June 2020.To enhance the search, alternate spellings, synonyms and related words were identified and truncation was used to allow for different word variations. Search terms of each group were combined using the Boolean operator 'OR' and 'AND' as appropriate.

Group one: Early mobilisation, exercise, movement, physical activity, physical exercise, mobilisation, walking.

Group two: Constipation, bowel movement, bowel motility, bowel transit time, gastrointestinal transit, colon contraction, frequency of defecation, stool frequency, opioid-induced constipation.

Group three: Laxatives, use of laxatives, laxative use.

Group four: Analgesia, strong analgesia, analgesics, pain relief, pain relievers, pain killers, opioids.

From the library search, few articles were identified that used laxative use and mobility in this population. Therefore, a manual search of each article's reference list was performed and the 'cited by' feature was also used to find more articles. This yielded articles that were related to this study. Both interventions (early mobilisation and laxative use) were utilised in the included studies. However, limited studies examined the combined effect of early mobilisation and laxatives in reducing constipation in post-operative orthopaedic patients. Grey literature and a book chapter were also used to explore expert opinion and evidence-based practice recommendations for these two interventions.

Titles, aims and abstracts were screened according to the inclusion and exclusion criteria (Table 1) to determine the relevance of studies for the review. The full text was downloaded and reviewed for clarification in instances where the title and abstract did not provide enough information. Articles were limited to peer-reviewed academic journals published in English or with an English version available in full text. Grey literature was added if it also met the inclusion criteria.

TABLE 1: INCLUSION AND EXCLUSION CRITERIA

Inclusion criteria	Exclusion criteria
• Quantitative, qualitative and mixed methods • Grey literature • Use of exercise or early mobilisation and laxatives in preventing or reducing constipation • Post-operative orthopaedic patients • Use of strong analgesia (opioids) • Age ≥ 18	• Known gastrointestinal disorder, bowel issues or diseases that can decrease bowel movement • Other forms of surgery other than orthopaedic surgery • Use of opioids without undergoing orthopaedic surgery • No use of opioids post-orthopaedic surgery • Studies not written in English language • Studies with subjects not related to the keywords • Age ≤ 18

PRISMA (PREFERRED REPORTING ITEMS FOR SYSTEMATIC REVIEWS AND META-ANALYSES) SCREENING

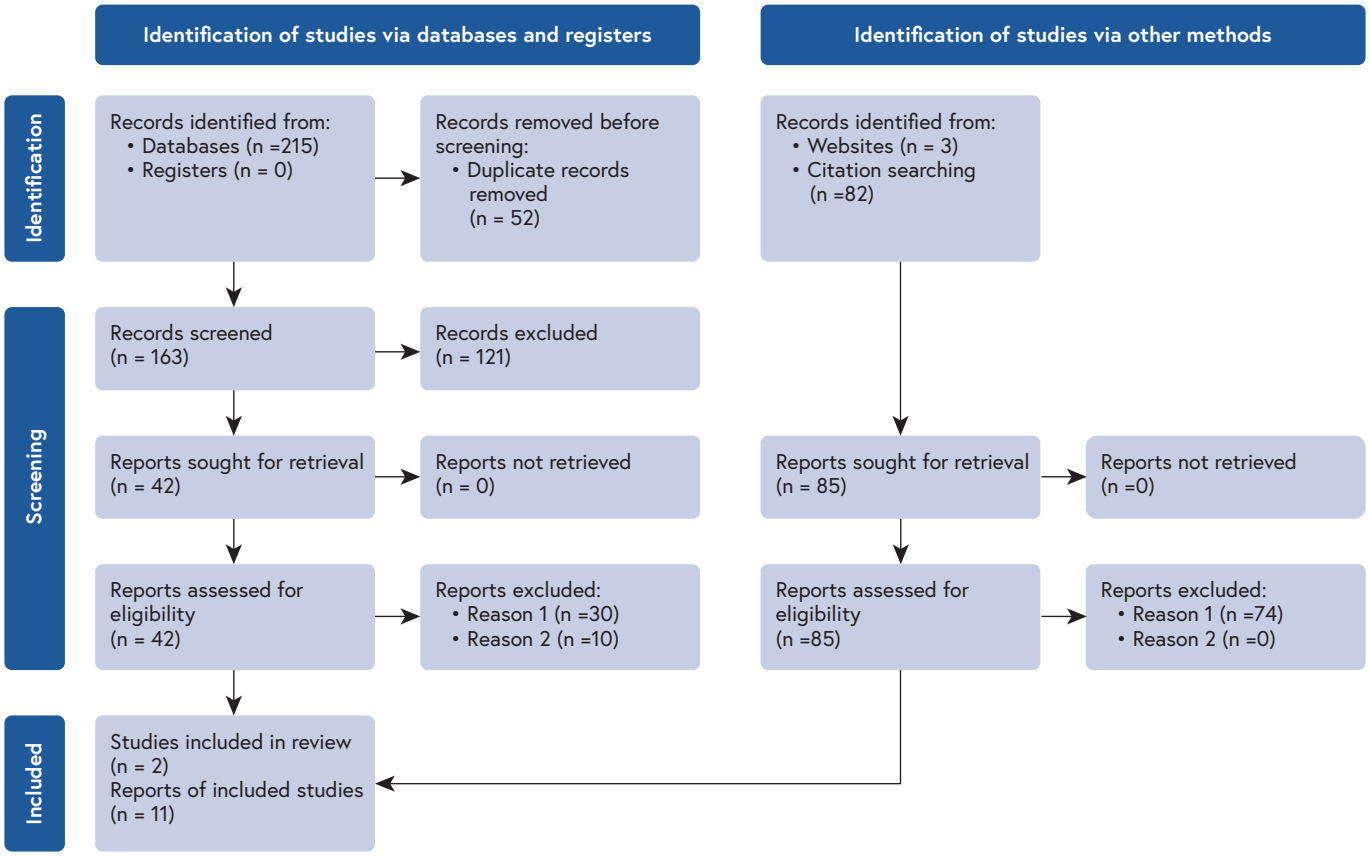
Across all six databases, the initial literature search using the keywords identified 215 potential articles located in CINAHL (= 81), Cochrane (= 14), Scopus (= 38), PubMed (= 0), Medline (= 1) and Google Scholar (=81). From manual searching and cross-referencing 82 articles and 3 grey materials were included. Duplicates were removed, which left 248 articles. The titles and abstracts of these articles were screened using the keywords, and 121 articles were excluded. The full text of 127 articles was assessed for eligibility with 114 articles excluded after the inclusion and exclusion criteria were applied. Finally, 13 studies were included in this review as illustrated in the PRISMA framework (summarised in Fig. 1). These articles met the inclusion and exclusion requirements for the selection outlined above.

QUALITY APPRAISAL

Eight articles were evaluated for methodological quality using the mixed methods appraisal tool (MMAT) version 2018.[80] One of the articles was evaluated using Joanna Briggs Institute (JBI) critical appraisal checklist for systematic reviews and research syntheses and the JBI opinion and text-critical appraisal tool was used for grey literature.[81] Each article was independently appraised by two reviewers. Observed discrepancies were discussed until an agreement was reached between both reviewers. A summary of the appraisal tool showed that of the articles all met more than 85% of the MMAT criteria (Table 2) therefore was deemed suitable. Of the grey literature 83% of the quality appraisal requirements were met (Table 3). The book chapter did not go through critical appraisal because it was from a peer-reviewed book and was deemed suitable.

DATA EXTRACTION AND DATA ANALYSIS

The studies included utilised different research designs, methodologies, interventions and outcome measures. Thus, relevant data from each study was extracted using a data collection tool consisting of study title and citation, methodology, study purpose, results, conclusion/recommendation/clinical implications and study limitations. Following the data analysis stages (data reduction, data display, data comparison, drawing of conclusion and verification) described by Whittemore and Knafl,[78] thematic analysis was performed on the data sample. An integrative review is a secondary research; therefore, ethical approval was not needed for this research.[82]



Key:
Reason 1: Does not meet the inclusion criteria
Reason 2: Written in other languages

*Consider, if feasible to do so, reporting the number of records identified from each database or register searched (rather than the total number across all databases/registers).
**If automation tools were used, indicate how many records were excluded by a human and how many were excluded by automation tools.

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reportng systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71. For more information, visit: http://www.prisma-statement.org/

FIGURE 1: PRISMA FLOW CHART

TABLE 2. SUMMARY OF ARTICLES AND MMAT ANALYSIS

Study	Title	Method	Sample	MMAT out of 7	Main findings
Madsen, Magor[53]	Comparison of two bowel treatments to prevent constipation in post-surgical orthopaedic patients	Single-blind, parallel, randomised Participants were randomised into 2 groups (standard treatment and Movicol bowel treatment)	31 Orthopaedic patients undergoing hip and knee replacement surgery	7	Post-operatively, the Movicol bowel treatment group had a bowel movement earlier than the standard treatment group. There was no significant difference in gastrointestinal symptoms in both groups There was no increase in the length of hospital stay due to constipation in both groups. Thus, it is reasonable to retain the standard treatment (commercially available laxative products). However, Movicol is cheaper, causes a faster bowel movement and is ultimately less invasive.
Ross-Adjie, Monterosso[36]	Bowel management post major joint arthroplasty: results from a randomised controlled trial	Multisite cluster randomised trial in private secondary and tertiary hospitals Participants were randomised into control (routine bowel management) and intervention (bowel management as per Murdoch protocol) group and were examined over 13 months.	331 patients (who require total hip and total knee replacement) from 7 hospitals	6	The intervention group took six days less than the control group to return to normal bowel function and were more than seven times more likely to return to normal bowel function by day five post-operatively. The administration of the Murdoch bowel protocol results in a clinically and statistically significant reduction in time taken to return to normal bowel function in post-operative total hip and total knee replacement patients.
Neighbour[83]	Improving bowel care after surgery for hip fracture	3 audits were conducted in 2010, 2011 and 2013 to evaluate bowel care for older people after hip fracture.	Cohort of 40 people aged 60 and older after surgical fixation of hip fracture	6	The initial audit showed none of the patients had a stool-type chart and recorded information was not acted on. The 3rd audit showed all patients had a record of stool type. 75% of the participants skipped doses of laxatives. Nursing staff had an improved awareness of patient bowel habits with each successive audit. By the 3rd audit, patients with hip fracture were significantly less constipated and patient experience improved greatly. Maintenance of stool chart, reviewing opioid analgesia and taking action based on results from the stool chart is important.
Sendir, Büyükyilmaz[57]	Post-operative constipation risk assessment in Turkish orthopaedic patients	Descriptive correlational study Data was collected using a patient information form and constipation risk assessment scale (CRAS) on the 2nd post-operative day	83 patients hospitalised in the orthopaedic ward	7	Gender, mobility, pharmacological agents, increased age and low educational levels showed patients were of high risk for constipation. Orthopaedic patients are at moderate risk of constipation post-operatively. Nurses should be attuned to routinely assessing the post-operative risk of orthopaedic patients as well as other similar patient populations to implement safe and effective interventions.
Yue, Liu[84]	Randomised controlled trial of a comprehensive protocol for preventing constipation following total hip arthroplasty (THA)	Prospective Randomised controlled trial Participants were randomised to receive either preoperative education about lifestyle only or the combination of education with post-operative abdominal massage and polyethylene glycol 4000 (Forlax): a form of laxative	80 total hip arthroplasty patients	7	Patients who received combination treatment showed a significantly lower rate of post-operative constipation (25%) than those who received only post-operative education (55%). They also showed a significantly lower rate of enema rescue (12.5% vs 40%). 62.5% of the combination group had their 1st defecation within 2 post-operative days as opposed to the other group at 35.9%. The 2 groups were similar in terms of constipation rate, on post-operative days 15 and 30, rate of post-operative adverse events and rate of readmission within 30 days. The combination treatment (education with post-operative abdominal massage and polyethylene glycol 4000) can relieve constipation after THA, reduce the need for enema rescue and shorten time to the first defecation without sacrificing safety. Nurses play a very important role in this protocol, especially in preoperative education and post-operative abdominal massage

TABLE 2. SUMMARY OF ARTICLES AND MMAT ANALYSIS (CONTINUED)

Study	Title	Method	Sample	MMAT out of 7	Main findings
Marciniak, Toledo[58]	Lubiprostone vs Senna in post-operative orthopaedic surgery patients with opioid-induced constipation: A double-blind, active-comparator trial	Double-blind, randomised, active comparator trial Participants were randomised into 2 groups; Lubriprostone and Senna groups.	64 adults who were admitted in inpatient rehabilitation and required opioids for analgesia after orthopaedic procedures	7	There was no significant difference in both groups in mean change from baseline to Day 7 assessment of patient assessment of constipation. Participants in both groups demonstrated improvement in symptoms of constipation and quality of life. Multiple laxative medications may be required for constipation symptoms control in this setting as participants in both groups frequently required rescue medication. It is not known if the physical activity performed by the participants as part of their rehabilitation could have influenced the improvement in constipation symptoms.
Stienen, Smoll[85]	Constipation after thoracolumbar fusion surgery	A retrospective collection of data Participants were group into two groups: constipation and non-constipation group	99 patients undergoing thoraco-lumbar fusion surgery for degenerative lumbar spine disease with instability	7	44% of participants showed constipation post-surgery and had longer surgical procedures with higher estimated blood loss. Morphine given during surgery was more in the group with constipation but was statistically insignificant. Laxative use was relatively high in both groups but more frequent in the constipation group. The rate of constipation is high after thoracolumbar surgery and is related to longer surgery time, higher intraoperative blood loss, and higher morphine doses during the post-operative period. Although laxatives were frequently administered but seemed little helpful to prevent constipation. Minimal invasive spinal surgeries were suggested which could reduce the rate of constipation as surgery time is reduced, amount and duration of administration of morphine are reduced and there is faster mobilisation which is assumed to have a positive effect on the restoration of normal bowel function.
Davies, Green[86]	The use of opioids and laxatives, and incidence of constipation, in patients requiring neck-of-femur (NOF) surgery: a pilot study	Pilot study	46 patients who required emergency surgery for fracture NOF over 8 weeks in 2007 were included	7	All patients received opioid analgesia and constipation occurred in 71.7% of the patients. Prophylactic laxatives were prescribed for 20 patients and 12 of them developed constipation. Of the 26 patients who did not receive prophylaxis, 21 developed constipation. The study demonstrates age and nutritional status are significant factors influencing the occurrence of constipation, though the prophylactic use of laxatives did not alleviate the incidence of constipation. Prescribing of opioids should also be for a short period and at the lowest effective dose. Reducing opioid use can help to prevent constipation.

TABLE 3. SUMMARY OF ARTICLES AND JBI ANALYSIS

Study	Title	Method	Sample	JBI out of 6	Main findings
Sonneborn and Bui[56]	Opioid-induced constipation management in orthopaedic and trauma patients: treatment and the potential of nurse-initiated management	The review examined OIC, management with laxatives and the potential role of nurses in improving the management of OIC	55 articles were reviewed of which 39 articles were cited in the paper Review	6	Orthopaedic and trauma patients are at high risk of developing OIC due to reduced mobility and increased opioid use to manage pain. Clinicians need to balance adequate analgesia and minimise OIC symptoms. OIC can reduce the quality of life of patients and generate a greater demand on healthcare utilisation. The use of laxatives can mitigate symptoms. Nurses can undertake an active role in the management towards reducing the likelihood of the onset of OIC.
McDermott and Sullivan[91]	Managing constipation after surgery	N/A	N/A	5	This is a review by a professional RN with a Phd. Healthline aims to cover all facets of physical and mental health openly and objectively. This section defines constipation, states that narcotics such as opioids result in constipation in the orthopaedic population. This happens in 40% of the post-operative population. Walk around as soon as possible after surgery to help to heal, prevent DVT and constipation. Plan to take a stool softener docusate or fibre laxative Metamucil after surgery.
Elliot[90]	Post-Surgery: Maximising success	N/A	N/A	5	Orthopaedic surgeon gives open access advice on post-management orthopaedic care. Constipation after orthopaedic surgery can be severe. Constipation is due to: strong opioid pain medication; therefore, it is advised to take regular laxatives from the first evening post-surgery (generally Coloxyl and senna, two tabs morning and night) Early mobilisation – bowels respond to movement. Eat fruit and vegetables especially kiwi fruit and prunes. Plenty of oral fluids- A microlax enema is recommended if no bowel movement after three days.
Frisch[92]	Opioid-induced constipation management in orthopaedic and trauma patients	N/A	N/A	5	PeerWell gives management advice to those who have chronic musculoskeletal health issues. An orthopaedic surgeon defines constipation and states orthopaedic patients on pain medications have a 40% increased risk of constipation when combined with lack of exercise. Advice: encourage fibre, prunes, get moving as soon as possible and take laxatives.

RESULTS

The goal of this review was to explore the effectiveness of mobilisation verses the effectiveness of laxatives. These were further broken into the source of information (article, book chapter and grey literature) they were retrieved from so triangulation between the three sources could ultimately be compared.

EFFECTIVENESS OF MOBILISATION

Of the articles, most of the studies (67%) promoted the effectiveness of mobilisation in relation to constipation.[36,57,58,86-88] Three studies emphasised that reliance on bedpans and lack of physical movement post-operatively were barriers to mobilisation, resulting in constipation.[57,86,87]

Two studies (22%) found a combination of pharmacological and non-pharmacological interventions were beneficial. Ross-Adjie, Monterosso noted that less constipation was reported after discharge when mobility was included daily as part of the Murdoch bowel protocol.[36] In agreeance, Yue, Liu inferred that constipation can be alleviated with non-pharmacological treatments, yet found that pharmacological treatments still tend to provide the most successful prevention of constipation.[88] One study (11%) by Marciniak, Toledo was inconclusive as it found constipation symptoms were improved in participants, but it was not clear if this was a result of the physical activity participants were involved in as part of their rehabilitation process (Table 2).[58]

Copanitsanou dissuades the use of bedpans and advocates that a daily toilet routine (e.g., every 2 hours) that promotes walking helps to mitigate constipation.[89] Remobilisation should begin immediately after surgery, once the patient is clinically stable. Copanitsanou also emphasised the importance of providing convenient access to toilets, reducing fasting times and promoting exercise/mobility by encouraging patients to sit at the edge of their beds and be engaged regularly in their everyday activities.[89]

Of the grey literature,[90-92] all sources emphasised the importance of early mobilisation after surgery, arguing that bowels respond to movement and early mobilisation and in turn will prevent post-operative constipation. Frisch described movement as a lotion to the bowel and encouraged post-operative orthopaedic patients to move within their pain comfort level.[92] It is important to increase movement any form of exercise, walking and taking the stairs all help in order to get regular bowel motions.[91,92]

EFFECTIVENESS OF LAXATIVES

From this review, it was found that the overall effectiveness of laxatives was mixed. From the articles, three studies (33%) were in favour of laxative use. Sendir, Büyükyilmaz found that laxatives safely preserve healthy bowel patterns when correctly used.[57] Laxatives such as Coloxyl and Senna and Movicol were most effective in relieving constipation, while Movicol recorded the fastest transit time for a bowel movement.[53] Marciniak, Toledo observed an improvement in bowel associated symptoms with the use of Senna and Lubiprostone they stated that the efficacy of laxatives in managing OIC is only 50%.[58]

Two studies (22%) advocated for a combination therapy approach with techniques such as post-operative massage, preoperative education and polyethylene glycol, and of the Murdoch bowel protocol (which included the use of Movicol and mobility) to be significant in preventing and relieving constipation.[36,88]

Although the above-mentioned studies found laxatives effective in relieving constipation symptoms when used alone or in combination with other interventions. The majority of studies (44%) had contrary results concluding that prophylactic use of laxatives does not reduce the incidence of constipation and that the true benefit of laxative administration for post-operative constipation was not remarkable.[85-86] The conclusion being that constipation as a result of OIC can be treated with laxatives, but symptoms will persist with continued opioid use, because opioids are the root cause of OIC.[56] Although laxatives were administered regularly to patients, it did not appear to relieve constipation because post-operative orthopaedic patients required multiple types of laxatives in multiple doses to manage constipation.[58,85,86] Sonneborn and Bui mentioned that inadequate evidence exists to direct health professionals on the most efficient laxative routine for the management of OIC.[56] Balancing sufficient analgesia and reducing OIC symptoms is a difficult challenge for clinicians.[56]

A solution would be that opioids and laxatives are taken together while opioids should be prescribed at the lowest effective dose for a short period and their use should be reviewed frequently to prevent constipation.[56,58,86,87] Diarrhoea is a common adverse effect of laxative use which should not be ignored.[86] Other adverse effects of opioid and laxative use were increased gastrointestinal symptoms such as abdominal bloating, nausea, discomfort and flatulence and these were reported more in the Movicol group even though it was not significant.[53]

Copanitsanou in an expert opinion piece concurred with the research findings presented in the empirical research articles and stated that the effectiveness of various laxatives does not vary greatly, and overuse of laxatives is a problem that should not be ignored.[89] Treatment with laxatives should usually be tailored to individual needs.[89] The grey literature encouraged the use of laxatives in post-operative orthopaedic patients and stated that laxatives such as Coloxyl and Senna; fibre laxatives like Psyllium; and stool softeners (Docusate) can help to alleviate constipation, while in cases of extreme constipation, suppositories, stimulant laxatives or enemas may be needed to induce bowel movements.[90-92] The Grey literature highlighted that laxatives should be taken from the first post-operative evening as it is better to have diarrhoea than to be constipated and the use of opioids should also be minimised.[90,91] The book chapter and grey literature mentioned diarrhoea as a common side-effect that the use of too many laxatives can induce.

Finally, this review separated the three forms of literature retrieved for triangulation and found that the grey literature and book chapter offer advice in favour of both treatment approaches and early mobilisation is liberally encouraged. Most of the articles promoted mobilisation; however, the exact benefit of this intervention was unsubstantiated from the articles reviewed.

DISCUSSION

This integrative review set out to explore which intervention, early mobilisation or laxative use is more effective in reducing constipation in post-operative orthopaedic patients who require strong analgesia. The review identified that although early mobility was encouraged in all the selected studies, grey literature and the book chapter, scant evidence exists as to the specific impact mobility provides as an isolated intervention for relieving constipation in this population. Rather, the merits of exercise are mentioned, in the prevention of all post-operative complications not only in preventing constipation.[43,44,54,59-62] Mobilisation is generally encouraged in conjunction with other interventions but is not solely advocated.[49,51,52] Only two studies stated that mobilisation possibly contributed to the participant's outcome.[36,86] Other studies could not distinguish if mobility was more important than laxatives.[53,56-58,85,87,88]

The significance that constipation in post-operative orthopaedic patients can be relieved with the use of early mobilisation was apparent in this review and correlates with the findings of other studies.[40,41] With the recommendation that patients with constipation need to increase their level of activity because aerobic exercise is necessary for constipation

management.[93-95] In contrast, immobility and bedrest cause constipation, thus emphasising the importance of discouraging bedrest and encouraging mobilisation as soon as possible.[96] This review found that the form of mobilisation is important because patients who had mobility issues and those who were mobilised in bed with the assistance of a device and a nurse were more prone to constipation.[57,86] It is important to mobilise patients out of bed, and the process of early mobilisation should progress to sitting out of bed, standing, walking and carrying out activities of daily living.[40,97,98] This literature review also identified that reduced mobility, encouraging bedrest and the use of bedpans increase the risk of constipation in post-operative orthopaedic patients.[57,86,87]

Mobility as an intervention is prevalent in the grey literature and book chapter, so this education is continually a message that is encouraged, even though the exact impact this advice has, is unknown. Mobility post-operatively is important advice; however, it is perhaps less effective when opioids are involved. It appears that early mobilisation is not emphasised as much as the use of laxatives to relieve constipation.[73-75] Rather, it is encouraged in conjunction with other modalities and interventions.

Laxatives were also explored in this review as to their effectiveness in relieving constipation in orthopaedic patients on opioids. The peer-reviewed articles in this review recorded contrasting results.[36,53,56-58,85,86,88] It was found that multiple doses of laxatives are required for constipation to be effectively managed in post-operative orthopaedic patients, which suggests that laxatives may not be as effective in managing constipation post-operatively in orthopaedic patients.[56,58,85,86] This concurs with literature that found the efficacy of laxatives in the management of OIC has been observed to be limited.[1,2,15,71] Evidence indicates that the problem of opioid induced constipation does not resolve over time.[56] This is possibly because laxatives have a nonspecific action and do not address the root cause of OIC.[1,56,72] Different forms of laxatives such as stool softeners, stimulants and bulk laxatives with varying modes of action exist. This is probably why multiple laxatives are required in post-operative orthopaedic patients to manage constipation.[1,2,37,58,63,86] However, insufficient evidence exists on the most efficient laxative routine for the management of OIC management.[56] Providing medication that addresses the root cause of OIC could be a more effective way of dealing with this problem. Examples of medications that deal with the root cause of OIC include methylnaltrexone bromide and oxycodone or naloxone, which are formulations containing opioid antagonists that act by blocking the effect of opioids on the gut.[1] However, some authors have found enemas, stimulants, or stool softeners to be effective.[1,2,37,63] Thus, it is recommended to use laxatives simultaneously with opioids, and when it is not effective in relieving OIC, medications like methylnaltrexone bromide and oxycodone or naloxone can be introduced.[1]

Some researchers recommend a combination approach. For example, Stienen, Smoll emphasised the need for a standardised protocol for pre-and post-operative administration of laxatives.[85] Bowel management protocols that clearly outline the sequence of administration of laxatives (for example Murdoch and Movicol protocol) have been shown in this review to be effective in the management of constipation. However, for the desired effect to be achieved, nurses need to adhere to the protocol as lack of adherence leads to constipation and the need for enemas.[53] Although the Murdoch bowel protocol utilised by Ross-Adjie, Monterosso had efficacy in this population it does include a combination of daily mobilisation, use of laxatives, increased intake of dietary fibre and fluid and adjustment of opioid doses as needed.[36] Ross-Adjie, Monterosso's study had limitations such as differences in the usual bowel regimen received by the control group and lack of clear definition of the usual bowel regimen.[36] These factors could have affected the overall results. Russell, Barnhart also found bowel management protocols were effective in managing constipation,[99] although the overuse of laxatives should not be ignored.[89] With the use of multiple doses of laxatives, patients are more prone to the adverse effects of laxatives, which probably causes them to decline the use of laxatives.[100] The use of laxatives causes diarrhoea, nausea, abdominal pain, vomiting, sudden urge to defecate, bloating/fullness, and gas which negatively impact the quality of life of patients.[72,100-103]

This review highlighted many factors besides opioids and the use of bedpans that need to be considered when identifying those at risk for post-operative constipation. For example, it is important to identify risk factors such as age (older) and gender (female) and presenting conditions such as diabetes mellitus.[57,86,88] Nutritional status or altered diet was a risk factor and in an inadequate fluid and fibre intake, such as those who experience preoperative fasting or the eating of hospital meals that are not based on individual requirements.[36,53,57,86,88,90,91] Consideration is needed of psychological issues such as reduced privacy, a change of environment, and extended hospitalisation, which can also contribute to constipation.[36,87,89] Not only is awareness needed, but nurses need to record and routinely monitor the status of their patients in relation to their bowel movements. Documentation is required so that bowel movements can be easily evaluated as to the effectiveness of the treatment given. Validated outcomes measures that can be used in assessing the effectiveness of the treatment given to treat OIC include a bowel function diary, bowel function index (BFI), Bristol Stool Form Scale (BSFS), and Patient Assessment of Constipation Quality of Life (PAC-QOL).[25,104-106] It is also important for nurses to regularly ask patients about their bowel movements and be actively interested in identifying a response to treatment.

All the sources used in this integrative review noted the importance of educating patients both pre-and post-surgery on the need for early mobilisation after surgery. Nurses need to be firm in encouraging patients to mobilise and get out of bed because of the poor health outcomes that have been related to immobility, including constipation. Nurses ideally educate patients on the importance of exercise and mobilisation, recovery and long-term outcomes.[8,9] Patients should also receive education about pharmacological interventions that are available.[8,7] Nurses are positioned to ensure adequate information is provided to patients to make informed decisions on the required prescribed laxatives.[8,7, 88] The patient's motivation to take laxatives is as important as the prescription of laxatives.[8,7] Sanguineti,Wild emphasised the need for nurses to encourage early mobilisation because it is associated with reduced post-operative complications and maximisation of functional levels.[107] Other interventions were also mentioned in this review in preventing and managing constipation, such as increasing fluid intake, eating food rich in fibre, and forming a normal toileting pattern, all of which correspond with other studies.[22,103,106]

LIMITATIONS

One of the major limitations of this review is the lack of literature available on the effectiveness of early mobilisation in preventing or relieving constipation in post-operative orthopaedic patients. No primary evidence on the effectiveness of early mobilisation in preventing or relieving constipation in post-operative orthopaedic patients was found, nor the exact formula of how much mobility is needed to be effective. The limited literature and evidence reveal the lack of evidence-based attention given to this issue. Differences in the definition of constipation between patients and health professionals could have also affected the results in the articles because some of the studies required self-report of constipation from patients. Patients defined constipation by focusing on stool consistency or straining during defecation, while clinicians described constipation based on the Rome III criteria.[1,24] Another limitation is that many of the studies included in this review had small sample sizes.

Further limitations may be that the search strategy may have resulted in pertinent material being excluded or missed during the search performed. Complexity exists in combining diverse methodologies, contributing to a lack of rigour, inaccuracy, and bias. However, quality appraisal was conducted all sources used in this review.

CONCLUSION

Nurses have an important role to play in the assessment and management of orthopaedic patients in relation to preventing constipation post-operatively. The current evidence gained from this review shows that both interventions should be utilised concurrently. Therefore, early mobilisation has its benefits and should be encouraged in post-operative patients; however, more research is required as to the exact amount required to promote bowel function. To relieve OIC, laxatives should be administered together with opioids, as some studies have found them effective. Constipation is a significant issue faced by post-operative orthopaedic patients, primarily when opioids are being used. Therefore, health professionals should be reminded of this ongoing problem and implement current effective measures to prevent and manage constipation in this population and can be applied to all post-operative populations that receive opioids.

SUGGESTIONS FOR FURTHER STUDIES

This integrated review has highlighted that further research is required to examine the effectiveness of early mobilisation only in relieving constipation in post-operative orthopaedic patients who require strong analgesia. Setting up a randomised controlled study comparing increased exercise and treatment as usual in this population could be beneficial. Qualitative studies that look at the attitudes and knowledge of nurses working on orthopaedic wards would also be beneficial.

CLINICAL IMPLICATIONS

The recommendations for practice drawn from this integrative review include the following three steps with associated interventions.

1. ASSESSMENT

- Evaluating the patient for risk factors.
- Baseline constipation assessment tailored to the individual, history of constipation, current hydration status, last bowel movement, the usual pattern of defecation and exercise.
- Early identification of constipation in post-operative orthopaedic patients.

2. TREATMENT

- Prescribing opioids at the lowest effective dose and daily review of medications (op ioids and laxatives) administered to patients.
- Administration of opioids and laxatives concurrently.
- Encouraging patients to get out of bed as soon as possible after surgery-no bedpans.
- Education advising early mobilisation, increase in fluid and fibre intake.
- The utilisation of bowel management protocols and adherence to the protocol.

3. EVALUATION

- Accurate documentation of bowel patterns of patients to identify patients at risk of constipation and to monitor the effectiveness of treatment provided.

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