

Original Article

PAIN LEVEL OF POSTOPERATIVE ORTHOPEDIC PATIENTS AT DR. SOETOMO GENERAL HOSPITALDavid Wicaksono^{1a}, Lilik Herawati², Herdy Sulistyono³¹Faculty of Medicine, Universitas Airlangga, Surabaya²Department of Physiology, Faculty of Medicine, Universitas Airlangga, Surabaya³Department of Anesthesiology dan Reanimation, Faculty of Medicine, Universitas Airlangga/Dr. Soetomo Academic Hospital, Surabaya^aCorresponding author: david.wicaksono3@gmail.com**ABSTRACT**

Introduction: Postoperative pain is the most undesirable consequence of the surgery. If it is not managed properly, it can lead to a long healing. However, assessment and treatment of postoperative pain in surgical wards still have not received attention. Differences in patient's pain level after surgery and after being transferred to the surgical ward is very important in monitoring the effectiveness postoperative pain management. **Objective:** This study was conducted to determine the overview of pain level experienced by patients following orthopedic surgery and to know the individual factors that can affect the patient's pain level. **Method and Material:** This research was observational analytic with 43 orthopedic postoperative patients as a sample. The Patients' pain level were measured by the Numeric Rating Scale (NRS) at one hour after surgery and 24 hours after surgery. **Result and Discussion:** The Pain level one hour after surgery varied between pain level 0 as much as 53% to pain level 8 as much as 4.7%. The results of measurements of pain 24 hours after surgery only 23.3% of the patients who did not complain of pain, and there was a patient who experienced pain level 10. The results of the statistical calculation, the difference between the level of pain one hour and 24 hours post-surgery obtained value of $p=0.037$ ($p<0.05$). **Conclusion:** There was a significant difference between the pain level at one hour and 24 hours post-surgery. It might be due to the process of peripheral and central sensitization in patients with delayed pain management. It also may be influenced by individual factors as well as medical personnel.

Keywords: NRS, Patients, Pain Level, Pain, Postoperative Pain.**ABSTRAK**

Pendahuluan: Nyeri post operasi adalah konsekuensi paling tidak diinginkan dari pembedahan, dan jika tidak dikelola dengan baik dapat menyebabkan penyembuhan yang lama. Namun, penilaian dan penanganan nyeri post operasi di bangsal bedah masih belum mendapat perhatian. Perbedaan tingkat nyeri pasien setelah operasi dan setelah pasien dipindah ke bangsal bedah sangat penting dalam memantau efektivitas manajemen nyeri post operasi. **Tujuan:** Penelitian ini dilakukan untuk mengetahui gambaran tingkat nyeri yang dialami oleh pasien setelah operasi ortopedi dan mengetahui faktor individu yang dapat berpengaruh pada tingkat nyeri pasien. **Metode dan Bahan:** Penelitian ini merupakan penelitian analitik observasional dengan 43 pasien post operasi ortopedi sebagai sampel. Tingkat nyeri pasien diukur dengan Numeric Rating Scale (NRS) pada satu jam setelah operasi dan 24 jam setelah operasi. **Hasil dan Pembahasan:** Tingkat nyeri saat satu jam post operasi bervariasi antara tingkat nyeri 0 sebanyak 53% ke level nyeri 8 sebanyak 4,7%. Hasil pengukuran nyeri pada 24 jam setelah operasi hanya 23,3% dari pasien yang tidak mengeluh nyeri, dan ada pasien yang mengalami tingkat nyeri 10. Hasil pengukuran nyeri 24 jam setelah operasi hanya 23,3% dari pasien yang tidak mengeluh nyeri dan ada pasien yang mengalami tingkat nyeri 10. Hasil perhitungan statistik perbedaan antara tingkat nyeri satu jam post operasi dan 24 jam post operasi diperoleh nilai $p=0,037$ ($p<0,05$). **Kesimpulan:** Ada perbedaan signifikan antara tingkat nyeri pada satu jam post operasi dan 24 jam post operasi. Mungkin karena terjadi proses sensitisasi sentral dan perifer pada pasien dengan manajemen nyeri yang kurang adekuat atau tertunda. Hal ini juga mungkin dipengaruhi oleh faktor individu maupun tenaga medis.

Kata kunci: NRS, Pasien, Tingkat Nyeri, Nyeri, Nyeri Post-Operasi.

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INTRODUCTION

Pain is a part of the human impression of everyday living and a manifestation of a pathological process.¹ The International Association for the Study of Pain (IASP) defined pain as an unpleasant sensory and emotional experience related to actual or potential tissue damage.² Pain is very subjective depending on the perception of each individual.

Pain is very unique because it can cause suffering for those who feel it, but on the other hand pain can also show benefits.¹ Pain has some functions as a protection, defensive mechanism, and diagnostic support mechanism. As a protection, the sense of pain allows a person to react to a trauma or cause of pain, so a person can avoid damage of body tissue. As a defensive mechanism, it allows immobilization of organs that are inflamed or broken so that the sensible feeling will subside and can heal quickly. As a diagnostic guide, pain can show an abnormal location quickly.³ Although the pain has benefits, the presence of pain must be immediately removed so that not to interfere.

Surgical procedures are associated with tissue injury and the majority of patients who are operated on have some degree of pain after surgery. Many patients can suffer moderate pain or even severe pain after surgery. Research had shown that pain treatment is lacking could cause acute and chronic negative effects.⁴

Pain after surgery (postoperative pain) is a specific type of acute pain. More than 75% of patients undergoing surgery suffered from acute pain.⁵ Acute postoperative pain could continue to be chronic postoperative pain in 10-50% of individuals after general surgical

procedures, with 2-10% of patients had severe chronic postoperative pain.⁴ The effective prevention of postoperative acute pain is one of the important things to prevent chronic or persistent postoperative pain.

The methods often used to measure pain include: NRS or VAS, VDS, FLACC, and FRS.⁶ By knowing the level of pain appropriately, it is expected that the therapy is also appropriate so the patient's condition is not getting worse because of the negative effects of the uncontrolled pain.

Postoperative pain is the most undesirable consequence of surgery, and if it is not managed adequately it can lead to prolonged healing and increased length of hospital stay.⁷ The survey continues to reveal that postoperative pain is still less successfully handled throughout the world.⁸ More than 20-years, the American survey showed that only one in four patients had adequate healing from postoperative pain. It made the Recovery Room (RR) protocol to include pain as the fifth vital sign that needs to be handled before the patient is taken to the ward.

In a study conducted by Schoenwald & Clark (2006), clinical practice in the assessment and treatment of pain was still lacking. Although not many patients complain of postoperative pain, the fact that the weakness of management of pain is an issue of concern. In addition, The England Surgeons, Royal College and the College of Anesthetists (1990) published documents that highlighted the failure to effectively assess and manage pain, which stated that the treatment of postoperative pain at British Hospital was inadequate and had not progressed significantly for many years.⁹ Whereas the difference in the patient's pain level between the 1 hour postoperative period

and the 24 hour postoperative period is not clearly known.

Because of this, further research is needed on postoperative pain to determine the general picture of pain in postoperative patients related to the management of postoperative pain performed at the Dr. Soetomo General Hospital Surabaya. The researchers was going to look for an overview of the level of pain in patients post elective surgery and also factors that can influence.

MATERIAL AND METHOD

This research is an observational analytic study and a cross sectional approach. The sample in this study was postoperative patients with extremist orthopedics in the Recovery Room of the Integrated Central Surgical Building and Surgical Ward at the Dr. Soetomo General Hospital. The sample data in this study was carried out by the total sampling method during the period between March 19 and April 30, 2015. The inclusion criteria were elective orthopedic patients who underwent surgery in the extremity section, had a fairly good awareness and were able to communicate, and entered into the criteria of adults (ages 18-64 years). The variables in this study were the results of measuring the pain level one hour postoperatively and the pain level 24 hours postoperatively. Data collection used data collection sheets (LPD) and Numeric Rating Scale (NRS) to measure pain levels. The data sources used in this study were primary data from the results of direct interviews with patients at one hour post surgery in the recovery room and 24 hours postoperatively in the surgical ward and secondary data from the patient's anesthesia status. Then the data was entered into the SPSS 17.0 program and analyzed using the Wilcoxon Signed Rank Test.

RESULT AND DISCUSSION

Table 1. Distribution of pain measurement results during preoperative, 1 hour postoperative, and 24 hours postoperative.

Pain Level	Preoperative		1 Hour Postoperative		24 Hour Postoperative	
	N	%	n	%	n	%
0	27	62.8%	23	53.0%	10	23.3%
1	3	7.0%	3	7.0%	7	18.6%
2	5	11.6%	6	14.0%	8	16.3%
3	4	9.3%	1	2.3%	5	11.6%
4	1	2.3%	3	7.0%	2	4.7%
5	1	2.3%	3	7.0%	3	7.0%
6	1	2.3%	1	2.3%	5	11.6%
7	1	2.3%	1	2.3%	1	2.3%
8	1	2.3%	2	4.7%	1	2.3%
9	0	0.0%	0	0.0%	0	0.0%
10	0	0.0%	0	0.0%	1	2.3%

Table 1 showed the results of measuring the level of pain in 43 patients before surgery, 1 hour after surgery, and 24 hours after surgery. The pain scale displayed that the NRS scale (Numeric Rating Scale) which was starting with a score of 0 which means no pain up to a score of 10 which means that pain was unbearable. The data in the table were presented in frequency and percentage. From the table, the pain level felt by patients during the preoperative visit and 1 hour postoperative were ranged in score of 0-8. There were no patients who had pain in the scores of 9 and 10. At 1 hour postoperative many patients did not complain of pain (53%). While the measurement of pain at 24 hours postoperative was found 1 person who had pain at score of 10 (2.3%).

Table 2 showed patients who did not feel pain initially and still did not feel pain in the measurement of 24 hours postoperative were 9 patients. Then, patients who did not feel pain initially and turned into pain were 14

patients, distributed 9 patients with mild pain, 4 patients with moderate pain, and 1 patient with severe pain. Patients who initially complained mild pain were 10 people, there were 6 patients with mild pain, 3 patients with moderate pain and 1 patient with severe pain. From 7 patients who complained of moderate pain at the beginning, most of them turned into mild pain as many as 4 patients. It could be seen that there was a decreasing in mild pain from being moderate pain. In addition, there was also a decreasing in pain level in patients who initially complained severe pain as many as 3 patients became mild pain and moderate pain. In tables 2 and 3 the NRS pain scale was grouped into four, namely no pain (score 0), mild pain (1-3), moderate pain (4-6), severe pain (7-10).

Table 2. Changes in the distribution of the number of patients from pain level on 1 hour postoperative to the pain level on 24 hours postoperative

Pain level on 1 hour postoperative	Pain level on 24 hour postoperative				Total n
	No pain	Mild pain	Moderate pain	Severe pain	
No pain	9	9	4	1	23
Mild pain	0	6	3	1	10
Moderate pain	1	4	1	1	7
Severe pain	0	1	2	0	3
Total	10	20	10	3	43

Changing in distribution globally could be seen in table 3. At the initial pain level, patients who gave a non-painful response were in the first rank (53.5%), exceeding half of the respondents and the rest who complained of mild pain 23.3%, moderate pain 16.3%, and severe pain 7%. Pain level distribution in table 3 showed a decreasing in the percentage of patients who were not painful from 53.5% to 23.3%. The results of statistical calculations that can be seen from table 3 also showed that more patients complain of pain 24 hours postoperative compared on 1 hour postoperative. It was seen

from mean of the data on 24 hours postoperative giving a score greater than 1 hour postoperative. In analytic calculations also obtained the results of $p < 0.05$ is 0.037 which means that there is a significant difference between the pain level on 1 hour postoperative and the pain level on 24 hours postoperative.

Table 3. Results of statistical analysis of 1 hour postoperative pain level and 24 hour postoperative pain level

	No pain	Mild pain	Moderate pain	Severe pain
Pain level on 1 hour postoperative	23 (53.5%)	10 (23.3%)	7 (16.3%)	3 (7%)
Pain level on 24 hour postoperative	10 (23.3%)	20 (46.5%)	10 (23.3%)	3 (7%)
	Mean	Std. Deviation	P	
Pain level on 1 hour postoperative	1.77	0.972	0.037	
Pain level on 24 hour postoperative	2.14	0.861		

* $p < 0,05$, there are significant differences

The most number of patients who complain of painless than complain of pain in the initial measurement of 1 hour postoperative can be caused by a factor in the patient's level of consciousness due to the effects of anesthetic drugs and the psychological factors of the patient. The effect of anesthetic drugs that still exist can affect patient awareness and pain perception felt during measurement. Anxiety can also be an influential factor. The measurement of the initial pain level was carried out in the recovery room where the patient was monitored and observed until the patient's condition was stable and qualified to be transferred to the surgical ward. Closed monitoring carried out by nurses and doctors there provides a sense of secure to patients, so that it affects patients in perceiving acute postoperative pain. In table 1 showed a

decreasing in the percentage of patients who are not painful, which means more patients complain of pain than at 1 hour postoperative. In addition, there is also an increasing in the percentage of patients who has mild pain and moderate pain. This provides information that there are factors that influence the management of postoperative pain in the surgical ward.

The results of statistical calculations that can be seen from table 3 also showed that more patients complain of pain on 24 hours postoperative compared to 1 hour postoperative. From the mean data at 24 hours postoperative giving a score greater than 1 hour postoperative. In analytic calculations found a significant difference between the pain level on 1 hour postoperative and the pain level on 24 hours postoperative. These differences are influenced by factors from the patient, experience of previous pain, culture, beliefs, mood, and also the ability to withstand the pain.¹⁰

Postoperative pain is one category of acute pain. Surgery activates the stress response to postoperative pain. Prolonged postoperative pain produces the changing in the nervous system, which converts normal physiological responses to dangerous stimuli. Inflammation or nerve damage results in changes in sensory processing at the peripheral and central levels with the results of sensitization. After sensitization occurs, stimuli which under normal conditions do not cause pain, are perceived as pain (allodynia) and an excessive response to the stimulus that causes pain (hyperalgesia).¹¹

Surgery causes trauma to the tissue, which results in dangerous stimuli and large nociceptive input. Then, after surgery there is an inflammatory process in the operating area, which is also responsible for dangerous inputs. Both of these processes sensitize the pain pathway. Both occur at the peripheral level

where there is a decreasing in afferent nociceptive threshold and at the central level by increasing excitation of spinal neurons involved in pain transmission. Peripheral sensitivity can occur with different stimuli such as temperature, tactile, mechanics, and chemistry. In clinical situations, this dangerous stimulation prolonged cause tissue damage and inflammation, and cause the releasing of substances from inflammatory mediators such as K, serotonin, bradykinin, substance P, histamine, etc. These substances act to sensitize nociceptors with high thresholds. As a low threshold stimulus, which usually does not cause pain, now, it is felt as pain. Central sensation occurs in surgical injuries through the dorsal mechanism where there is an increasing response to stimuli that are normally not painful and to the area surrounding the operation cause secondary hyperalgesia. This due to secondary C nerve fibers to primary afferents caused morphological and biochemical changes in the dorsal horn of the spinal cord which are difficult to return to normal. The changing that occur are an expansion in the size of the receptor diameter, as well as a big increase and duration of response to stimuli and finally there is a decreasing in the threshold. NMDA receptors (N-methyl-D-aspartic acid) can mediate responses in physiological process of sensory information, and are also involved in central sensitization.¹¹

CONCLUSION

In this study, there were more patients who complained of pain 24 hours postoperative compared to 1 hour postoperative. There was a significant difference between the level of pain at one hour postoperative and the 24-hour postoperative pain level. These differences can be influenced by individual

patient factors such as gender, surgery history, and level of education as well as factors from medical personnel both in assessing and managing postoperative pain in patients. Patients on 24 hours postoperative, there may be peripheral or central sensitization due to delay or inadequate treatment of pain so that the pain was felt at 24 postoperative becomes higher. The lack of attention of medical personnel to postoperative pain had by patients can also be one of the main influential factors. There are also psychologic factors from patients who may feel afraid of medical personnel so they do not report their pain. After reading this research, it is expected that medical staff can be more attentive in carrying out assessment and management of postoperative pain. Future studies are expected to take samples over a longer period of time than this study. In addition, the variables studied for further research are expected to be more including variables related to paramedic performance.

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Conflict of Interest

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REFERENCES

1. Chandra, S. Panduan Tatalaksana Nyeri Perioperatif. Perhimpunan Dokter Spesialis Anestesiologi dan Reanimasi Indonesia, Jakarta. 2009.
2. International Association for the Study of Pain (IASP). IASP Taxonomy. 2012. [Cited on 2014 July 29th]. Available from: http://www.iasp-pain.org/AM/Template.cfm?Section=Pain_Definitions
3. Mangku & Senapathi. Buku Ajar Ilmu Anestesia dan Reanimasi. Jakarta: Indeks. 2010.
4. Kehlet & Holte. Effect of postoperative analgesia on surgical outcome. *Br J Anaesth.* 2011;87(1):62-72. [Cited on 2014 August 10th]. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/11460814>
5. Ceyhan & Güleç. Is postoperative pain only a nociceptive pain?. *The journal of the Turkish Society of Algology.* 2010;22(2):47-52. [Cited on 2014 August 11th]. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/20582745>
6. National Institute of Clinical Studies. Emergency Care Acute Pain Management Manual. Canberra: National Health and Medical Research Council (NHMRC). 2011.
7. Schug, SA & Chong, C. Pain management after ambulatory surgery. *Curr Opin Anaesthesiology.* 2009;22(6):738-743.
8. Rawal, N & Langford, RM. Current practices for postoperative pain management in Europe and the potential role of the fentanyl HCl iontophoretic transdermal system. *Eur J Anaesthesiol.* 2007;24(4):299-308.
9. Mackintosh, Carolyn. Assessment and management of patients with post-operative pain. *Nursing Standard.* 2007;22(5):49-55.
10. Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine. *Acute Pain Management: Scientific Evidence.* Australia: National Health and Medical Research Council (NHMRC). 2010.

11. Rao, Manimala. Acute Post Operative Pain. Indian Journal of Anaesthesia. 2006;50(5):340-344. [Cited on 2016 February 2nd]. Available from: <http://medind.nic.in/iad/t06/i5/iadt06i5p340.pdf>.