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Prospective Observational Study to Compare and Validate Objective Pain Score Vs Numerical Rating Scale To Evaluate Acute Post Operative Pain

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ABSTRACT
Background: Postoperative pain management is crucial for enhancing patient recovery, especially following major abdominal surgeries. Accurate assessment of pain is essential to administer appropriate analgesia. Traditionally, the Numerical Rating Scale (NRS) is widely used, but its subjective nature can lead to inconsistencies. The Objective Pain Score (OPS), a newer and more objective tool, may offer a more accurate assessment of acute pain.
Aim: To compare and validate a 4-point Objective Pain Score (OPS) for evaluating acute postoperative pain against the Numerical Rating Scale (NRS) in patients undergoing elective laparotomy surgeries.
Methods: This prospective observational study was conducted in the Post Anesthesia Care Unit (PACU) at SRM hospital over 12 months, involving 96 patients who underwent elective abdominal surgeries. Pain assessment was performed using both OPS and NRS at regular intervals for 48 hours postoperatively. Rescue analgesia was administered based on the pain scores, with paracetamol for moderate pain and fentanyl for severe pain. Discrepancies between OPS and NRS were resolved by consulting the acute pain service (APS) consultant.
Results: Out of 1,824 paired OPS and NRS readings, 145 instances showed disagreement, with OPS proving more reliable in determining the need for analgesia. OPS demonstrated superiority in minimizing unnecessary administration of higher-level analgesics, particularly when NRS overestimated pain severity. Statistical analysis showed that OPS is more consistent and objective than NRS.
Conclusion: The study concludes that while NRS remains a conventional pain assessment tool, OPS offers a slight advantage due to its objective nature. Implementing OPS in postoperative pain management could reduce unnecessary administration of higher-level analgesics, thus optimizing pain control.

Keywords: Objective Pain Score, Numerical Rating Scale, Acute Postoperative Pain, Analgesia, Laparotomy

1. INTRODUCTION

Pain is a vital function of the nervous system in providing the body with a warning of potential or actual injury. It is both a sensory and emotional experience, affected by psychological factors such as past experiences, beliefs about pain, fear or anxiety [1]

Nociceptors:
Nociceptors are the specialized sensory receptors responsible for the detection of noxious (unpleasant) stimuli, transforming the stimuli into electrical signals, which are then conducted to the central nervous system. They are the free nerve endings of primary afferent Aδ and C fibers. Distributed throughout the body (skin, viscera, muscles, joints, meninges) they can be stimulated by mechanical, thermal or chemical stimuli [2]
Inflammatory mediators (bradykinin, serotonin, prostaglandins, cytokines, and H+) are released from damaged tissue and can stimulate nociceptors directly. They can also act to reduce the activation threshold of nociceptors so that the stimulation required to cause activation is less. This process is called primary sensitization [3]
Ascending tracts in the spinal cord There are two main pathways that carry nociceptive signals to higher centers in the brain. The spinothalamic tract: secondary afferent neurons decussate within a few segments of the level of entry into the

spinal cord and ascend in the contralateral spinothalamic tract to nuclei within the thalamus. Third order neurons then ascend to terminate in the somatosensory cortex. There are also projections to the
Periaqueductal grey matter (PAG). The spinothalamic tract transmits signals that are important for pain localization [4]
The spin reticular tract: fibers also decussate and ascend the contralateral cord to reach the brainstem reticular formation, before projecting to the thalamus and hypothalamus. There are many further projections to the cortex. This pathway is involved in the emotional aspects of pain [5]
The experience of pain is complex and subjective, and is affected by factors such as cognition (e.g., distraction or catastrophizing), mood, beliefs and genetics. The somatosensory cortex is important for the localization of pain. However, imaging techniques such as functional magnetic resonance imaging (fMRI) have demonstrated that a large brain network is activated during the acute pain experience. This is often called the 'pain matrix'. [5] The commonest areas activated include the primary and secondary somatosensory cortex (S1 and S2), insular, anterior cingulate cortex and prefrontal cortex, and the thalamus, demonstrating that these areas are all important in pain percept.

2. MECHANISM OF PAIN

The three main processes that the basic pain mechanism goes through when noxious stimuli are present are transduction, transmission, and modulation. For instance, transduction proceeds along the nociceptive pathway in the following order: stimulus events are transformed into chemical tissue events; chemical tissue and synaptic cleft events are then transformed into electrical events in the neurons; and electrical events in the neurons are transduced as chemical events at the synapses. The subsequent mechanism would be a gearbox once transduction was finished. It occurs by the transmission of electrical events through neural pathways, and neurotransmitters in the synaptic cleft transmit data from the post-synaptic terminal of one cell to the pre-synaptic terminal of another. While this is going on, the modulation event occurs.

3. SIGNS AND SYMPTOMS OF PAIN:

- Increased respiratory rate
- Increased heart rate
- Peripheral vasoconstriction
- Pallor
- Elevated B.P
- Increased Blood Glucose Levels
- Diaphoresis
- Dilated pupils [6]

Pain:
*Underlying Etiology- Nociceptive, inflammatory, Neuropathic
*Anatomic Location¬- Somatic, visceral
*Temporal-Acute, chronic
*Intensity¬-Mild, Moderate, severe [6]

Based on intensity:
Mild pain:
Pain scale reading from 1 to 3 is considered as mild pain
Moderate pain:
Pain scale reading from 4 to 6 is considered as moderate pain
Severe pain:
Pain scale reading from 7 to 10 is considered as severe pain [7]

Pain assessment tools:
These are various tools that are designed to assess the level of pain.

The most commonly used tools are:
Verbal Rating Scale
Numeric Rating Scale
Wong Baker's Faces Pain Scale [8]

Goal of assessment of postoperative pain.
To assist in diagnosing and to quantify post-operative pain
(2) To select appropriate therapy.
(3) To evaluate the response to therapy

Scales for assessing pain are useful in determining both the severity of the condition and the efficacy of various treatments. Scales used to measure pain should be simple and accurate. The numeric rating scale (NRS) is a well-liked scale for this

function since it can be used quickly. Although it would be ideal to assess acute pain simultaneously when the patient is moving and resting (important for functionality and post-operative consequences), this is typically not done due to a lack of time. Pain is a subjective experience, and both the patient's estimate of their own pain and the observer's assessment can be influenced by a wide range of variables, including socioeconomic position, religious views, and psychological health. Score of pain [9]

Numerical rating scale:
The numeric rating scale (NRS) (FIGURE 4) is a pain screening tool that is frequently used to evaluate the current level of pain using a 0–10 scale, where 0 corresponds to "no pain" and 10 to "the worst pain imaginable. [10]
The NRS-11 has been widely utilized in clinical settings to assess pain. NRS can be used in adults and children (>9 years old) receiving medical care in any context who are able to quantify their level of pain. The NRS has the enormous advantage of simply requiring verbal communication between the physician and children, unlike other well-known pain scales, which can present issues with procurement, distribution, storage, and infection control.[11]

The Advantages and Disadvantages of the Numeric Rating Scale

Advantages
- The whole process takes under a minute.
- Both administering and scoring the test take less than a minute.
- Since it uses a numeric scale, there are no problems with translation while using it abroad.
- For assessing pain severity, it has been found to be valid and trustworthy.
- It is accessible to more people because it can be administered verbally and in writing.

Disadvantages
- Intensity is the only aspect of pain that is evaluated.
- Past pain experiences are not considered.

Objective pain score:
To objectively determine the requirement for analgesia in patients undergoing abdominal surgery and to monitor the efficacy of
The analgesic measures, we therefore suggested a 4-point objective pain score (OPS) [12].

Management of pain:
Pain in the peri-operative period can be managed through Pharmacological interventions and regional blockade like central neuraxial analgesia, fascial plane blocks, nerve blocks.
Pharmacological therapy is given by using Analgesics.
- The analgesics may be NON-OPIOIDS (NSAIDS) OR OPIODS OR ADJUVANTS
- NSAIDS: Non-steroidal anti-inflammatory drugs

Opioids: Opioids are medications that relieve pain. Derived from opium.
Adjuvants: Adjuvants are drugs originally developed to treat conditions other than pain but also have analgesic properties [13]

Nonopioids: -Used alone or in conjunction with opioids for mild to moderate pain.
-E.g.; NSAIDS- paracetamol, aspirin.
Opioids: - for moderate or severe pain
-E.g.: morphine, codeine
Adjuvants:
- Used for analgesic reasons and for sedation and reducing anxiety.
-E.g.: Tri-cyclic antidepressants, Anti epileptics, Corticosteroids [14]

Regional anaesthesia:
Epidural anaesthesia is a neuraxial procedure that involves delivering medication, most often local anaesthetic, to the epidural space for analgesia or anaesthesia. The epidural space is located superficial to the dura mater of the spinal cord and just deep to the ligamentum flavum of the vertebrae.
Epidural anesthesia is a technique for perioperative pain management with multiple applications in anesthesiology. It is useful as a primary anesthetic, but most commonly, it is used as a pain management adjuvant. It can be a single shot or a continuous infusion for long-term pain relief. Aside from the benefit of potentially providing excellent analgesia, its use reduces the exposure to other anesthetics and analgesics, decreasing side effects. It has also shown to decrease cortisol levels, expedite the return of bowel function, decrease the incidence of PE and DVT in the postoperative period, and shorten lengths of in-hospital sta

Indications

Epidurals are useful for surgical anesthesia of thoracic surgery, major intra-abdominal surgery, or spine surgery, granted that muscle relaxation is not needed. This technique may also be for intra-op or post-op pain management. It may decrease the surgical risk and morbidity of certain patient populations, for example, patients with
Ischemic cardiac disease. It also has been shown to decrease post-op lung complications and increase the intestinal return of function after abdominal surgery.

Containdication

Absolute
Refusal of the patient
Bacteraemia
Local infection at the site of puncture
Haemorrhagic diathesis or therapeutic anticoagulation
Increased intracranial pressure
Relative
Significant aortic stenosis
Right to left shunt and pulmonary Hypertension
Anatomical deformities of the spine

4. MATERIALS AND METHODS

After obtaining the institutional ethics committee approval and patient's informed consent from patient attender this study was conducted on patients who underwent Elective Laparotomy surgeries under General Anaesthesia with epidural.
Study Design: This study will be done in a prospective observational method.

Study Population

Patient who underwent elective laparotomy under GA with epidural and shifted post operatively to PACU for epidural infusion.
PERIOD OF STUDY:12months
INCLUSION CRITERIA:

- Patients aged from 18-65 years
- Patients with ASA I-III
- Patients scheduled for elective laparotomy surgeries done under general anesthesia with epidural

EXCLUSION CRITERIA:

- Patients with hemodynamic instability
- Patients with coagulation disorders
- Patients with known allergy to local anesthesia

5. METHODOLOGY

We conducted a prospective observational study involving 96 patients undergoing elective laparotomy surgeries performed at SRM hospital over a period of 12 months. This study is done to compare and validate Objective Pain Score (OPS) vs Numerical Rating Scale (NRS) for acute pain in patients undergoing elective laporotomy surgeries. The patients were evaluated after being shifted to the Post Anesthesia Care Unit. Patients undergoing major abdominal surgical procedures and meeting the inclusion criteria were included in the study. All patients were standardized to receive general anesthesia and an epidural for pain relief. The attending Anesthesiologist provided anesthesia as clinically indicated. The patients were shifted to PACU after surgery to receive an epidural infusion for post-operative pain relief. All patients received Inj.0.2% Ropivacaine epidural infusion at 4ml/hr. The patients were assessed for pain using Objective Pain Score and Numerical Rating Scale at regular intervals. If the patient experienced postoperative nausea and vomiting (PONV), they received Inj. Ondansetron 4 mg i.v stat as standard protocol. Rescue analgesia for breakthrough pain was divided into Level 1 (analgesia was supplemented with Inj. Paracetamol 1 g i.v for NRS 2-5 and OPS 3) and Level 2 (analgesia was supplemented with Inj. Fentanyl 25 mcg i.v for NRS >6 and OPS 1 and 2). When there was any disagreement between the two scores, the consultant in charge of the acute pain service (APS) and not involved in the study was consulted to determine the need for analgesic supplementation. Analgesic measures were targeted to achieve NRS <3 and or OPS >3. The clinical parameters of demographic variables such as age, height, weight, BMI was noted. Base vitals such as Heart rate (HR), Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP), Mean Arterial Pressure (MAP), oxygen saturation (SpO2) were recorded.
Pain was assessed and rated using both Numerical Rating Scale and Objective Pain Score, every 2 hours from immediate post-operative period up to 24 hours and after 24 hours, every 4 hours up to 48 hours. The scales were thus compared, and the rescue analgesia administered according to the levels as mentioned earlier.

6. STATISTICAL ANALYSIS

All the statistical analysis was performed using Statistical Package for Social Sciences (SPSS Version 20) for Microsoft Windows. The data were normally distributed and therefore, parametric tests were performed. Descriptive statistics (Mean, Standard Deviation, Median, Frequency and Percentage) were included. To compare the quantitative data between 2 scales Kolmogorov-Smirnov Z test was used. The results were expressed in 95% confidence interval. A value of $p<0.05$ was considered to be statistically significant.

7. RESULTS

Based on OPS, Paracetamol was given preferentially than fentanyl at 2nd, 6th, 8th, 10th, 12th, 14th, 16th, 18th, 20th and 22nd hours (10 hours). This was because according to NRS Scale, the patient required fentanyl but when assessed using OPS scale, patient required only paracetamol. This leads us to infer that OPS is better than NRS.

Objective Pain Score

HRS	1	2	3	4	M	S.D	K.MO.TEST	P VALUE
2	Nil	6	31	51	3.55	0.613	3.74	0.000
%	Nil	6.3	32.3	61.5				
4	Nil	12	35	49	3.38	0.7	3.13	0.000
%	Nil	12.5	36.5	51				
6	8	14	36	38	3.08	0.93	2.3	0.000
%	8.3	14.6	37.5	39.6				
8	4	17	41	34	3.09	0.83	2.31	0.000
%	4.2	17.7	42.7	35.4				
10	13	7	47	29	2.95	0.96	3.02	0.000
%	13.5	7.3	49	30.2				
12	11	12	43	30	2.95	0.95	2.73	0.000
%	11.5	12.5	44.8	31.3				
14	5	18	35	38	3.1	0.88	2.34	0.000
%	5.2	18.8	36.5	39.6				
16	Nil	16	29	51	3.36	0.755	3.24	0.000
%	Nil	16.7	30.2	53.1				
18	3	5	32	56	3.46	0.739	3.4	0.000
%	3.1	5.2	33.3	58.3				
20	6	5	27	58	3.42	0.855	3.45	0.000
%	6.3	5.2	28.1	60.4				
22	5	12	25	54	3.33	0.89	3.28	0.000
%	5.2	12.5	26	56.3				
24	2	11	31	52	3.38	0.77	3.21	0.000
%	2.1	11.5	32.3	54.2				
28	Nil	14	25	57	3.44	0.73	3.59	0.000
%	Nil	14.6	26	59.4				
32	6	19	17	54	3.23	0.98	3.36	0.000
%	6.3	19.8	17.7	56.3				
36	3	18	23	52	3.29	0.88	3.24	0.000
%	3.1	18.8	24	54.2				

40	Nil	2	27	67	3.67	0.51	4.24	0.000
%	Nil	2.1	28.1	69.8				
44	Nil	nil	10	86	3.89	0.3	5.17	0.000
%	Nil	nil	10.4	89.6				
48	Nil	nil	4	92	3.95	0.2	5.29	0.000
%	Nil	nil	4.2	95.8				

The P value of OPS is 0.00 ($p<0.01$) at 1% significance level. After statistical analysis with logistic regression. It has been found that these hours are statistically significant with OPS pain scores.

Numerical Rating Scale

HRS	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**M**	**S. D**	**P VALUE**
2	19	26	24	8	9	9	1	Nil	nil	1.81	2.350	0.001
%	19.8	27.1	25	8.3	9.4	9.4	1	Nil	nil			
4	16	17	21	14	19	5	4	Nil	nil	2.35	1.67	0.033
%	16.7	17.7	21.9	14.6	19.8	5.2	4.2	Nil	nil			
6	13	11	19	18	17	12	1	5	nil	2.83	1.86	1.250
%	13.5	11.5	19.8	18.8	17.7	12.5	1	5.2	nil			
8	14	7	17	18	17	17	2	1	3	3.03	1.95	0.230
%	14.6	7.3	17.7	18.8	17.7	17.7	2.1	1	3.1			
10	8	4	19	16	17	15	6	3	8	3.68	2.15	0.159
%	8.3	4.2	19.8	16.7	17.7	15.6	6.3	3.1	8.3			
12	4	13	23	12	12	8	11	13	nil	3.54	2.13	0.004
%	4.2	13.5	24	12.5	12.5	8.3	11.5	13.5	nil			
14	12	17	14	6	13	16	13	5	nil	3.2	2.2	3.200
%	12.5	17.7	14.6	6.3	13.5	16.7	13.5	5.2	nil			
16	17	22	11	11	13	4	17	1	nil	2.68	2.15	0.002
%	17.7	22.9	11.5	11.5	13.5	4.2	17.7	1	Nil			
18	28	18	12	4	20	4	6	4	nil	2.27	2.14	0.001

%	29.2	18.8	12.5	4.2	20.8	4.2	6.3	4.2	nil			
20	31	15	16	12	6	7	3	3	3	2.13	2.21	0.006
%	32.3	15.6	16.7	12.5	6.3	7.3	3.1	3.1	3.1			
22	15	29	15	4	9	10	9	5	nil	2.56	2.19	0.000
%	15.6	30.2	15.6	4.2	9.4	10.4	9.4	5.2	nil			
24	7	31	25	13	3	6	9	2	nil	2.39	1.82	0.000
%	7.3	32.3	26	13.5	3.1	6.3	9.4	2.1	nil			
28	14	25	19	28	4	2	4	Nil	nil	2.05	1.47	0.000
%	14.6	26	19.8	29.2	4.2	2.1	4.2	Nil	nil			
32	19	26	10	19	10	3	nil	9	nil	2..30	2.06	0.001
%	19.8	27.1	10.4	19.8	10.4	3.1	nil	9.4	nil			
36	26	15	18	7	13	1	10	3	3	2.43	2.32	0.002
%	27.1	15.6	18.8	7.3	13.5	1	1.4	3.1	3.1			
40	19	32	20	5	5	15	nil	Nil	nil	2.1	2.04	0.000
%	19.8	33.3	20.8	5.2	5.2	15.6	nil	Nil	nil			
44	37	40	10	3	1	nil	5	Nil	nil	1.07	1.42	0.000
%	38.5	41.7	10.4	3.1	1	nil	5.2	Nil	Nil			
48	55	32	8	1	Nil	nil	nil	Nil	nil	0.53	0.69	0.000
%	57.3	33.3	8.3	1	Nil	nil	nil	Nil	Nil			

The p value of 2nd hour,4th hour,12th hour,16th hour,18th hour,20th hour,22nd hour,24th hour,28th hour,32nd hour,36th hour,40th hour,44th hour,48th hour is 0.000 where ($p<0.005$). After statistical analysis with logistic regression. It has been found that these hours are statistically significant with pain scores.

Distribution of Drugs

	PARACETOMOL		**FENTANYL**	
HRS	NO	YES	NO	YES
2HRS	65	31	80	16
%	67.7	32.3	83.3	16.7
4HRS	82	14	70	26
%	85.4	14.6	72.9	27.1
6HRS	67	29	85	11
%	69.8	30.2	88.5	11.5
8HRS	59	37	79	17
%	61.5	38.5	82.3	17.7
10HRS	37	59	84	12

%	38.5	61.5	87.5	12.5
12HRS	71	25	81	15
%	74	26	84.4	15.6
14HRS	52	44	85	11
%	54.2	45.8	88.5	11.5
16HRS	41	55	96	0
%	42.7	57.3	100	0
18HRS	66	30	87	9
%	68.8	31.2	90.6	9.4
20HRS	64	32	91	5
%	66.7	33.3	94.8	5.2
22HRS	66	30	88	8
%	66.8	31.4	91.7	8.3
24HRS	96	0	81	15
%	100	0	84.4	15.6
28HRS	94	2	93	3
%	97.9	2.1	96.9	3.1
32HRS	89	7	87	9
%	92.7	7.3	90.6	9.4
36HRS	95	1	89	7
%	99	1	92.7	7.3
40HRS	96	0	90	6
%	100	0	93.8	6.2
44HRS	96	0	96	0
%	100	0	100	0
48HRS	96	0	96	0
%	100	0	100	0

Based on OPS, Paracetamol was given preferentially than fentanyl at 2nd,6th,8th,10th,12th,14th,16th,18th,20th and 22nd hours (10 hours).This was because according to NRS Scale, the patient required fentanyl but when assessed using OPS scale, patient required only paracetamol. This leads us to infer that OPS is better than NRS.

8. DISCUSSION

Laparotomy surgeries are associated with relatively more intra and post operative pain. Hence, maintaining the analgesia intra and post operatively will help in facilitating the recovery of the patients from the surgical morbidity.

Among the various types of analgesia continuous central neuraxial analgesia via an epidural catheter has been already proved effective.

In our study, which was conducted in patients undergoing elective laparotomy surgeries under General anesthesia with epidural analgesia, we evaluated the effectiveness of objective pain score versus the commonly used numerical rating scale and also demonstrated that OPS is a useful tool for objectively proving the necessity for analgesia in the perioperative period.

We included 96 patients of whom 48 patients (50%) were male and 48 patients (50%) were female who has underwent elective laparotomy surgeries under general anesthesia with epidural and post operatively admitted to PACU.

Our study is a prospective observational study conducted on patients between age 18-65 with equal distribution of gender in male and female. Our study population had a height range from 142-188cms, weight range from 32-86 kgs, ASA physical status I-III which out of 96% patients, 7.3% belonged to ASA I, 37.5% belonged to ASA II, and 55.2% belonged to ASA III.

Hemodynamic parameters such as heart rate, blood pressure and Spo2 were monitored every 2nd hourly up to 24hrs and every 4th hourly from 24-48hrs.

There are different pain scales used to quantify post operative pain. The numerical rating scale is a more common scale used universally. The numeric rating scale (NRS) is a pain screening tool that is frequently used to evaluate the current level of pain using a 0–10 scale, where 0 corresponds to "no pain" and 10 to "the worst pain imaginable." NRS can be used in adults and children (>9 years old) receiving medical care in any context who are able to quantify their level of pain. The NRS has the enormous advantage of simply requiring verbal communication between the physician and children, unlike other well-known pain scales, which can present issues with procurement, distribution, storage, and infection control.

Objective pain score is a newer scale which is more accurate to determine the intensity of pain as it is not subjective as Numerical rating scale to objectively determine the requirement for analgesia in patients undergoing abdominal surgery and to monitor the efficacy of the analgesic measures, we therefore suggested a 4-point objective pain score (OPS).

This study was done to assess the accuracy of OPS compared to NRS scale thereby preventing additional doses of rescue analgesia.

We took 1,824 paired readings of the OPS and NRS for the 96 patients who underwent elective laparotomy surgeries and were under epidural infusion for post operative analgesia. The rescue analgesia was divided into 2 incremental levels in which level 1 received paracetamol 1gm of infusion. (NRS 2-5 & OPS 3) and level 2 received fentanyl 25mcg NRS ≥6 OPS 1 and 2.

On 145 occasions out of 1824, the two scores contradicted, and the decision was made to administer supplemental analgesic was decided based on OPS. Out of the above 145, on 90 occasion NRS was suggestive of the need for level 2 analgesia while the OPS was suggestive on level 1. Hence, level 1 analgesic 1gm of paracetamol was administered on the above occasion and the patient had adequate pain relief.

On the other hand, 55 other occasions NRS was suggestive of level 1 analgesia (Inj.paracetamol) whereas according to OPS on the same occasion did not demand analgesic (OPS 4) Hence, even when no analgesics were administered on those occasions the patient remained comfortable. This confirms the superiority of OPS in prediction of pain.

Priyanka Jain et al did a comparative study to validate the objective pain score to assess the pain in surgical patients and compared the effectiveness with numerical rating scale. They took 1021 paired readings of the OPS and NRS of 93 patients who underwent laparotomy and used patient-controlled analgesia were evaluated. Acute pain service (APS) personnel recorded the OPS and NRS. Rescue analgesia was divided into two incremental levels (level 1-paracetamol 1 g for NRS 2 - 5 and OPS 3, Level 2-Fentanyl 25 mcg for NRS ≥ 6 and OPS 1 and 2). They found that, on all 25 occasions, the decision to supplement analgesia went in favor of the OPS over the NRS. there were 17 occasions in which observer bias was possible for level 2 rescue analgesia she further concluded that the OPS is a good stand-alone pain score and is better than the NRS for defining mild and moderate pain. It may even be used to supplement NRS when it is indicative of mild or moderate pain. This study proved that OPS is better than NRS. This study correlates with our study which proves OPS is a better scale [8].

John Donovan et al. conducted A cross-sectional study to evaluate the reliability and validity of the objective Chronic Pain Behavioral Pain Scale for Adults (CBPS) compared to the conventional NRS. A researcher and a nurse used the CBPS and the NRS to evaluate patients both before and after an interventional pain procedure. Concurrent validity, concept validity, and interrater reliability were examined. Their findings revealed construct validity, with CBPS and NRS median (IQR) values preprocedural (4 (2–6) and 6 (4–8) and post procedure (1 (0–2) and 3 (0–5) demonstrating an equally average substantial reduction in pain from preprocedural to post procedure. They added that research has demonstrated the concept validity, concurrent validity, and inter-rater reliability of the CBPS. This study is comparable to our study [30]

Lotta Wikström et al. conducted a prospective observational study on the validity of the numerical rating scale and a daily summary of repeated numerical rating scale scores. They used a verbal scale (no, mild, moderate, and severe), and associations between Measure 1 (postoperative nausea ratings) and Measure 2 (retrospective nausea scores at rest and during activity, postoperative Day 2) were both investigated using nonparametric statistical methods. He found that nausea at rest and nausea during exertion had a rS Pearson correlation of 0.81. They also came to the conclusion that the Numeric Rating Scale (NRS) is a trustworthy tool for determining the degree of nausea based on the results of the study, which showed good correlations between the NRS results and a verbal scale. In study they found that NRS scale is the best tool for assessment of degree of nausea when compared to verbal scale. This study shows that NRS is a better scale than VRS which is in contradiction to our study [14].

9. LIMITATIONS

Our study population does not include pediatric patient and hence the credibility of OPS in children could not be made out.

Our study was limited to elective laparotomy surgeries hence could not evaluate acute pain involved in several emergency laparotomies.

10. CONCLUSION

In our study, we conclude that though Numerical Rating scale is a conventional pain scale followed routinely in every institute Objective pain score (OPS) carries a slighter advantage as it is objectively assessed.

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