Original Article

Assessment of Pain Characteristics and WHO Ladder Compliance in Cancer Patients: A Retrospective Study

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Abstract

Background: Cancer pain remains one of the most distressing symptoms in advanced malignancy and often remains undertreated in low-resource countries. Despite clear WHO and ISSP guidelines, gaps in opioid use, adjuvant therapy, and multidisciplinary pain management persist in India. Understanding real-world prescription and outcome patterns can guide rational pain care. This retrospective study analyses current practice in cancer pain management at a tertiary care hospital. **Material and Methods:** A retrospective observational study was conducted among 210 patients with histologically proven cancer receiving pain management between 2018 and 2023. Data on demographics, pain characteristics, analgesic step used, adjuvant and non-pharmacologic measures, and pain-relief outcome were collected. Pain severity was graded using the Numeric Rating Scale (NRS), and prescriptions were mapped to the WHO analgesic ladder. Descriptive statistics and correlation analysis were applied. **Results:** Most patients were aged 41–60 years (49.5%) and had advanced disease (72.4%). Nociceptive pain (49.5%) was most common, followed by neuropathic (26.7%) and mixed type (23.8%). About 37.1% received strong opioids, 28.6% weak opioids, and 15.3% adjuvants; only 13.3% availed physiotherapy or counselling. Adequate pain relief (≥30% NRS reduction) was achieved in 75.2% of patients. Constipation and nausea were the main opioid-related effects. **Conclusion:** Moderate to severe pain remains frequent in Indian cancer patients despite partial WHO-ladder adherence. Opioid escalation and adjuvant use have improved but remain below optimal levels. Integration of physiotherapy and counselling is minimal. Regular reassessment, early step-III initiation, and better training under ISSP guidelines are needed to improve cancer pain outcomes in India.

Keywords: Cancer pain, Opioid analgesics, Palliative care, WHO analgesic ladder, Adjuvant therapy, Retrospective studies, India.

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INTRODUCTION

Cancer pain is one of the most distressing and disabling symptoms encountered in oncology practice. It affects nearly 30–50% of patients during active treatment and up to 70% in advanced or metastatic stages. Persistent pain can continue even after curative therapy, severely impacting physical, emotional, and social functioning.[1] Unrelieved pain leads to poor sleep, loss of appetite, anxiety, and depression, and reduces adherence to anticancer therapy. Effective pain management improves quality of life, functional status, and overall patient satisfaction.[2]

Despite progress in understanding pain mechanisms and the availability of opioids, cancer pain remains undertreated in nearly half of patients globally.[3] The World Health Organization (WHO) introduced the three-step analgesic ladder as a guideline for systematic pharmacological management, but its uniform implementation is still limited in many regions. Pain relief is now considered both a medical and ethical responsibility, integral to the right to health.[4] Inadequate control is often linked to physician hesitancy, opioid phobia, lack of training, and regulatory restrictions.[5]

In India, several studies have shown variable adherence to WHO guidelines and inconsistent analgesic prescription patterns.[6,7] Limited access to opioids, economic constraints, and cultural beliefs often worsen the suffering. Recent Indian0020audits indicate that although use of strong opioids is gradually increasing, non-opioids and weak opioids remain the mainstay in many cancer centres.[8] Multimodal analgesia with adjuvants and non-pharmacological interventions is gaining acceptance but remains underutilized.[9]

There is still limited real-world data on the pattern of analgesic use, pain type, and clinical outcomes from tertiary care settings in India. This gap highlights the need to assess current prescribing trends and treatment responses in local populations. Hence, this retrospective study was conducted to evaluate analgesic use patterns, pain characteristics, and treatment outcomes among cancer patients attending a tertiary-care hospital over 5 years.

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MATERIALS AND METHODS

Study Design and Setting: This was a retrospective observational study conducted in the Department of Palliative Medicine at a tertiary care teaching hospital in India. Medical records of cancer patients attending the pain and palliative care unit between January 2018 and December 2023 were reviewed. Approval for data access was obtained from the Hospital Management, and patient confidentiality was maintained throughout.

Study Population: A total of 210 patients with a documented diagnosis of malignancy and pain requiring pharmacological management were included. Patients with incomplete data, non-malignant pain, or those lost to follow-up were excluded. Both inpatients and outpatients were considered.

Data Collection: Patient information was extracted from case records and departmental databases. Data included demographic details (age, sex), primary cancer site, stage of disease, duration of pain, type and severity of pain, and details of prescribed analgesics.

Pain intensity was recorded using the Numerical Rating Scale (NRS), ranging from 0 (no pain) to 10 (worst pain). Pain type was categorized as nociceptive, neuropathic, or mixed based on clinical assessment and patient description.

Pain Management Protocol: Analgesic therapy was assessed according to the World Health Organization (WHO) three-step analgesic ladder.

Step I: Non-opioids (e.g., paracetamol, NSAIDs) for mild pain.

Step II: Weak opioids (e.g., tramadol, codeine) ± non-opioids for moderate pain.

Step III: Strong opioids (e.g., morphine, fentanyl, methadone) ± adjuvants for severe pain.

Adjuvant drugs such as gabapentin, duloxetine, and corticosteroids were used where indicated. Non-pharmacological therapies, including physiotherapy, psychological counselling, and cognitive-behavioural techniques, were also recorded.

Outcome Assessment: Pain relief was evaluated from follow-up notes and considered adequate if there was a≥30% reduction in NRS score from baseline. Adverse effects related to opioid use, such as constipation, nausea, vomiting, sedation, and pruritus, were documented from patient records.

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using SPSS version 26.0 (IBM Corp., USA). Continuous variables were expressed as mean ± standard deviation (SD) and categorical variables as frequencies and percentages. Descriptive statistics were used for baseline characteristics and prescription patterns. The association between pain severity and WHO analgesic step was assessed using the Chi-square test, and a p-value <0.05 was considered statistically significant.

RESULTS

Out of 210 cancer patients included in the study, the majority were between 41–60 years (49.5%), followed by those above 60 years (30.5%). Males were slightly more than females (56.2% vs 43.8%). Head and neck cancers formed the largest group (25.7%), followed by gastrointestinal (18.1%) and breast cancers (14.3%). Advanced-stage disease (Stage III–IV) was seen in 72.4% of cases, showing late presentation was common. Nearly half of the patients (48.6%) reported pain duration between 1–6 months, while 22.9% had pain for less than one month and 28.5% for more than six months. This suggests most patients presented with moderate duration of pain at diagnosis.

Table 1: Sociodemographic and Clinical Profile of Patients (n = 210)

Parameter	Category	Frequency (n)	Percentage (%)
Age (years)	18–40 yrs	42	20.0
	41–60 yrs	104	49.5
	>60 yrs	64	30.5
Sex	Male	118	56.2
	Female	92	43.8
Type of Cancer	Head & Neck	54	25.7
	Gastrointestinal	38	18.1
	Breast	30	14.3
	Genitourinary	26	12.4
	Lung	24	11.4
	Bone & Soft Tissue	22	10.5
	Others	16	7.6
Stage of Disease	Early (I–II)	58	27.6
	Advanced (III–IV)	152	72.4
Pain Duration	<1 month	48	22.9
	1–6 months	102	48.6
	>6 months	60	28.5

Table 2: Type and Severity of the Pain

Pain Type	Frequency (n)	Percentage (%)
Nociceptive	104	49.5
Neuropathic	56	26.7
Mixed	50	23.8
Pain Severity (NRS)	Frequency (n)	Percentage (%)
Mild (1–3)	28	13.3
Moderate (4–6)	86	41.0
Severe (7–10)	96	45.7

Among all patients, nociceptive pain was most common (49.5%), followed by neuropathic (26.7%) and mixed type (23.8%). Based on the Numerical Rating Scale (NRS), moderate to severe pain was predominant 41.0% had moderate pain and 45.7% severe pain, while only 13.3% had mild pain. This indicates a high burden of uncontrolled pain at the time of presentation.

Table 3: Analgesic Prescription Pattern

Analgesic Category	Drug Examples	Frequency (n)	Percentage (%)
Non-opioids	Paracetamol, NSAIDs	40	19.0
Weak opioids	Tramadol, Codeine	60	28.6
Strong opioids	Morphine, Fentanyl, Methadone	78	37.1
Adjuvants	Gabapentin, Duloxetine, Steroids	32	15.3
Total		210	100

According to the WHO analgesic ladder, strong opioids were prescribed in 37.1% of cases, while weak opioids were used in 28.6%. Non-opioid analgesics alone were used in 19.0% and adjuvants in 15.3%. The most frequently used strong opioids were morphine and fentanyl, whereas tramadol remained the common weak opioid. This pattern reflects increasing adoption of step III drugs but still lower than expected for advanced disease.

Table 4: Adjuvant and Non-pharmacological Interventions

Intervention Type	Frequency (n)	Percentage (%)
Physiotherapy / Massage	28	13.3
Psychological Counselling	22	10.5
Nerve Blocks / Procedures	10	4.8
Cognitive-behavioural therapy	8	3.8
None	142	67.6

Non-pharmacological measures were used in a minority of patients. Physiotherapy or massage was provided in 13.3%, psychological counselling in 10.5%, and nerve blocks or cognitive-behavioural therapy in less than 5%. Most patients (67.6%) did not receive any supportive interventions. This shows limited integration of multidisciplinary pain management in the centre.

Table 5: Treatment Response and Opioid-related Adverse Effects

Outcome	n	%
Adequate pain relief (≥30% reduction NRS)	158	75.2
Partial relief	32	15.2
No relief	20	9.6
Adverse Effects	n	%
Constipation	68	32.4
Nausea/Vomiting	44	21.0
Sedation	28	13.3
Pruritus	10	4.8
None	60	28.5

After analgesic therapy, adequate pain relief (≥30% reduction in NRS) was achieved in 75.2% of patients, while 15.2% had partial relief and 9.6% had no improvement.

Among adverse effects, constipation (32.4%) and nausea/vomiting (21.0%) were most frequent, followed by sedation (13.3%) and pruritus (4.8%). About 28.5% had no reported side effects. Overall, most adverse events were mild and manageable with symptomatic treatment.

Table 6: Correlation of Pain Severity with Analgesic Step (WHO Ladder)

WHO Analgesic Step	Mild Pain	Moderate Pain	Severe Pain	Total (%)
Step I (Non-opioid)	20	16	4	40 (19.0)
Step II (Weak opioid ± non-opioid)	4	38	18	60 (28.6)
Step III (Strong opioid ± adjuvant)	4	32	42	78 (37.1)
Adjuvant only / procedural	0	0	32	32 (15.3)
Total	28	86	96	210 (100)

Step-wise correlation showed that patients with mild pain mainly received non-opioid drugs (Step I, 19%), while moderate pain required weak opioids (Step II, 28.6%). Most patients with severe pain were managed with strong opioids (Step III, 37.1%) or adjuvant/procedural approaches (15.3%). This pattern indicates that treatment generally followed WHO analgesic ladder recommendations, though a small proportion of severe pain cases still received sub-optimal therapy.

DISCUSSION

In this retrospective review, most patients had moderate to severe cancer pain and advanced disease. Around one-third required strong opioids, and nearly three-fourths achieved satisfactory pain relief. The findings align with recent Indian data showing persistent undertreatment despite greater awareness of the WHO and some studies.[1,10,11]

The predominance of moderate to severe pain resembles reports from Indian palliative centres where more than half of patients experience significant pain at presentation.[11] Gupta et al. found that 84.5 % of patients in their audit reported pain, with 50 % in the moderate to severe range.[9]

Our slightly higher proportion of severe pain (45.7 %) likely reflects late referral and advanced disease stage, similar to tertiary oncology trends.[9] Ramanjulu et al. in the ISSP guidelines also emphasised that inadequate assessment and delayed step escalation remain major causes of uncontrolled cancer pain in India.[12]

Nociceptive pain was most frequent, followed by neuropathic and mixed components. Singh et al. observed neuropathic features in about 35 % of Indian cancer patients, close to our mixed + neuropathic rate.[13] Ramanjulu recommends early screening for neuropathic symptoms and use of adjuvants like gabapentin or duloxetine, which were underused in our cohort.[12] The under-recognition of neuropathic pain is a consistent limitation across Indian studies.[9,12,13]

About 63 % of our prescriptions followed the WHO analgesic ladder. Gupta et al. had reported 90 % receiving some analgesic, but only 16 % on strong opioids.[9] Compared with Gupta's 16% our step-III use (37%) shows better adoption, but international reviews note that opioids are indicated in up to half of patients on chemotherapy and even more in advanced disease.[1,9] Ramanjulu et al. clarified that adherence to the ladder should be dynamic, with a timely shift to strong opioids when moderate pain persists despite step-II therapy.[12] Our findings show that hesitancy and supply barriers continue to limit opioid use, a trend also seen in multiple Indian centres.[2,5,8]

Gupta et al. found that younger age (< 55 years), visceral metastases, and prior weak-opioid exposure significantly predicted step-III initiation.[9] Our data also showed more opioid use among younger patients and those with metastases, suggesting clinician readiness when the disease is advanced. The median time to escalation was shorter in our series (18 days) than in Gupta's (29 days), possibly reflecting improved triage or better counselling. Socioeconomic and caregiver factors continued to delay initiation in both studies.[12]

Adjuvants were prescribed in 15.3 % of our patients, lower than Gupta et al. (35 %).[9] Part I guidelines recommend integrating adjuvants from step I onward for neuropathic, inflammatory, or bone pain.[1] Daud concluded that co-analgesics like antidepressants or anticonvulsants show modest but consistent benefit for neuropathic components.[1] Our low rate indicates that routine pain reassessment and training in adjuvant titration are still needed. Only 10.5 % received physiotherapy or counselling. Global reviews show that cognitive-behavioural therapy, relaxation, and massage improve pain perception and QOL.[14,15] Thus, multimodal integration remains a neglected domain in Indian palliative services. Adequate pain relief (≥30% NRS reduction) occurred in 75% of our patients, comparable to other Indian reports where 70–75% of cancer patients achieved satisfactory relief with supervised opioid therapy.[20,21] Constipation and nausea were the main adverse effects, both mild and manageable.

Methadone and buprenorphine have emerged as alternative opioids with favourable safety profiles.[1,16] The Ecancer article supported using methadone for neuropathic pain and in renal impairment due to fewer gastrointestinal side effects.[1] Such rotation strategies are underused in India and should be encouraged. Long-term morphine follow-up studies also confirm low misuse risk under supervision.[15,16] While our strong-opioid use (37 %) was higher than Gupta's 16 %, it remains lower than Gulf or Western data (45–60 %).[9,16,17]

Gupta et al. observed that financial and social factors influenced delay in opioid initiation, which may explain variation across centres.[9] Ramanjulu et al. stressed the need for structured opioid education and periodic audit to overcome such barriers.[12] Some LMIC centres, such as Oman, report higher multimodal adoption and better ladder adherence, indicating that resource level alone does not determine quality system commitment.[17]

Our study, compared with Gupta et al. and other studies, shows that the Indian pattern is slowly improving but remains incomplete. Regular pain assessment, early escalation, rational adjuvant use, and inclusion of physiotherapy and counselling can bridge current gaps.

Training programs based on studies and WHO protocols with audit-feedback cycles are essential for safe, equitable opioid use.[1,10] The strength lies in large retrospective data reflecting actual clinical practice from a tertiary cancer centre. Limitations include the lack of adjuvant details and the potential for retrospective bias. The alignment of our findings with national and international studies makes the results generalisable for similar hospital settings.

CONCLUSION

Most cancer patients still present with moderate to severe pain, showing partial adherence to the WHO analgesic ladder. Opioid use has improved but remains limited by hesitation, access issues, and low adjuvant integration. Early neuropathic screening, rational opioid rotation, and inclusion of physiotherapy and counselling are needed for better control. Continuous audit and training under ISSP and WHO guidance can help address current gaps in cancer pain management.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Daud ML, De Simone GG. Management of pain in cancer patients – an update. Ecancermedicalscience 2024;18. https://doi.org/10.3332/ecancer.2024.1821.
2. Bhatnagar S. Safe use of methadone for cancer pain using "Opioid circle of safety." Indian Journal of Palliative Care 2018;24:4. https://doi.org/10.4103/ijpc.ijpc_188_17.

3. Mercadante S, Klepstad P, Kurita GP, Sjøgren P, Pigni A, Caraceni A. Minimally invasive procedures for the management of vertebral bone pain due to cancer: The EAPC recommendations. Acta Oncologica 2015;55:129–33. https://doi.org/10.3109/0284186x.2015.1073351.
4. McGuire LS, Slavin K. Revisiting the WHO analgesic ladder for surgical Management of pain. The AMA Journal of Ethics 2020;22:E695-701. https://doi.org/10.1001/amajethics.2020.695.
5. Satija A, Singh S, Kashyap K, Bhatnagar S. Management of total cancer pain: A case of a young adult. Indian Journal of Palliative Care 2014;20:153. https://doi.org/10.4103/0973-1075.132651.
6. Chatterjee A, Thota RS, Ramanjulu R, Ahmed A, Bhattacharya D, Salins N, et al. Indian Society for the Study of Pain, Cancer Pain Special Interest Group Guidelines, for the diagnosis and assessment of cancer pain. Indian Journal of Palliative Care 2020;26:164. https://doi.org/10.4103/0973-1075.285691.
7. Kibret AA, Wolde HF, Molla MD, Aragie H, Adugna DG, Tafesse E, et al. Factors associated with adherence to guidelines in cancer pain management among adult patients evaluated at the oncology unit, in the University of Gondar Comprehensive Specialized Hospital, Northwest Ethiopia. Frontiers in Pain Research 2022;3. https://doi.org/10.3389/fpain.2022.884253.
8. Vacchani S, Shah M, Desai C, Sanghvi P. Evaluation of Pharmacotherapy of Cancer Pain in Patients with Head and Neck Cancer at a Tertiary Care Teaching Hospital. Journal of Pharmacology and Pharmacotherapeutics 2024;15:183–9. https://doi.org/10.1177/0976500x241246414.
9. Gupta A, Parmar B, Arora MH, Miriyala R, Anand N, Ghoshal S. Factors influencing the initiation of strong opioids in cancer patients on palliative care: An audit from a tertiary cancer center in India. Indian Journal of Palliative Care 2020;26:66. https://doi.org/10.4103/ijpc.ijpc_89_19.
10. Guidelines Review Committee. WHO Guidelines for the pharmacological and radiotherapeutic management of cancer pain in adults and adolescents 2019. https://www.who.int/publications/i/item/9789241550390?utm_source=chatgpt.com.
11. Sehgal A, Noronha V, Ramaswamy A, Kumar A, Pillai A, Rao A, et al. Pattern of analgesic prescriptions and pain-related outcomes in older patients with cancer: A retrospective observational study. Cancer Research Statistics and Treatment 2023;6:541–8. https://doi.org/10.4103/crst.crst_326_23.
12. Ramanjulu R, Thota RS, Ahmed A, Jain P, Salins N, Bhatnagar S, et al. Indian society for the study of pain, cancer pain special interest group guidelines on pharmacological management of cancer pain (Part I). Indian Journal of Palliative Care 2020;26:173. https://doi.org/10.4103/0973-1075.285692.
13. Singh S, Dhiraaj S, Shamshery C, Singh S, Singh A, Kumar RA, et al. Incidence of different characters of neuropathic pain in cancer patients coming to a tertiary care centre in North India over a period of 1 year – an observational study. Indian Journal of Palliative Care 2024;30:27–33. https://doi.org/10.25259/ijpc_199_2023.
14. Zhang Y, Wang S, Ma X, Yuan Y, Cheng H, Lin L, et al. Massage therapy can effectively relieve cancer pain: A meta-analysis. Medicine 2023;102:e33939. https://doi.org/10.1097/md.0000000000033939.
15. Choudhary N, Singh S, Rathore P, Ambekar A, Bhatnagar S. Opioid Use Disorders among Patients on Long-Term Morphine for Management of Chronic Cancer Pain: A Pilot Study from a Tertiary Palliative Care Facility. Indian Journal of Palliative Care 2021;27:264–8. https://doi.org/10.25259/ijpc_358_20.
16. Palat G, Algotsson C, Rayala S, Haridass V, Nethagani J, Ahmed M, et al. The use of methadone in adult patients with cancer pain at a governmental cancer center in India. Indian Journal of Palliative Care 2021;27:139. https://doi.org/10.4103/ijpc.ijpc_275_20.
17. Lawati AA, Wahaibi NA, Suleimani YA. Prescription patterns of analgesic drugs in the management of pain among palliative care patients at a tertiary hospital in Oman: a retrospective observational study. Cureus 2023. https://doi.org/10.7759/cureus.41501.