ORIGINAL ARTICLE

# PRESCRIPTIONS MESHING BASED ON THE WHO THREE-STEPS ANALGESIC LADDER: AN OBSERVATIONAL STUDY

Ihsan Khan[1], Najm Ur Rehman[1], Majid Khan[2], Tanzeela Ghani[3], Nida Iftikhar[4], Anjum Shahzad[2], Abbas Iqbal[2]

ABSTRACT

**Introduction**: Pain is an unpleasant sensory and emotional experience associated with either actual or potential tissue damage. This study aims to compare prescriptions with the benchmark of the three-step analgesic ladder recommended by the World Health Organization (WHO). Given Pakistan's membership in the WHO, adherence to the WHO analgesic ladder is essential.

**Material & Methods:** The current two-month observational study was conducted at Lady Reading Hospital (LRH) in Peshawar, Pakistan, the data collected on prescription practices based on a specialized proforma, categorizing them based on their pain condition and therapy. Lastly, the data analyzed using Microsoft Excel and Graph pad Prism. The study assessed compliance with the WHO analgesic ladder for patients experiencing mild, moderate, or severe pain and categorized them based on therapy.

**Results**: A total of 81 cases were gathered from various hospital wards, including orthopedic, psychiatric, and surgical wards. Out of all patients, 64 (79%) were male and 17 (21%) were female. The study revealed that 77 patients were found to be complying and only four patients deviating from the ladder. Among the four patients who deviated, three had moderate pain, and one had severe pain. The study revealed that the WHO analgesic ladder was predominantly followed, with only a few deviations noted. Physicians demonstrated a good understanding of the gold standard in analgesic therapy. Many patients (95%) adhered to the ladder, indicating a high level of awareness among physicians regarding rational analgesic prescribing practices.

**Conclusion**: The findings suggest that the WHO analgesic ladder was largely adhered to at LRH, with a negligible deviations observed. This underscores the importance of benchmarking practices in prescribing analgesics in hospitals to ensure rational and effective pain management for patients.

**Key Words**: mild, moderate and severe pain, WHO Ladder

**Authors' Declaration**: The authors declared no conflict of interest and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All authors contributed substantially to the planning of research, question designing, data collection, data analysis and write-up of the article.

**Authors' Affiliation**

[1]Shaheed Benazir Bhutto University (SBBU), Sheringal
[2]Abasyn University, Peshawar
[3]Hamdard Laboratory, Peshawar
[4]Medical Science Liaison Medical Affair Department Getz Pharmaceutical Korangi

**Corresponding Author**

Majid Khan
Abasyn University, Peshawar
Email: majidkhanpiran@gmail.com

**This article may be cited as**: Khan I, Rehman N, Khan M, Ghani T, Iftikhar N, Shahzad A, Iqbal A. Prescriptions meshing based on the WHO three-steps analgesic ladder: an observational study. Rehman J Health Sci. 2024;6(1). 38-43

Submitted: Fe 01, 2024 Revisions Submitted: May 20, 2024 Accepted: June 30, 2024

## INTRODUCTION

The International Association for the Study of Pain (IASP) defined "Pain is an unpleasant sensory and emotional experience associated with either actual or potential tissue damage or narrated in terms of such damage". It is a common symptom of most of the diseases which alert the body to give protective responses. Pain is linked with the central nervous system is called neuropathic pain. It is the prime duty of clinicians to ask the patients regarding pain whether mild, moderate, or severe. Proper region identification as well as rating of pain by scale, is also essential to treat the patient rationally.[1]

In 1986 (revised in 1996), the WHO introduced the guidelines for the management of pain which is called the three-steps analgesic ladder. It is standard for therapy worldwide for patients in pain and best for cancer pain especially chronic pain. If pain occurs, there should be prompt oral administration of drugs in the following order: non-opioids (aspirin and paracetamol); then, as necessary for mild pain, weak opioids for moderate pain entail codeine and for severe pain recommended drugs are morphine and adjuvants can be combined with all steps in the ladder.[2] (Figure 1)

The painkiller drugs should be prescribed to the patients on the ladder which can promote rational use of drugs like the selection of right drug for right patient at lowest affordable cost. Similarly, for cancer pain analgesic ladder is crucial to decide ideal drug.[2] Study articulated in Poland acknowledged to the WHO by using a ladder almost 90% of patients were treated successfully.[3] Analgesic ladder playing pivotal role in the management of pain and turn into efficient pain management into those patients who were on hemodialysis. In the management of pain elder patients required great attention as compared to young patients.[4]

**Figure 1:** Three-steps recommended by the WHO for safe analgesic practices.

The primary source to assess the pain is the patient self-report, the clinician should ask the patient about pain. Clinicians should easily assess the pain with administered rating scales, after starting treatment at the regular intervals the efficacy of the pain relief should be documented.[1]

Based on duration pain is classified into the following types; the pain can be acute or chronic. Acute pain lasts for less than three months, and it acts as a signal of warning, defensive that may be associated with medical procedures, post-operative pain, and trauma. On the other hand, pain that persists for more than three months is considered as chronic pain. It does not act as a signal of warning and defensive, it is considered the nature and symptom of the disease. For chronic pain multi-therapeutic activities are required.[3] Based on severity pain can be mild, moderate, or severe. Pain severity can be assessed by several scales such as Numerical Rating Scale (NRS), Verbal Descriptor Scale, and Faces Pain Scale (FPS). Among these, the FPS has garnered the highest rating based on public response. The FPS is segmented into three categories: 1-4 indicating mild pain, 5-6 for moderate pain, and 7-10 denoting severe pain, as illustrated in Figure 1.[5] To the best of our knowledge this will be the first approach to highlight and assess the WHO three steps analgesic ladder for the management of pain.

## MATERIAL AND METHODS

The two-months study was conducted at Tertiary Care Hospital Lady Reading Hospital (LRH) Peshawar, Khyber Pakhtunkhwa (KPK) from 1st January to 28th February 2021. LRH is the largest hospital of KPK having capacity of 1,691 beds. LRH is providing the health care facilities to the people near about all the districts of KPK as well as to the people of Afghanistan. The data of 81 patients were collected from the different wards including the psychiatry, orthopedic and surgical ward.

### Data Collection and Analysis

This study was conducted in the Pharm-D Clinical Clerkship of the first author. After receiving a proper permission from the hospital. The data was mostly collected by asking questions from the patients, patient attendance, nurses, and also collected from the files of the patients. After collection, the data was arranged carefully and analyzed through Microsoft Excel 365 and Graph pad prism 8.0.

### Pain-wise Data Distribution

The patient's data was also distributed based on their types of pain that may be mild-moderate or severe pain as well as gender-based compliance with the WHO yardstick for pain.

## RESULTS

The total 81 patients' data was collected from the different wards including the psychiatry, orthopedic and surgical ward. In which 64 (79%) patients were male and 17 (21%) were female. Besides, patients were also divided based on their

age ranges in which the patients were common in the age of 11-30 further ages are given in the (Table 1). In addition to that, the patients were also classified based on their pain type, as depicted in Figure 2 & 3.

In the current study the WHO analgesic ladder was followed up-to the mark in the mild pain 100%, 91.2% in the moderate pain and 75% for severe pain (Table 2). For age-wise distribution of the patients please see Table 1 and for pain wise distribution of the patients and types of analgesics prescribed Figure 2**.**

Table 2 shows Compliance versus deviations from the WHO three steps ladder and Figure 3 shows graphical depiction of pain-wise distribution.

## DISCUSSION

Pharmacotherapy is the primary method for the treatment of pain. The WHO developed guidelines for the management of pain in 1986, which is called the WHO scheme or three-stage analgesic ladder. For analgesic care, it has become a global benchmark. For the treatment of chronic pain with the substrate, it is also commonly used. If the pain occurred, the oral administration of the drugs will be promoted in the following ways, initially, the non-opioids drugs such as (Paracetamol and aspirin) will be used followed by, if necessary, the weak opioids drugs should be used, then strong opioids until the patient is free from the pain.[3] In the current study the WHO analgesic ladder was followed up to great extent in the mild pain it was followed up to 100% in the moderate pain 91.2 % and in severe 75%.

A study conducted in Poland in which 85-90% of the patients successfully treated when they complied the WHO three steps of analgesic.[3] Another study conducted by Zernikow *et al.* according to their study in the management of mild pain paracetamol and dipyrone were frequently prescribed. Similarly, in current study in the management of mild pain ketorolac and ibuprofen were commonly prescribed interestingly all of these were non-opioids. So, in the management of mild pain the current study depicts similarities with the study conducted by Zernikow *et al.* According to the study of Zernikow *et al*., in the management of moderate pain tramadol was used and morphine for severe pain. In our study for the management of severe pain the nalbuphine was prescribed and tramadol for moderate pain. Thus, the Zernikow *et al.* reflects great similarities to our study.[6]

Singh *et al.* study reveals that 77% patients were inadequately managed and, in our study, only 4.94% patients inadequately managed.[7] Another study conducted by Kirou-Mauro *et al,* in which they reported that approximately 29% to 48% of patients were inadequately treated for their pain symptoms.[8] A study conducted in India by Saxena *et al*. in their study the proportion of inadequately pain management was 79% and, in our study, only 4.94% patients were deviated.[9] Vuong *et al.* study reported that 33.3% patients were inadequately managed.[10] Similarly, Beck and Falkson in South Africa reported that only 21% of the cancer patients had achieved 100% pain relief. In our study the WHO analgesic ladder was followed up to maximum extent due to which the patient's achieved relief from pain.[11]

According to the study conducted by the Geeta *et al.*, the WHO analgesic ladder was effective and plays an important role in the management of pain in children with leukemia. For the effective management of pain, the assessment of the severity and the type of the pain was crucial. The WHO three-steps analgesic ladder was declared an ideal benchmark for the management of pain in leukemia patients. In most cases, pain in children with leukemia was managed while using WHO step-1 which was effective in 31 children. While step-2 was effective in 21 children and step-3 was less frequently used only in 16 children.[12]

In 2012 a study conducted by the Silviniemi *et al*. they collected the data by using different types of questionnaire. The data were collected from 720 physicians in which 59 were working in oncology and 661 physicians were in the internal medicine. After analysis of the data, it was found that the WHO analgesic ladder was not well known among most of the physicians. Only 46% of the oncologists and 32% physicians know the WHO three-steps analgesic ladder. About 50% of the oncologist and one-third of other physicians answered that treatment of the cancer pain in Finland was at inappropriate level. The main reason for this improper treatment was the lack of knowledge and skills[13] The results of our study purports that physicians were aware regarding the analgesic ladder because only slight deviation was noted in case of severe pain 25% deviation, moderate 8.8% and no deviation noted in mild pain.

## CONCLUSION

This study sums up that the WHO analgesic ladder was adhered up to its highest level: 100%

for mild pain, 91.2% for moderate pain, and 75% for severe pain. The primary reason for not following the guidelines was a lack of awareness regarding the WHO analgesic ladder. All prescriptions should strictly comply with the WHO analgesic ladder to promote rational analgesic practices. This study was restricted to a single center, highlighting the necessity for similar investigations across multiple hospitals to ensure alignment with the WHO's recommended pain management standards.

**Conflict of Interest**

Nil

**Acknowledgment**

The contributions of all the co-authors are acknowledged.

**REFERENCES**

1. Borda AP, Charnay-Sonnek F, Fonteyne V, Papaioannou EG. Guidelines on Pain Management and Palliative Care. Arnhem, Netherlands: European Association of Urology (EAU); 2013.
2. Mishra S, Bhatnagar S, Gupta D, Nirwani Goyal G, Jain R, Chauhan H. Management of neuropathic cancer pain following WHO analgesic ladder: a prospective study. Am J Hosp Palliat Care. 2009;25(6):447-451.
3. Świeboda P, Filip R, Prystupa A, Drozd M. Assessment of pain: types, mechanism and treatment. Pain. 2013;2(7).
4. Barakzoy AS, Moss AH. Efficacy of the World Health Organization analgesic ladder to treat pain in end-stage renal disease. J Am Soc Nephrol. 2006 Nov;17(11):3198-3203.
5. Jones KR, Vojir CP, Hutt E, Fink R. Determining mild, moderate, and severe pain equivalency across pain-intensity tools in nursing home residents. J Rehabil Res Dev. 2007;44(2):305-314.
6. Zernikow B, Smale H, Michel E, Hasan C, Jorch N, Andler W. Paediatric cancer pain management using the WHO analgesic ladder–results of a prospective analysis from 2265 treatment days during a quality improvement study. Eur J Pain. 2006;10(7):587-595.
7. Singh H, Banipal RPS, Singh B. Assessment of adequacy of pain management and analgesic use in patients with advanced cancer using the brief pain inventory and pain management index calculation. J Glob Oncol. 2017;3(3):235-241.
8. Vuong S, Pulenzas N, DeAngelis C, Torabi S, Ahrari S, Tsao M, Danjoux C, Barnes T, Chow E. Inadequate pain management in cancer patients attending an outpatient palliative radiotherapy clinic. Support Care Cancer. 2016;24(2):887-892.
9. Beck SL, Falkson G. Prevalence and management of cancer pain in South Africa. Pain. 2001 Oct;94(1):75-84.
10. Geeta MG, Geetha P, Ajithkumar VT, Krishnakumar P, Kumar KS, Mathews L. Management of pain in leukemic children using the WHO analgesic ladder. Indian J Pediatr. 2010 Jun;77(6):665-668.
11. Silvoniemi M, Vasankari T, Vahlberg T, Vuorinen E, Clemens KE, Salminen E. Physicians' self-assessment of cancer pain treatment skills—more training required. Support Care Cancer. 2012;20(11):2747-2753.

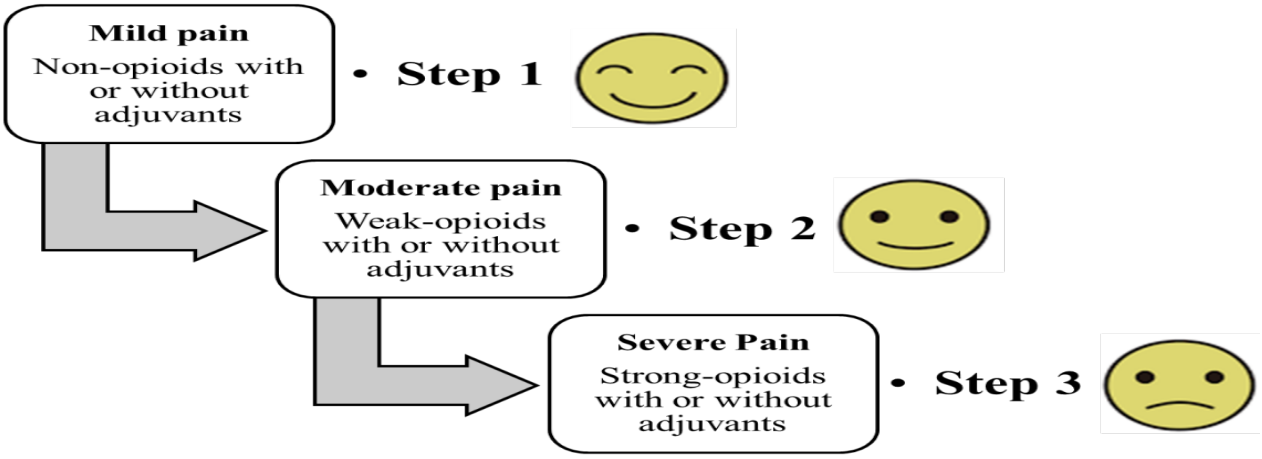


*Figure 1: Three-steps recommended by the WHO for safe analgesic practice*

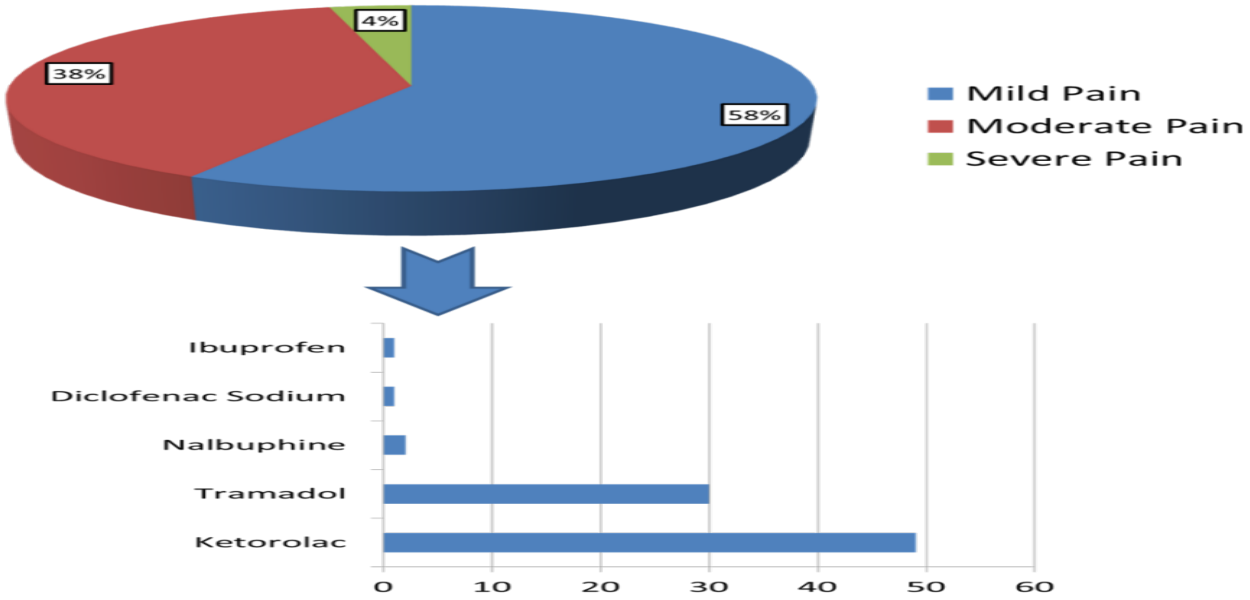


*Figure 2: Pain wise distribution of the patients and types of analgesics prescribed*

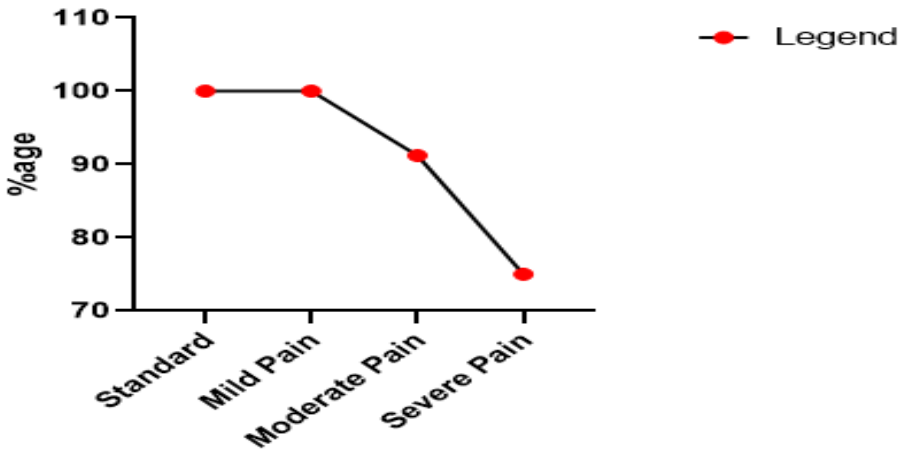


*Figure 3: Graphical depiction of pain-wise distribution*

*Table 1: Age-wise distribution of the patients*

| Age in year | Male | Female | Total | Percentage (%) |
|---|---|---|---|---|
| 01—10 | 06 | 01 | 07 | 8.6 |
| 11—20 | 15 | 02 | 17 | 20 |
| 21—30 | 15 | 03 | 18 | 22 |
| 31—40 | 10 | 02 | 12 | 14 |
| 41—50 | 04 | 00 | 04 | 4.9 |
| 51—60 | 07 | 01 | 08 | 9.87 |
| 61—70 | 03 | 04 | 07 | 8.6 |
| 71—80 | 02 | 01 | 03 | 3.70 |
| 81—90 | 02 | 02 | 04 | 4.93 |
| 91—100 | 00 | 01 | 01 | 1.23 |

*Table 2: Compliance versus deviations from the WHO three steps ladder*

| Pain type | Followed | Not followed | Percent % (S.D) | Total followed (%) | Optimal value (%) |
|---|---|---|---|---|---|
| Mild pain | 47 | 00 | 00 | 100 | 100 |
| Moderate pain | 31 | 03 | 8.8 | 91.2 | 100 |
| Severe pain | 03 | 01 | 25 | 75 | 100 |

*S.D = standard deviation