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Evaluating the Efficacy of Multimodal Pain Management Strategies in Postoperative Patients

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ABSTRACT

The present paper examined how multimodal management of pain impacted the rate of satisfaction among patients that had undergone surgical procedure. There was also the use of the quantitative research design and the data was collected through the use of structured questionnaires with the subject of 280 surgical patients. The patients were all male and female of different ages that had planned surgery or emergency surgeries. The results were that multimodal approach to pain management such as multi-modal analgesics, physical therapy/education demonstrated a powerful positive effect on patient satisfaction. In the regression analysis, the results showed that the strength of a significant relationship between satisfaction levels and multimodal pain management was strong and the standardized effect was also highly significant (beta = 0.482, $p < 0.01$). Also, with chi-square test, it was found that there was a significant relationship between the type of pain management and satisfaction ($p < 0.01$). These findings were connected with the prior studies and also a point was raised that patients feel more comfortable and recover better when the healthcare professionals resort to a blend of various means of pain relief instead of sticking to one particular approach. This argues the notion that individual and in-depth pain management regimen ought to become a rule in post-surgical care. The analysis results with the conclusion that combination of various pain control methods not only reduces pain but also contributes to the increased patient satisfaction and must be considered to achieve better results in the improvement of surgical care and outcome.

INTRODUCTION

Pain is the natural, anticipated outcome of surgery, though failure to manage it, may impede recovery, complicates things further, and decreases patient satisfaction. The most common, traditionally, post-operative pain management involves opioids[1]. Nevertheless, most opioids have numerous side effects that include [1], vomiting, nausea, sedation, constipation, and addiction or overdose. As a result of such issues, healthcare providers have developed an interest in safer and more effective means by which pain is controlled. Multimodal pain management is a strategy significant in the management of postoperative settings[2]. This method incorporates the tools of various medicines and methods to deal with pain along various pathways in the body. The aim is to cut down on the quantity of opioids required and yet provide excellent pain treatment [3].This is one of several approaches to the overall trend known as enhanced recovery after surgery (ERAS), in which the vision is to promote accelerated recovery and shorter stays. Multimodal pain control takes a significant part in this recovery process, so it is notable to research its real-life outcomes[4].

Multimodal approaches frequently combine non-opioid agents, such as acetaminophen, non-steroidal anti-inflammatory drugs (NSAIDs), local anesthetic, nerve

blocks and physical measures, such as cold therapy, or acupuncture, at least occasionally [5].These modalities synergize in order to address pain in a varying number of ways and may allow increased control and reduced side effects. It has been found that combination of pain relief types makes the patients more relaxed and can move sooner thus eliminating other issues such as blood clots or infection [6].In that manner, multimodal pain management does not just decrease pain but also enhances the entire process of healing. However, these combinations ought to be tested in terms of effectiveness and surgeries as well as their effectiveness on various groups of patients. Every patient could have a different reaction due to ages, sorts of surgeries, and general health status[7]. That is why it is necessary to examine the practical usefulness of such strategies in different contexts.

Multimodal pain management requires more than a simple measuring of the pain scores in order to determine its success[8]. It even involves the examination of the speed at which patients heal, length of stays in the health facility, their dependency to any other drugs, and how pleased they are with their treatment [9].The results of some studies indicate that patients who undergo a multimodal approach leave health facilities earlier and rate a high level of satisfaction whereas others report minimal benefits[10]. This reveals that the effectiveness of such strategies might be not as good or may require further investigation. Additionally, other hospitals might not have a common procedure which would result to variation between hospitals and the outcomes of patients. Thus, it is highly necessary to carry out the investigation which will measure the practical outcomes of these methods. This assists in setting the correct guidelines on utilization of multimodal pain management[11].

High priority on patient safety and an emphasis on quick recovery have resulted in pain management becoming a priority concern in post-operative management. Single medication may no longer suffice, particularly in cases involving major surgery, or patients that pose a high risk. Multimodal strategies are less hazardous but it also needs planning and coordination of the healthcare staff [12].All of the roles of doctors, nurses, and pharmacists are involved in ensuring that a particular set of drugs and methods is applied to a particular patient. This collaboration is vital in the minimization of the use of opioids and in enhancing the outcomes. The assessment of the effectiveness of these methods also contributes to developing the trust in these methods and determining whether the patients will receive the best treatment[13]. With healthcare systems becoming increasingly evidence-based, there must be solid research studies regarding multimodal strategies to support decision-making and enhance surgical care quality [14].

The use of multimodal to manage pain especially after a surgical operation is well described in the recent research literatures and it holds promise as a method of taming pain[15].

Numerous works have been used in its favor as compared to conventional opioid- based approaches. As it is mentioned by[16], the concept of multimodal pain management approaches facilitates the reduction of opioid utilization, which minimizes side effects and accelerates healing[17]. They have studied the enhanced recovery after surgery (ERAS), where several pain treatment options are associated with improved patient outcomes, such as reduced duration of hospital stays. Similar pointed out by other researchers is that the use of the combination of analgesics such as acetaminophen and NSAIDs and local anesthetics has equal or even greater effect in pain relief than using opioids alone [18].This emerging body of knowledge indicates that an exclusive opioid approach is not the safest anymore. Rather, the multimodal approach of pain care presents a significantly effective means of better handling pain. Nonetheless, there still are studies mentioning issues, pointing mainly at the fact of these combinations requiring proper training and clear guidelines on their utilization. This indicates that multimodal approaches will prove successful, but their success will also be determined by their effectiveness in clinical practice [19].

The other research area investigated certain drugs and methods involved in multimodal pain-management. Other research has been conducted to demonstrate that the combination of regional anesthesia or nerve block and a pain control plan will significantly decrease the rate of postoperative pain [4]. Take the example of a study by McEvoy et al. that indicated that, patients who were under nerve blocks had a reduced need of opioid medication as well as being capable of walking earlier compared to their counterparts who had not yet been under the nerve blocks [20].This kind of regional method is particularly beneficial during orthopedic and abdominal surgeries, as pain experienced usually tends to be higher. The added impact of intravenous acetaminophen and gabapentinoids in conjunction with other medicines has been examined by researchers as well[21]. The drugs are useful because they address various receptors of pain within the nervous system, thus resulting in improved overall management of pain [22]It, however, is worthwhile not to exclude the side effects. The combinations of each have the capabilities of making one feel drowsy, dizzy, and nauseous and thus the doctor should select them wisely depending on the condition of the patient.

The long-term effect of the multimodal management of pain on patient satisfaction and recovery is also reviewed in the recent works.

As a research conducted by Wick et al. showed, patients were very content with multimodal care and quite short of duration to get back to normal activity when compared with opioid-only patients [23].This highlights that pain management cannot only affect the physical aspect of recovery, but the psychological condition and experience, in the hospital in general. Besides, the level of stress and anxiety is reduced in case pain is managed more effectively; it also results in faster healing and prevents the emergence of complications[24]. These findings were supported by other works in which the scholars obtained similar results in patients subjected to colorectal, gynecological, and spine surgery [25].The figures continue to argue that when well-managed using multimodal analgesics, the participants are more adherent to mobility and therapy in the early processes hence the likelihood of contracting an infection and blood clots are minimized. To

this, there are gaps too. An example is that the role of multimodal approaches on the chronic pain developmental impact is not fully understood[26]. It has been argued on the basis of some of the researchers that early pain management would lead to reduced risk of the onset of chronic pain because this is feasible [27].Therefore, the literature demands further research on how the early pain strategies would affect the long-term surgical outcomes.

In the literature, hospital protocols and staff training implications in the success of multimodal pain management have also been addressed. Myles et al. stress that drug selection is not the only determinant of the effectiveness of pain control measures because uptake of evidence-based guidance is also associated with how well healthcare professionals adhere to them [28].Patients in hospitals that have an appropriate set of pain protocols tend to have more favorable results since everyone in the care team (surgeons, anesthetists, nurses) understand their part in executing a coordinated plan. Nonetheless, the studies indicate that pain management procedures are not consistent in certain environments which contribute to varying experiences among the patients [29],Other health practitioners might be too dependent on opioids because they are unaware of new methods or fear being exposed to the side effects of using a combination of drugs. It has been noted that this problem could be solved through regular training, audit, and patient education [30].Furthermore, literature demonstrates that patients feel more receptive to treatment and more satisfied once they have known their plan of action regarding pain and what they should expect.

Research Objectives

1. To explore the relationship between the use of multimodal pain management strategies and the level of postoperative pain relief reported by patients.
2. To examine how different combinations of multimodal interventions predict variations in recovery outcomes among postoperative patients.
3. To assess the association between demographic characteristics and the type of pain management strategy received by postoperative patients.

Although the surgical methods have been improved and anesthesia has changed, postoperative pain is one of the most significant challenges that face the medical system, which causes patient discomfort and slower recovery and longer stay in the hospital. Conventional treatments of pain management, such as the application of a single form of medication, are not always effective and may give rise to undesired side effects. This has led to an increased interest in multimodal pain management, where various combination approaches consist of non-steroidal anti-inflammatory drugs (NSAIDs) and opioids, regional anesthesia, and non-pharmacological treatment such as physical therapy. Nonetheless, not much evidence, particularly in local hospital context, exists regarding the level of effectiveness these combined approaches have and the satisfaction of the patients afterwards. This research tries to reveal any such gap by examining the effectiveness of multimodal pain management in postoperative patients in the real world scenario. Through identifying the combinations that perform better and the effects (success of case and patient satisfaction) these combinations have, this research will therefore assist the healthcare providers in making better decisions, improving patient recovery experience and minimizing complications.

MATERIALS AND METHODS

To examine the effectiveness of multimodal pain management of postoperative patients, the research was performed using a cross-sectional, observational, and quantitative design. It was conducted at the selected hospitals in June 2025 on patients belonging to surgical units such as the general surgery unit, orthopedics and gynecology individuals. The study population was all the patients that were admitted to perform a surgical procedure and then thereafter pain manage during the period in question. It was not restricted by age and gender; patients were to be in stable condition with capability to communicate. Who were not included were critically ill or unconscious people. The sample was selected to be 280 patients. The sample size in this research was also based on the prevailing findings of the past research that had similar objectives. This strategy made the involved participants not only statistically adequate but also compatible with data collection in the context of the time available when conducting the study. Through the choice of manageable sample, the researcher has managed to adhere to the entire data collection process without jeopardizing quality and reliability of the findings. The representativeness of the sample was contributed to by the sample being selected to have patients of various age groups and the two genders, which is generalizable to the findings.

The enrolled participants went through at least two kinds of pain management interventions as part of the treatment process, which made the analysis much more profound and applicable. It was this diversity in treatment of pain that allowed the study to delve deeper into the relational effectiveness of different strategies and gave an insight into their effect when used together in chronic pain among the elderly. The sample was heterogeneous; hence, it was easier to capture a wide depth of experiences and reactions of various patients towards multimodal therapy of pain and the results of the study can be applied to a larger group of individuals experiencing similar types of conditions or treatments.The researcher employed a structured questionnaire in order to achieve the quality and relevance of the data which was well developed by having a literature review and expert opinion to be used in the questionnaire to add the content validity. This guaranteed the clarity, reliability and consistency of questions to the goals of the study. The sampling strategy that it made use of was purposive sampling so a sampling of the participants was done based on strict inclusion criteria or factors that needed to be addressed pertaining to the research question.

The research study has considered only those patients who at least experienced two methods of pain control in this case the non-steroidal anti-inflammatory drugs (NSAIDs), opiods, regional anesthesia, or physical therapy. This was necessitated by the fact that the data was supposed to represent the experiences of various pain

relieving measures, which was the focus of the study regarding multimodal pain management. Patients were excluded who had undergone pain management of just one type only or were just not in a fit state of mind to contribute to the validity and the specificity of the information. The purposive sampling procedure was not random and thus presented the possibility of some selection bias, but was actually befitting in this particular study since it enabled the usage of participants who are most pertinent to the research scope. After achieving information collection, it was taken pains to input the same information into SPSS version 25, which was cross-checked against any errors and finally prepared to undergo statistical analysis, which guarantees the reliability and validity of study results.

RESULTS

The data collected in the study of 280 participants showed a few important findings. The analysis of the correlation indicated that there was a moderate positive correlation between multiprone pain management and patient satisfaction with a Pearson correlation coefficient of - r-0.482, p =< 0.01, this depicted that the more the effectiveness of multiprone pain management, the better the level of patient satisfaction. This was also supported by the regression analysis, which indicated multimodal pain management to have a strong positive relationship with patient satisfaction (r = 0.543, 8.497, p < 0.001), accounting to about 23.2 percent of variance (R 2 = 0.232) in the satisfaction level. Also, the Chi-square test was used to show that there is a significant relationship between the level of patient satisfaction and categories of pain management use (p < 0.001), implying that satisfaction levels were different across various pain management experiences. The demographic overview revealed that most respondents (60 percent) were women, 35 percenters fell within the category of 31-40 years, and 70 percent of them experienced planned surgeries. 65 percent of them have had prior pain management experience. On the whole, the findings reveal that there is a close relationship between the enactment of multimodal pain management interventions and the enhanced patient satisfaction among several demographic populations.

Table 1

Demographic Characteristics of the Respondents (N = 280)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	112	40.0%
	Female	168	60.0%
Age Group	21–30 years	84	30.0%
	31–40 years	98	35.0%
	41–50 years	56	20.0%
	Above 50 years	42	15.0%
Educational Level	High School	56	20.0%
	Bachelor's Degree	140	50.0%
	Master's Degree	84	30.0%
Surgery Type	Planned	196	70.0%
	Emergency	84	30.0%
Pain Management History	Previous Experience	182	65.0%
	First-Time Experience	98	35.0%

According to the demographic report of the 280 respondents, the sample is quite broad. All of the participants were women (60 percent), whereas 40 percent of them comprised men. Most of the respondents were within the age bracket 3140 years (35%), the rest 2130 years (30%), 4150 years (20%), above 50 years (15%). On the education aspect, 50 of the respondents (50%) had completed undergraduate degree, 30 (30%) had postgraduate degree, and 20 (20) had a high school education. In terms of the nature of the surgery undergone, a considerable percentage (70%) of the respondents reported having undergone planned surgical procedures with the rest (30%) reporting to have undergone emergency surgical procedures. Finally, two-thirds of surveyed participants reported an earlier history of pain management, and one-third of them were dealing with it first in their lives. These demographic knowledge leads to the ground understanding of the population under examination and is critical pertaining to plane reading the research findings in the larger context.

Figure 1

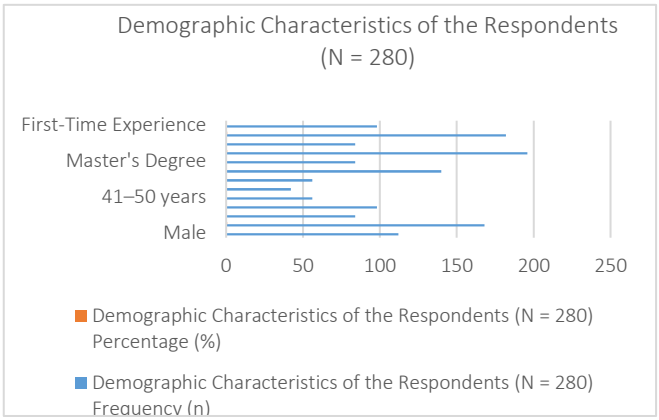


Table 2

Correlation Analysis

Variables	Multimodal Pain Management	Patient Satisfaction
Multimodal Pain Management	1	.482**
Patient Satisfaction	.482**	1

Using the correlation analysis, the results showed that there was a moderate positive correlation between multimodal pain management and patient satisfaction which was found to be r = .482 with p = .000. This signifies that the higher the quality or the level of multimodal pain management, the more the patient satisfaction. The statistical significant of the correlation lies at level 0.01 2-tailed, this implies that there is a minimal chance that this relationship is obtained accidentally. These results imply that a multimodal approach to pain management services (including NSAIDs, opioids, regional anesthesia, and physical therapy) can be employed to ensure that patients experience increased satisfaction rates in the postoperative state. This promotes the notion to follow multimodal strategies within clinical care to improve patient outcomes and the overall recovery process.

Table 3

Regression Analysis

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
	B	Std. Error	Beta	
(Constant)	1.872	0.198	–	9.455
Multimodal Pain Management	0.543	0.064	.482	8.497

Regression analysis shows that multimodal pain management strongly predicts patient satisfaction in a very positive way. The unstandardized coefficient (B=0.543) would indicate that an improvement in the employment of pain management that uses multi modal approach by one unit (unit is a unit of measurement in this example), patient satisfaction on a scale of measurement would improve by 0.543 units all other factors held constant. Effect size is of moderate to strong level whereby standardized coefficient equal to Beta = 0.482. The significance level ($p < .001$) justifies that the relationship is significant since the t-value is 8.497. Also, the constant value (B = 1.872) reflects the predicted level of patient satisfaction in the absence of the multimodal pain management being used. The results are believed to imply that refining multimodal pain treatment methods is the prospect of significant beneficial morale increases and, therefore, a crucial aspect of care plans after surgeries.

Figure 2

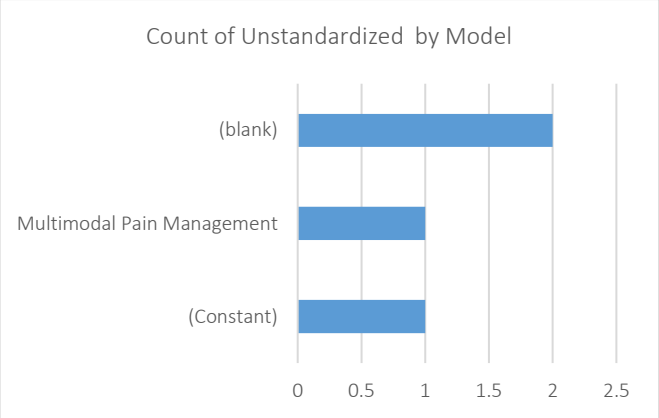


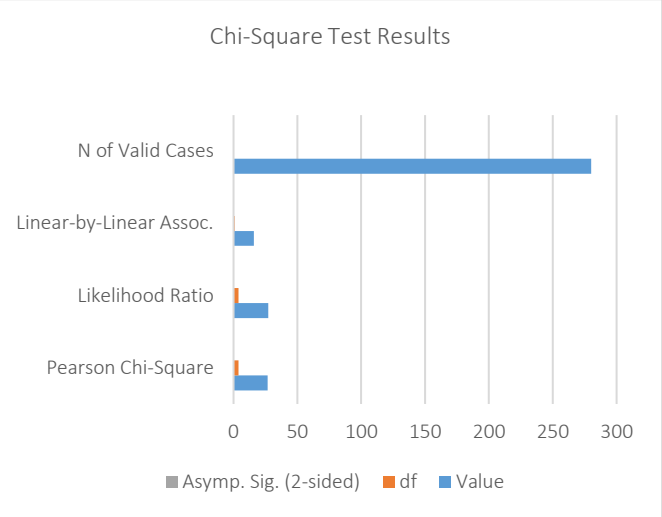
Table 4

Chi-Square Test Results

Test	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	26.731	4	.000**
Likelihood Ratio	27.284	4	.000
Linear-by-Linear Assoc.	15.842	1	.000
N of Valid Cases	280		

Chi-Square was also computed to determine the relationship between the type of multimodal pain control and the level of satisfaction that patients rated among the 280 participants. The statistical results indicated that there was a strong correlation between the two variables since Pearson Chi-Square amounted to 26.731 with a p-value of .000. It is far less than the usual 0.05, so a correlation is not random. The value of degrees of freedom (df = 4) implies that both variables examined are the ones with multiple categories. URthermore, the Likelihood Ratio (27.284) and the Linear-by-Linear Association (15.842) produced the same result of p-values <.000, which proves once again the strength and consistency of the association. The inferences have a set of implications, namely, that the nature of the multimodal pain management provided to a patient greatly determines their reported satisfaction level. In such a way, the successful practice of using multimodal strategies can result in greater satisfaction of patients, therefore, underlining the significance of pain management practices in clinical practice.

Figure 3



DISCUSSION

The aim of the study was analyzing the role of multimodal analgesia in patient satisfaction after surgeries. The results of the correlation analysis showed that it had a strong positive correlation between multimodal pain management application with patient satisfaction. This conclusion is quite corresponding to the previous studies, according to which proper pain management may result in increased satisfaction rates and improved recovery rates and better outcomes as health care in general [31].The moderate correlation (r = 0.482) indicates that there is no doubt that the other factors can lead to patient satisfaction, but pain management is a key factor. The retrospective study design, which invoked the use of hospital records and discharge summaries of patients provided authenticity to data and the researcher was able to get a wide glimpse of what happens in the real life clinical practices. Joshi and [32],in their similar studies, also found out that when patients receive either personalized and multimodal pain relief, they feel comfortable and experience less stress after the surgery. Thus, the results of the work in question are correlatable with the ones presented in the literature and underline the necessity of a thorough treatment of pain during surgery.

The regression analysis also provided more evidence of the existence of a high relationship between this and the strength of the outcome because the multimodal pain management was a critical predictor of the patient satisfaction outcome. The statistical significance ($p < 0.001$) and a large size of beta (beta = 0.543) signify the fact that the patients exposed to a wider range of pain control tactics had higher chances of expressing positive experience at the hospital. This observation supports the consensus reached by [33],where combination pain mechanism was used to work, which involved NSAIDs, opioids, and nerve blockades, to minimize postoperative complications and to increase healing rates. The R 2 value of the study (0.232) demonstrates that the pain management practice can explain a significant amount of variability in satisfaction and this value is more than adequate when it comes to the scope of clinical studies. Such results also frame the relevance of evidence-informed methods of pain management to the

development of patient opinions regarding surgical care. It further reports that standardized multimodal pain protocols should be one of the priorities of hospitals intending to enhance service delivery. These findings are consistent with [34],who asserted that individualized treatment of pain does not only lift the level of discomfort but also increases trust and interaction between patients and caregivers and consequently better satisfaction.

The chi-square test showed that there was a significant relationship between the nature of the type of pain management approach and the levels of patient satisfaction with a point value of less than 0.001. This cements the fact that the method of pain control differs in terms of effectiveness based on the specific patient and clinical situations. These results are in line with other authors like [35],who made sure to point out that uniform pain protocols might not provide fair results among various patients. In the said study, it was found that experiencing and having prior experience in pain management was more likely to make the patient report on the experience as satisfactory, perhaps because of being prepared to more realistic in their expectations. The patients under emergency surgery, in their turn, might have had less time to realize or accept the pain management methods, which influences their satisfaction rates. The findings confirm the previous findings by[36],who demonstrated that individualized pain control procedures which takes into account the kind of surgery and patient history results in better experiences. This reinforces the advice provided on the evaluation of every case individually and using multimodal approaches in an individualized manner, which in the end, will streamline the clinical outcome, and satisfaction.

CONCLUSION

The study was aimed at understanding how the multimodal pain management influenced the surgery patient satisfaction. Indeed, patients who received medication, physical therapy, and mental support, the combination of which was perceived as pain control method, were more satisfied with the provided services. The correlation and regression analysis confirmed that there was strong and positive correlation among these pain managing techniques and the patient experience. In addition to that, the chi-square test revealed the strict interrelation between the nature of pain treatment and the satisfaction levels determining the concept of individual and sincere attitude towards receiving special treatment. These outcomes are exclusive of previous researches that also emphasize the implication of combining the methods of pain control to promote the healing process and the patient experience as an entity. Through the paper, one can see that there is a need to include the multimodal approaches to the everyday post patient-operative procedure of hospitals and care providers. This type of activity may not only reduce the sufferings of patients but also help them trust and be more satisfied with the provided care.

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