

Exploring postoperative pain management strategies in pediatric surgery

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ABSTRACT:

Background: The impact of pain experienced after surgery hinders the recovery process. Limited research exists regarding the approach to managing postoperative pain in children in developing nations.

Aim: Our objective was to assess the present methods employed by pediatric surgeons in Pakistan for managing postoperative pain in children.

Methods: A group of 48 pediatric surgeons/trainees participated in two yearly conferences of the Association of Pediatric Surgeons of Pakistan, held in May 2023 and April 2024. These individuals were surveyed using a questionnaire to gather information about the methods used for managing postoperative pain in children, as well as their personal opinions and perspectives.

Results: Forty people filled out the survey, which means that 85% of the people asked responded. Out of those who responded, 29 of them (77%) were consultants, and 11 of them (23%) were trainees. Only 3 of the respondents (6%) used any guidelines, and 10 of them (27%) had a set way to handle pain in children after surgery at their hospital. Almost half of the respondents (17, which is 45%) relied on their clinical judgment to assess postoperative pain. Some other ways they assessed pain included crying, needing oxygen to keep their blood oxygen levels above 96%, increased vital signs (like heart rate and blood pressure), facial expressions, and trouble sleeping (12 people, which is 34.3%). Other methods included observing how alert the child was, how calm they were, how they responded to breathing or crying, physical movement, muscle tension, and facial expressions (13 people, which is 37%). There was also a verbal rating scale (11 people, which is 28%). In newborn babies, 90% of the respondents used paracetamol and 34% used pentazocine for routine pain relief after surgery. None of the respondents used morphine for newborns after surgery. In older children, the most commonly used pain relievers were paracetamol (36 people, which is 93%), pentazocine (31 people, which is 82%), and nonsteroidal anti-inflammatory drugs (29 people, which is 81%). More than half of the respondents (21 people, which is 57%) were not happy with how they currently manage pain after surgery.

Conclusion: Doctors did not often check how much pain people were feeling, and the treatment they gave for pain, even though it used different methods, did not follow a specific plan. This means that people didn't always get enough relief from their pain. We need to do a better job of recognizing and taking care of the pain people feel after surgery in our hospitals. We should try harder to evaluate and treat their pain.

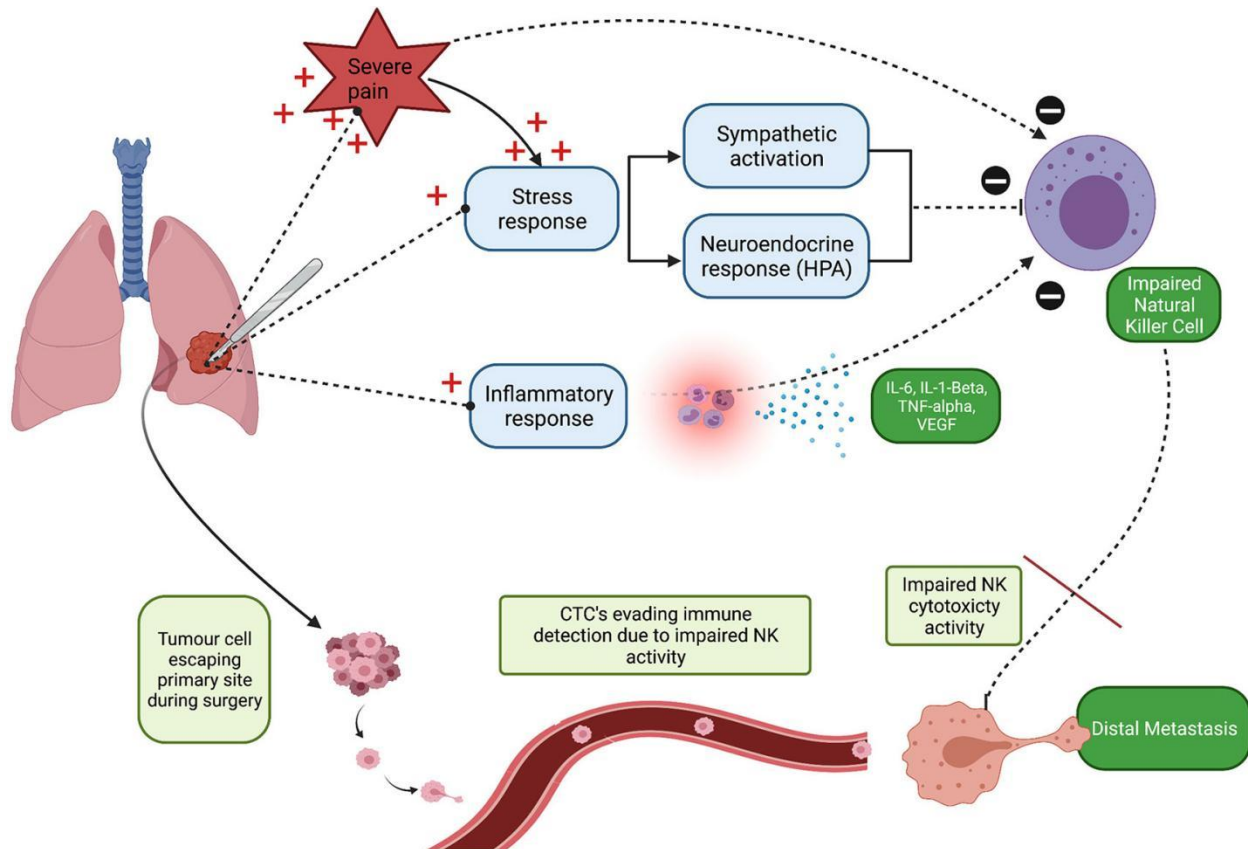
Keywords: Pediatric Surgery, Postoperative Pain, children, pediatric surgeons, Developing Nations.

INTRODUCTION:

Postoperative pain is caused by various physiological processes triggered by surgical injury. It is linked to autonomic, endocrine, metabolic, physiological, and behavioral reactions [1]. Research indicates that insufficient alleviation of postoperative pain can lead to detrimental physiological and psychological effects, ultimately resulting in considerable illness, delayed recovery, impairment in daily activities, and

even death. Despite the existence of guidelines for managing acute pain in children, many children continue to experience pain during their hospital stay due to failure to follow the available guidelines [2]. Pediatric surgery is a complex and delicate field of medicine that requires meticulous care and attention. While advances in surgical techniques have significantly improved the outcomes of pediatric surgical procedures, postoperative pain management remains a critical aspect of patient care [3]. Effective pain management in the pediatric population is essential not only for alleviating suffering but also for promoting speedy recovery, minimizing complications, and ensuring overall patient satisfaction [4]. Exploring postoperative pain management strategies in pediatric surgery is crucial due to several unique factors. Children often experience pain differently from adults, and their ability to communicate their discomfort may be limited, especially in the case of infants and toddlers. Additionally, the developing neurophysiology and pharmacokinetics of children necessitate tailored pain management approaches that consider their specific physiological and psychological characteristics [5]. In recent years, there has been a growing recognition of the need for comprehensive and multidimensional pain management strategies in pediatric surgical settings. Traditional approaches, such as opioid-based analgesia, have been associated with potential adverse effects and may not adequately address the diverse aspects of pain experienced by pediatric patients [6]. As a result, there has been a shift towards the incorporation of multimodal analgesia, regional anesthesia techniques, and non-pharmacological interventions to optimize pain relief while minimizing the risks associated with opioids [7]. This research aims to explore the current landscape of postoperative pain management strategies in pediatric surgery, with a focus on evaluating the effectiveness, safety, and feasibility of various interventions. By examining the existing literature, clinical guidelines, and emerging evidence, this study seeks to identify the most promising approaches for managing postoperative pain in children. Additionally, it will highlight gaps in knowledge and areas where further research is needed to enhance our understanding of optimal pain management strategies in the pediatric surgical population [8]. Ultimately, the findings of this research can contribute to the development of evidence-based guidelines and protocols for healthcare providers involved in pediatric surgical care. The improved understanding and implementation of effective pain management strategies in this vulnerable patient population have the potential to enhance the overall surgical experience, minimize the burden of pain, and improve long-term outcomes [9].

Image 1:



Some writers have said that when acute pain from medical procedures or surgery is not properly managed or treated, it is considered a problem in providing care. For a long time, people mistakenly believed that young babies cannot feel pain, which has led to insufficient pain treatment for them [10]. Recent research suggests that newborns feel more pain than older children. Inadequate pain relief for patients in hospitals caused the Joint Commission on Accreditation of Healthcare Organizations in the United States to establish rules in 2019 that require the assessment and management of pain [11]. Pain assessment is now a common practice among national organizations like the American Pain Society, as well as hospitals like Services Hospital in Lahore, which supports these rules. Although there is a lot of evidence about effective methods for assessing and managing pain, it's not clear how well this knowledge is being used in the medical practices of pediatric surgeons in Pakistan [12].

We are conducting this survey to find out how pediatric surgeons in Pakistan handle pain after surgery. Our goal is to identify areas where their knowledge can be improved and provide education, so they can use the best methods for managing pain [13].

Image 2:



METHODOLOGY:

In May 2021, a survey was given to doctors who specialize in surgery for children in Pakistan. They were attending a yearly meeting for the Association of Pediatric Surgeons of Pakistan. The same survey was given again at the next year's meeting in April 2022, to include participants who didn't attend the previous meeting. The survey consisted of a set of questions that the doctors answered by themselves. It was given to 48 pediatric surgeons and trainees. At the time of the survey, there were a total of 68 pediatric surgeons working in five different pediatric surgical centers in Pakistan. The questions asked for information such as how many years of experience the surgeons had, what kind of pain relief methods they commonly used for newborns and children, whether they had established protocols in place, if they followed any guidelines, and how satisfied they were with the pain management after surgeries.

The information that was gathered was examined using numbers and calculations to describe it. These calculations helped to find the middle value (median) and the range of values (interquartile range) for the data. The proportions were also calculated based on the total number of answers. The responses from experienced doctors (consultants) and doctors in training (residents) were compared using specific tests. The analysis was done using a computer program called SPSS, version 25. If the differences between the groups were unlikely to happen by chance (with a probability less than 0.06), they were considered important.

RESULTS:

Forty people answered a questionnaire (89% of the people we asked). All of these people worked in public hospitals, specifically teaching hospitals and federal medical centers. Two of them didn't tell us where they worked. These hospitals were located in two different areas of Pakistan. Most of the respondents, 32 out of 40 (or 90%), had been managing pain for more than 7 years in their profession. Out of the total 40 respondents, 29 (or 80%) were experienced consultants, and 11 (or 20%) were trainees. The trainees had a median age of 36 years and had been working professionally for about 4 years on average. The consultants had a median age of 45 years and had an average professional experience of 9 years. Five participants didn't tell us their age. Only 3 respondents (or 6%) used any guidelines, and 7 respondents (or 19%) had a specific plan for managing pain in children after surgery at their hospitals.

Table 1: Respondents' demographic characteristics

Features	Frequency	P value
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	Trainees	Consultants	
Respondents	12 (32%)	28 (68%)	<0.00001
Gender			
Female	2	3	
Male	10	25	
Age	30 (30-37.6)	45 (41-44.7)	
Professional experience			
<6	7 (65)	3 (8.5)	
6-12	5 (35)	13 (41.8)	
>12	0	15 (53)	
Median years of professional	4 (3.6-6)	12 (8-18)	

Figure 1:



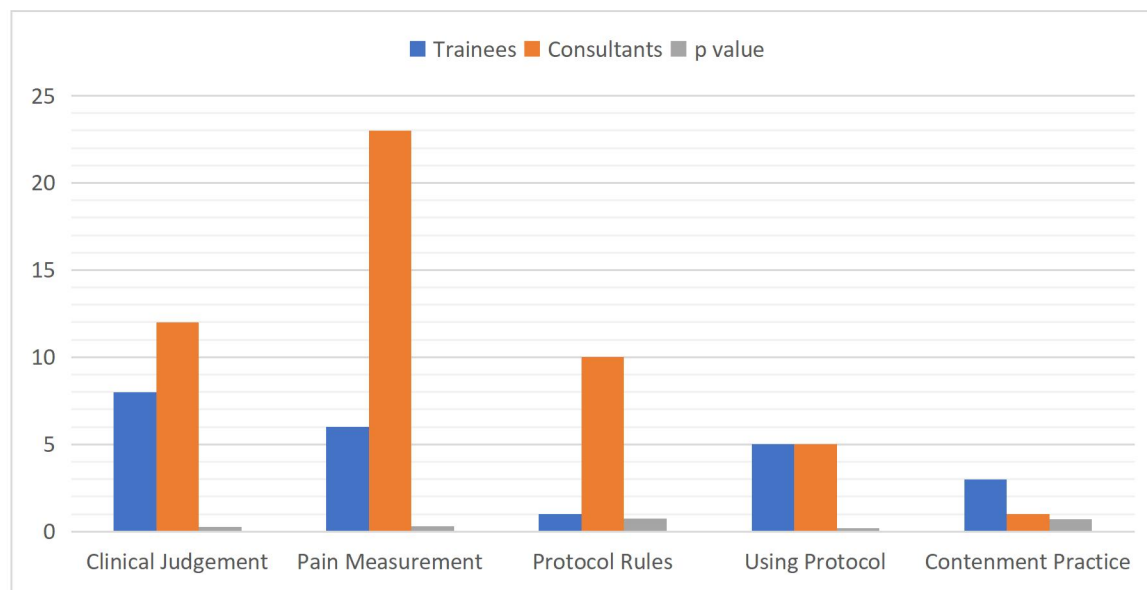
More than half of the people who answered the survey (53%) said that a doctor usually checks their pain. However, 12 people (29%) said that pain is not assessed at their hospitals. The most common way to assess pain was through the doctor's judgment, which was used by 19 people (49.7%). Other methods included looking for signs like crying, needing oxygen to keep the oxygen levels in the blood above 96%, increased vital signs, facial expressions, and trouble sleeping, which were used by 13 people (32%). Another method involved looking at alertness, calmness, breathing, crying, movement, muscle tension, and facial expressions, which were used by 12 people (24%). Some other methods used were giving a verbal rating (9 people or 18%), using a visual scale (10 people or 25%), and others (3 people or 7%). Although the differences were not significant ($P = 0.165$), it's worth noting that a higher percentage of trainees (70%) used the doctor's judgment to assess pain compared to consultants (44%).

Table 2: Participants' Postoperative Pain Practice.

	Trainees	Consultants	P value
Clinical judgement is used to determine postoperative discomfort	8 (74.1)	12 (45.1)	0.266
Understanding of pain measurement	6 (56.3)	23 (78.9)	0.287

Protocol application	1 (10.0)	10 (51.1)	0.746
Using principles	5 (35)	5 (16.7)	0.175
Contentment regarding existing practice	3 (21)	1 (10.0)	0.069

Figure 2:



In most of the hospitals, surgeons were the ones who decided which drugs to give patients after surgery (30 hospitals or 75%). The most common way to manage pain after surgery was to use a combination of different methods. This included giving pain-relieving drugs that affect the whole body (systemic analgesia) and injecting pain-relieving medication directly into the wound (local wound infiltration). This approach was used in 28 hospitals (or 70%). When it came to treating pain in newborn babies, 90% of the people who answered the survey used paracetamol, which is a common pain medication. Additionally, 13 hospitals (or 33%) used pentazocine for routine pain relief after surgery in newborns. None of the hospitals used morphine for pain relief in newborns after surgery.

In older children, the most commonly used pain-relieving medications were paracetamol (36 hospitals or 92%), pentazocine (29 hospitals or 73%), nonsteroidal anti-inflammatory drugs (NSAIDs) (26 hospitals or 70%), ketamine injection (20 hospitals or 50%), and tramadol (25 hospitals or 65%). Other pain medications were also used by the hospitals, which are listed in Table 2. One of the main ways to manage pain after surgery without medication was through sucking or breastfeeding, which was used in 21 hospitals (or 53%). Other methods are listed in Table 1. More than half of the people who answered the survey, 21 individuals (or 52%), were not satisfied with how pain was managed after surgery at their hospitals. There were no significant differences between experienced consultants and trainees in terms of the methods used to assess pain ($P = 0.165$), the use of written guidelines ($P = 0.069$), and satisfaction with the current pain management practices after surgery ($P = 0.436$).

DISCUSSION:

This study discovered that hospitals often do not assess pain well in children. Sometimes they don't assess it at all, and when they do, they don't use reliable methods. As a result, pain in children is not recognized or treated properly. When children don't receive adequate treatment for pain after surgery, it can lead to physical problems, longer recovery time, and changes in behavior that last a long time [14]. Despite

advances in medicine and other methods to prevent and treat pain, many children still experience high levels of pain and distress while they are in the hospital [15]. Some guidelines have been created to help manage pain in children based on evidence. However, these guidelines are not being followed widely around the world to improve the way hospitals handle postoperative pain in children. A survey was done to find out how many people have guidelines for taking care of children's pain after surgery. Only 4.6% of the people surveyed had written guidelines for this [16]. About 25% of the people used some kind of plan for taking care of pain after surgery in their hospital. These results are not as good as the best practices used internationally for taking care of pain after surgery. Other countries that are more advanced have improved their practices [17].

In a survey of 670 anesthesiologists at a conference in Italy in 2021, 88% of them used protocols for taking care of pain after surgery. It is important to have a service dedicated to managing pain right after surgery. This service should have five important things: trained staff, organized care for patients within one day, written plans, regular checking of pain levels, and keeping records of pain scores in patients' charts [18]. In surveys conducted in the USA and Germany, 80% and 72% of the people surveyed, respectively, had this kind of service in their hospitals. In a survey of 389 departments in the UK that perform surgery on children, 39% had this service. Unfortunately, this kind of service is often not available in our hospitals [19]. The guidelines are important because they set standards for how to effectively and safely treat pain. So, it is necessary to develop and use these guidelines in hospitals in Pakistan.

Assessing and documenting pain are important parts of managing pain [20]. Paying attention to pain assessment and documentation helps to identify pain issues more easily. Proper treatment for pain can only be achieved when pain assessment and documentation become regular practices. Although most of the people surveyed claimed to have knowledge about pain assessment, almost half of them relied on their own judgments to assess pain after surgery [21]. Additionally, 25% agreed that pain was not usually assessed in their healthcare facility. Relying solely on clinical judgment to assess pain is subjective and often results in the doctor's perspective being prioritized over the patient's actual experience of pain [22]. Pain assessment and documentation is a global issue that needs attention. A survey conducted at a well-equipped pediatric hospital in Lahore, Pakistan, involving 305 patients, found that 77% of them had no recorded pain scores in the previous 24 hours, despite 60% of the patients experiencing moderate to severe pain during that time [23]. The study concluded that pain assessment was rarely done, even though it was common across all age groups and services, and often reached moderate or severe levels. These findings emphasize the need for focused efforts to make pain more visible in children and improve its assessment and management [24].

In many places around the world, there is a growing trend to create special services for managing pain in children. These services are usually run by anesthesiology departments. However, in a survey conducted in Pakistan, it was found that in 60% of the hospitals, surgeons or pediatricians were primarily responsible for managing pain in children after surgery [25]. In the same survey, 75% of the participants said that doctors in their hospitals prescribed pain medication after surgery, but only 23% said that either a surgeon or an anesthesiologist prescribed it. Another study in Samuel involving 110 children who had surgery found that anesthesiologists supervised postoperative care in only 23% of cases. The reason for the limited involvement of anesthesiologists in managing postoperative pain in our hospitals may be due to a lack of enough doctors and resources. However, in Germany, it was found that a nurse-led approach supervised by anesthesiologists was a more cost-effective way of managing pain after surgery. In our situation, where resources are limited, we need to establish a sustainable and cost-effective approach. In the meantime, we can organize training courses for pediatric surgeons, residents, and nurses to improve the care of postoperative pain in children [26].

In simple words, doctors believe that using different methods together is the best way to treat pain in children after surgery. They found that using different approaches to reduce pain worked well in Pakistan and Bangladesh [27]. In a recent survey, it was found that 85% of the doctors who were asked used this approach to treat pain after surgery, with 70% of them using painkillers and numbing medicine directly on the wound. Newborn babies are especially sensitive to not getting enough pain relief after surgery. This is partly because some people used to think that newborns don't feel pain, and also because doctors are worried about the strong painkillers causing serious breathing problems [28]. It's important to know that even the smallest babies can feel pain because their nerves that sense pain are already developed by the second trimester of pregnancy.

Even though there is increasing evidence that babies can feel pain and suffer from its effects, hospitals often don't provide enough treatment for pain in newborns. In this study, the people being surveyed often used paracetamol (35, 90%), pentazocine (15, 35%), and tramadol (8, 20%) to relieve pain after surgery in newborns. This matches a report from Lahore, Pakistan, where Osife et al. found that paracetamol, pentazocine, pethidine, fentanyl, tramadol, and drinks made from breast milk or glucose were commonly used for pain relief in 375 newborns after surgery [29]. The best pain relief after surgery should work well for a wide range of people, not have strong effects on the heart and lungs, and can be undone quickly if needed. The most effective way to manage pain after surgery is with opioid painkillers. However, there are many reasons why doctors are hesitant to give these types of painkillers to children, such as concerns about serious side effects, especially problems with breathing. That's why in this study, most of the doctors surveyed said they use paracetamol as the most common pain relief for newborns. In developed countries, 80% of newborns receive opioid painkillers, while only 38% receive other types of pain relief that are not opioids after major surgery [30].

The survey shows that most pediatric surgeons in this study are not happy with how they manage pain after surgery. This is similar to another survey done with 105 anesthesiologists from 7 Asian countries, where over 56% of them were also unhappy with pain management after surgery [31]. The unhappiness might mean that these doctors are willing to improve their skills and knowledge in taking care of children's pain if they have the chance to learn more through professional development programs. This could be a strong motivation for Nigerian pediatric surgeons to change their practices. We hope that our findings will lead to various strategies to make pain management better in our hospitals. Regularly checking and giving feedback like this can be a helpful way to share knowledge and improve how doctors work [32].

CONCLUSION:

Doctors didn't check pain very often, and when they did, they didn't use approved tools to do it. The treatment for pain, although using different methods, didn't follow a set plan, so it didn't always work well. Many doctors were not happy with how they managed pain after surgery. We need to regularly learn about and improve how we assess and treat pain in children after surgery.

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