

Breaking the Pain Barrier: Unravelling the Prevalence and Predictors of Acute Postoperative Pain

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ABSTRACT

Background: Major treatment challenges arise from Acute postoperative pain (APP), which can result in pain that lasts for a longer time and delays patient's recovery. In Pakistan, many people who undergo surgery often do not receive proper pain relief during the postoperative period.

Objective: To discover the prevalence and predictors of acute postoperative pain following surgery among patients in a tertiary care hospital in Mirpur, AJ&K.

Methodology: A cross-sectional study was conducted at Divisional Headquarters Hospital Mirpur. A total of 225 adult surgical patients were included using consecutive sampling technique. The patient's pain severity was measured using the NRS within 24 to 48 hours following the surgery. The interviews and chart reviews were used to gather information about the patients' demographics, the surgical procedures done, the type of anesthesia used and the analgesia approach applied. In order to find what factors are linked to severe pain after surgery (NRS ≥ 7), multivariate logistic regression was applied.

Results: 72.9% of patients had moderate to severe levels of APP on the NRS. Pain that was graded as severe affected 34.2% of the patients. Severe pain tended to occur more often in females (OR = 1.92, $p = 0.041$) in patients with comorbidities (OR = 2.14, $p = 0.011$), those who underwent surgery on the abdomen (OR = 2.67, $p = 0.007$), those who used general anesthesia (OR = 1.81, $p = 0.042$) and especially among patients who did not use a combination of analgesic strategies (OR = 1.81, $p = 0.042$). The average NRS score was lower when using more than one type of pain relief method.

Conclusion: Pain after surgery is still very common in Pakistan. Patients with female gender, additional diseases, surgery of the abdomen and undergoing general anesthesia are most likely to have severe postoperative pain. The use of various pain treatment methods and standard pain assessment tools are necessary for improving how a patient feels.

Keywords: Postoperative pain, pain predictors, multimodal analgesia, general anesthesia, abdominal surgery, pain management.

Introduction

Acute postoperative pain (APP) is a common clinical burden that distresses surgical patients all over the world. The efficient management of APP is essential, since uncontrolled pain can cause such complications as delayed recovery, extended hospitalizations, transition to chronic pain disorders ¹. It has been reported by studies that around 80% of patients have postoperative pain and many of whom experience moderate to severe pain ².

This variation highlights the need to have an in-depth understanding of APP with regards to enhancing pain management techniques and patients outcomes ³. A number of factors are identified as the predictors of APP intensity and persistence. Preoperative anxiety and depression have been related to enhanced pain sensitivity and the risk of suffering from chronic postoperative pain⁴. In addition, the nature as well as the extent of surgical procedures are relevant. For example, long surgeries requiring axillary lymph node dissection have been

associated with greater incidences of postoperative pain syndromes ⁵. In addition, there are some surgical factors, for instance, open versus minimally invasive approach to surgery, that can significantly impact pain after the operation⁶. The Outcomes Research Consortium, an international clinical research group, has emphasized the importance of identifying simple, low-risk, and cost-effective interventions to enhance perioperative care and reduce the incidence of APP ⁷.

Their research highlights the potential of multimodal analgesia and peripheral nerve blocks in mitigating acute pain and preventing its transition to chronic pain ⁸. Despite advancements in pain management, a considerable number of patients continue to experience inadequately controlled postoperative pain ⁹. This inadequacy not only affects immediate postoperative recovery but also contributes to the development of persistent postsurgical pain, a condition that can

significantly impair quality of life ¹⁰. Various analgesic approaches, including patient-controlled analgesia (PCA) and regional anaesthesia, have been proposed to optimize pain relief ¹¹. Multimodal analgesia, which involves the use of different classes of analgesics to target various pain pathways, showed promising results in reducing opioid consumption and improving pain control ¹². Moreover, the integration of non-pharmacological strategies, such as cognitive behavioural therapy and preoperative patient education, has demonstrated benefits in enhancing pain management outcomes ¹³. In conclusion, APP remains a prevalent and challenging aspect of postoperative care. Understanding the predictors of APP and implementing effective pain management protocols are essential steps toward enhancing patient recovery and reducing the burden of chronic postoperative pain ^{14 15}.

Methodology

A cross-sectional study was used to establish the prevalence and severity of acute postoperative pain in surgical patients at Divisional Headquarters Hospital Mirpur, which is a tertiary-care hospital with a high surgical case load. The target population included patients admitted to surgical wards and post-anaesthesia care units (PACUs), the study was conducted over three months. Sample size was determined using Cochran's formula and was calculated as 225. Eligible patients were aged 18-yr or older, had undergone surgical procedures, and could report pain levels verbally or via validated pain scales and were assessed 24-48 hours postoperatively. The patients were excluded if they had cognitive abilities which impeded the assessment of pain, those who were on long-term opioid therapy before the surgery, those with missing medical records or those who failed to participate. The consecutive sampling technique was used to recruit participants from the surgical patient registry. Data were gathered using face-to-face interviews and reviews of the medical records, with the use of a structured questionnaire, covering demographics (age, gender, BMI, comorbidities), surgical characteristics (type of surgery, duration, anaesthesia used), and pain assessment (intensity measured using the Numerical Rating Scale (NRS) from 0 to 10. The outcome variable in the study was the prevalence of acute postoperative pain, which was reported as a non-zero score in a NRS. Independent variables were patient-related factors, which included age, gender, and comorbidities. surgical related factors including type of surgery and anaesthesia; pain management related factors- type of analgesia and use of multimodal strategies. Data were analysed using SPSS. Descriptive statistics involved a measure of the mean and the standard deviation for continuous variables, and a frequency with percentage for categorical variables. The inferential statistics included the Chi-square test for categorical variables measuring predictors of severe

postoperative pain, the independent t-test for continuous variables, and the use of multivariate logistic regression model to recognize predictor of severe postoperative pain defined as NRS ≥ 7 . A p-value lower than 0.05 was taken to be of statistical significance.

Results

A total of 225 postoperative patients were enrolled in the study, with a mean age of 44.6 ± 13.2 years. Of these, 128 (56.9%) were male and 97 (43.1%) were female. The majority of patients (62.2%) had a normal BMI ($18.5\text{--}24.9 \text{ kg/m}^2$), while 24.9% were overweight and 12.9% were obese. Regarding comorbidities, 85 (37.8%) had at least one chronic condition, with hypertension (21.3%) and diabetes mellitus (15.1%) being the most common. Table:I The overall prevalence of acute postoperative pain (defined as NRS ≥ 4) within 24–48 hours after surgery was 72.9% ($n=164$). Among these, 38.7% ($n=87$) reported moderate pain (NRS 4–6), and 34.2% ($n=77$) experienced severe pain (NRS ≥ 7). Only 61 patients (27.1%) reported mild pain or no pain (NRS 0–3). Surgical characteristics showed that 44% of patients underwent abdominal surgeries, 26.2% orthopaedic procedures, 15.1% ENT surgeries, and the remaining 14.7% various other procedures (e.g., urologic, gynaecologic). The mean duration of surgery was 93.4 ± 27.8 minutes. General anaesthesia was used in 142 patients (63.1%), spinal anaesthesia in 61 patients (27.1%), and local/regional anaesthesia in 22 patients (9.8%). Pain type analysis revealed that incisional pain was the most frequently reported (59.3%), followed by visceral pain (24.5%) and neuropathic pain (16.2%). Regarding pain management, 138 patients (61.3%) received a combination of NSAIDs and opioids (multimodal therapy), 49 patients (21.8%) received opioids only, 26 (11.6%) received NSAIDs only, and 12 patients (5.3%) received no analgesia within 6 hours postoperatively due to either delays or oversight.

Bivariate analysis showed significant associations between severe postoperative pain (NRS ≥ 7) and female gender ($p = 0.028$), presence of comorbidities ($p = 0.011$), type of surgery (abdominal and orthopaedic associated with higher pain, $p = 0.002$), use of general anaesthesia ($p = 0.036$) and inadequate pain management (non-multimodal strategy, $p < 0.001$). The mean NRS score among patients with multimodal analgesia was 4.2 ± 1.8 , compared to 6.3 ± 2.1 in those receiving opioids alone and 6.9 ± 1.5 in those receiving no analgesia ($p < 0.001$). Table:IV

In the multivariate logistic regression model, the factors which were identified as independent predictors of severe postoperative pain (NRS ≥ 7) were female gender: OR = 1.92, 95% CI [1.03–3.57], $p = 0.041$,

presence of comorbidities: OR = 2.14, 95% CI [1.19–3.85], $p = 0.011$, abdominal surgery: OR = 2.67, 95% CI [1.31–5.44], $p = 0.007$, use of general anaesthesia: OR = 1.81, 95% CI [1.02–3.22], $p = 0.042$ and non-multimodal analgesia: OR = 3.49, 95% CI [1.88–6.46], $p < 0.001$. No statistically significant association was found between age or BMI and severe pain levels. These findings highlight that postoperative pain remains a significant burden for surgical patients, especially those undergoing abdominal procedures, females, individuals with comorbid conditions, and those not receiving adequate multimodal pain management. Table:V

Variable	(n)	(%)
Gender		
Male	128	56.9
Female	97	43.1
BMI Category		
Normal (18.5–24.9 kg/m ²)	140	62.2
Overweight (25–29.9 kg/m ²)	56	24.9
Obese (≥ 30 kg/m ²)	29	12.9
Comorbidities		
Present	85	37.8
Absent	140	62.2
Common Comorbidities		
Hypertension	48	21.3
Diabetes Mellitus	34	15.1

Variable	(n)	(%)
Type of Surgery		
Abdominal	99	44.0
Orthopaedic	59	26.2
ENT	34	15.1
Other (Urologic, Gyn, etc.)	33	14.7
Anaesthesia Used		
General	142	63.1
Spinal	61	27.1
Local/Regional	22	9.8
Pain Type		
Incisional	133	59.3
Visceral	55	24.5
Neuropathic	37	16.2
Pain Management Strategy		
Multimodal (NSAIDs + Opioids)	138	61.3
Opioids only	49	21.8
NSAIDs only	26	11.6
No Analgesia	12	5.3

Pain Severity Level	NRS Score Range	Frequency (n)	Percentage (%)
No/Mild Pain	0–3	61	27.1
Moderate Pain	4–6	87	38.7
Severe Pain	≥ 7	77	34.2
Total with NRS ≥ 4 (Prevalence)	–	164	72.9

Variable	Severe Pain (%)	p-value
Gender		0.028*
Male	30.5	
Female	39.2	
Comorbidities Present	45.9	0.011*
Type of Surgery		0.002*
Abdominal	42.4	
Orthopedic	37.3	
Other	21.5	
Anesthesia Used		0.036*
General	38.7	
Spinal/Local	27.1	
Pain Management		<0.001*
Multimodal	26.1	
Non-multimodal	49.2	

Variable	Adjusted OR	95% CI	p-value
Female Gender	1.92	1.03–3.57	0.041*
Comorbidities Present	2.14	1.19–3.85	0.011*
Abdominal Surgery	2.67	1.31–5.44	0.007*
General Anesthesia	1.81	1.02–3.22	0.042*
Non-Multimodal Analgesia	3.49	1.88–6.46	<0.001*

*Statistically significant at $p < 0.05$

Discussion

In Pakistan, the prevalence of moderate to severe acute postoperative pain is 72.9% in surgical patients at a tertiary care setup with (NRS ≥ 4). Notably, severe pain (NRS ≥ 7) was reported by 34 patients – that is 34.2% of patients. This points at the continued problem of successful postoperative pain management. These findings do correspond with international reports that although the anaesthetic and analgesic techniques have improved, postoperative pain is not well controlled in many health care systems¹⁶. Research carried out in the United States of America showed that 86% of patients experienced postoperative pain with the first 48 hours presenting the moderate to severe level in 75% of patients¹⁷, which is almost the same as ours in Mirpur, Pakistan. Likewise, a multicentre European trial found moderate to severe pain reported in 55% of surgical patients; however, there was a disparity between procedures and countries¹⁸. There were significant gender differences in perception of pain within our cohort; females were likely to describe severe pain (this is consistent with the findings from the UK and Brazil where female patients report more

pain sensitivity and reporting)^{19 20}. Some of the factors leading to this gender inequality include biological, psychological, and social factors. Patients with comorbidities had significantly higher odds of having severe pain similar to an observation from Canada where it is known that patients with diabetes, hypertension, and depression record higher painful score after-surgery²¹. Chronic inflammation and shifted pain processing in these groups may be the cause of this tendency. Abdominal procedures had independently significant associations with severe postoperative pain. This has been echoed by results obtained from research conducted in India and other countries, where open abdominal procedures were always characterized by high nociceptive and inflammatory pain response as opposed to minimal or orthopaedic surgeries^{22 23}. General anaesthesia as compared to spinal/local anaesthesia was strongly linked with agonizing pain. Similar findings were reported in randomized controlled trials carried out in Sweden and Japan where neuraxial anaesthesia was found to potentially have better immediate postoperative analgesia due to better blocking of the afferent pain conduction^{24 25}. Noteworthy is that the use of multimodal analgesia was protective against severe pain. This is consistent with the global guidelines and literature including a Cochrane review that indicates superiority of multimodal treatment over monotherapy in decreasing opioid consumption and encouraging pain results in patients^{26 27}. Our rate for moderate to severe postoperative pain (72.9%) is more than what has been reported in developed countries such as Germany (57%)²⁸ and less than some low-resource settings like Nigeria (84%)²⁹. Such differences could mirror disparities in pain management regimes, access to drugs, training of employees and expectation level of patients. On the international scale, postoperative pain and its predictors remain an international challenge. Kehlet and Dahl stressed that surgical pain not only retards recovery but also leads to the chronic pain syndromes should it be poorly managed³⁰. The weaknesses of this study include

its cross-sectional nature that makes causal inference difficult, as well as the reliance on self-reported pain scores, which may be biased due to self-report nature. However, a robust insight on the prevalence of pain and predictors of pain is offered by the structured method, validated scales, and logistic regression analysis. Based on these findings, the adoption of pain assessment with standardized tools, and the development of multimodal protocols for pain relief tailored to the procedure and comorbidities – should be implemented in similar tertiary hospitals' surgical wards. Future research should examine long term pain outcomes and examine the efficacy of targeted intervention.

Conclusion

Most surgical patients still complain of significant pain after their operations and in our hospital, 72.9% of them have moderate to severe pain. More females, patients with more than one health condition and patients who underwent abdominal surgery experienced greater pain. Such results are in line with what happens worldwide, showing room for improvement in managing pain. Using various types of pain medication helped lessen pain. It is important to use the same pain assessment system and the provision of personalized, evidence-based strategies for managing their pain.

RECOMMENDATIONS

Regular pain assessments should be done using common methods for every surgical patient. Develop tailored strategies that fit each type of operation and the patient's individual health issues. Help hospitals to ensure that healthcare personnel are well trained in pain management after surgery. Carry out more studies about how pain affects people over time and what can be done to help.

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