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Pain Management Techniques in Patients with Deep Vein Thrombosis and Lower Limb Amputations: A Cross-Sectional Study

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Abstract

Objective: The objective of the study is to assess the role of pharmaceutical and non-pharmacological pain management techniques in patients with deep vein thrombosis and lower limb amputation.

Methodology: The study used a cross sectional approach which included 270 individuals undertaking the survey with 170 male participants, 89 female participants and 11 participants who prefer not to say. More specifically, the study was aimed at exploring the efficacy of graduated compression stockings, Inferior Vena Cava (IVC) filters, opioids, and non-steroidal anti-inflammatory drugs (NSAIDs). The Numeric Pain Rating Scale (NPRS 0-10) was used to measure patient-reported outcomes, with 0 being normal and 10 being severe.

Results: The effectiveness of each of the techniques was analyzed using SPSS statistical software. Pharmaceutical pain management techniques included morphine and celecoxib for the lowest pain levels, hydrocodone and warfarin for the highest. Non-pharmaceutical approaches included graduated compression stockings for the most effective pain management. The study found a significant difference between pharmaceutical and non-pharmaceutical treatments for deep vein thrombosis (DVT) with a value of 4.2000 compared to the pharmaceutical treatment 3.5704, with a mean difference of -0.62963. The t-test yielded a t-value of -2.876 and a p-value of 0.012, indicating that non-pharmaceutical treatments are more effective than pharmaceutical treatments.

Conclusion: The study concludes that non-pharmaceutical pain management techniques such as graduated compression stockings are more effective in reducing pain in patients with deep vein thrombosis and lower limb amputations than pharmaceutical options.

Keywords: Pain Management, Deep Vein Thrombosis, Pharmaceutical, Non-pharmaceutical, Lower Limb Amputation.

1. Introduction

Deep vein thrombosis (DVT) is known as a severe condition which arises when blood clots develop in deep veins usually in the lower limbs following an amputation of the limb (KHALED et al., 2023). It is one of the most frequent postoperative events after such surgeries, with the prevalence being between 45-84% (Shah, 2017). On the other hand, the lower limb amputations are the more serious surgeries that can be required due to several conditions, such as peripheral artery disease, trauma, or diabetes complications (Barnes et al., 2020). Surgery that results to amputation though is considered lifesaving, brings in other complications.

Managing pain in patients admitted in the hospital for amputation involves not only the postoperative pain but also the phantom limb pain which may occur even after several years of the amputation of the limbs. Lower limb amputees are at a higher risk for DVT because of reasons such as prolonged immobility, injury, and cancer (Pisulkar et al., 2023). DVT results in severe pain and inflammation in the injured area, especially in a case of an amputation where the individual has a residual limb. Successful management of this type of pain is very important to the rehabilitation process of these patients.

There are several ways in managing the pain associated with DVT in lower limb amputations such as use of anticoagulants, application of compression and early mobilization. Anticoagulants help to avoid clot formation and growth, compression decreases edema and pain, and the early use of the extremities stimulates venous blood circulation, preventing the development of DVT (Thaler et al., 2015; Wolberg et al., 2015). However, there is limited information available about the efficacy and practicality of these methods in lower limb amputees with DVT. This

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study aims to evaluate the incidence of DVT in lower limb amputees and assess common pain management practices. The findings will contribute to current knowledge on pain alleviation in this patient population and inform the development of more research-supported interventional pain management strategies.

Pharmaceutical and non-pharmaceutical management of pain related to DVT as well as lower limb amputation includes the use of analgesics. Medications include pain-relieving drugs such as NSAIDs and opioids from pharmaceutical management while non-pharmaceutical methods such as elevation, compression therapy, and physical therapy relieve discomfort and enhance circulation (Azam et al., 2016; Azirar et al., 2019). In lower limb amputations post-operative pain control involves the use of opioids, NSAIDs and local anesthetic. Non-pharmacological interventions such a prosthetic fitting, counseling, and physiotherapy are vital in pain control and to assist with rehabilitation (Trulsson Schouenborg et al., 2021). Nevertheless, empirical studies centered on the efficacy of integrated pharmaceutical and non-pharmaceutical approaches are scarce, which limits the enhancement of overall chronic pain specialist treatment models for such conditions.

The management of pain is of essence particularly in patients diagnosed with DVT and those with lower limb amputation. It helps to decrease pain, increase the level of functioning, and increase well-being. In lower limb amputations, it assists in the control of postoperative pain such as phantom limb pain which influences the recovery process and prosthesis use. Consequently, the practical implication of this study is to provide an understanding that can be used to improve practice in clinical settings. In this way, by defining and comparing methods of pain management, it may give additions to create appropriate approaches, which in turn can lead to the enhance of patients and enhancement of their quality of life.

The purpose of this study is to establish the usage of various treatments involving pain management in patients with DVT and lower limb amputations, such as medication and other methods like physiotherapy and counseling. It also evaluates the extent to which these techniques help to control pain, appraises the level of suffering, changes in functional status, and satisfaction with the pain control modalities used.

Research Questions:
How effective are pharmaceutical versus non-pharmaceutical pain management techniques in alleviating pain in patients with deep vein thrombosis (DVT)?
Which pain management strategies are more effective for improving outcomes in patients who have undergone lower limb amputation?

H1: Non-pharmaceutical pain management techniques can provide greater pain relief in comparison to pharmaceutical pain management techniques in patients with deep vein thrombosis undergoing lower limb amputation.

H2: Pharmaceutical pain management techniques can demonstrate a higher level of patient-reported side effects compared to non-pharmaceutical techniques.

2. Literature Review:

2.1 Pharmaceutical Pain Management Techniques

Pain management for DVT and lower limb amputations uses a variety of drugs that are targeted at keeping the patient comfortable. The standard pharmacological management for DVT consists of NSAIDs as well as opioids. Non-steroidal anti-inflammatory drugs, including aspirin, celecoxib and naproxen, are usually administered to relieve mild to moderate pain and inflammation (Fokunang et al., 2018; Williams, 2018). They are helpful in relieving pain from the inflammatory process of DVT, however, may be inadequate in the management of severe pain. In such circumstances, morphine or oxycodone that are potent analgesics can be used but their use is usually restricted due to side effects and risk of dependency (Hooman Khademi et al., 2016).

Lower limb amputees especially complain of pain management because it is a complex procedure arising from post-surgical and phantom limb pain. Postoperative patients control moderate to severe pain through opioids such as fentanyl and hydrocodone as they help in controlling the pain significantly (Aroke et al., 2020). They may also be used alongside opioids in order to manage the inflammatory pain. Furthermore, nerve blocks or epidural analgesia that involve the use of local anesthetic like lidocaine can be given to reduce pain (Prasad et al., 2020). Pharmaceutical management also involves other therapies like antidepressants and anticonvulsants which has been

effective in treating neuropathic pain that is common in DVT and amputation patients. For example, gabapentin and amitriptyline are used to treat neuropathic pain and phantom limb pain, respectively (Zilliox, 2017). Although these medicines are effective, their use is associated with certain risks, including side effects and interactions with other therapies. Although medications play a significant role in controlling pain, it is value to combine them with non-pharmacological methods.

2.2 Non-pharmaceutical Pain Management Techniques

Non-pharmaceutical pain management approaches are crucial in the overall management of pain in patients with deep vein thrombosis (DVT) and lower limb amputations. These techniques are frequently used with pharmaceutical treatments for improved pain relief and overall patient results.

Non-pharmacologic methods used for DVT are physical methods such as elevation of the limbs, use of stockings and exercise. The use of an elevated limb decreases the pressure experienced by the veins and thus the swelling, to potentially lessen the pain (Orhurhu et al., 2021). Compression stockings or garments are short stretch sock that exert varying pressure on the leg to promote proper blood circulation and minimize the incidence of swelling (Dissemond et al., 2016). Moreover, the patient has to engage in physical activities for example, gentle exercise and stretches could be helpful to reduce pain and circulation. All these not only relieve pain, but also prevent the development of new complications, for example, chronic venous insufficiency.

With regards to pain control in lower limb amputation surgeries, non-pharmacological interventions play a central role in dealing with short term postoperative pain and phantom limb pain. In the category of rehabilitation, physical therapy remains essential when it comes to mobilization and the use of residual limbs and prosthetics. It consists of exercises that concern the flexibility, strength, and usage of few or all muscles in the body. The specific approach to treatment aimed to address the perception of pain and the overall psychological outcome of the condition with chronic pain can include the use of CBT in particular. Other approaches like the mirror therapy has also been used to reduce phantom limb pain since they help to recalibrate the pain signals in the brain (Costa, 2019). Also, various other treatments such as acupuncture and massage therapy can also help in managing chronic pains while improving the quality of life of patient (Bauer et al., 2016).

3. Methodology:

3.1 Study Design

This study has utilized a cross-sectional approach to assess and compare pain management practices in patients having DVT and those who have undergone lower limb amputations. A cross-sectional study design is suitable for this research since it focuses on a specific time and captures samples of effectiveness as well as practices of pain management. This design enables the evaluation of different approaches to pain management and results in a broader, more accurate picture of current practice.

The study compares various pain management techniques from a large patient population at a specific time point, aiming to establish the relationship between pain relief and improved quality of life. It helps identify common practices and areas for improvement in pain management approaches, preparing for future research. The data collection process is time-efficient, making it a useful tool for assessing pain management practices. The findings will be beneficial in estimating the efficacy of pharmaceutical and non-pharmaceutical pain management measures.

3.2 Participants

3.2.1 Criteria for Inclusion/Exclusion

The sample comprises of 270 patients, of which 170 were male, 89 were female, and 11 choose not to disclose their gender. The inclusion criteria includes the patient with DVT or the patient who has undergone lower limb amputation within the last six months. Participants selected for this study were 18 to 45 years and above to give informed consent about the study. Patients who cannot provide written informed consent due to cognitive impairment, have conditions unrelated to DVT or amputation that could interfere with the study outcome, developing research related acute pain requiring active medical intervention were excluded.

3.3 Recruitment Process

Patients has been recruited from hospitals and clinics that were treated from DVT and lower limb amputation cases. Recruitment has entailed coordination with healthcare practitioners who will nominate the people that meet the inclusion criteria. Advertising pamphlets and informational brochures were placed in outpatient clinics, centers of medical rehabilitation, surgical wards, etc. Further, healthcare providers were reached out to recommend other patients that can participate in the study. All participants has given their informed consent

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to participate in the study through signing consent forms which has stated the purpose of the study, activity to be undertaken and possible risks of participation.
Recruitment plan includes the efforts to ensure that patients are diverse in terms of demographics and their experiences with pain management. This approach also aid in gathering a full understanding of the efficacy of numerous pain management strategies in diversified patients.

3.4 Data Collection

3.4.1 Pharmaceutical Pain Management Techniques

For data collection, the types of medicine taken by the patients for the purpose of alleviating pain has been recorded. These included morphine, oxycodone and hydrocodone opioids which are largely used to treat severe pain. Aspirin, celecoxib and naproxen has also been reported under nonsteroidal anti-inflammatory drugs (NSAIDs) which are used to treat moderate pain and inflammation. Also, the classes of warfarin has been observed for their uses in treating DVT despite the fact that they are not mainly analgesics. Other medicines such as rivaroxaban and enoxaparin were also found to be treating pain in DVT patients.

3.4.2 Non-Pharmaceutical Pain Management Techniques

The study has gathered information on other non-pharmacological methods of alleviation of pain. These include exercises and manual physical therapy which are engagements activities typically used to lessen pain and enhance functionality. The treatments that the most patient were able to alleviate pain were Graduated Compression Stockings, IVC filters, and TENS has been recorded.

3.5 Assessment Tools

Pain intensity has been measured using the Numerical Rating Scale (NRS) for the participants to rate their pain. The rating scale is developed on the intensity of the pain (0 is normal and 10 is severe) (Chauny et al., 2016). These tools aim to provide a numerical value of the intensity of the pain which helps in comparing the effects of various approaches to pain management.

3.6 Data Analysis

Data analysis has been conducted using the statistical analysis tool (SPSS) in order to compare the efficiency of pharmaceutical and non-pharmaceutical methods of pain management. The demographic data of the participants and the methods of managing pains has been described statistically. Descriptive statistics power such as arithmetic mean and standard deviation has been used in this study while inferential statistics such as t-tests has been used by comparing between the pharmaceutical and non-pharmaceutical pain management techniques to measure pain intensity.
Specifically, the analysis was aimed to compare the effectiveness and outcomes of the different pain management strategies, in relation to the patients' pain experiences. This can assist in identifying the appropriate interventions that can be used to alleviate the pain in patients diagnosed with DVT and patients who have undergone lower limb amputations. The study results can help compare the efficiency of using various forms and approaches in pain management and advance knowledge of pain management practices as a whole.

4. Results:

Figure 1 shows the pie chart illustrating the gender distribution of the 270 participants: 170 (63%) male, 89 (33%) female, and 11 (4.1%) prefer not to disclose their gender. The mean value of the primary variable is 1.4111, with a standard deviation of 0.56990. The distribution is skewed to the right, suggesting a concentration of lower values.

4.1 Pharmaceutical Pain Management Techniques

Figure 2 data shows the frequency of pain levels reported for three opioid medications (morphine, oxycodone, and hydrocodone) across different pain scales from 0 to 10. For each medication, varying numbers of participants report different pain levels, with a general trend indicating that higher pain levels are more frequently associated with hydrocodone (4-9). For oxycodone the pain values were ranging from 2-5 which shows a mild to moderate pain relief. Morphine tends to show a decrease in pain levels from 0-3, suggesting variability in its effectiveness among patients.

Figure 3 data shows the use of three NSAIDs in pain management. As reported from the patient, naproxen generally showed the highest pain scores, with most values ranging from 4-7 on a scale of a 1 to 10. This suggests Naproxen was least effective at reducing pain. Aspirin scores were mostly in the 2-3 range, indicating it provided some pain relief but not as much as the other drugs. Celecoxib had the lowest scores, mostly in the 1-2 range, suggesting it was the most effective at reducing pain.

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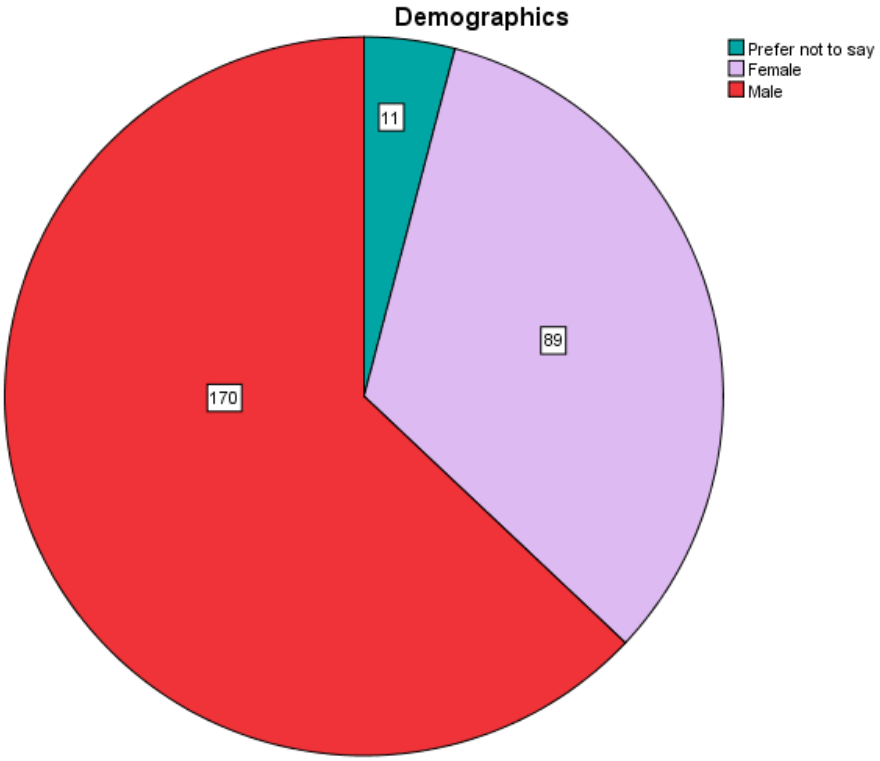

Figure 1: Gender Distribution

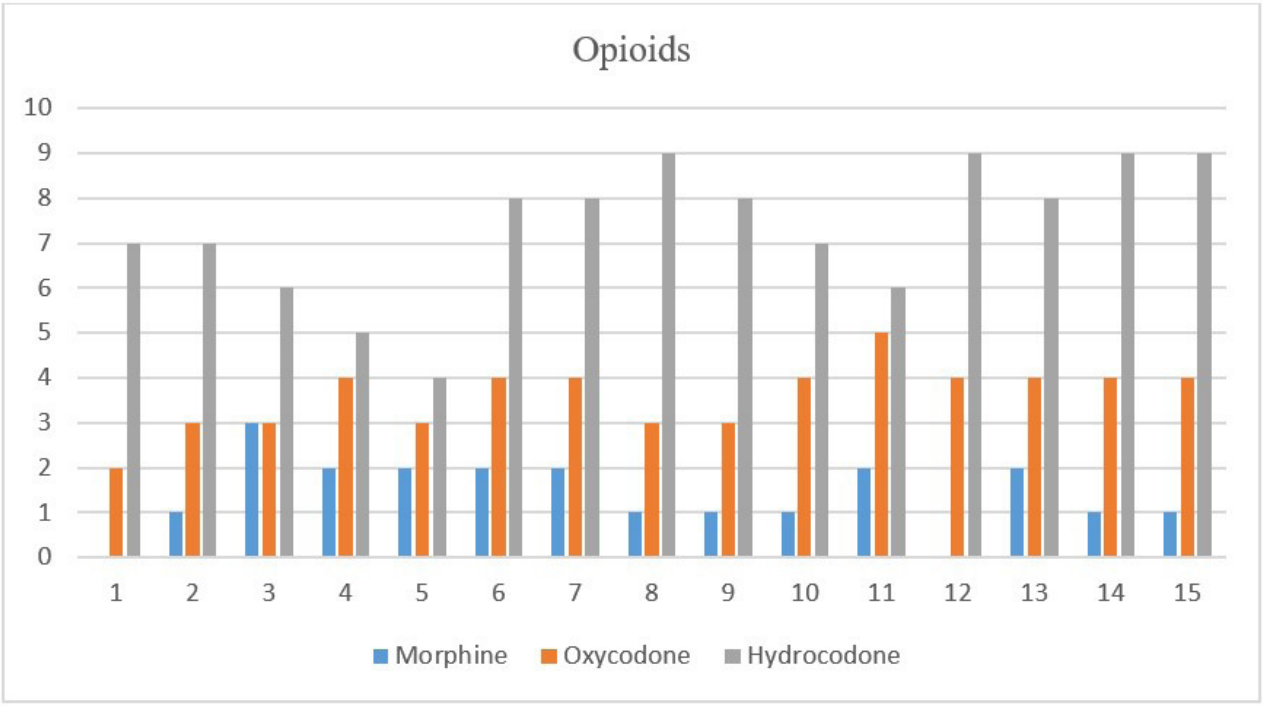

Figure 2: Pharmaceutical Pain Management Techniques - Opioids

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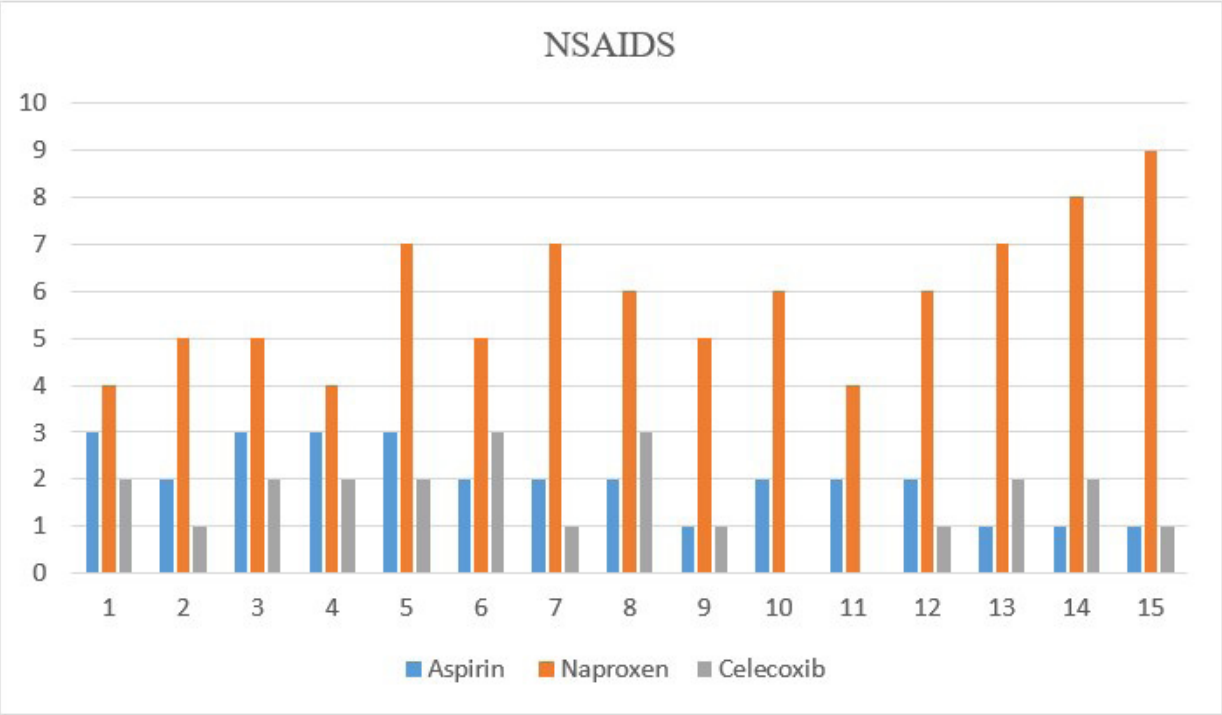

Figure 3: Pharmaceutical Pain Management Techniques - NSAIDs

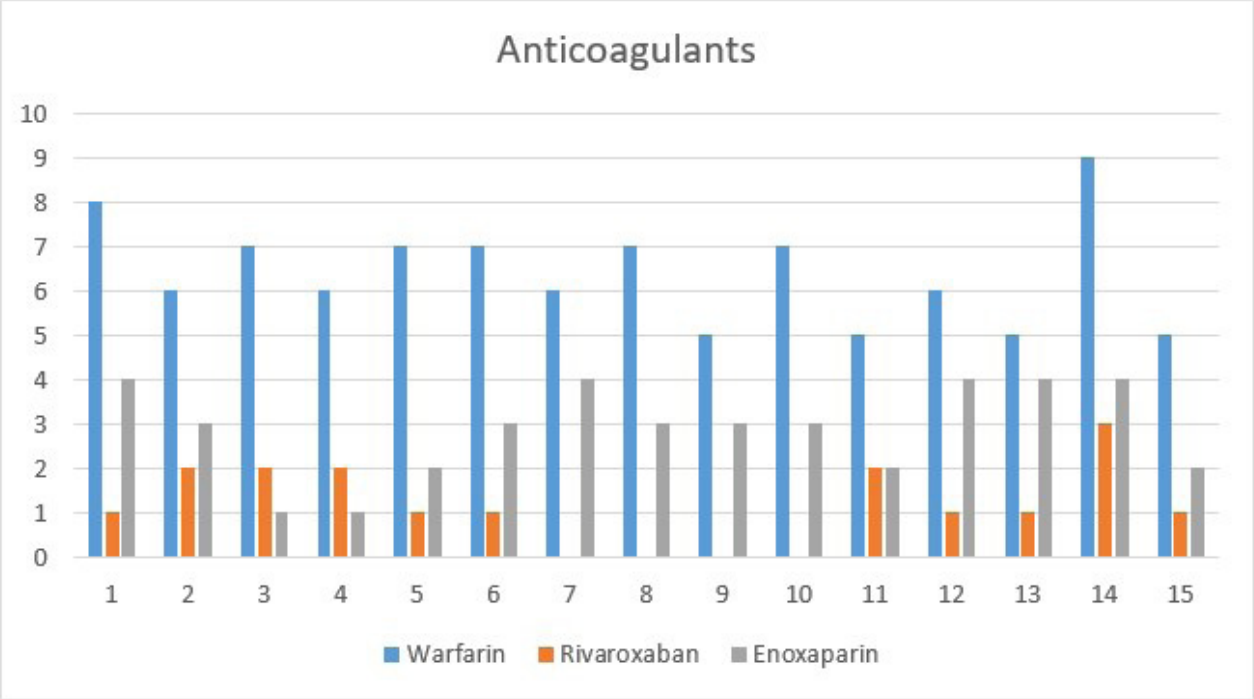

Figure 4: Pharmaceutical Pain Management Techniques - Anticoagulants

Figure 4 shows the data obtained from the patients that were prescribed anticoagulants for pain management. As per the data, warfarin consistently showed the highest pain level scores, ranging from 5-9, suggesting it was the least effective at reducing pain. Rivaroxaban mostly had lower scores of 0-2, implying it was most effective. Enoxaparin scores ranged from 1-4, indicating it provided pain relief but was not as effective as rivaroxaban. Hence, rivaroxaban generally performed the best of the three anticoagulants at reducing reported pain levels, followed by enoxaparin, with warfarin the least effective.

4.2 Non-Pharmaceutical Pain Management Techniques

Figure 5 data compares the effectiveness of three non-pharmaceutical pain management techniques to pain relief: graduated compression stockings, IVC filters, and TENS devices. TENS consistently showed the highest pain scores ranging from 5-10, suggesting it provided the least effective pain relief. IVC filters mostly had lower scores from 1-6, implying greater effectiveness. Graduated compression stockings were most effective with mainly 0-3 scores. Hence, graduated compression stockings generally performed the best at reducing reported pain levels based on the scale of 1-10, followed by IVC filters, with TENS devices as the least effective non-pharmacological approach in this group.

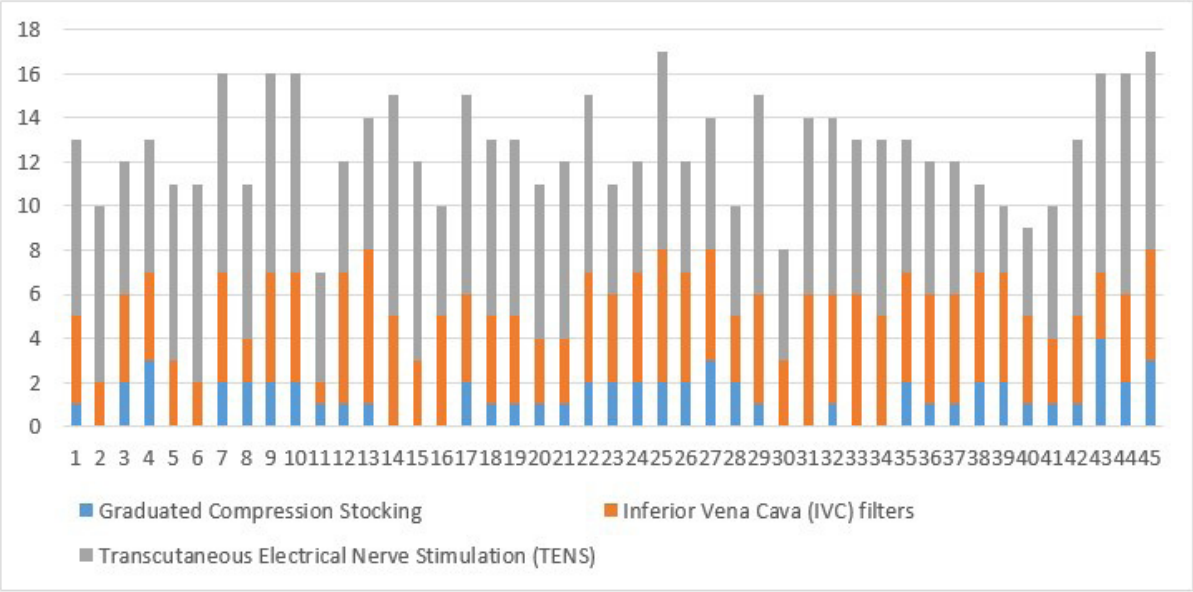

Figure 5: Non-pharmaceutical Pain Management Techniques

4.3 One-Sample T-Tests - Pharmaceutical Pain Management Techniques

Table 1 shows the one-sample t-tests for pharmaceutical pain management techniques which reveal significant differences from a test value of 0 for all medications, based on a pain scale where higher values indicate more pain. Hydrocodone (mean = 7.33, $t = 18.407$, $p < 0.001$) and Warfarin (mean = 6.40, $t = 20.949$, $p < 0.001$) are associated with the highest pain levels. Naproxen (mean = 5.87, $t = 15.092$, $p < 0.001$) and Oxycodone (mean = 3.60, $t = 18.924$, $p < 0.001$) also show significant pain. Morphine (mean = 1.40, $t = 6.548$, $p < 0.001$) and Celecoxib (mean = 1.53, $t = 6.487$, $p < 0.001$) are linked to the lowest pain levels, indicating better pain relief.

4.4 One-Sample T-Tests - Non-pharmaceutical Pain Management Techniques

Table 2 shows the one-sample t-tests for non-pharmaceutical pain management techniques which demonstrates significant differences from a test value of 0 for all treatments based on a pain scale. Transcutaneous Electrical Nerve Stimulation (TENS) has the highest mean score (7.07, $t = 26.314$, $p < 0.001$), indicating the highest pain levels. Inferior Vena Cava (IVC) filters show a mean score of 4.27 ($t = 22.889$, $p < 0.001$), suggesting moderate pain. Graduated Compression Stockings have the lowest mean score (1.33, $t = 9.155$, $p < 0.001$), reflecting the lowest

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Table 1: One-Sample T-test – Pharmaceutical Pain Management Techniques

One-Sample Statistics				
	N	**Mean**	**Std. Deviation**	**Std. Error Mean**
Morphine	15	1.40	.828	.214
Oxycodone	15	3.60	.737	.190
Hydrocodone	15	7.33	1.543	.398
Aspirin	15	2.00	.756	.195
Naproxen	15	5.87	1.506	.389
Celecoxib	15	1.53	.915	.236
Warfarin	15	6.40	1.183	.306
Rivaroxaban	15	1.13	.915	.236
Enoxaparin	15	2.87	1.060	.274

One-Sample Test						
Test Value = 0						
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Morphine	6.548	14	.000	1.400	.94	1.86
Oxycodone	18.924	14	.000	3.600	3.19	4.01
Hydrocodone	18.407	14	.000	7.333	6.48	8.19
Aspirin	10.247	14	.000	2.000	1.58	2.42
Naproxen	15.092	14	.000	5.867	5.03	6.70
Celecoxib	6.487	14	.000	1.533	1.03	2.04
Warfarin	20.949	14	.000	6.400	5.74	7.06
Rivaroxaban	4.795	14	.000	1.133	.63	1.64
Enoxaparin	10.473	14	.000	2.867	2.28	3.45

pain levels. This suggests that Graduated Compression Stockings are associated with the least pain, while TENS results in the most pain.

Table 2: One-Sample T-test – Non - pharmaceutical Pain Management Techniques

One-Sample Statistics				
	N	**Mean**	**Std. Deviation**	**Std. Error Mean**
Graduated Compression Stocking	45	1.33	.977	.146
Inferior Vena Cava (IVC) filters	45	4.27	1.250	.186
Transcutaneous Electrical Nerve Stimulation (TENS)	45	7.07	1.802	.269

4.5 Paired Samples T-test

Table 3 shows the results of paired samples t-test which indicates a significant difference between pharmaceutical and non-pharmaceutical treatments for deep vein thrombosis (DVT) and lower limb amputation. The non-pharmaceutical treatment had a higher mean score (4.2000) compared to the pharmaceutical treatment (3.5704), with a mean difference of -0.62963. The t-test

One-Sample Test						
Test Value = 0						
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Graduated Compression Stocking	9.155	44	.000	1.333	1.04	1.63
Inferior Vena Cava (IVC) filters	22.889	44	.000	4.267	3.89	4.64
Transcutaneous Electrical Nerve Stimulation (TENS)	26.314	44	.000	7.067	6.53	7.61

yielded a t-value of -2.876 and a p-value of 0.012, indicating that this difference is statistically significant. The 95% confidence interval for the difference [-1.09920, -0.16006] does not include zero, supporting the conclusion that non-pharmaceutical treatments are significantly more effective than pharmaceutical treatments in this context.

Table 3: Paired Sample T-test - Comparison between pharmaceutical and non-pharmaceutical pain management techniques

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pharmaceutical_DVT	3.5704	15	.37998	.09811
	NonPharmaceutical_DVT	4.2000	15	.84327	.21773

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	Pharmaceutical_DVT & NonPharmaceutical_DVT	15	.213	.446

Paired Samples Test									
Paired Differences							t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pharmaceutical_DVT - NonPharmaceutical_DVT	-.62963	.84793	.21894	-1.09920	-.16006	-2.876	14	.012

5. Discussion

The current study is based on 270 participants, 63% of whom were male, 33% were female, and 4.1% of them did not wish to state their gender. The mean of the pain score was computed to be 1.4111, which points to lower pain status. For the pharmaceutical pain management, morphine and celecoxib had the lowest pain intensity levels, while hydrocodone and warfarin had the highest pain intensity levels. Among the nonpharmacological techniques, graduated compression stockings were found to be most beneficial followed by IVC filters. While TENS was observed to be the least beneficial among all the techniques. The results of the paired samples t-test identified that non-pharmaceutical treatments were significantly more effective to pharmaceutical treatments for pain in DVT and lower limb amputation based on statistical results.

The study compared pain ratings for opioids and anticoagulants to evaluate their effectiveness in pain control. Morphine was found to be the most effective opioid, with a mean lower pain score of 1.40, indicating significant pain relief in patients with DVT and lower limb amputation. Oxycodone provided moderate pain relief with a mean score of 3.60, while hydrocodone had the most significant

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mean pain score of 7.33, suggesting it was related to most pain less than other opioids. The current study's result align with the previous study conducted by Alviar et al., (2016) in which they found out that morphine taken both orally and intravenously is effective in reducing phantom limb pain intensity compared to placebo. However, there were side effects noted such as constipation and dizziness (Alviar et al., 2016).

As the current study shows that NSAIDs mainly celecoxib and aspirin showed the lowest pain scores from 1-3 with celecoxib showing the lowest score indicating that it was the most effective medicine in reducing the pain. The results supports the previous studies where celecoxib was found to reduce inflammation and pain intensity in pre-clinical trials (Tellegen et al., 2018).

In the case of anticoagulants, patients reported experiencing highest level of pain with warfarin, which had a mean score of 6.40. This can be perceived to mean that warfarin was the least effective anticoagulant in reducing pain among all the anticoagulants that were investigated here. On the other hand, rivaroxaban had the lowest mean pain score of 1.13, showing it was the most effective in the reducing the pain. The pain score of enoxaparin was 2.87, meaning that it reduced the pain but was not as efficient as rivaroxaban. Rivaroxaban has been found in studies to considerably lower the incidence of recurrent venous thromboembolism (VTE) when compared to traditional anticoagulants such as warfarin, indicating its efficacy in the treatment of DVT and accompanying pain (Wu et al., 2020). Furthermore, in terms of postoperative pain treatment a meta-analysis and review conducted by Liu et al., (2019) shows that rivaroxaban has been linked to decreased pain levels and a reduced risk of thromboembolic events, making it an attractive alternative for patients having orthopedic procedures (Liu et al., 2019).

Non-pharmaceutical methods for pain control were also assessed such as graduated compression stockings, IVC filters, and TENS. Graduated compression stockings had the lowest mean pain score of 1.33, suggesting that they were the most helpful among the non-pharmaceutical interventions in this study. IVC filters had a mean of 4.27 for pain, which indicates that the use of the IVC filter is moderately effective in the management of pain. TENS was rated the lowest with mean pain score of 7.07, suggesting it was the least effective of all the non-pharmacological techniques. Gradual compression stocking has been previously reported to prevent pain and swelling in the legs in patients with deep vein thrombosis (Muñoz-Figueroa & Ojo, 2015; Sachdeva et al., 2018).

The results of the paired samples t-test elicited the differences between the means of pharmaceutical and non-pharmaceutical management of DVT and lower limb amputation. Non-pharmaceutical treatments had a mean pain score of 4.2000 while pharmaceutical treatments had a score of 3.5704 giving a mean difference of -0.62963. The t-value was -2.876, and the p-value was 0.012, which also suggest that non-pharmaceutical treatments were significantly more effective when it came to managing pain rather than pharmaceutical treatments. The difference had a 95% confidence interval of [-1.09920, -0.16006], which supported the finding that non-pharmaceutical treatments were more effective in DVT and lower limb amputation pain management. The results can be supported by the previous studies where non-pharmaceutical therapies, such as physical therapy and cognitive-behavioral methods, frequently resulted in better pain alleviation for chronic diseases than pharmaceutical treatment (Gupta, 2023; Whale et al., 2022)

This study can also suggest that genetic variation can be taken into account whenever assessing efficacy of pain management interventions. Since the 270 patients studied come from different genetic background, it is expected that they respond differently to drug metabolism and effectiveness in pain relief. For example, genetic differences may affect the patient's ability to metabolize opioids and anticoagulants, which thus alter the effectiveness and risks related to these medications. These fluctuations therefore suggest that individual patient management strategies should be adopted, as the type of management that would be effective in a particular patient may not be effective in the other patient. Through the incorporation of genetic information into the treatment of pain, patient-oriented and specialized kinds of treatment can be achieved, thereby enhancing the treatment regime for patients.

The current study on pain management techniques in patients with deep vein thrombosis and lower limb amputations has some limitations, including a large sample size, inaccurate self-reported pain, dosage issues, and compliance with treatment protocols. It also does not consider condition severity or other medical conditions that may affect pain management response. Despite these, combining pharmaceutical and non-pharmaceutical approaches can yields positive results. Non-pharmaceutical technique like graduated compression stockings and medicines like morphine and celecoxib have been linked to reduced pain levels in the current study. Combining these

options together with personalizing pain management strategies, reconsidering patient reactions, optimizing compliance with prescribed therapy, and raising patient awareness regarding therapy execution is recommended. This approach can help reduce pain and improve patient outcomes.

6. Conclusion:

The study indicates that non-pharmaceutical pain management approaches, especially graduated compression stockings are much more effective than pharmaceutical techniques in relieving pain in patients with deep vein thrombosis (DVT) and lower limb amputations. While opioids and NSAIDs provide various degrees of pain alleviation, graded compression stockings can produce better results. The findings emphasize the necessity of combining non-pharmaceutical therapies with pharmaceutical treatments to improve pain management tactics. Future studies should look at long-term effectiveness and optimize combined therapy techniques to improve patient outcomes and quality of life.

References:

Alviar, M. J. M., Hale, T., & Lim-Dungca, M. (2016). Pharmacologic interventions for treating phantom limb pain. Cochrane database of systematic reviews(10).

Aroke, E. N., McMullan, S. P., Woodfin, K. O., Richey, R., Doss, J., & Wilbanks, B. A. (2020). A practical approach to acute postoperative pain management in chronic pain patients. Journal of PeriAnesthesia Nursing, 35(6), 564-573.

Azam, M. Q., Sadat-Ali, M., & Badar, A. (2016). Pain management in knee arthroplasty: an overview. Current Orthopaedic Practice, 27(4), 360-370.

Azirar, S., Appelen, D., Prins, M. H., Neumann, M. H., de Feiter, A. N., & Kolbach, D. N. (2019). Compression therapy for treating post-thrombotic syndrome. Cochrane Database of Systematic Reviews(9).

Barnes, J. A., Eid, M. A., Creager, M. A., & Goodney, P. P. (2020). Epidemiology and risk of amputation in patients with diabetes mellitus and peripheral artery disease. Arteriosclerosis, thrombosis, and vascular biology, 40(8), 1808-1817.

Bauer, B. A., Tilburt, J. C., Sood, A., Li, G.-x., & Wang, S.-h. (2016). Complementary and alternative medicine therapies for chronic pain. Chinese Journal of Integrative Medicine, 22, 403-411.

Chauny, J.-M., Paquet, J., Lavigne, G., Marquis, M., & Daoust, R. (2016). Evaluating acute pain intensity relief: challenges when using an 11-point numerical rating scale. Pain, 157(2), 355-360.

Costa, C. A. F. (2019). ReLiPh: rehabilitation for lower limb with phantom pain Universidade da Madeira (Portugal)].

Dissemond, J., Assenheimer, B., Bültemann, A., Gerber, V., Gretener, S., Kohler-von Siebenthal, E., Koller, S., Kröger, K., Kurz, P., & Läuchli, S. (2016). Compression therapy in patients with venous leg ulcers. JDDG: Journal der Deutschen Dermatologischen Gesellschaft, 14(11), 1072-1087.

Fokunang, C., Fokunang, E., Frederick, K., Ngameni, B., & Ngadjui, B. (2018). Overview of non-steroidal anti-inflammatory drugs (nsaids) in resource limited countries. Moj Toxicol, 4(1), 5-13.

Gupta, R. (2023). Non-pharmaceutical management of chronic pain. GSC Advanced Research and Reviews, 16(2), 158-165.

Hooman Khademi, M., Farin Kamangar, M., Paul Brennan, M., & Reza Malekzadeh, M. (2016). Opioid therapy and its side effects: a review. Arch Iran Med, 19(12), 870.

KHALED, A., EWADA, A. A., & IBRAHIM, A. E. (2023). Incidence of Deep Venous Thrombosis (DVT) Postoperatively Following Major Lower Limb Amputation in Patients on Prophylactic Anticoagulation. The Medical Journal of Cairo University, 91(03), 43-49.

Liu, J., Zhao, J., Yan, Y., & Su, J. (2019). Effectiveness and safety of rivaroxaban for the prevention of thrombosis following total hip or knee replacement: A systematic review and meta-analysis. Medicine, 98(9), e14539.

Muñoz-Figueroa, G. P., & Ojo, O. (2015).

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Venous thromboembolism: use of graduated compression stockings. British Journal of Nursing, 24(13), 680-685.

Orhurhu, V., Chu, R., Xie, K., Kamanyi, G. N., Salisu, B., Salisu-Orhurhu, M., Urits, I., Kaye, R. J., Hasoon, J., & Viswanath, O. (2021). Management of lower extremity pain from chronic venous insufficiency: a comprehensive review. Cardiology and therapy, 10, 111-140.

Pisulkar, G., Salwan, A., Taywade, S., Awasthi, A., & Saoji, A. (2023). Assessment of Risk Factors of Deep-Vein Thrombosis after Lower Limb Surgery. Journal of Datta Meghe Institute of Medical Sciences University, 18(3), 347-352.

Prasad, G. K., Khanna, S., & Jaishree, S. V. (2020). Review of adjuvants to local anesthetics in peripheral nerve blocks: Current and future trends. Saudi journal of anaesthesia, 14(1), 77-84.

Sachdeva, A., Dalton, M., & Lees, T. (2018). Graduated compression stockings for prevention of deep vein thrombosis. Cochrane database of systematic reviews(11).

Shah, R. (2017). Incidence of Venous Thrombo-Embolism Following Arthroplasties in Lower Limbs in Indian Population: A Prospective Study by Using Color Doppler Imaging Rajiv Gandhi University of Health Sciences (India)].

Tellegen, A., Rudnik-Jansen, I., Pouran, B., De Visser, H., Weinans, H., Thomas, R., Kik, M., Grinwis, G., Thies, J., & Woike, N. (2018). Controlled release of celecoxib inhibits inflammation, bone cysts and osteophyte formation in a preclinical model of osteoarthritis. Drug delivery, 25(1), 1438-1447.

Thaler, J., Pabinger, I., & Ay, C. (2015). Anticoagulant treatment of deep vein thrombosis and pulmonary embolism: the present state of the art. Frontiers in Cardiovascular Medicine, 2, 30.

Trulsson Schouenborg, A., Rivano Fischer, M., Bondesson, E., & Jöud, A. (2021). Physiotherapist-led rehabilitation for patients with chronic musculoskeletal pain: interventions and promising long-term outcomes. BMC musculoskeletal disorders, 22, 1-14.

Whale, K., Dennis, J., Wylde, V., Beswick, A., & Gooberman-Hill, R. (2022). The effectiveness of non-pharmacological sleep interventions for people with chronic pain: a systematic review and meta-analysis. BMC Musculoskeletal Disorders, 23(1), 440.

Williams, B. S. (2018). Nonopioid analgesics: nonsteroidal antiinflammatory drugs, cyclooxygenase-2 inhibitors, and acetaminophen. In Essentials of pain medicine (pp. 457-468. e452). Elsevier.

Wolberg, A. S., Rosendaal, F. R., Weitz, J. I., Jaffer, I. H., Agnelli, G., Baglin, T., & Mackman, N. (2015). Venous thrombosis. Nature reviews Disease primers, 1(1), 1-17.

Wu, H., Cao, H., Song, Z., Xu, X., Tang, M., Yang, S., Liu, Y., & Qin, L. (2020). Rivaroxaban treatment for young patients with pulmonary embolism. Experimental and Therapeutic Medicine, 20(2), 694-704.

Zilliox, L. A. (2017). Neuropathic pain. CONTINUUM: Lifelong Learning in Neurology, 23(2), 512-532.