Pakistan Journal of Clinical Research

Original Research

Open Access

Assessment of Adherence to the WHO Pain Ladder in the Management of Cancer Pain at Hayatabad Medical Complex Peshawar

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ARTICLE INFO

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Article History

Received:	07-05-2026
Revised:	14-07-2026
Accepted:	22-07-2026
Published:	30-07-2026

How to Cite
Ahmad Z, Usman H, Adil M, Safyan MGM, Afzal A, Fatima L, et al. Assessment of Adherence to the WHO Pain Ladder in the Management of Cancer Pain at Hayatabad Medical Complex Peshawar. Pak J Clin Res. 2025;3(7):16-21. doi:10.65761/pjcr.2026.308

DOI: https//doi:10.65761/pjcr.2026.308

ABSTRACT

Background: Cancer painis a common and distressing complication that can significantly impair patients' quality of life. The World Health Organization (WHO) pain ladder provides a structured approach for selecting analgesic therapy according to pain severity. However, compliance with these recommendations may vary across healthcare settings. This clinical audit assessed compliance with the WHO pain ladder criteria in the management of cancer pain at Hayatabad Medical Complex, Peshawar.

Methods: A hospital-based clinical audit was conducted among 120 adult cancer patients experiencing cancer-related pain. Data were collected through patient interviews and review of medical records using a structured proforma. Pain intensity was assessed using the Numerical Rating Scale (NRS). Prescribed analgesic regimens were compared with the predefined WHO pain-ladder criteria according to documented pain severity. Data were analyzed using SPSS, with descriptive statistics and appropriate tests of association.

Results: Of the 120patients, 68 (56.7%) were males and 52 (43.3%) were females. Mild, moderate, and severe pain was reported by 18 (15.0%), 57 (47.5%), and 45 (37.5%) patients, respectively. Overall, 78 (65.0%) patients received analgesic management that met the predefined WHO pain-ladder criteria, while 42 (35.0%) did not meet the audit criteria. Compliance was highest among patients with mild pain (83.3%) and lower among those with moderate (63.2%) and severe pain (60.0%).

Conclusion: Overall, 65.0% compliance with the predefined WHO pain-ladder criteria was observed. Improved pain assessment, appropriate analgesic selection, opioid availability, and healthcare-provider training are recommended.

Keywords: Cancer pain; WHO pain ladder; Analgesics; Opioids; Pain management.

INTRODUCTION

Cancer is one of the major causes of morbidity and mortality worldwide and represents a substantial public health challenge, particularly in low- and middle-income countries.[1,2] As cancer progresses, patients may experience a wide range of symptoms, among which pain is one of the most frequent and distressing.[3,4] Cancer-related pain may result directly from tumor invasion, metastasis, nerve compression, inflammation, or tissue damage, and may also arise as a consequence of surgery, chemotherapy, radiotherapy, or other cancer treatments.[5,6] A systematic review and meta-analysis reported that pain affects approximately 44.5% of patients with cancer, while moderate-to-severe pain is experienced by about 30.6% of patients, demonstrating that pain remains an important clinical problem despite advances in cancer treatment and supportive care.

Cancer pain has substantial physical, psychological, and social consequences.[7,8] Persistent or inadequately controlled pain can interfere with sleep, mobility, daily activities, appetite, mood, and social functioning, ultimately reducing patients' quality of life. The prevalence of pain also varies according to the stage of cancer, with advanced, metastatic, and terminal disease generally associated with a greater burden of pain.[9,10] Earlier evidence demonstrated that approximately two-thirds of patients with advanced, metastatic, or terminal cancer experience pain.[11–13] Therefore, effective assessment and timely treatment of cancer

ISSN Print: 3080-5791 • ISSN Online: 3080-5805 | https://pjcr.org

pain are essential components of comprehensive cancer care.

The World Health Organization (WHO) has played an important role in developing standardized approaches to cancer pain management. The traditional WHO analgesic ladder was introduced as a simple stepwise framework for selecting analgesic therapy according to pain severity.[14,15] The conventional approach consists of three principal steps: non-opioid analgesics for mild pain, weak opioids for mild-to-moderate pain, and strong opioids for moderate-to-severe pain, with adjuvant medicines used when clinically indicated.[16] This framework has provided clinicians with a practical approach for rational analgesic prescribing and has contributed substantially to the development of cancer pain-management practices worldwide.[17]

The current WHO guidance further emphasizes that analgesic selection should be individualized according to the severity and characteristics of pain rather than applying the ladder as a rigid sequence. The 2019 WHO guideline recommends that adults and adolescents with cancer pain should receive an analgesic appropriate to their pain severity and clinical condition. Non-steroidal anti-inflammatory drugs (NSAIDs), paracetamol, and opioids may be used alone or in combination depending on clinical assessment, while patients with moderate or severe pain should not be managed with mild analgesics alone.[18–20] The guideline also addresses opioid maintenance, rescue medication, routes of administration, opioid rotation and cessation, and the use of adjuvant medicines such as corticosteroids, antidepressants, and anticonvulsants.

Despite the availability of evidence-based recommendations, appropriate cancer pain management remains challenging.[21] Inadequate pain control may result from insufficient pain assessment, limited knowledge among healthcare professionals, concerns regarding opioid-related adverse effects, restrictive prescribing practices, inadequate availability of analgesic medicines, and patient or caregiver misconceptions regarding opioid therapy. WHO has specifically highlighted the very low availability of medicines for moderate and severe pain in many low- and middle-income countries, while also emphasizing the need to balance access to effective analgesia with safe prescribing and monitoring.[22]

The problem is particularly relevant in Pakistan, where evidence indicates important gaps in cancer pain management. A cross-sectional study conducted among patients with advanced cancer at Mayo Hospital, Lahore, found that only about one-third of patients reported adequate pain management. Among patients prescribed morphine, only a small proportion were compliant with treatment recommendations, while non-opioids and weak opioids such as tramadol and codeine were frequently prescribed.[23] These findings suggest that undertreatment and inappropriate analgesic selection may remain important barriers to effective cancer pain control in Pakistan.

Healthcare-provider knowledge and access to appropriate medicines may also influence adherence to the WHO approach. A 2024 study conducted among physicians and surgeons in tertiary-care hospitals across the four provinces of Pakistan found that only 55.64% of respondents were familiar with the WHO cancer pain analgesic ladder. Nonavailability of recommended analgesic drugs was reported as an important reason for failure to follow the ladder.[24] More recent evidence from Pakistan has similarly demonstrated that approximately 54% of prescriptions were consistent with WHO pain-management recommendations, with weak opioids frequently prescribed and strong opioids notably absent, particularly in patients with severe pain.

Appropriate adherence to evidence-based pain-management recommendations is therefore essential for improving cancer patients' comfort and quality of life. Studies have demonstrated that multimodal treatment based on the WHO approach, including appropriate opioids and adjuvant medicines, can substantially improve pain control in patients with cancer-related pain.[25,26] However, the extent to which these recommendations are followed may differ between healthcare institutions and clinical settings. There is limited local evidence specifically evaluating adherence to the WHO pain ladder among cancer patients receiving treatment in tertiary-care hospitals of Khyber Pakhtunkhwa.

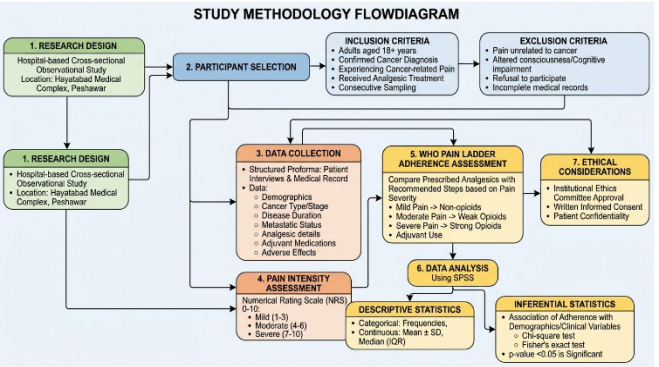
Hayatabad Medical Complex (HMC), Peshawar, is an important tertiary-care healthcare facility serving patients from Peshawar and surrounding districts. Assessing cancer pain-management practices at this institution can provide useful information regarding the extent to which analgesic prescribing corresponds with patients' reported pain severity and WHO recommendations. Therefore, the present study is designed to assess adherence to the WHO pain ladder in the management of cancer pain at Hayatabad Medical Complex, Peshawar. The study evaluates pain severity, patterns of analgesic use, and the proportion of patients receiving treatment consistent with the recommended WHO approach. The findings may help identify gaps in current pain-management practices and provide evidence for strengthening guideline-based cancer pain management and palliative-care services in the local healthcare setting.

METHODOLOGY

A hospital-based clinical audit was conducted to assess adherence to the World Health Organization (WHO) pain ladder in the management of cancer pain at Hayatabad Medical Complex, Peshawar. The audit included adult patients aged 18 years and above with a diagnosis of cancer who experienced cancer-related pain and received analgesic treatment. Patients were identified from the oncology department, inpatient wards, and outpatient clinics using a consecutive sampling technique. Patients with pain unrelated to cancer, altered consciousness or severe cognitive impairment preventing communication, refusal to participate, or incomplete medical records were excluded.

Data were collected using a structured proforma through patient interviews and review of medical records. The information included demographic characteristics, cancer type and stage, duration of disease, metastatic status, pain intensity, analgesic medications, dose, route, frequency, opioid use, adjuvant analgesics, and adverse effects. Pain intensity was assessed using the Numerical Rating Scale (NRS), ranging from 0 to 10, with scores of 1–3 classified as mild pain, 4–6 as moderate pain, and 7–10 as severe pain.

Adherence to the WHO pain ladder was assessed by comparing the prescribed analgesic regimen with the recommended treatment step according to the patient's documented pain severity. Appropriate use of non-opioid analgesics for mild pain, weak or appropriate opioid therapy for moderate pain, and strong opioids for severe pain were considered when determining adherence, along with the appropriate use of adjuvant medications when clinically indicated. Audit compliance was determined according to predefined criteria.



Data were entered and analyzed using SPSS v27. Categorical variables were presented as frequencies and percentages, while continuous variables were expressed as mean ± standard deviation or median with interquartile range, as appropriate. The association between adherence to the WHO pain ladder and demographic or clinical variables was assessed using the Chi-square test or Fisher's exact test. A p-value of <0.05 was considered statistically significant.

RESULTS

A total of 120 patients with cancer pain were included in the clinical audit to assess compliance with the predefined criteria for adherence to the World Health Organization (WHO) pain ladder at Hayatabad Medical Complex, Peshawar. The mean age of the participants was 52.4 ± 12.1 years, with an age range of 19–78 years. Among the participants, 68 (56.7%) were males and 52 (43.3%) were females. Most patients were aged above 50 years. Regarding documented pain severity, 18 (15.0%) patients had mild pain, 57 (47.5%) had moderate pain, and 45 (37.5%) had severe pain.

Based on the clinical audit criteria, 78 (65.0%) patients received analgesic management that complied with the recommended WHO pain-ladder step, whereas 42 (35.0%) did not meet the predefined compliance criteria. Among patients with mild pain, 15 (83.3%) received management consistent with the recommended Step 1 approach, while 3 (16.7%) did not meet the audit criteria. Of the patients with moderate pain, 36 (63.2%) received management meeting the predefined criteria, whereas 21 (36.8%) were classified as non-compliant. Among patients with severe pain, 27 (60.0%) received management consistent with the predefined criteria for severe pain, while 18 (40.0%) did not meet the recommended treatment criteria.

Table 1. Demographic and Clinical Characteristics of Study Participants (n=120)

Variable	Frequency (n)	Percentage (%)
Age group		
≤30 years	8	6.7
31–40 years	16	13.3
41–50 years	27	22.5
51–60 years	38	31.7
>60 years	31	25.8
Gender		
Male	68	56.7
Female	52	43.3
Pain severity		
Mild (1–3)	18	15.0
Moderate (4–6)	57	47.5
Severe (7–10)	45	37.5
Overall WHO ladder adherence		
Adherent	78	65.0
Non-adherent	42	35.0

Table 2. Adherence to WHO Pain Ladder According to Pain Severity

Pain severity	Total n	Appropriate management n (%)	Non-adherent n (%)
Mild	18	15 (83.3)	3 (16.7)
Moderate	57	36 (63.2)	21 (36.8)
Severe	45	27 (60.0)	18 (40.0)
Total	**120**	**78 (65.0)**	**42 (35.0)**

The highest adherence was observed among patients with mild pain (**83.3%**), while adherence was comparatively lower among patients with moderate (**63.2%**) and severe pain (**60.0%**). Overall, approximately two-thirds of patients received analgesic treatment consistent with the WHO pain ladder, whereas one-third showed evidence of inadequate or inappropriate alignment with the recommended analgesic step.

Table 3. Pattern of Analgesic Use

Analgesic category	Frequency (n)	Percentage (%)
Non-opioid analgesics	32	26.7
Weak opioids	29	24.2
Strong opioids	45	37.5
Combination therapy	14	11.7
Total	**120**	**100.0**

Strong opioids were the most frequently prescribed analgesic category, particularly among patients with severe cancer pain. Non-opioid analgesics were mainly prescribed for patients with mild pain, while weak opioids were commonly used among patients with moderate pain. Combination analgesic therapy was prescribed in a smaller proportion of patients.

Overall, the clinical audit demonstrated 65.0% compliance with the predefined WHO pain-ladder criteria, with variation according to documented pain severity. The proportion of non-compliant cases was highest among patients with severe pain (40.0%), followed by those with moderate pain (36.8%), while the lowest proportion was observed among patients with mild pain (16.7%). These findings indicate gaps in alignment between documented pain severity and the analgesic regimen prescribed according to the predefined audit criteria.

DISCUSSION

The present study assessed adherence to the WHO analgesic ladder in the management of cancer pain among 120 patients at Hayatabad Medical Complex, Peshawar. The findings demonstrated that 65.0% of patients received analgesic treatment consistent with the appropriate WHO pain-ladder step, whereas 35.0% showed non-adherence. These findings indicate that although the WHO approach is being followed in a considerable proportion of patients, a substantial proportion may still be receiving analgesic treatment that does not adequately correspond to their documented pain severity. Effective cancer pain management is an important component of cancer care because pain can substantially affect physical functioning, psychological well-being, and quality of life. Cancer pain is a multidimensional problem requiring systematic assessment and an individualized therapeutic approach.[3,4]

In the present study, mild pain was observed in 15.0% of patients, moderate pain in 47.5%, and severe pain in 37.5%. The relatively high proportion of patients with moderate and severe pain emphasizes the importance of appropriate analgesic selection and timely escalation of treatment. Cancer pain severity may vary considerably according to cancer type, disease stage, pain mechanism, and individual patient characteristics. Therefore, systematic pain assessment and regular reassessment are essential for determining appropriate treatment and modifying analgesic therapy when required.[5,9]

The highest adherence in this study was observed among patients with mild pain, where 83.3% received treatment consistent with the recommended approach. This relatively high adherence may be explained by the straightforward nature of Step 1 therapy, in which non-opioid analgesics are generally used, with adjuvant medicines when clinically indicated. In contrast, adherence decreased to 63.2% among patients with moderate pain and 60.0% among patients with severe pain. This decline suggests that greater challenges may arise when patients require opioid-based treatment. Contemporary approaches to cancer pain

management emphasize appropriate opioid selection, dose optimization, and incorporation of adjuvant therapies according to the patient's pain characteristics and clinical condition.[14,16]

The relatively lower adherence among patients with severe pain is particularly important. In the present study, 40.0% of patients with severe pain were classified as non-adherent, suggesting potential undertreatment or inadequate escalation of analgesic therapy. A previous study conducted among patients with advanced cancer in Pakistan reported similarly concerning findings, with only approximately one-third of patients achieving adequate pain management. The study also found that most patients were prescribed non-opioids or weak opioids and that only a small number of patients receiving morphine were compliant with treatment recommendations. These similarities suggest that inadequate escalation of analgesia, particularly for severe cancer pain, may remain an important problem in Pakistani healthcare settings. International evidence similarly indicates that substantial gaps can persist between recommended cancer-pain management and actual clinical practice.[20,21]

The pattern of analgesic use in the present study showed that strong opioids were prescribed to 37.5% of patients, non-opioid analgesics to 26.7%, weak opioids to 24.2%, and combination therapy to 11.7%. The relatively high use of strong opioids is appropriate given the substantial proportion of participants reporting severe pain. However, the fact that 40% of patients with severe pain were still considered non-adherent indicates that prescribing an opioid alone does not necessarily mean that pain management fully conforms to the WHO approach. Dose adequacy, route, frequency, titration, rescue medication, and use of adjuvant therapy must also be considered. Contemporary literature emphasizes that opioid therapy should be individualized and integrated with other pharmacological strategies rather than being considered solely on the basis of opioid class.[17,25]

The findings are also consistent with evidence from Pakistan showing barriers to implementation of the WHO analgesic ladder. A 2024 study involving physicians and surgeons from tertiary-care hospitals across Pakistan found that only 55.64% of respondents were familiar with the WHO cancer pain analgesic ladder, while nonavailability of recommended drugs was identified as an important reason for not following it. This finding is relevant to the current study because adherence at the patient level depends not only on clinical decision-making but also on healthcare-provider knowledge, availability of appropriate analgesics, institutional prescribing practices, and regulatory factors affecting opioid access. Similar challenges have been identified internationally, particularly in resource-limited settings, where restricted availability of analgesics and limitations in healthcare infrastructure can interfere with optimal cancer pain management.[22,19]

Similarly, a recent cross-sectional study from Pakistan reported that approximately 54% of prescriptions were consistent with WHO pain-management recommendations, while weak opioids were frequently prescribed and strong opioids were not used in the studied population. Although the adherence level in the present study was somewhat higher at 65%, both studies demonstrate that a considerable proportion of cancer patients may not receive treatment fully aligned with guideline-based pain management. Differences in hospital setting, cancer population, availability of medicines, sample characteristics, and definitions of adherence may account for the variation between studies. Evidence from cancer populations also demonstrates that pain remains prevalent and can interfere substantially with daily activities, supporting the importance of effective analgesic management.[10,11]

International evidence also supports the importance of appropriate adherence to structured cancer pain-management approaches. A prospective study of patients with neuropathic cancer pain demonstrated that multimodal treatment based on the WHO analgesic ladder, including opioids and appropriate adjuvant medicines, was associated with substantial improvement in pain control over follow-up. Furthermore, an observational study evaluating long-term implementation of the WHO ladder reported that a large proportion of patients were treated according to the ladder and that adjuvant medicines were frequently required, highlighting the importance of individualized and multimodal treatment rather than reliance on analgesics alone. Psychological and non-pharmacological interventions may also contribute to improved pain outcomes when integrated with pharmacological treatment.[8]

An important consideration is that the WHO pain ladder should not be interpreted as a rigid sequence that must be followed identically in every patient. Cancer pain may arise through different mechanisms, including nociceptive, neuropathic, and mixed pathways, and consequently requires individualized assessment and management. The current approach to cancer pain management emphasizes appropriate opioid selection, rescue medication, route of administration, opioid rotation or cessation when necessary, and use of adjuvant medicines. Therefore, the 35% non-adherence observed in this study should be interpreted as a potential indicator of divergence from guideline-based analgesic management rather than automatically assuming that every deviation represents inappropriate clinical care.[15,18]

The findings have practical implications for Hayatabad Medical Complex and similar tertiary-care institutions. Regular assessment of pain using standardized tools, documentation of pain scores, development of institutional cancer-pain protocols, continuing education of physicians and nurses, and improved availability of appropriate opioid and non-opioid analgesics may improve adherence. Particular attention should be given to patients with severe pain because they demonstrated the lowest adherence in the present study. Ensuring access to appropriate analgesics, particularly opioids when clinically indicated, remains an important component of effective cancer pain management, especially in resource-constrained healthcare settings.[6,22]

Overall, the present study demonstrates moderate adherence to the WHO pain ladder, with better adherence among patients with mild pain and comparatively poorer adherence among those with moderate and severe pain. The results are broadly consistent with previous evidence indicating persistent gaps in cancer pain management. Improving healthcare-provider knowledge, ensuring availability of appropriate analgesics, strengthening pain assessment and documentation, and integrating palliative-care services could help reduce undertreatment and improve the quality of cancer pain management. Such improvements are particularly important because cancer pain is associated with psychological distress and other adverse effects that can substantially reduce patients' overall quality of life.[7,12]

CONCLUSION

The present study concluded that adherence to the WHO pain ladder in the management of cancer pain at Hayatabad Medical Complex, Peshawar, was moderate. Although most patients received analgesic treatment consistent with the recommended WHO approach, a considerable proportion experienced non-adherence, particularly those with moderate and severe pain. Inadequate alignment between pain severity and analgesic selection may contribute to insufficient pain control and reduced quality of life. The findings highlight the need for systematic pain assessment, accurate documentation, appropriate opioid prescribing, and rational use of adjuvant analgesics. Regular

training of healthcare professionals regarding evidence-based cancer pain management and improved availability of essential analgesic medicines are recommended. Strengthening institutional pain-management protocols and palliative-care services may further improve adherence and ensure effective, individualized pain relief for cancer patients.

Ethical Approval
Ethical approval was obtained from the relevant institutional ethics committee, and written informed consent was obtained from all participants. Confidentiality and privacy of patient information were maintained throughout the study.

Data Availability
The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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Informed Consent
Written informed consent was obtained from all participants before enrollment in the study.

Funding
This research received no external funding.

Conflict of Interest
The authors declare that they have no competing interests.

Acknowledgments
The authors would like to express their sincere gratitude to the administration and staff of Hayatabad Medical Complex, Peshawar, for their support and cooperation during the conduct of this study. The authors also acknowledge the support of the departments and healthcare professionals involved in data collection and patient management. We are grateful to all patients and participants whose data contributed to this research.

Declaration of AI-Assisted Language Editing
Gemini AI was used for grammar, language correction and generation of flow diagram and then verified by the authors.

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