



GUIDELINES FOR THE MANAGEMENT OF PAIN IN NIGERIA

Federal Ministry of Health
Nigeria

2018

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**RESPONSE TO DRUGS AND RELATED ORGANISED CRIME IN NIGERIA
(FED/2012/306-744) (NGAV16)**



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FOREWORD

The Government of Nigeria is deeply committed to providing high quality and comprehensive care for its population of people living in pain. This commitment is evident in the steps the government has taken to increase access to and availability of medicines for management of pain, including the provision of controlled medicines.

Pain is a major problem accompanying several disease entities and could also be the presenting complaint of several diseases. It has either been poorly, under- or inconsistently treated or managed in patients. The reasons for this could be many, one of which is inadequate knowledge amongst healthcare professionals as reported by the International Narcotic Control Board (INCB).

This Guidelines for Pain Management in Nigeria is developed to provide informed guidance to healthcare practitioners and care-givers in their management of pain in all categories of patients requiring pain relief. It contains information on methods and practical steps of assessment, diagnosis and treatment of pain both pharmacologically and non-pharmacologically, as well as effective monitoring.

This document is a product of the extensive work and contributions of a wide range of relevant stakeholders and the Technical Experts in Pain Management, in different fields of medical practice, across organizations within the healthcare delivery system of the nation.

I am convinced that the implementation of these Guidelines will lead to a standardized treatment protocol that will ensure the highest standard of quality care in line with global best practices.

I therefore endorse this document as the principal guide for the provision of pain management for adults and children in Nigeria and advise that all healthcare providers should be guided by its recommendations.



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Nigeria, 2018

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We equally thank the Technical Expert Group and its members for their dedication, contributions and vision in developing this document.



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TABLE OF CONTENTS

Foreword	i
Acknowledgements	ii
Contributors	iii
Table of Contents	vi
Executive Summary	ix
Key Terms, Abbreviations, Acronyms.....	xi
1.2 Acronyms and Abbreviations	xi
1.2 Definition of Terms	xii
Methodology	xiv
1. Introduction.....	1
2. Patient Care.....	5
2.1 Patient Assessment.....	6
2.1.1 Critical Elements of Assessment.....	7
2.1.1a Patient History	7
2.1.1b PQRST	7
2.1.1c Pain Assessment in Children:	8
2.1.1d Pain Intensity Measurement Tools.....	8
2.1.2 Recommendations.....	11
2.2 Interventions for Patients	12
2.2.1 Pharmacological Interventions	12
2.2.1a Introduction to Pain Management	12
2.2.1b Recommendations Related to Use of the “Analgesic Ladder”	14
2.2.1c Summary Classification of Analgesics	16
2.2.1d Description and guidance for medication use	17
2.2.1e Conclusion.....	30
2.2.2 Recommendations for Pharmacological Interventions	30
2.2.3 Non-pharmacological Interventions	32
2.2.3a Introduction to non-pharmacological interventions.....	32

2.2.3b Goals of non-pharmacological interventions.....	32
2.2.3c Principles of non-pharmacological management of pain.....	33
2.2.3d Cognitive-Behavioral Interventions	34
2.2.3e Physical Interventions.....	35
2.2.3f Role of Physical Therapy in Pain Management in Special Conditions.....	42
2.2.4 Recommendations for Non-Pharmacological Interventions	43
2.2.5 Nurses and Other Caregivers	47
2.2.5a General roles of nurses	47
2.2.5b Nursing roles specific to pain management.....	48
2.2.6 Recommendations related to quality nursing care and pain management	51
2.2.7 Patient Monitoring	52
2.2.8 Recommendations related to monitoring patients	53
3. Special Considerations	55
3.1 Use of Controlled Medicine	56
3.1.1 Overview.....	56
3.1.2 Recommendations related to use of controlled medicines.....	58
3.2 Cancer Pain.....	60
3.2.1 Overview.....	60
3.2.2 Recommendations related to cancer	60
3.3 Chronic Pain management	62
3.3.1 Overview.....	62
3.3.1a Conditions for prescribing opioids in cases of chronic pain	62
3.3.2 Recommendation for Chronic Pain	64
3.4 Unique Patients	65
3.4.1 Overview.....	65
3.4.2 Recommendations for unique populations.....	68
4.0 health service delivery.....	69
4.1 Overview.....	69
4.1.1 Primary Healthcare Facilities	70
4.1.2 Secondary Healthcare Facilities.....	70

4.1.3 Tertiary Healthcare Facilities	70
4.2 Recommendations	71
5.0 Building Capacity	72
5.1 Overview.....	72
5.2 Components of Training.....	72
5.3 Recommendations	74
Appendix I – PROFORMA	75
Appendix II – Assessment tools.....	76
Appendix III – Pain Ladder – modified WHO	77
Appendix IV – Classifications of pain	78
Classification systems	78
Duration of Pain	78
Pathophysiological Mechanism.....	79
Anatomical location.....	80
Aetiological classification	80
Situation classification	80
Appendix V – Pharmacological interventions	82
Appendix VI – Non-pharmacological Pain Summary Chart.....	88
Non-Pharmacological Management of Acute Pain.....	88
Non-Pharmacological Management of Chronic Pain.....	89
Appendix VII – Opioid Comparative Table	90
Appendix VIII – Glossary of Terms	92

EXECUTIVE SUMMARY

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such. It is a presenting feature of many health conditions. Unfortunately, both acute and chronic pain are grossly under-treated in Nigeria for a wide variety of cultural, attitudinal, educational, political, and logistical reasons. Although accurate data on the burden of pain and its management in Nigeria does not exist, many reports document the common problem areas related to acute or chronic cancer and non-cancer pain.

Recently there has been increased global attention to the disparity between the medical needs of patients in low- and middle-income countries and the actual use of controlled medicines to meet their needs in relation to pain. Access to the highest quality and safest medical interventions is a human right. Attention to ethics and human rights have contributed to an increased global advocacy for the use of controlled medications, including opioids, in the management of pain. Controlled medicines used for medical purposes, when patients are adequately screened and monitored, are effective and can be safely administered by healthcare providers.

Selecting appropriate interventions for the management of pain requires physicians, pharmacists, physiotherapists, nurses and other healthcare staff to consider factors such as patient condition, underlying disease conditions, co-morbidities, severity of pain, and side effects of selected interventions. In reality, we know that managing pain also involves consideration of factors such as cost, policies and legislation, as well as access to healthcare.

The medications for the relief of pain are of different types and from different pharmacologic classes, having different mechanisms of action and side effects. They fall into pharmacologic classes such as non-steroidal anti-inflammatory drugs (NSAIDS), non-opioid analgesics, opioid (Narcotic) analgesics and adjuvants. In the recent past, the use of opioids has become imperative since this class of medicines is key to pain relief for many patients. While advocating for increased access to controlled medications for pain, it is important to note that every effort must be put in place to ensure that there is no diversion of these medicines for non-medical use. Prescription of opioids for the management of pain is appropriate when a more conservative method is ineffective. However, a treatment plan must be in place to avoid diversion, potential misuse and further complications such as substance use disorders.

Some of the medicines recommended in this guideline include Over The Counter (OTC) medicines and Prescription Only Medicines (POMs). Adjuvants are also very important and useful in relieving pain.

Physicians must medically assess all patients for presence of pain, regardless of the patient's medical diagnosis. Pain treatment is therefore, patient focused. When appropriate and

possible, healthcare team will establish treatment goals and a treatment plan, with either pharmacological and or non-pharmacological interventions, to obtain optimal outcomes.

This pain guideline provides recommendations, supported by analysis of the current literature and by a synthesis of expert opinions, open forum commentary and clinical data. It can, and should be used by all health care practitioners, with an aim to improve the quality of life.

How to use these guidelines:

This guideline is a tool to guide decision making in the management of patients presenting with pain. It provides a framework for pain management in diverse population and clinical situations using the following format:

1. Appropriate assessment to identify cause and severity of pain;
2. Comprehensive explanation to patient and family caregiver at all stages;
3. Correct disease factors or health conditions that can be reversed;
4. Consider and institute non-pharmacological interventions where necessary;
5. Prescribe appropriate first-line analgesics following the recommendations of the World Health Organization (WHO) Analgesic Guidelines;
6. Consider adjuvant/second-line analgesics;
7. Review patient assessment and management;
8. At all stages of management consider involvement of interdisciplinary pain team, including possible referral to other services or more experienced clinicians.

Bearing in mind the individual variability in pain perception, expression and analgesic response, we recommend individualized management, according to each patient's condition and need.

It is recommended that the guidelines be used in conjunction with other relevant reference materials, including National Policy on Controlled Medicines, National Essential Medicines List, Standard Treatment Guidelines and National Drug Formulary.

KEY TERMS, ABBREVIATIONS, ACRONYMS

1.2 ACRONYMS AND ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
DPN	Diabetic Peripheral Neuropathy
FMOH	Federal Ministry of Health
GFR	Glomerular Filtration Rate
HCP	Health Care Provider
HIV	Human Immunodeficiency Virus
IASP	International Association for the Study of Pain
IM	Intramuscular
IV	Intravenous
NAFDAC	National Agency for Food and Drug Administration and Control
NPHCDA	National Primary Health Care Development Agency
NRS	Numeric Rating Scale
NSAID	Non-Steroidal Anti-inflammatory Drugs.
PCA	Patient Controlled Analgesia
PHN	Post Herpetic Neuralgia
RCT	Randomized Controlled Trials
SC	Subcutaneous
SCD	Sickle Cell Disease
SSRI	Selective Serotonin Reuptake Inhibitor
TCA	Tricyclic Antidepressants
TEG	Technical Expert Group
TENS	Transcutaneous Electrical Nerve Stimulation
VAS	Visual Analogue Scale
VRS	Verbal Rating Scale
WHO	World Health Organization

1.2 DEFINITION OF TERMS

Acute pain: symptoms occurring for less than three months

Addiction: a brain disorder characterized by compulsive engagement in rewarding stimuli despite adverse consequences

Addictive behaviour: a behaviour that is both rewarding and reinforcing

Addictive drug: a drug that is both rewarding and reinforcing

Analgesic: an agent for producing insensibility to pain without loss of consciousness

Anaesthetic: a substance that causes loss of sensation or consciousness

Anticonvulsants: a medication used to control seizures or stop an ongoing series of seizures

Breakthrough pain: a sudden temporary flare of severe pain that occurs on a background of otherwise controlled pain

Chronic pain: symptoms occurring for greater than 3months

Controlled medicine: a drug or chemical whose manufacture, possession or use is regulated by a government
Dependence: an adaptive state associated with a withdrawal syndrome upon cessation of repeated exposure to a stimulus (e.g., drug intake)

Drug sensitization or reverse tolerance: the escalating effect of a drug resulting from repeated administration at a given dose

Drug withdrawal symptoms: symptoms that occur upon cessation of repeated drug use

Incident pain: type of breakthrough pain related to an activity

Intravenous: administered into a vein

Intramuscular: administered into a muscle

Neuropathic pain: symptoms arising from a disturbance of function or pathologic change in a nerve

NSAIDS: Category of drugs that alleviate pain, reduce fever and inflammation

Narcotic(s): a group of medicines that relieve acute and chronic severe pain by binding to opioid receptors

Opioid: a group of substances that resemble morphine in their physical or pharmacological effects, especially their pain-relieving properties

Oral: taken by mouth

Pain: an unpleasant sensory or emotional experience associated with actual or potential tissue damage or described in terms of such damage

PARENTERAL: administered elsewhere in the body other than mouth and alimentary canal

Physical dependence: dependence that involves persistent physical–somatic withdrawal symptoms (e.g., fatigue and delirium tremens)

Psychological dependence: dependence that involves emotional–motivational withdrawal symptoms (e.g., dysphoria and anhedonia)

Reinforcing stimuli: stimuli that increase the probability of repeating behaviours paired with them

Rewarding stimuli: stimuli that the brain interprets as intrinsically positive and desirable or as something to be approached

Sensitization: an amplified response to a stimulus resulting from repeated exposure to it

Side effect: a secondary effect of a drug or medical treatment

Somatic pain: pain relating to the body especially as distinct from the mind

Substance use disorder: a condition in which the use of substances leads to clinically and functionally significant impairment or distress

Tolerance: the diminishing effect of a drug resulting from repeated administration at a given dose

Visceral pain: pain involving internal organs of the body

METHODOLOGY

The United Nations Office on Drugs and Crime (UNODC) project, ‘Response to Drugs and Related Organized Crime in Nigeria’, funded by the European Union, under the 10th European Development Fund (EDF) modality, supports the Nigerian government to develop pain management clinical practice guidelines, to ensure a standardized pain management practice and the delivery of adequate and effective pain management for patients in Nigeria, in line with international best practices. The guidelines address the management of pain in all patients, including unique populations such as neonates, infants, children, adults and individuals with special needs. The overall aim is to enhance appropriate and high-quality medical care.

The guidelines were developed by a twenty-five-member Technical Expert Group (TEG) constituted by the Federal Ministry of Health based on clinical expertise in pain management. The membership comprised representatives of the medical specialties of Anaesthesia, Neurology, Clinical Pharmacology, Dermatology, Obstetrics and Gynaecology, Orthopaedics, Surgery, Psychiatry, Nursing, Palliative Medicine, Physiotherapy, National Agency for Food and Drug Administration and Control (NAFDAC), Pharmacists’ Council of Nigeria (PCN), Association of Community Pharmacists of Nigeria (ACPN), Committee of Heads of Pharmacy in Federal Health Institutions (COMPHFHI), the Federal Ministry of Health (FMOH), American Cancer Society’s (ACS’s) Treat the Pain Program and Non-Governmental Organisations (NGOs), Society for the Study of Pain Nigeria (SSPN), the Sickle Cell Foundation, Nigeria.

The TEG developed the guidelines during a series of three (3) meetings that spanned over a period of four months. The first Technical Expert Group (TEG) Workshop was held in Lagos, Nigeria, from 29th to 31st August 2017. During this workshop, a draft of the roadmap plan, which formed the basis for further work to develop the guidelines on pain management, was created. The process of creating the initial draft included a review of the relevant papers and practices on pain management.

Next, specific issues on pain management were identified and prioritized according to relevance to the Nigerian context. This included the identification of reasons for creation of the guidelines and potential barriers to its successful implementation. Following this, sub-working groups consisting of TEG members were created to focus on each of the specific pain management issues identified as well as key components of the guidelines, with several TEG members participating in more than one sub-working group. Additionally, key terms were identified and defined.

The second TEG Workshop held also in Lagos, from the 10th to 12th of October 2017. The methods by the expert panel were (i) Identification of priority topics (ii) Identification and evaluation of pain treatments publications from web searches (iii) Review of other appropriate literatures from web search; (iv) Detailed assessment and synthesis of the

evidence; (v) Formation of recommendations; and (vi) Writing and publication of the guidelines' content.

In addition, the expert panel identified existing pain management clinical guidelines developed by professionals in other countries, in order to find more relevant and well-conducted studies. Guidelines used include those of the American Academy of Pain Medicine, CDC Guideline for Prescribing Opioids for Chronic Pain, Neuropathic Pain, Special Interest Group of the International Association for the Study of Pain, WHO guidelines on the pharmacological treatment of persisting pain in children with medical illnesses, Primary Care Pain Medication Prescribing Guidelines for Monterey County, California USA and The Hospital for Sick Children ('Sick Kids') Clinical Practice Guidelines for Pain Management. Also, consensus statements (based on clinical experience) were made by the expert group in treatment areas where there was minimal scientific evidence.

The third TEG Workshop held in Abuja, Nigeria from the 20th to 23rd of November 2017. This meeting involved the members of the TEG and a significant cadre of thirty-five additional stakeholders in the healthcare system. The inputs and feedbacks at this third meeting were taken into consideration in producing these guidelines.

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1. INTRODUCTION

The goal of these Guidelines is to provide informed guidance to healthcare practitioners as they manage pain in patients.

The key objectives are to:

- 1. Provide all healthcare practitioners with standards of practice that will assist them in the effective assessment, treatment and monitoring of pain.*
- 2. Increase the utilization of, and access to standard pain treatment options and care in Nigeria;*
- 3. Ensure all patients with pain receive the highest quality care within a framework of ethics and respect for human rights.*

Pain can be defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage.¹ It is the most common symptom of a disease and is very often the first pointer to a deviation from the normal functioning of different parts of the human body.

Pain and its management constitute a significant burden in Nigeria. Although the true prevalence of pain in the population is difficult to determine, different studies determining point prevalence of low back pain, a common surrogate for chronic pain in a community, reported high rates ranging from 58% among secondary school students in Ibadan, South-West Nigeria,² to 68.2% among fishermen in riverine parts of Rivers State in South-South Nigeria³ and 73.5% among professional drivers in Kano, North-West Nigeria.⁴ The direct and indirect cost of these findings on the physical, social and financial well-being of the citizenry has been scarcely assessed.

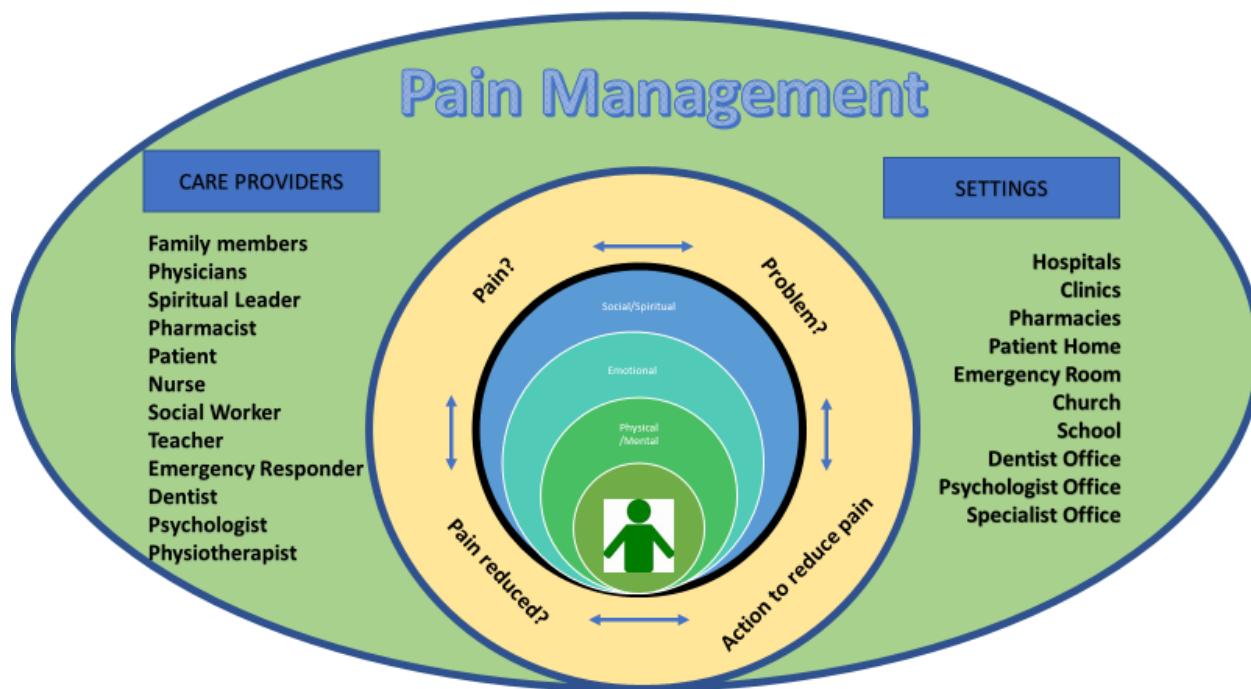
Apart from the evidently high prevalence, management of pain has been a recurring challenge across the country. A study among peasant farmers with musculoskeletal pain in South-West Nigeria reported the use of herbal concoctions alone for treatment of pain in 83.8% of farmers, while 23.6% reported combining the herbal therapies with conventional medicine.⁵ In Nigerian hospitals, several reports on postoperative pain have demonstrated infrequent assessment, poor diagnosis and inadequate treatment among patients.⁶⁻⁸ One of the factors identified to be responsible for poor pain management is the poor knowledge of healthcare professionals in comprehensive pain management. Treatment plans are usually

not protocol-based, and physicians' prescriptions are often influenced by what is available irrespective of patients' need.

Understanding the physiology and classification of pain will help in the assessment and management of pain. Determining the type of pain helps to formulate the best treatment plan.

Pain can be classified in different ways based on: (1) duration-acute or chronic pain, (2) pathophysiological mechanism of pain- nociceptive or neuropathic pain, (3) anatomic location relating to the part(s) of the body involved such as low back pain, shoulder pain, and (4) the cause of the pain including neoplastic (cancer-related) and non-neoplastic (non-cancer-related).^{9,10}

While the curricula of health care professionals are being proposed to include comprehensive and interdisciplinary pain management, these guidelines have been developed to serve as a guide for better and safer clinical practice with recommendations on how a particular health condition or procedure should be managed as it relates to pain. Healthcare professionals are encouraged to treat patients with holistic consideration of immediate circumstance, allowing flexibility as the situation demands.



Stakeholders in Pain Management

The recommendations are intended to aid the assessment, diagnosis and treatment of pain by all healthcare providers in its widest meaning including, but not limited to, doctors, nurses, palliative care workers, pharmacists, physiotherapists, and clinical psychologists. All personnel involved in caring for patients experiencing pain, from any cause across the

different practice setting in Nigeria, will benefit from different aspects of these guidelines. The recommendations should guide the healthcare professional, from the primary care level to the tertiary level, such that all patients' pain is effectively relieved, at an affordable cost, and in a timely manner. These guidelines are also intended for healthcare policy-makers in Federal, State and Local Governments, hospital administrators, as well as public-health program coordinators, who play a crucial role in improving access to effective and safe pain management at various levels of the Nigerian health system.

It provides knowledge on assessing pain in patients, and appropriate diagnosis of pain within its classification. It aims to provide information on optimal pain control for Nigerian patients, while incorporating measures to improve quality of life and reduce incidences of adverse outcome of treatment to the barest minimum. This document recognizes that a total pain-free state may not be feasible in all cases and therefore emphasizes the focus on enhancing the physical, mental and spiritual well-being of the individual being treated. It includes both pharmacological and non-pharmacological interventions and encourages a patient-centered approach to care. The guidelines also encourage rational use of pain medicines such that misuse are prevented.

Specific diseases such as sickle cell disease and cancers are typically associated with pain, and in such instances, pain management may require therapies targeted at the underlying conditions. These guidelines are not organized as disease-specific therapies, but rather provide an overarching approach to pain management that can be used with all patients. A number of health conditions already have National Guidelines regarding their control and treatment; this document is meant to complement existing resources with additional information.

As with every guideline, current information used in making specific recommendations and suggestions may change with time. An update of these guidelines will therefore take place every three (3) years as new evidence and interventions become available.

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2. PATIENT CARE

Patient care is a collection of services provided to individuals in poor health. The human right to health means that everyone has the right to the highest attainable standard of physical and mental health to be achieved using the highest quality interventions. This includes ensuring a continuum of care for all patients that are treated and managed for pain, using the most scientific and valid methods.

In a busy world, where there are rarely enough health professionals available to meet the high number of patients, it is tempting to simply prescribe a pain medication and move to the next patient. The guidelines encourage physicians and other healthcare providers to carefully assess the level of pain, how it impacts the patients and their clinical history prior to creating a treatment plan that supports the patient and caregivers. Please note that both non-pharmacological and pharmacological interventions should be explored to meet the unique circumstances of each patient.

Pain is the most common disease symptom that brings patients in contact with the healthcare system. Patients in pain interact with healthcare providers of all types and at all levels of care, whether in the community (primary care physicians) or secondary health institutions. Patients often present with a desire for physicians to immediately relieve the pain, requesting or insisting upon pain medication. It is critical that a proper assessment is made and the most beneficial intervention selected.

A comprehensive knowledge of the underlying pathophysiology of pain is essential for effective pain management. Consequently, the approach to patients with pain begins with a detailed history and careful examination to identify the underlying cause, whether the pain is part of a specific syndrome and if it is nociceptive, neuropathic or mixed nociceptive and neuropathic.

All patient care, or treatment, begins with an explanation to patient, and combines physical and psychological approaches, using both non-drug and drug treatment.

2.1 PATIENT ASSESSMENT

- *Pain assessment is the cornerstone of successful patient care.*
- *It is critical to collect as much accurate information as possible prior to taking a decision on both diagnosis and treatment.*
- *Regular assessment of pain results in improved outcomes.*

Effective clinical management of pain ultimately depends on its accurate assessment, which entails a comprehensive evaluation of the patient's pain, symptoms, clinical history and functional status. Pain assessment enables health care providers to treat pain and alleviate suffering. It should be carried out at regular intervals and should be integrated into clinical care. The assessment process is essentially a dialogue between the patient and the healthcare provider that addresses the nature, location and the extent of the pain. It also looks at its impact on the patient's daily life and concludes with the pharmacological and non-pharmacological treatment options available to manage it. It is not a one-off process, and it is important that treatment interventions be evaluated by subsequent pain assessments to determine its effectiveness.

CASE STUDY A:

Mrs. A is a 45-year old woman who has just been admitted into the Oncology ward with paraplegia as a result of metastatic breast cancer. She also has several pressure ulcers on her coccyx and hip in addition to a stage four pressure ulcer on her left heel. She has chronic pain due to her diagnosis and also cries out in pain every time the nurses attempt to turn her while cleaning her up. Following a detailed history that includes PQRST and physical examination, the doctor measures her pain intensity with the Numeric Pain Rating Scale and other characteristics of her pain with the McGill Pain Questionnaire. Investigations to confirm the aetiology of her pain are ordered.

To have an effective pain assessment, the healthcare provider must accept the patients' self – reported pain as accurate and the primary source of information. Patients should be allowed to describe the pain in their own words. Also, the location of the pain can be determined by

showing the patient a picture of the human body (at least the front and back), requesting that they indicate the primary and multiple areas of pain and demonstrate the direction of radiated pain if appropriate.

2.1.1 Critical Elements of Assessment

The critical elements of the assessment of pain include 1) patient history, 2) physical examination and 3) pain measurement.

2.1.1a Patient History

Patient's history includes collecting information regarding the following elements:

Onset, duration, location, periodicity, radiation to other areas, patient's description of pain, aggravating and relieving factors, psychosocial effects, previous pain condition, pain medication history, perceived intensity/ severity, and a patient's emotional response. (See Appendix I - Proforma)

2.1.1b PQRST

A brief mnemonic to aid in remembering pain assessment is **PQRST**:

P - Provokes and Palliates

- What caused the pain?
- What makes the pain better?
- What makes it worse?

Q - Quality

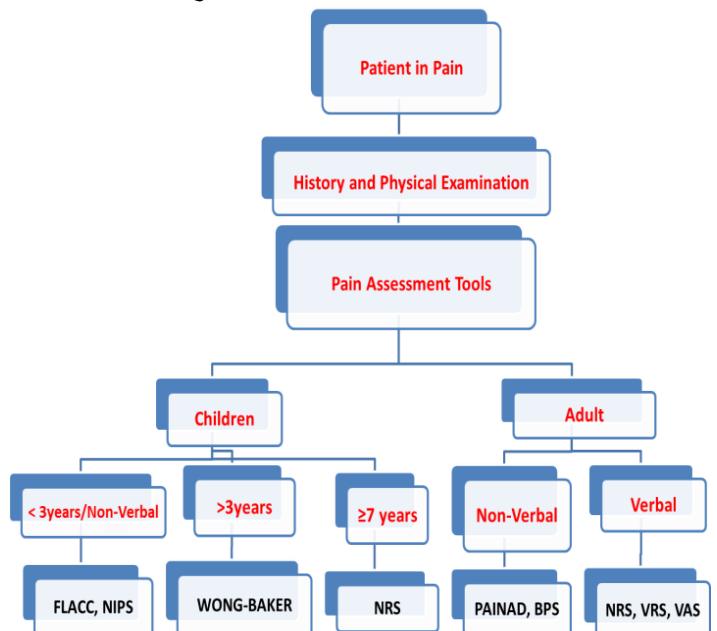
- What does the pain feel like?
- Is it sharp, dull, Stabbing, burning? etc.

R - Region and Radiation

- Where is the pain located?
- Is the pain confined?
- Does the pain radiate? If so, to what part of the body?
- What part of the body did the pain start? When was that?

S - Severity

- How bad is the pain? (Scale 0-10)



Pain Evaluation Diagram

T - Time and Treatment history

- When did the pain start?
- Is it present all the time?
- Are you pain-free at night or during the day?
- Are you pain-free on movement?
- How long does the pain last?
- What have you taken previously for this pain?
- What medications/interventions are you currently on?
- Are you on any complimentary/alternative therapies e.g. herbs?

2.1.1c Pain Assessment in Children:

Assessment in children also utilizes a mnemonic (QUEST-T):

Q - Question the child (if verbal) and parents/caregiver, and the parent/caregiver alone if child is non-verbal.

U - Use pain rating scales for measurement of pain if appropriate.

E - Evaluate behavior and physical changes.

S - Secure the parents involvement.

T - Take the cause of pain into account.

T - Take action and evaluate the result.

2.1.1d Pain Intensity Measurement Tools

Pain tools/scales can be used to determine the severity of the expressed pain in both adults and children. These tools may be unidimensional or multidimensional (See Appendix II - Assessment Tools).

Adults

The tools indicated below include unidimensional and multidimensional tools for use with adults.

Unidimensional tools are easy-to-use, simple and quick, but they are valid and reliable tools that measure pain intensity only. Therefore, these tools are no substitutes for comprehensive pain assessment. They are more commonly used in patients with acute pain.

1. The Visual Analogue Scale (VAS)

The VAS pain rating scale uses a 10 cm-long horizontal line with verbal descriptor, “No pain” and “Worst pain imaginable” at both ends. Patient’s make a mark along the line indicating what they feel best represents their perception of the intensity of their pain.

2. The Numeric Pain Rating Scale (NRS)

In this scale, patient is asked to rate his/her pain intensity on a numerical scale that usually ranges from 0 (which indicates “No pain”) to 10 (indicating the “worst pain imaginable”).

3. The Verbal Rating Scale (VRS)

Using this scale, the health care provider describes the meaning of pain to the patient. Six descriptors (i.e.” No pain”, “mild pain”, “moderate pain”, “severe pain”, “very severe pain”, and “worst pain possible” are presented to the patient who then chooses the description that best represents his/her pain intensity.

Multidimensional tools are more commonly used in patients with chronic pain and measure several dimensions of pain, with differing combinations including pain intensity, quality, affect, interference with functioning, and effects on general quality of life.

1. Brief Pain Inventory (BPI)

This measures pain severity and the degree of interference of the pain with seven (7) aspects of patient’s function, using 0–10 NRS. The seven domains measured are general activity, walking, normal work, relations with other people, mood, sleep, and enjoyment of life. It can be self-administered, given in a clinical interview, or even administered over the telephone. Two forms exist, the BPI- Long version and BPI – short version.

2. McGill Pain Questionnaire (MPQ)

This evaluates sensory, affective-emotional, evaluative, and temporal aspects of the patient's pain condition. It has a long and short version. The short form (SF-MPQ) consists of 11 sensory descriptors such as sharp or shooting pain. There are also four affective descriptors, such as sickening or fearful as verbal descriptors. The patient is asked to rate the intensity of each descriptor on a scale from 0 to 3, with three (3) being the most severe. Three pain scores are calculated: the sensory, the affective, and the total pain index. Patients also rate their present pain intensity on a 0–5 scale and a VAS.

3. West Haven-Yale Multidimensional Pain Inventory (WHYMPI)

Containing 52 items and 15 subscales, the WHYMPI assesses areas such as interference of pain, response from significant others, pain severity, perceived life control, affect, and participation in various work, social, and personal activities.

There are other, more specialized pain tools that meet the needs of unique patients. For example, the Pain Assessment in Advanced Dementia (PAINAD) scale is an observational tool that assesses pain in patients who are cognitively impaired with advanced dementia and who because of their condition can experience more pain or prolonged pain due to its under treatment. This tool consists of five (5) items - breathing, negative vocalizations, facial expressions, body language and consolability. Each item is assessed on a three (3) point score ranging in intensity from 0-2, resulting in an overall score ranging from 0, indicating "No pain", to 10 indicating "severe pain".

The use of tools to assess pain described above should not be used in isolation. Healthcare professionals must also conduct a physical examination of the patient and order the necessary investigations to determine the causes of the symptoms a patient is experiencing, and make an accurate diagnosis. A physical examination should include a general physical examination as well as relevant systemic examination. Investigations should include basic tests such as ordering a full blood count or kidney function tests. Other tests may be ordered depending on the suspected aetiology of the pain. For instance, with Mrs. A in the Case Study A found at the beginning of this section on page 6, a spine X-ray, bone scan, tissue biopsy and quantitative sensory testing (QST) for neuropathic pain may be indicated.

Children

Pain measurement in infants and children is more complicated than in adults. However, there are a variety of tools available for this. The instrument of choice takes into consideration the child's level of development.

In general, there are three (3) ways of measuring pain in children:

1. Ask the child

If a child is four years or older, use the Wong-Baker Faces Scale. This scale shows a series of faces ranging from a happy face at 0, which represents "no hurt", to a crying face at 10, which represents "hurts worst". Based on the faces and descriptions, the patient chooses the face that best describes their level of pain. The health care provider points to each face, using the words to describe pain intensity, and asks the patient to choose the faces that best describes the pain they feel and with the number assigned to that face recorded by the healthcare provider.

2. Ask the Parent and/or family caregiver

It is important to ask for behavioural or verbal cues from caregivers and parents as these may be pointers to pain in a child, especially if they cannot talk.

3. For the child who cannot talk

Use FLACC scale or the Neonatal Infant Pain Scale (NIPS). The FLACC scale is a unidimensional behavioral pain assessment instrument to measure pain intensity in young children (neonates, infants, children under three years of age). It can also be used in children who are unable to verbally report their pain. It includes five items (Face, Leg, Activity, Cry, and Consolability) and is scored in a range of 0–10. The scale has five criteria, which are each assigned a score of 0, 1 or 2.

For older children

Numerical Pain Rating scale (NRS) can be used in older children from ages of 7 years.

2.1.2 Recommendations

1. Adequate assessment of patient's pain should be undertaken prior to instituting treatment and at regular intervals as care continues.
2. Healthcare providers should be familiar with pain assessment tools and employ them in their daily practice.

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2.2 INTERVENTIONS FOR PATIENTS

Patients are the cornerstone of decisions made regarding care. Following a detailed assessment of the patient, the appropriate intervention to safely relieve the pain is selected.

It is critical that the patient have access to quality interventions across the full continuum of care to include both pharmacological and non-pharmacological interventions. Given the subjective nature of pain, there is no one standard practice guaranteed to meet the needs of all patients. Rather it is crucial to begin with the least invasive and most likely to address the pain symptoms in the safest way possible for each individual patient.

2.2.1 Pharmacological Interventions

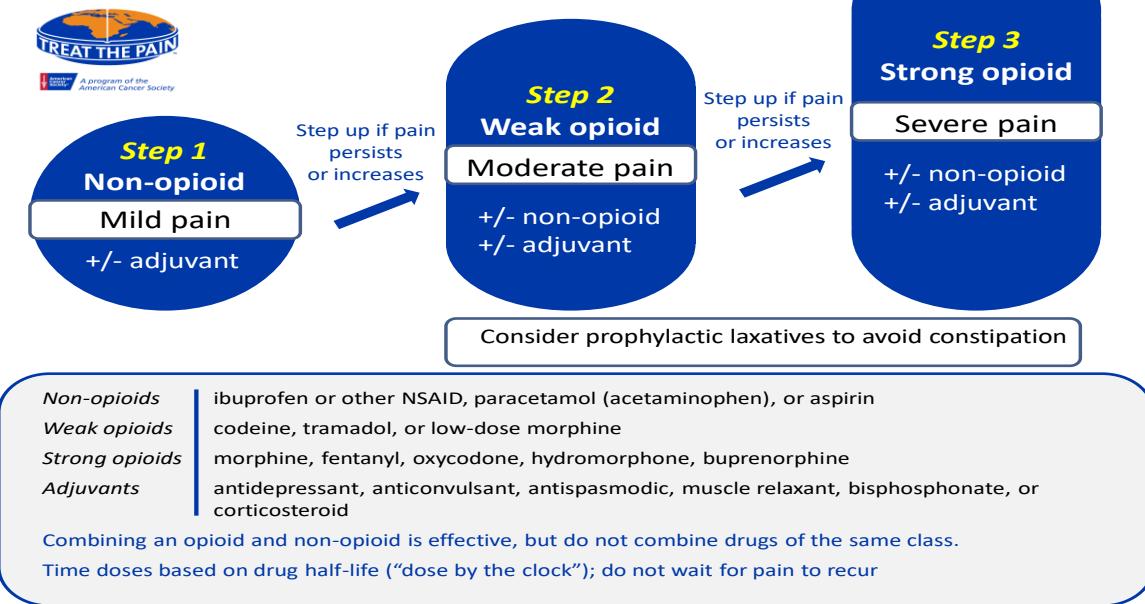
2.2.1a Introduction to Pain Management

Analgesics form the mainstay of pharmacologic management of pain. Effective treatment of pain requires a clear understanding of the pharmacology, potential impact, and adverse effects associated with each of the analgesics prescribed, and how these may vary from patient to patient.

The choice of drug should be based on the severity of the pain, not the stage of disease. To give effect to this, the World Health Organization (WHO) has for several decades promoted the three-step analgesic ladder as a framework for the rational use of analgesic medications in the treatment of pain¹ (Figure 1). The ladder was updated in 2012 to include two-step ladder for children, which does not include the rung for weak opioids (Figure 2).

Figure 1

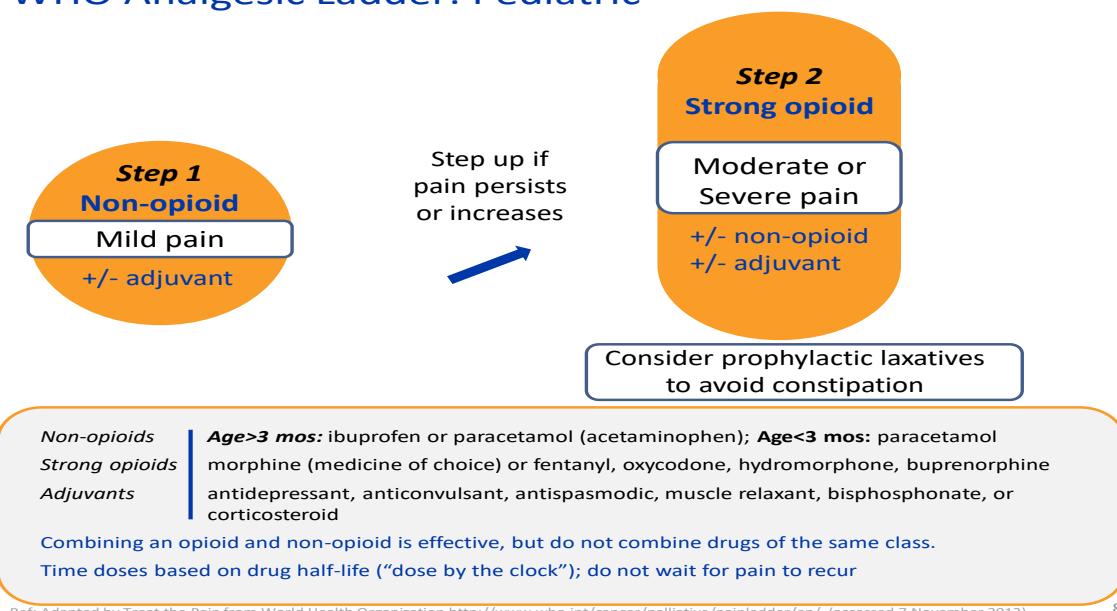
WHO Analgesic Ladder: adults



4

Figure 2

WHO Analgesic Ladder: Pediatric



8

The ladder is a pain management algorithm, which was originally designed for cancer pain management but is today applicable not only for cancer patients with pain, but also for all patients with either acute or chronic non-malignant pain who require analgesics.¹ The ladder, if followed correctly, is thought to offer inexpensive treatment and adequate relief for 70% to 80% of patients.^{2,3} However, consideration must always be given to treating the underlying cause of the pain by means of surgery, radiotherapy, chemotherapy, or other appropriate medical measures.

The WHO analgesic ladder above proposed the use of a limited number of relatively inexpensive medications, such as morphine, in a stepwise approach and this has revolutionized the management of pain world-wide. The first-line pharmacologic agent for the symptomatic treatment of mild to moderate pain recommended by the WHO analgesic ladder are basic pain relievers, usually widely available without prescription, such as paracetamol (acetaminophen) or a nonsteroidal anti-inflammatory drug (NSAID).

The choice between these two medications depends on the type of pain and patient risk factors for NSAID-related adverse effects, such as gastrointestinal, renovascular, or cardiovascular effects. For moderate pain, it recommends a combination of basic pain relievers and a weak opioid, such as codeine. For moderate to severe pain, the WHO has recognized that strong opioids, such as morphine, are ‘absolutely necessary’.⁴

2.2.1b Recommendations Related to Use of the “Analgesic Ladder”

The cornerstone of the ladder rests on five simple recommendations for the correct use of analgesics to make the prescribed treatments effective.

These 5 points are as follows:

1. Administration of analgesics:

The oral form of medication should be preferred whenever a patient is physically able to take oral medication. Buccal, sublingual, and rectal routes are to be considered reasonable alternatives before parenteral routes of administration, except in the immediate post-operative period. The intramuscular route should be avoided as it is generally more painful, and has variable absorption, compared to other routes. The intravenous or subcutaneous routes should be considered in preference when a parenteral route is needed. Transdermal fentanyl is appropriate in the setting of severe continuous pain in patients who cannot use the oral route, but this product is not suitable for post-operative pain management.

2. Analgesics should be given at regular intervals:

To relieve pain adequately, it is recommended that the duration of the medication’s efficacy is respected and the prescribed dosage taken at definite intervals based on drug half-life (“dose by the clock”); and in accordance with the patient’s level of pain.

The patients who report constant pain should receive analgesics on an “around the clock basis” rather than “as needed” (prn). Only patients who report intermittent pain may receive analgesics on an “as needed” (prn) basis.

3. Analgesics should be prescribed according to pain intensity as evaluated using pain rating scale:

This point is important because pain-relief medications should be prescribed after clinical examination and adequate assessment of the pain. The prescription must be given according to the level of the patient’s pain, using the World Health Organization 3 step ladder approach to pain management, or the proposed 4-step ladder⁵ in Figure 3 below, and not according to the medical staff’s perception of the pain.

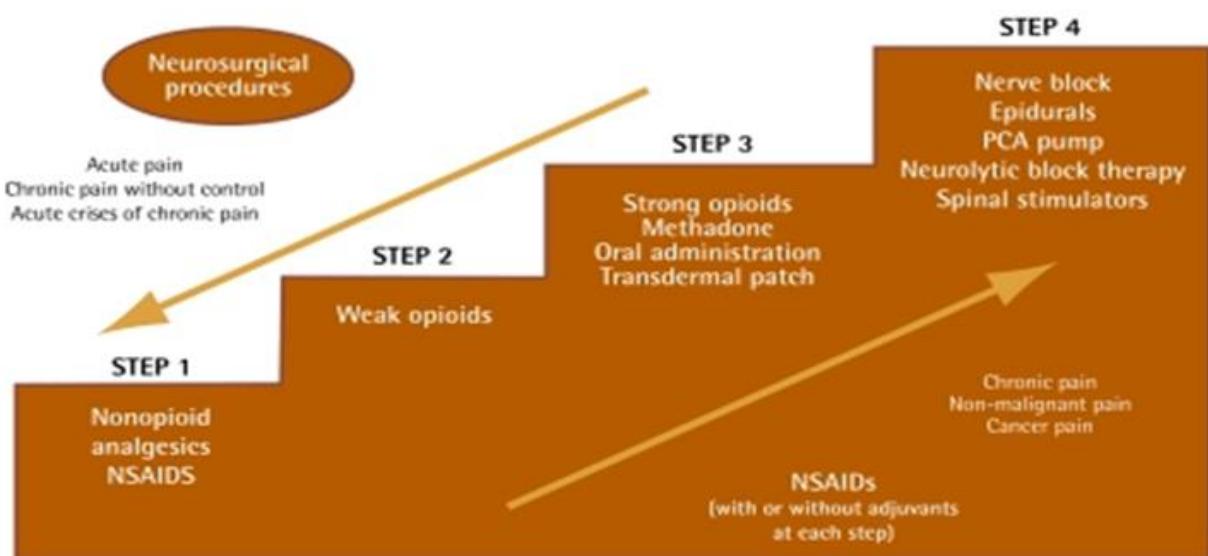


Figure 3: Newly proposed analgesic ladder

4. Dosing of pain medication should be adapted to the individual:

The choice of analgesics should be based primarily on the patient report of pain. There is no standardized dosage in the treatment of pain. Every patient will respond differently. For strong opioids like morphine, there is no maximum dose; the correct dosage is one that will allow adequate relief of pain without side effects. However, the non-opioid analgesics have ceiling and maximum daily dose limits should be adhered to in order to avoid toxicity.

5. Analgesics should be prescribed with a constant concern for detail:

The regularity of analgesic administration is crucial for the adequate treatment of pain. It is ideal to provide a written personal programme to the patient and his or her family/caregiver, detailing names of drugs, reason for use, (e.g. 'for pain', 'for bowels'), dose (number of ml, number of tablets) and number of times per day, to ensure that all these stakeholders and medical staff have the necessary information about when and how to administer the medications. The patient and his or her family/caregiver should be warned of possible side effects of the medications.

The concept of multimodal analgesia is an attempt to target the sensitization process at one or more anatomical sites along the nociceptive pathway, including the site of injury, peripheral nerve axon, dorsal horn of the spinal cord, and cerebral cortex. Regional analgesia is a major component of the multimodal therapy.

2.2.1c Summary Classification of Analgesics

Classification of analgesics

A. Systemic analgesics

- a. Non-opioids Analgesics (most commonly used analgesics)
 - i. Acetaminophen (Paracetamol)
 - ii. Non-steroidal Anti-inflammatory Drugs (NSAIDs)
- b. Opioids:
 - i. Weak Opioids – e.g. Codeine
 - ii. Strong Opioids – e.g. Morphine
- c. Adjuvants (drugs which have indirect analgesic effects)
 - i. Anticonvulsants e.g. Carbamazepine, Gabapentin
 - ii. Antidepressants e.g. Amitriptyline, Imipramine
 - iii. Antispasmodics e.g. Hyoscine butylbromide
 - iv. Muscle relaxants e.g. Diazepam, Tizanidine
 - v. Corticosteroids e.g. Dexamethasone, Hydrocortisone, Prednisolone
 - vi. Laxatives e.g. Bisacodyl, Lactulose
 - vii. Bisphosphonate e.g. Zoledronic acid

B. Others

- a. Local Anaesthetics: These interrupt pain pathways by blocking axonal conduction.
 - i. Lidocaine
 - ii. Bupivacaine
- b. N-methyl D-aspartate (NMDA) receptor blocker
 - i. Ketamine

2.2.1d Description and guidance for medication use

Detailed description and guidance for the use of medication can be found in the summaries below:

Non-Opioids

1. Paracetamol: also known as acetaminophen

This is an effective step 1 analgesic. Its site and mechanism of action are not known and it is the first-line treatment for most mild to moderate acute pain because of its favorable safety and cost profiles. It is generally well-tolerated, has few drug-drug interactions, is not associated with gastrointestinal effects (as with NSAIDs), and can be used during pregnancy.

Routes of administration: Oral, intramuscular (I.M), intravenous (I.V) and rectal.

Dosage: Adult dose: 500mg-1g by mouth every 6 hours; maximum daily dose 4g

Note: Paracetamol can be combined with an NSAID.

Risks/Adverse Effects: Hepatotoxicity can occur if more than the maximum dose is given per day.

2. Non-Steroidal Anti-Inflammatory Drugs (NSAIDs): Examples include, ibuprofen, diclofenac, piroxicam, naproxen, ketorolac, ketoprofen, mefenamic acid, etc.

NSAIDs are effective step 1 analgesics. NSAIDs inhibit cyclo-oxygenase, the enzyme that converts arachidonic acid to prostaglandins. All NSAIDs inhibit cyclo-oxygenase (COX) but vary in COX-2 selectivity. Different NSAIDs have similar analgesic effects.

There are several classes of NSAIDs and some patients respond better to one class of NSAIDs than to another. They include non-selective Cyclo-oxygenase (COX) inhibitors and selective COX2 inhibitors. The non-selective NSAIDs are relatively contraindicated in the setting of significant pre-existing renal insufficiency. Examples of COX-2 selective NSAIDs include: Celecoxib and Rofecoxib. There is a ceiling to the analgesic effects of NSAIDs but not to their anti-inflammatory effects, although adverse effects may limit upward dosing titration.

Routes of administration: oral, suppository, topical, intramuscular (I.M) and intravenous (I.V)

Dosage:

Ibuprofen - Adult dose: 400mg by mouth every 6-8 hours; maximum daily dose 1.2g; give with food and avoid in asthmatic patients; maximum dosing limit should be lowered in patients with liver impairment

Diclofenac - Adult dose: 50mg by mouth every 8 hours; maximum daily dose 150mg; give with food and avoid in asthmatic patients

Ketorolac - Adult dose: 17–64yrs (normal renal function): 60mg IM or 30mg IV once; or, 30mg IM or IV every 6 hours; ≥65yrs, or <110lbs (50kg), or renal impairment: 30mg IM or 15mg IV once; or, 15mg every 6 hours; do not exceed 5 days' combined (parenteral + oral) therapy or recommended dose; may use as-needed for breakthrough pain if appropriate.

Note: Ibuprofen, diclofenac, piroxicam, meloxicam and naproxen are among the most commonly used because of their effectiveness, adverse effect profile, cost, and over-the-counter availability.

Risks/Adverse Effects: NSAIDs can have significant adverse effects. There are substantial differences among the different classes as to the likelihood of adverse effects, which may in part be due to their relative COX-2 selectivity. Contraindications to NSAIDs include: Peptic ulceration, bleeding diathesis, renal impairment, history of asthma, hypotension or hypovolaemia.

Potential adverse effects that can occur with any of the non-selective NSAIDs, irrespective of the route of administration, include: gastropathy, renal failure and inhibition of platelet aggregation. Some drugs, however, such as ibuprofen, ketorolac appear to be relatively safer.

The following categories of patients are more likely to develop gastrointestinal bleed as a side-effect of NSAIDs: elderly, previous history of ulceration, chronic alcohol abusers, use of corticosteroids, protein wasting (cachexia) and use of oral anticoagulants. Gastric protection with misoprostol or omeprazole may be needed in these patients.

Nephrotoxicity: NSAIDs should not be used in those with altered renal haemodynamics e.g. those with hypotension or hypovolaemia, elderly, those with heart failure and diabetes, and those on diuretics. These drugs should not be used in these patients to minimize the risk of renal failure, including renal papillary necrosis. Ensure adequate hydration and good urine output in all patients on NSAIDs.

The drugs may also cause Reye's syndrome in children.

Opioid Analgesics

Opioids remain the mainstay of systemic analgesia for the treatment of moderate to severe pain. The analgesic effects of opioids are primarily achieved through the activation of G-protein coupled receptors (known as opioid receptors) on neurons, which open potassium channels to hyperpolarise their membranes. Opioids differ in terms of their affinity to bind to the receptor sites, their pharmacokinetics and their physicochemical properties, which means that certain opioids will have advantages over others due to differing side-effect profiles, routes of administration, development of tolerance and propensity for immunomodulation.⁷

Routes of administration: oral, intramuscular (I.M), intravenous (I.V), subcutaneous (Subcut), sublingual, intra-nasal, intrathecal, epidural, and intradermal

Opioids can be classified in two ways. First by mechanism of action and second by potency.

Classification of Opioids by Mechanism of Action

1. **Pure agonists:** These agents have no clinically relevant ceiling effect to analgesia; as dose is raised, analgesic effects increase until analgesia is achieved or dose-limiting side effects supervene. They are most commonly used to treat moderate to severe pain.

Examples include - Morphine, Fentanyl, Hydrocodone, Oxycodone, Oxymorphone, Propoxyphene, Hydromorphone, Levorphanol, Pethidine (Meperidine), Methadone, Codeine, and Dihydrocodeine, Tramadol

2. **Partial agonists:** These are μ -agonist with lower intrinsic efficacy (partial agonists). They produce a dose response curve that has a lower maximum response (efficacy) than a full agonist.

Examples include – Buprenorphine and Suboxone

3. **Mixed agonist–antagonists:** These are agents that produce agonist effects at one receptor and antagonist effects at another. They have ceiling effect for analgesia and some produce psychotomimetic side effects more readily than do pure agonist opioids. They have potential to induce acute abstinence in patients with physical dependency to agonist opioids. In general, these drugs are less preferred by patients with opioid addiction disorder.

Examples include - Butorphanol, Dezocine, Nalbuphine and Pentazocine

4. **Pure antagonists:** These agents have a very high affinity for the opioid receptors, but no intrinsic efficacy. They compete with endogenous and exogenous opioids at μ receptor sites. They are used for prevention or reversal of opioid effects.

Examples include - Naloxone, Naltrexone, Alvimopan, and Methylnaltrexone

Classification of Opioids by potency

Opioids can be classified as either weaker in strength or stronger acting opioids.

1. Opioids considered to be first step or weaker in strength

Examples include - codeine, tramadol, and dihydrocodeine (DF118), and mixed opioid agonist-antagonists such as pentazocine, butorphanol, dezocine, and nalbuphine.

It should be noted that mixed opioid agonist-antagonists should not be used in the patients already taking a pure agonist opioid. This is because if used together, competition for the opioid receptors may cause a withdrawal reaction. Further, agonist-antagonists are not recommended as routine analgesics, as their dosing is limited by a ceiling effect.

Codeine

- Adult dose: 30-60mg by mouth every 4 hours; maximum daily dose 240mg
- If pain relief is not achieved with 240mg/day, move to strong opioid
- Can be combined with Step 1 analgesic
- Give laxative to avoid constipation unless patient has diarrhoea
- Genetic variability can lead to variable rates of metabolism, which may make codeine ineffective or lead to excessive side effects.

Codeine is not recommended in infants and young children because of low analgesic effect and safety and efficacy problems related to genetic variability that affects metabolism.⁸

Tramadol

Tramadol is commonly referred to as an atypical centrally acting analgesic because of its combined effects as an opioid agonist and a serotonin and noradrenaline reuptake inhibitor. It is an effective analgesic but may not provide adequate pain relief if used as the sole agent for the management of moderate to severe acute pain.

- Adult dose: 50-100mg by mouth every 4-6 hours
- Start with a regular dose and increase if no response (dose limit: 400mg/day)
- 75 years or older: Maximum dose: 300mg per day

- Use with caution in epileptic cases, especially if patient is taking other drugs that lower the seizure threshold
- May cause serotonin syndrome in patients on other medications containing serotonin
- May be preferable to other opioids in the management of pain due to pancreatitis because of its relaxant effect on the sphincter of oddi⁸

Tramadol is not recommended for children because of lack of data on safety and efficacy in children.⁸

Pentacozine

Dose - 30mg IV/IM/SC every 3-4hr; not to exceed 30mg/dose IV or 60mg/dose IM/SC; not to exceed 360mg/day IV/IM/SC

The use of pentazocine and butorphanol is associated with relatively high risk of psychotomimetic adverse effects.

2. Opioids considered to be next step or stronger in strength

Examples include - Morphine, Pethidine, Fentanyl, Oxycodone, Hydromorphone, Buprenorphine, Methadone

Morphine

This is the “Gold standard” against which other opioid analgesics are measured. When used correctly, patients don’t become dependent or addicted, tolerance is uncommon, and respiratory depression doesn’t usually occur.⁸

Morphine is available as parenteral and oral (immediate-release or sustained-release) formulations

Immediate-release: Use to titrate starting dose and treat breakthrough pain

- Dose every 4 hours; last dose at bedtime is usually doubled to avoid waking patient up at night e.g. 2.5mg every 4 hours and 5mg as last 4-hourly dose for the day.
- Priority should be given to making immediate-release formulations available always.
- Adult starting dose: 2.5–20mg by mouth every 4 hours depending on age, previous use of opiates, etc.
- Patients changing from regular administration of a Step 2 opioid: 10mg by mouth every 4 hours.

- If the patient has experienced weight loss from sickness or has not progressed onto Step 2 analgesics: 5mg by mouth every 4 hours.
- Frail or elderly patients: 2.5mg by mouth every 6 to 8 hours due to the likelihood of impaired renal function.
- Increase dose gradually until pain is controlled.
- The correct morphine dose is the one that gives pain relief without side effects: there is no ‘ceiling’ or maximum dose. Titrate the dose upwards until pain is relieved or side effects prevent moving up further.
- After determining daily dose with immediate-release morphine, prescription can be changed to sustained-release morphine, being careful to adjust dose as needed to maintain the total daily dose.

Sustained-release (or slow-release):

- Dose every 8-24 hours, depending on the formulation.

When stopping an opioid after a chronic use, reduce daily dose by 25% each day to avoid symptoms of withdrawal.

When changing from one opioid to another, be mindful of the need to convert doses.

All patients on opioids are at high risk for constipation, and laxatives should be ordered unless contraindicated

Pethidine (Meperidine)

Pethidine is not recommended for chronic administration and so not suitable for patients with chronic pain. Pethidine is renally excreted and the routine dosing of the drug every 3 hours for analgesia may lead to unavoidable accumulation of norpethidine and produce significant adverse effects (e.g. tremulousness, dysphoria, myoclonus, and seizures). There is also risk of adverse effects if renal clearance is impaired.

- Dose: 50-150mg PO/IM/SC 3-4hrly PRN; adjust dose based on degree of response;
- Preoperatively: 50-150mg IM/SC q 3-4hr PRN;
- Continuous infusion: 15-35mg/hr.

Physicians should consider the mechanism of action, the potency and the patient history when determining the best medication for success with each individual patient. However, healthcare professionals should always be prepared to monitor the patient and exercise vigilance related to the impact of side-effects related to the prescription use of opioids and the potential for opioid overdose.

Side-effects of opioids include but are not limited to nausea, vomiting, sedation, constipation, respiratory depression, hypotension, urinary retention and pruritus.

In the case of opioid overdose, *Naloxone* is indicated for the reversal of opioid depression (including respiratory depression) induced by natural and synthetic opioids.

Naloxone

Dose: 0.4-2mg IV/IM/SC; repeat q 2-3min PRN; not to exceed 10mg (0.01mg/kg). Consider other causes of respiratory depression if desired response not achieved after administering 10mg cumulative total.

The terms “opioid switching” and “opioid rotation” are often used interchangeably. Opioid switching can be defined as the clinical practice of changing to an alternative opioid because of an inadequate analgesic effect and/or dose-limiting side effects while opioid rotation can be defined as the practice of changing between different opioids in a set schedule to prevent potential adverse effects and limit dose escalation.

The theory behind switching from one opioid to another opioid is based on concepts of incomplete cross-tolerance to the analgesic and non-analgesic effects across opioids and a high degree of individual variation in response to different opioids. This could potentially lead to a better balance of benefit to harm when one opioid is changed to another. However, well-designed studies that evaluate the benefits and harms of opioid switching are lacking. There is also currently, no evidence to recommend opioid rotation to prevent side-effects or dose escalation.

Dose conversion tables and rotation protocols are available but there is insufficient evidence to guide specific recommendations. These tables are shared below as a reference point as additional evidence becomes available information may change.

Of note, the definition of equi-analgesic dose is a dose in steady state providing the same analgesic response. This has been standardized to 10mg of parental morphine in most studies. The steps to convert or rotate between opioids have been proposed as follows:

- i. Calculate total mg dose taken in past 24 hours
- ii. Determine equi-analgesic dose as referenced in the table below
- iii. If pain is controlled on current opioid, reduce the new opioid daily dose by 25-50% to account for cross-tolerance, dosing ratio variation, and interpatient variability
- iv. If pain is uncontrolled on the current opioid, increase opioid daily dose by up to 100-125%
- v. Titrate rapidly to analgesic effect during first 24 hours

OPIOID EQUI-ANALGESIC DOSE TABLE

Opioid Agonist	Duration of action	Route	Equi-analgesic dosage
Morphine	3-4 h	IM/IV/SC	10 mg
		Oral	30 mg
Codeine	3-4 h	IM/IV/SC	120 mg
		Oral	200 mg
Hydromorphone	2-3 h	IM/IV/SC	1.5 mg
		Oral	7.5 mg
Hydrocodone	3-5 h	Oral	30 mg
Oxycodone	3-5 h	Oral	20 mg
Oxymorphone	3-6 h	IM/IV/SC	1 mg
		Oral	10 mg
Meperidine	2-4 h	IM/IV/SC	75 mg
		Oral	300 mg
Fentanyl	1-2 h	IM/IV	0.1-0.2 mg
Levorphanol	6-8 h	IM/IV/SC	2 mg
Methadone	6-8 h	IM/IV/SC	5 mg
		Oral	10 mg

Adjuvant analgesics or Co-analgesics

Adjuvant analgesics, referred to as co-analgesics, are medicines that are not primarily used for analgesia. The use of adjuvants that target neuropathic pain are particularly important because such pain may be difficult to treat with opioids alone. Adjuvants are also useful for other pains that are only partially sensitive to opioids such as bone pain, smooth or skeletal muscle spasms, or pain related to anxiety.

Adjuvants fall into the following classes:

1. Antidepressants:

a. Tricyclic antidepressants (TCAs)

Examples include amitriptyline and nortriptyline

Use for pain (Neuropathic) presenting primarily as burning or abnormal sensation (dysaesthesia). These are generally first line choice of medicines for neuropathic pain. Analgesia usually takes a few days to manifest while antidepressant effect may take longer to manifest. They are useful in pains that are accompanied by insomnia, anxiety or depression, fibromyalgia, and lumbosacral radiculopathy.

They are contraindicated in patients with cardiac conduction disturbances and or decompensation because they can produce heart block and arrhythmias; and in epileptics because they can lower seizure threshold. TCAs can cause anticholinergic effects such as dry mouth, sweating, dizziness, orthostatic hypotension, fatigue, constipation, urinary retention. To minimize side effects, it is advised that you start with low dose up to a maximum of 100mg/day.

b. Selective Serotonin and Norepinephrine Reuptake Inhibitors (SNRIs)

Examples include Duloxetine, Venlafaxine and Bupropion – (a second generation non-TCA).

These are used for treatment of neuropathic pain.

2. Anticonvulsants/antiepileptic drugs (AEDs)

Examples include Carbamazepine, Sodium valporate, Gabapentine, Pregabalin, and Benzodiazepines e.g. Clonazepam

These can also be used in the treatment of neuropathic pain. Before use, always check for possible drug-drug or drug-disease interactions.

Use Phenytoin and Carbamazepine with caution since, being hepatic enzyme inducers, they can result in rapid metabolism of other medicines. Side effects include drowsiness, lack of muscle coordination (ataxia), blurred vision and anaemia.

3. Skeletal muscle relaxants and antispasmodics

Antispasmodics are more useful for visceral organs. They are useful for the relief of colicky abdominal pains and renal colic. Antispasmodics can cause nausea, dry mouth or constipation.

Examples include Hyoscine butyl bromide and Papaverine.

Skeletal muscle relaxants are useful and are effective in reducing pain and muscle tension and they increase mobility. Sedation is a major side effect in the use of these medicines. These medicines should be used with caution in patients driving motor vehicles or operating heavy machinery.

Examples of skeletal muscle relaxants include Chlorzoxazone, Methocarbamol, Dantrolene, Baclofen, Carisoprodol, Cyclobenzaprine, Metaxolone, Tizanidine and Benzodiazepines.

Anxiolytics that have skeletal muscle relaxant activities such as Diazepam and Lorazepam can cause drowsiness and ataxia.

Local Anaesthetics

There are many straight forward local anaesthetic techniques which can be used for acute pain management. They include: regional blocks (e.g. intrathecal and epidural), local infiltration with long acting local anaesthetics, specific nerve blocks and plexus blocks. These are specialized techniques often provided by pain experts and anaesthetists. See the proposed 4-step analgesic ladder referenced in figure 3 on page 15 and in Appendix III.

Ketamine

Ketamine is a phencyclidine derivative with N-methyl D-aspartate (NMDA) receptor blocking activity. It is an anaesthetic and a strong and fast-acting pain killer – which makes it helpful before, during and after surgery. Ketamine provides analgesic activity at sub-anæsthetic doses. Low dose ketamine (0.25-0.50mg/kg)^{9,10} administered by either intravenous or subcutaneous infusion is used as an adjunct to opioids for postoperative analgesia and for acute pain management in the Emergency Department.¹⁰ This should be under the supervision of an anaesthetist or pain specialist. The mechanism of action of ketamine is largely due to non-competitive antagonism of the central nervous system N-methyl-D-aspartate (NMDA) receptor which leads to blockade of sensory input and impairs limbic functions.¹⁰ NMDA

receptors play a role in the mediation of visceral pain and peripheral nerve pain sensitization.

Oral ketamine has particularly been found useful and effective for wound dressing, especially burns wound dressing, and in the emergency room at a dose of 6-8mg/kg, either alone or in combination with other analgesics (co-analgesia).^{10,11} The efficacy of oral ketamine is dose dependent and onset of action is 20minutes.¹¹

Ketamine is used in palliative care settings for refractory cancer pain, and for neuropathic pain which is unresponsive or poorly responsive to first-line analgesics like opioid drugs, NSAID, tricyclic antidepressant or anticonvulsant.^{10,12,13}

Side effects of ketamine include disorientation and general confusion due to the drug's anaesthetic nature as well as drowsiness, increased heart rate and elevated blood pressure. Large doses of the drug can result in intense and unpleasant visual and auditory hallucinations, coupled with marked de-realization and a frightening detachment from reality.^{10,11}

Types of Pain

1. Pain Emergency

Exacerbation of pain require immediate action and the onset of pain relief should not be delayed unduly by prolonged assessment or differential diagnosis. Any pain intensity in the range of 'severe' or 'excruciating' (Pain score 9 or 10) is considered a pain emergency and efforts must be made to control the pain (i.e. to get pain score below 5 out of 10) within the shortest possible time.⁸ Rescue or breakthrough medication should be prescribed for emergencies, especially when healthcare professionals are not available out of office hours.¹²

One method of doing this is to administer a rapidly acting opioid analgesic such as morphine, pethidine, or fentanyl in titrated intravenous bolus doses until pain control is achieved. Wait for dose to take effect, usually 10 minutes for IV morphine and 30 minutes for oral morphine, and then re-assess. Repeat doses until pain is controlled, then convert to stable regular doses of analgesic. Rescue analgesic can also be administered in titrated doses orally.

2. Breakthrough Pain

Breakthrough pain is a sudden, temporary flare of severe or excruciating pain that occurs on a background of otherwise controlled pain. It can be expected both at rest and during movement. Healthcare providers routinely under-diagnose and under-treat breakthrough pain. It is usually associated with greater pain-related functional impairment, worse mood, and more anxiety.

When breakthrough pain lasts for longer than a few minutes, extra doses of analgesics ("breakthrough" or "rescue" doses) will likely provide additional relief and this should be given as determined by the patient's pain, in addition to regular pain treatment. Physicians are expected to write analgesic orders that include rescue doses, which should be administered at the first sign of breakthrough pain, and each rescue dose administered should be documented in the patient's chart.⁸

To be effective and to minimize the risk of adverse effects, the choice of breakthrough formulation should be an immediate-release preparation of the same opioid that is in use for routine dosing.

The use of extended-release opioids should be avoided for rescue dosing to minimize the risk of adverse effects. When methadone or transdermal fentanyl is used, it is best to use an alternative short-acting opioid e.g. morphine or hydromorphone, as the rescue dose. Oral immediate-acting fentanyl is also available. For each breakthrough dose, offer 5% to 15% of the 24-hour dose.

3. Incident or procedural pain

This is a form of pain precipitated by a particular activity or procedure, such as dressing change, washing, change in position, eating, or dis-impaction. The pain can be anticipated.

Treatment is to supplement regular analgesic regimen with a rescue dose given 20-30 minutes before the activity.

4. Neuropathic pain

Neuropathic pain arises as a direct consequence of a lesion or a disease affecting the somatosensory system. Neuropathic pain may be of two types, central neuropathic pain and peripheral neuropathic pain.

As with nociceptive pain, drug treatment is the mainstay of management of neuropathic pain.

In general, nerve related pain does not respond to high dose opioid therapy. However, patients with neuropathic pain may sometimes derive benefits from opioids, particularly in cases of nerve compression pain when combined with corticosteroids.

Superficial burning pain and spontaneous stabbing pain associated with nerve injury often respond best to one or more of tricyclic antidepressants, anticonvulsants or local anaesthetics (class I anti-arrhythmic).

Tricyclic antidepressants

Examples include amitriptyline, imipramine, nortriptyline, and desipramine. The starting dose of these drugs depends on patient's age, weight and previous use of such drugs and concurrent medication.

Amitriptyline

This is useful for the treatment of neuropathic pain, presenting primarily as burning or abnormal sensations (dysaesthesia).

Dose: Adults: 10-75mg or 0.5-2mg/kg at night then increase slowly as needed; commonly started at 12.5mg at night and then increase to twice per day as needed.

Response should be evident within 5 days, if no effect after 1 week, stop the drug.

Side-effects include dry mouth and drowsiness. Use with caution in the elderly because it may increase falls. Use with caution in those with cardiac disease because it may cause orthostatic hypotension.

Nortriptyline

May be better tolerated than amitriptyline.

Anticonvulsants

Examples include Clonazepam, Carbamazepine, Valproic acid, Gabapentin, and Pregabalin.

Use for neuropathic pain.

Clonazepam

Adults: 0.5mg to 2mg once a day

Carbamazepine

Adults: start at 100mg twice a day and can be increased up to 800mg twice a day.

Sodium valproate

Adults: 200 mg - 1.2g once a day.

Gabapentin

Adults: start with 300mg at bedtime and titrate up every 2 or 3 days (300mg twice per day, then 3 times per day) until effective or side effects occur. Usual effective dose is 300-600mg 3 times a day (maximum dose 1200mg 3 times per day). Decrease dose in patients with renal insufficiency

Of note, Phenytoin and Carbamazepine should be used with caution because of the rapid metabolism of other drugs metabolised in the liver and therefore potential drug interactions.⁸ Side effects may include drowsiness, loss of muscle coordination (ataxia) or blurring of vision.

2.2.1e Conclusion

Freedom from pain is important to patients and is fundamental to the quality of care. Hence, it should not be seen as someone else's responsibility or simply dismissed because in the end the pain and the patient go away. Relief from pain is a fundamental human right, as indicated in the 1948 Universal Declaration of Human Rights (WHO, 2002). Opioids remain the mainstay of pain management, but the long-term potential complications of tolerance, dependency, hyperalgesia and the suppression of the hypothalamic/pituitary axis, as well as other well-known side-effects should be acknowledged and appropriately managed when they occur.

Only the general principles of pharmacologic interventions in pain management are discussed in this presentation. Patient pain management in specific situation/circumstances is expected to be discussed elsewhere in this document.

2.2.2 Recommendations for Pharmacological Interventions

RECOMMENDATIONS:

1. Following assessment of patient's pain, the appropriate intervention should be determined with the highest regard for the safety of the patient and reduction of pain level.
2. Healthcare providers should be familiar with pharmacological interventions as part of a continuum of care that leads to the relief of pain.
3. The WHO Pain Ladder, or a new adaptation of it, which accommodates the modern and invasive techniques of pain management, found in figure 3, should be used as the core guidance in managing pain in patients.
4. Co-analgesics are important complementary medications in pain relief.
5. Adjuvants are useful for neuropathic pain and other pains that are only partially sensitive to opioids such as bone pain, smooth or skeletal muscle spasms, or pain related to anxiety.
6. Rescue analgesic should be prescribed for breakthrough pain, especially when healthcare professionals are not available out of office hours.

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2.2.3 Non-pharmacological Interventions

2.2.3a Introduction to non-pharmacological interventions

Pain is the most common reason for seeking healthcare, and as a presenting complaint, accounts for 78% of visits to the hospital outpatient departments.¹ It is an unpleasant phenomenon that is uniquely experienced by each individual, and cannot be adequately defined, identified, or measured by an observer. Pain is always a subjective experience and is whatever the experiencing person says it is.² It is multidimensional in nature and affects people physically, psychologically, socially and spiritually. Patients' responses to pain may be influenced by: genetics, age, gender, ethnicity, socioeconomic and psychiatric factors, culture, religion, previous experiences, patient perceptions, motivation and patient expectations.³

Non-pharmacologic pain therapy refers to interventions that do not involve the use of medications to treat pain. They are considered to have fewer side-effects, be cost effective and tend to be preferred by older populations.⁴ It has been proven that combining pharmacological and non-pharmacological methods yield more effective pain control for the patient.⁵

There are two theories which explain the mechanism of pain reduction using non-pharmacological methods, the Gate control theory and the Neuromatrix theory of pain.

- The Gate control theory illustrates how the psychological pain components reduce the physiological transmission of pain impulses in the body. It also stimulates descending nerve impulses to close the “gate” located in the dorsal horn of the spinal cord, hence causing a modulated pain experience. The theory affords a framework for a pain management plan that can provide good pain relief outcomes.
- The Neuromatrix theory of pain states that the perception of painful stimuli does not result from the brain's passive registration of tissue trauma, but from its active generation of subjective experiences through a network of neurons known as the neuromatrix. This demonstrates that the action individuals take to reduce pain alters the brain centers serving attention, cognition and emotion and result in modulation of pain.⁶

2.2.3b Goals of non-pharmacological interventions

The goals of non-pharmacologic interventions include, but are not limited to:

- Reduce pain, decrease fear, reduce distress and anxiety;
- Provide patients with a sense of control;

- Reduce the dosage of analgesic medications thereby decreasing side effects, especially when using opioids;
- Avoid the use of medications where possible; and
- Improve the quality of life, prevent and/or manage complications and preserve functional abilities.

Pain is a complex phenomenon associated with various causes and issues. It becomes more complex for those with chronic pain. In the light of the multifactorial nature of this problem, the treatment plan has to be individualized for each patient. The patient is the center of care; therefore a holistic approach should be adopted in patients' care.

Acute pain is the normal physiologic response to a noxious chemical, thermal, or mechanical stimulus, and it is usually time limited. Chronic pain, however, is a state in which pain persists beyond the usual course of the disease and may cause intermittent or continuous pain for months or years. Severe pain problems seriously affect the quality of patients' social and working lives. It can be described through marked changes in sleep patterns, coping mechanisms, ability to exercise, undertake normal daily tasks, and attend to work and social activities which leads to a reduction in the physical, psychological and social wellbeing of the patient, hence the multidimensional aspects of pain.³

Effective pain therapy requires a biopsychosocial model of care. This takes into account the physiology of pain alongside the cognitive impacts and the multiple variables of lifestyle and community living, which can generate increased suffering and distress.

The core principles in developing an effective treatment plan are education about the nature of the pain, setting appropriate goals, and developing a comprehensive treatment plan. Clinicians should become familiar with these interventions so that they can offer patients flexibility in the pain management approach. Pain is often the most debilitating aspect of physical injury, and non-pharmacological therapy can supplement drug treatments or work in their stead. If there are complications that prevent the use of strong medications, non-pharmacological therapy might be an alternative; teaching the patient how to reduce the severity of pain through the use of appropriate body mechanics and exercise pacing.³

2.2.3c Principles of non-pharmacological management of pain

The response of patients to pain may be influenced by: genetics, age, gender, ethnicity, socioeconomic and psychiatric factors, culture, religion, previous experiences, patient perceptions, and patient expectations.

Current understanding demonstrates that complex neural processing produces pain and that modulation of the pain experience occurs at multiple sites in the periphery and throughout the central nervous system. This is reflected by many factors, from the internal (thoughts, mood) and external environment,⁶ that can affect the intensity and quality of pain. Although

this concept has been recognized for over 30 years, new treatment strategies have been developed to target processes involved in pain at multiple levels, underscoring the importance of a bio-psycho-social approach.^{7,8}

Pain management must be standardized to acknowledge diversity in culture, values and belief systems and ensures that practice is non-discriminatory, and promotes dignity and self-determination. There must be a collaborative partnership that facilitate and support people with pain to participate in all aspects of their care. This should involve building on strengths, holding hope and enhancing resilience to promote recovery. The treatment plan should therefore provide ethically based care consistent with the mental, physical, spiritual, emotional, social and cultural needs of the individual and should value the contributions of other agencies and stakeholders in the collaborative provision of holistic, evidence-based care.⁹

2.2.3d Cognitive-Behavioural Interventions

Various psychotherapeutic techniques are available for patients with acute or chronic pain. These include supportive therapy, hypnosis and cognitive behavioral therapy. The decision on which psychological modality to adopt will be made by the attending psychiatrist and /or psychologist. Other important modalities include patient education, distraction, bed rest, music therapy, relaxation and imagery.

1. Psychologic preparation, education and information

Preparation is a key component of reducing pain and anxiety associated with procedures. The main goal of preparation and patient education is to inform the patient about the procedure and to start desensitizing the patient.

2. Distraction

Distraction is the most common type of cognitive-behavioral method and is most effective when pain is mild to moderate (it is difficult to concentrate when pain is severe). It is an intervention that is often used to guide attention away from painful stimuli. It is most effective when adapted to the patient's developmental and cognitive level. Current research indicates that distraction can lead to reduction in procedure times and number of staff required for procedures, especially in children. Researchers hypothesize that children "cannot attend to more than one significant stimulus at a time".^{4,10}

Active distraction involves participation in activities during procedures such as blowing bubbles, sucking, playing a game, interacting with an electronic device. In other cases, passive distraction may be employed where attention is redirected to a stimulus or an object such as showing a toy (kaleidoscope), storytelling, singing songs, rocking, swaddling, etc.

3. Relaxation Techniques

The goal of relaxation technique is to produce the relaxation response - “a physical state of deep rest that changes physical and emotional responses to stress (e.g. decreased heart rate, blood pressure, rate of breathing, and muscle tension)”. Methods include, but are not limited to:

- a. Progressive Muscle Relaxation (PMR): Helps patients recognize difference between tensed and relaxed muscle groups
- b. Diaphragmatic Breathing (Belly Breathing)
- c. Meditation: Studies suggest that making meditation a habit may help people manage their pain and self-esteem and lower their anxiety, depression and stress. The details vary, depending on what type of meditation is chosen, but generally involves focusing thoughts and attention on one thing, such as one's breathing, a word or phrase that inspires or comforts.
- d. Music Therapy: Multiple research studies have investigated the role music plays on pain and stress. Music may be beneficial in reducing pain, anxiety and stress in emergency departments, waiting rooms and during transport.¹¹
- e. Guided Imagery: Helps patients use their imagination to divert thoughts from the procedure to a more pleasant experience. It is designed to develop a vivid image involving all senses. Imagery provides distraction and reduces the perception of pain by eliciting descending signals from the brain that can help block the pain signals.⁴
- f. Virtual Reality (VR): Virtual reality has been used to manage pain and distress associated with a wide variety of known painful medical procedures. Investigators hypothesize that VR acts as a non-pharmacologic form of analgesia by exerting an array of emotional affective, emotion-based cognitive and attention processes on the body's intricate pain modulation system. Recently, new applications, including VR, have been developed to augment evidence based interventions, such as hypnosis and biofeedback, for the treatment of chronic pain.¹²

2.2.3e Physical Interventions

The Physiotherapy approach is aimed at acute, chronic and cancer-related pain. Physiotherapists play a critical role in assisting people to live with chronic pain. They work across the continuum, assisting patients in pain with the aim of diminishing it, improving quality of life where possible, and preventing acute and sub-acute painful conditions developing into chronic pain.^{7,8}

- For acute pain, recommended management involves pain education, assurance, advice on resuming normal activity and discussion of options for pain management, as needed. Management techniques, such as manual therapy should follow international best practice guidelines and their efficacy should be measured by objective outcome measurements at regular intervals.
- For chronic pain, these strategies can also be useful. However, in highly complex pain presentations, the utilization of graded exercises and activities, education about pain, and modification of unhelpful beliefs and responses, would help assist a great deal. Systematic review of evidence further supports multi-disciplinary interventions in the management of chronic pain.⁸
- A biopsychosocial approach with inter-professional collaborative practices should be facilitated to enhance the knowledge and skills necessary for people to self-manage their pain. Providing information and support to family and significant others, the workplace and other healthcare providers is also an important physiotherapy role. These recommendations were based on systematic reviews of randomized controlled trials.⁸
- Standardized outcome measures, both functional and self-report, should be advocated for broad clinical use to effectively measure outcomes and provide a benchmark for management.⁸

Physiotherapy employs diverse physical techniques, such as thermal agents and electrotherapy, as well as therapeutic exercise and behavioral therapy. Physical interventions include; positioning, bracing, manipulation and mobilization, aromatherapy or massage therapy, transcutaneous electrical nerve stimulation (TENS), heat therapy, electrotherapy, cold therapy and hydrotherapy. Physiotherapists make important contribution through their health promotion, prevention, screening, triage, assessment and treatment activities.

1. Bed Rest

The use of prolonged bed rest in the treatment of patients with neck and low back pain and associated disorders is without any significant scientific evidence. For severe radicular symptoms, limited bed rest of less than 48 hours may be beneficial to allow for reduction of significant muscle spasm brought on with upright activity.¹³ Splinting an injured area to immobilize the joints around the area and prevent movement could be a major means of providing rest for the injured tissues. Findings demonstrated that Kinesio taping would be an effective method for reducing neck and low back pain and improving functional performance.¹⁴ Kinesio taping also showed good prognosis in managing pain during the acute phase.¹⁵

2. Manipulation and Mobilization

Manipulative treatment is commonly used in the treatment of patients with pain and associated disorders. Many different types of manual treatment exist, including soft tissue myofascial release, muscle energy/contract-relax, and high-velocity low-amplitude manipulation. Soft tissue myofascial release may include various techniques, including effleurage, pétissage, friction, and tapotement. It has been shown to improve flexibility, decrease the perception of pain, and decrease the levels of stress hormones.^{16,17}

Studies have demonstrated analgesic effects and modulation of spinal excitability with use of manual therapy techniques, with clinical outcomes of improved gait and functional ability among patients with lower quadrant pain.¹⁸ Cherkin *et al* demonstrated massage to be as effective as patient self-directed education and more effective than acupuncture.¹⁹ Mealy *et al* demonstrated that patients receiving mobilizing physical therapy showed significant improvements in cervical movement and pain weeks after the accident compared with a group receiving the standard treatment of rest and a cervical collar.²⁰ Although no controlled trials have been done regarding patient-activated techniques, this low-risk, patient-controlled technique has potential advantage over more passive manipulative techniques.

3. Electrotherapy²¹

Electrotherapy is the use of electrical energy or currents as a medical treatment. This involves the use of electric current to produce pain relief. The immediate goals of electrotherapy are to improve muscle performance and control pain. Several mechanisms of action are proposed for each type of modality, and indications often depend on the stage of healing. After acute injury, transcutaneous electrical nerve stimulation (TENS) can be used to control pain, and neuromuscular electrical stimulation or interferential current can be used to address oedema and muscle spasm or to prevent disuse atrophy.

In the case of painful inflammatory conditions, electrical currents can be used for the transdermal delivery of anti-inflammatory or pain-controlling medications by driving charged ions through the skin in *iontophoresis*. Electrical stimulation is a valuable modality after surgery or injury, and it is widely used to improve neuromuscular control and to provide biofeedback for muscles. Electrical stimulation and interferential current are also applied with the goal of breaking the pain-spasm-pain cycle during the acute or subacute phases of healing. The tonic contraction of a muscle induces an ischaemic event that further increases muscle tone.

4. Transcutaneous Electrical Nerve Stimulation

Transcutaneous electrical nerve stimulation (TENS) has been used to treat patients with various pain conditions, including neck and low back pain.^{22,23} Success may be dictated by many factors, including electrode placement, chronicity of the problem, and previous modes of treatment.²⁴ TENS is generally used in chronic pain conditions and not indicated in the initial management of acute cervical or lumbar spine pain.^{22,23} Overall, research is limited in regard to the isolated use of TENS in the treatment of patients with acute cervical and lumbar spine disorders, though it has been used in combination with Range of Motion (ROM) exercises, spray and stretch, and myofascial release.²⁴

A study using functional Magnetic Resonance Imaging has shown that TENS is effective in reducing pain among subacromial impingement patients and also induce analgesic effect through modulation of discriminative, affective, and motor aspects of central pain perception.²⁵

5. Electrical Stimulation

High-voltage pulsed galvanic stimulation has been used in acute neck pain to reduce muscle spasm and soft tissue oedema. Its effect on muscle spasm and pain is thought to occur by its counter irritant effect on nerve conduction and a reduction in muscle contractility. Use of electrical stimulation should be limited to the initial stages of treatment, such as the first week after injury, so that patients may quickly progress to more active treatment that includes restoration of ROM and strengthening.²⁰ Electrical stimulation often may be combined with ice or heat to enhance its analgesic effects.

6. Interferential Currents

Interferential therapy is produced by mixing two medium frequency currents that are slightly out of phase, so that they ‘interfere’ within tissues, to produce Low Frequency (Beat Frequency) effect inside the tissue. The two currents are applied simultaneously and where they cross, form an area of wave interference which results in a modulated frequency equal to the difference in frequency of the two waves.

7. Thermotherapy

Thermotherapy is the application of heat to the body to relieve symptoms of acute or chronic pain. Heat treatment is particularly effective in managing pain related to muscle spasms or tension and tissue injury. It produces several benefits that can help to relieve pain. Heat increases blood flow to the skin by causing vasodilation, which improves oxygen and nutrient delivery to tissues. It also helps to relax muscles near the surface and thus increases their elasticity, reducing stiffness of joints. Research has demonstrated that superficial heat can block internal pain receptors. In addition,

heat helps to prepare the skin for the application of various physical agents. Many patients find the application of moist heat to be relaxing and soothing.

Heat should not be applied to fresh injuries, because increased blood flow to the treated area may actually worsen swelling and enhance haemorrhage. Thermotherapy may not be used to treat conditions related to cancer or tissue that has received radiation treatment. Pregnant women should not use any form of heat therapy (including hot tubs) that exposes their fetus to prolonged heat. In addition, people with poor sensation, for example diabetics, are at increased risk of burns from overuse of heat. Moreover, ultrasound thermotherapy may cause gas bubble formation in tissue or superheating of the periosteum over bony surfaces. This therapy may not be used near the spine in patients who have had some types of spinal surgery.

Heath therapy can be broadly classified into two: the superficial heat modalities and the deep heating modalities.

a. Superficial Heat

Superficial heat can produce heating effects at a depth limited to between 1 and 2cm. Deeper tissues are generally not heated owing to the thermal insulation of subcutaneous fat and the increased cutaneous blood flow that dissipates heat. It has been found to be helpful in diminishing pain and decreasing local muscle spasm. Continuous low-level heat therapy is a new concept. It has demonstrated effectiveness in reducing pain, decreasing muscle stiffness, improving flexibility, and decreasing disability.²⁶ They include Infrared radiation, Wax therapy, Hot Packs, low level Laser therapy.

Superficial heating modalities are useful in musculoskeletal pains of superficial origin that are chronic in nature. Stimulation of cutaneous heat receptors will produce a pain-relieving effect via spinal segmental mechanism. Pain associated with secondary muscle spasm or tension syndromes is attributed to local ischaemia resulting from partial occlusion of blood vessels within the muscle. Heat produces a hyperaemia within the muscle which resolves the ischaemia and reduces pain. Local increase in circulation removes the chemicals stimulating nociceptors and so has a counter irritation effect. Psychological reactions to superficial heat produces relaxation, warmth and sedation.

b. Deep Heating Modalities

These modalities produce heat beyond the superficial range. They are more useful for chronic pain originating from the joints and deep tissues. They include ultrasound, short wave diathermy, and micro wave diathermy.

(i) Ultrasound

Ultrasound is a deep-heating modality that is most effective in heating structures such as the hip joint, which superficial heat cannot reach. It has been found to be helpful in improving the distensibility of connective tissue which facilitates stretching.²⁷ Ultrasound is useful for treating acute postsurgical pain after cervical and lumbar spinal surgery, total knee and hip replacement or ankle repair, when swelling and inflammation prevent the patient from participating in exercise therapy and day-to-day activities. The most common dose is 20% to 50%, depending on whether the condition is acute, at a frequency of 1 or 3MHz, depending on how much depth of penetration is desired in the tissues, for about 10 minutes.

Recent review on chronic tendon injuries have shown therapeutic ultrasound as one of the modalities widely used in conservative management.²⁸

(ii) Short Wave Diathermy²⁹

The term diathermy refers to the creation of heat using electrical pulses. In diathermy, a high-frequency electric current is delivered via shortwave, microwave, or ultrasound, which is able to generate deep heat in body tissues. The heat can be used to improve circulation and/or relieve pain. In addition, shortwave diathermy can be used in medicine for treating damaged tissues and relaxing muscles. The electric pulse of short-wave diathermy creates heat deep inside a targeted tissue, reaching areas as deep as two inches from the skin's surface.

While the diathermy machine doesn't apply heat directly to the body, the current created by the machine allows the body to generate heat within the targeted area itself. The heating of the tissues is carried out by high frequency alternating current which has a frequency of 27.12MHz, and a wave length of 11 meter. Currents of such high frequencies do not stimulate motor or sensory nerves nor do they produce any muscle contraction. Short wave diathermy is very effective in relieving pain and helps in reduction of inflammation. It can be used for management of pain of low back ache, knee pain due to arthritis, shoulder pain, bursitis, capsulitis, osteomyelitis, strain, sprain, brachial plexus neuritis, fibrositis, myositis and rheumatism.

8. Extracorporeal Shockwave Therapy (ESWT)²⁹

ESWT is based on a unique set of pressure waves that stimulate the metabolism, enhance blood circulation and accelerate the healing process. Damaged tissue gradually regenerates and eventually heals. Examples of condition treated by this modality include rotator cuff tendonitis, plantar fasciitis, tennis elbow and golfers elbow.

9. Therapeutic Laser²⁹

Lasers have become a popular choice of pain treatment in recent years. Light emitted by lasers penetrates the skin and is absorbed by cells in muscles, joints, blood and nerves. Light energy stimulates cellular reactions that produce enzymes, increase blood and lymph flow, and stimulate collagen production, all of which accelerate the healing process and reduce inflammation and pain. It is recommended in treatment of postsurgical pain cases, such as cervical and lumbar discectomy or laminectomy, total hip replacement, total knee replacement and rotator cuff repairs.

10. Cryotherapy

Cryotherapy can be achieved through the use of ice, ice packs, or continuously via adjustable cuffs attached to cold water dispensers. Intramuscular temperatures can be reduced by between 3°C and 7°C, which functions to reduce local metabolism, inflammation, and pain. Cryotherapy works by decreasing nerve conduction velocity, termed cold-induced neuropraxia along pain fibers, with a reduction of the muscle spindle activity responsible for mediating local muscle tone.³⁰

11. Exercise

Physical exercises improve not only pain, but also strengthen and improve flexibility among patients with lower limb osteoarthritis.³¹ Current reviews on fibromyalgia have stated physical exercise as one of the multidimensional approach to treat the condition.³² Correction of posture may be the simplest technique to relieve symptoms in patients with nonspecific pain, though it is extremely difficult to change habits. A comprehensive programme incorporating flexibility, ROM, and postural correction with strengthening is clinically supported in the treatment of patients with neck pain and associated disorders.

Aerobic exercise may also decrease the psychological impact of low back pain by improving mood, decreasing depression, and increasing pain tolerance.³³ Theoretically, aerobic exercise may help to improve the body's ability to break down scar tissue via tissue plasminogen activator.³⁴ Improvement of aerobic fitness is a reasonable goal in conjunction with an active exercise programme that emphasizes restoration of normal lumbosacral motion, trunk strengthening, and instruction in proper body mechanics.

12. Patient Education

It is essential that patients have an understanding of the likely aetiology of their pain. The education of patients should include a review of the basic anatomy and biomechanics of the spine and the aetiology of patients' complaints. Proper education ensures that patients will become active participants in their treatment as they progress to a more comprehensive home exercise programme. Patients must be made

to understand the necessary commitment to their programme, as poor compliance with treatment may be a risk factor for poor patient outcome.

13. Positioning

Positioning is another simple strategy for pain control. Simply assisting a patient to change position in the bed or chair or while ambulating can improve comfort. Additionally, appropriate body alignment and support of extremities can improve patient comfort and outlook. Keeping items within reach also makes a patient more comfortable.

2.2.3f Role of Physical Therapy in Pain Management in Special Conditions

1. Pain management in Cancer patients

- a. Soft tissue mobilization technique for these patients may prove beneficial in limiting subsequent shoulder dysfunction among breast cancer patient with axillary web syndrome.³⁵
- b. Sufficient levels of exercise have been shown to be consistently associated with fewer side effects, such as chest wall pain and shoulder limitation among patients that had undergone breast cancer treatment.³⁶
- c. Physical exercise regimens have been associated with significant improvements in fatigue, depression, sleep disturbances, pain, and quality of life in cancer patients. The improvements were independent of the type of cancer, extent of disease, or treatment status. Additional benefits described by participants were support, a sense of belonging, and being understood.³⁷

2. Post-surgical pain

- a. Application of kinesiotaping on patients post laparoscopic cholecystectomy have been shown to decrease level of pain and also improve functional mobility compared to controlled group patients.³⁸

3. Pain management in ante- and post-natal patients

- a. A study concluded that patients who followed physiotherapy programme after cesarean delivery have shown reduced pain perception.³⁹
- b. Breathing exercises, muscle relaxation, lumbosacral massage, and showers, have been reported to reduce pain as cervical dilation increased.⁴⁰

4. Temporomandibular Joint (TMJ) pain

- a. Anaesthetic blockade and physical therapy (massage and muscular stretching), when used together, are effective in the reduction of pain in patients with TMJ disorders compared to those who received anaesthetic blockade alone.⁴¹

5. Phantom Limb pain

- a. Evidence has demonstrated that TENS has potential for reducing phantom limb pain and stump pain at rest and on movement.⁴²
- b. The effect of tactile discrimination training is enhanced when patients watch the reflected image of their unaffected limb during training, and showed reduction of pain and two-point discrimination threshold on patients with phantom limb pain.⁴³

2.2.4 Recommendations for Non-Pharmacological Interventions

RECOMMENDATIONS

Pain management must be standardized to acknowledge diversity in culture, values and belief systems, and ensure that practice is non-discriminatory and promote dignity and self-determination.

There must be a collaborative partnership that facilitate and support people with pain to participate in all aspects of their care. This should involve building on strengths, holding hope and enhancing resilience to promote recovery.

The treatment plan should therefore provide ethically based care consistent with the mental, physical, spiritual, emotional, social and cultural needs of the individual, and should value the contributions of other agencies and stakeholders in the collaborative provision of holistic, evidence-based care.

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2.2.5 Nurses and Other Caregivers

Nurses play a critical role in the care of patients. As has already been established, many patients present with pain and need interventions related to pain management.

Nurses have an ethical obligation to monitor patients and ensure the highest quality care is being provided to all, including the management of pain during the nursing process. The nursing process is a series of organized steps designed for nurses to provide excellent care.

Nurses, other healthcare givers, parents and relatives who spend longer periods of time with patients, are in a good position to ensure quality care. Although many disciplines are involved in pain management, nurses play a pivotal role in assessment, monitoring and evaluation of pain. Each professional nurse and other care givers, by virtue of their code of ethics carries responsibility for rights, behavior and knowledge. Communication between patients, parents and other healthcare givers is critical in comprehensive pain management.

2.2.5a General roles of nurses

Nurses, and other caregivers have a number of roles in caring for patients. The patients overall experience and duration of illness are often influenced by the actions of nurses and caregivers. Effective and quality nursing and other healthcare professionals' roles in relation to pain management include, but not limited to the following:

- Proper assessment of patient in pain;
- Developing an individualized nursing care plan using the components of nursing process including assessment, nursing diagnosis, planning, implementation, and evaluation;
- Have adequate knowledge and understanding of culture and patient beliefs;
- Alleviate pain and suffering using holistic measures;
- Provide regular and consistent patient pain monitoring and evaluation;
- Involve other team members in patients care;
- Ensure proper pain documentation and reporting of findings;
- Serve as patient advocates and inform sound decision making;
- Educate patients regarding their pain medications and discharge details;

- Ensure good nurse and other professional-patient relationship;
- Ensure good nurse and other professional-family caregiver relationship;
- Maintain confidentiality as required by patients and caregivers;
- Involve family members in patients care and supportive role at home during the period of recuperation; and
- Refer patients to other caregivers, such as social welfare workers when need arises.

2.2.5b Nursing roles specific to pain management

1. Nurses are often expected to play an important role in the health of a patient. Within the context of nursing care for patients, the management of pain becomes a priority for the nurse, moreso for the patient's quick recovery. The nurse is responsible for the following aspects of pain management on a regular basis: **Analgesic dosing and administration**
 - a. Nurses should be able to identify procedural or incident pain and breakthrough pain, and intervene appropriately for each situation.
 - b. Ensure pain medications are given on a regular schedule and not '*pro re nata*' (PRN).
 - c. Where possible, give analgesics by the simplest, most effective and least painful route.
 - d. Always ask, observe for and document the occurrence of side effects such as pruritus or bradypnoea.

2. Procedural pain management principles

- a. Nurses should establish good rapport with patients before commencing any painful procedure such as wound dressing.
- b. They should ensure that patients receive pre-emptive analgesia, if possible, before such procedures including, but not limited to fentanyl lollipops and EMLA cream.
- c. They should prepare for such procedures away from patients, especially children, to reduce anxiety which may heighten pain perception.
- d. For children, nurses should encourage parent/family members to be helpful and supportive by staying around during the procedure to reduce separation anxiety.

- e. For children, consider undertaking painful procedures in a child-friendly environment.
- f. Nurses should use reward system of praise with children to gain their trust for subsequent painful procedures.

3. Basic elements in pain management nursing

- a. Nurses should have overall knowledge related to health issues and should be knowledgeable about pain, aetiology, types and signs.
- b. Nurse pain specialist should be skillful enough to handle and provide the necessary nursing cares to patients in pain.
- c. Nurses should identify and develop individualized nursing care plans to address the needs of patients in pain.
- d. Nurses should understand and take into account a patient's socio-economic status in order to ensure all possible efforts are made to support the patient and family during difficult times. Adequate knowledge of patients' status will help identify which patient requires referrals to the social welfare workers.

2.2.5c Code of Ethics for Nurses and Other Professionals in Pain Management

- a. Nurses and people
 - i. Nursing care should not be biased against factors such as age, color, creed or culture;
 - ii. Nurses are required to promote health, prevent illness, restore health and alleviate suffering;
 - iii. Every nurse should be fair in his/her judgment to herself, patients and relatives;
 - iv. Every nurse should guarantee that accurate, timely and culturally-sensitive information is given to patients about the management of their pain;
 - v. The nurse should be trusted to keep in confidence, patient's personal information and be wise with sharing such information; and
 - vi. The nurse should contribute to an ethical organizational environment, and challenge unethical practices and settings.
- b. Nurses and practice
 - i. The nurse carries personal responsibility and accountability for pain management nursing practice;

- ii. The nurse is responsible for maintaining competence by continual learning; and
 - iii. The nurse should also maintain a standard of personal health such that the ability to provide care is not compromised.
- c. Nurses and co-workers
 - i. The nurse should sustain a collaborative and respectful relationship with co-workers in nursing and other fields;
 - ii. The nurse is expected to take suitable action to safeguard individuals, families and communities when their health is endangered by a co-worker or any other person; and
 - iii. The nurse is expected to support and guide co-workers to advance ethical conduct.
- e. Pharmacists and people
 - i. Pharmaceutical care should not be biased against factors such as age, color, creed or culture;
 - ii. Pharmacists are required to promote health, to prevent illness, to restore health and to alleviate suffering;
 - iii. Every pharmacist should be fair in his/her judgment to self, patients and relatives;
 - iv. Every pharmacist should guarantee that accurate, timely and culturally-sensitive information is given to the patient about the management of their pain;
 - v. The pharmacist should be trusted to keep in confidence patient's personal information and be wise with sharing such information; and
 - vi. The pharmacist should contribute to an ethical organizational environment, and challenge unethical practices and settings.
- d. Pharmacists and practice
 - i. Pharmacists should be able to provide pharmaceutical care for patients, adequate counseling, dose adjustment where necessary,
 - ii. The pharmacist carries personal responsibility and accountability for pain management ;
 - iii. The pharmacist is responsible for maintaining competence by continual learning; and
 - iv. The pharmacist should maintain a standard of personal health such that the ability to provide care is not compromised.

- f. Pharmacists and co-workers
 - i. The pharmacist should sustain a collaborative and respectful relationship with co-workers;
 - ii. The pharmacist is expected to take suitable action to safeguard individuals, families and communities when their health is endangered by a co-worker or any other person; and
 - iii. The pharmacist is expected to support and guide co-workers to advance ethical conduct.

2.2.6 Recommendations related to quality nursing care and pain management

RECOMMENDATIONS:

The relief of pain should be seen as important to every nurse and caregiver from a holistic perspective, and not seen as someone else's responsibility.

Family caregivers should be made aware of different strategies for pain management on discharge.

Nurses should help patients advocate for what feels appropriate for them within their cultural context in pain management.

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2.2.7 Patient Monitoring

Monitoring patients in pain is essential as it:

1. *Allows the team to know effectiveness of the prescribed pain interventions.*
2. *Allows for prompt review/modification of pain management plan.*
3. *Allows for monitoring complications such as drug side effects, allergic reactions, and adverse drug reactions.*
4. *Allows for ensuring compliance with prescriptions.*
5. *Monitor for substance use disorder behaviors.*

Patient monitoring during pain management is important for many reasons. It allows for the determination of the effectiveness of the prescribed pain interventions such that prompt review/modification of pain management plan is accomplished. It also allows for monitoring of complications such as drug side effects, allergic reactions, adverse drug reactions, and enables us to ensure compliance with the prescriptions. Opioid abuse has been described to be an epidemic in some developed countries; monitoring of patients on such medications allows early detection of behaviors related to substance use disorders.¹

The level of monitoring employed depends on the pain diagnosis. However, the minimum monitoring to be employed should include monitoring the dimensions of pain which are physical, psychosocial and spiritual. In the acute pain conditions, such as trauma, postoperative and labour pain, monitoring is at the level of the simple unidimensional tools employed in pain assessment. In chronic pain conditions, particularly in non-cancer pain, and where opioids have been included in the pain management, a more detailed monitoring is indicated.

Monitoring is usually performed by the health care professionals, however patients are the focus of care and should be actively engaged in their own monitoring. Tools such as “Pain Diaries” are used for this purpose.² The family members or caregivers of the patients are also encouraged to participate in the treatment and monitoring activities.

Patients should evaluate themselves and be evaluated based on the following considerations:

1. Reduction of pain

2. Occurrence of adverse effect
3. Substance use disorder behaviour
4. Improvement of activity
5. Mood of the patient
6. Effectiveness of analgesia using pain assessment tools to rate the severity of pain.
7. The healthcare provider should also:
 - i. Determine how much relief the patient has experienced using the medication(s) as provided, and ask specifically about side effects commonly associated with the medication.
 - ii. Enquire about adherence to medication dosage and compliance issues, if any.
 - iii. Observe patients for signs of behaviors related to substance use disorders, such as unendorsed dose escalation and loss of prescription or early request for refill of prescription.³ Quantitative urine monitoring for opioids may be carried out periodically.
 - iv. Note changes, if any, in the patient functional goals such as sitting position, standing position, walking ability and activities of daily living.
 - v. Pain is also associated with psycho-social effects. There is, therefore, the need to note changes in mood, sleep pattern, ability to concentrate and relationship to others.

In conclusion, it is essential that all healthcare workers, caregivers, family members and the patient him or herself participate actively in monitoring the progress of the patient. Monitoring actions must become a routine practice which informs treatment decisions, protects patients and documents progress toward a healthy life.

2.2.8 Recommendations related to monitoring patients

RECOMMENDATIONS:

Patients' monitoring is essential for informed evaluation of the effectiveness of treatment interventions.

Regular data collection on patient pain informs local and national health information and research.

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3. SPECIAL CONSIDERATIONS

Pain treatment is often more successful when using a multidisciplinary or team approach. This involves one or two specialists directing the services of a number of team members. The specialists may have different goals related to treatment but each have the goal of relieving pain and returning the patient to daily life activities.

All patients are unique, and as such, should be afforded tailored interventions to meet their circumstances. In this section a number of areas will be discussed where healthcare providers should take special consideration to meet the needs of patients.

Each patient is unique and the condition or conditions which bring them to the healthcare facility are particular to them. In this section, information will be provided related to patients with a history of substance use disorders, patients who have cancer and patients with chronic pain. Each of these patients requires more attention and focus, from not just the physician, but the entire healthcare team.

Additionally, in the last section, the needs of the “unique populations” such as children, pregnant women, persons with mental health conditions, and individuals with sleep disorders will be addressed.

3.1 USE OF CONTROLLED MEDICINE

There are various subsisting legislations, rules and regulations on controlled substances including narcotics medicines. In as much as there is attempt to increase access to these essential medicines for the medical relief of pain, there is also a concern about diversion.

Legislation and Regulatory policies regulate inappropriate prescribing, but should not prevent the prescription of opioids and controlled substances where medically indicated and appropriately managed. The physician in consultation with the pharmacist must closely monitor prescribing and dispensing refill orders. All efforts must be made to treat the underlying pathologic condition. Where necessary, prescriber and dispenser must come to a proper understanding of any situation that warrants prescribing for longer periods, with subsequent monitoring of the patient.

3.1.1 Overview

Pain is non-discriminating. All types of persons will experience pain, including persons who have a history of substance use or substance use disorders. Screening of such patients is essential to identify those at higher risk for misuse or abuse of opioids. Patients with substance use disorder who present with acute pain should be treated in the same way as any other patient with acute pain using the WHO analgesic ladder. Chronic pain treatment is also addressed using the same strategies as with other patients, with the aim of maximizing functional level and providing pain relief.¹

A history of behaviors associated with drug use disorders, such as use of drugs and alcohol, may contribute to a patient's risk of relapse and without interventions, may be a contributory factor for opioid related overdose deaths. Clinicians should take adequate history about drug and alcohol use before prescribing analgesics, particularly opioids, for patients with chronic pain outside of active cancer, palliative and end-of-life care.² However, it should be noted that a history of behaviors related to drug use disorders does not preclude a patient from receiving pharmacological interventions related to the management of pain.

The American Academy of Pain Medicine (AAPM) offered the following statements in the use of opioids, which can be extended to other controlled medicines and substances:

“Prescription of opioids for chronic, intractable pain should be done in consultation with a team including the patient, caregivers, and all other relevant healthcare workers. A conservative treatment plan is recommended to manage the pain symptoms in a step-by-step process while avoiding diversion”.

“Pain should be treated as appropriate and as comprehensive as possible. It should be systematic, collaborative and patient focused. Such collaborations may include cognitive - behavioural and pharmacological interventions”.

Pharmacological and non-pharmacological methods should be instituted. AAPM does not advocate opioids as first-line treatment but where it is judged as the most suitable, it should be instituted. Prescribing and dispensing practices must be followed, with a goal of protecting the patient from further harm, preventing diversion, noting and addressing respiratory depression, and monitoring for dependence and other side effects.

Fear and mis-information have contributed to policies that prevent patients from accessing controlled medicines. Prescribers must be sensitive to and understand the complexity of substance use disorders, assessing a patient's history and other vulnerabilities when managing use of opioids and other controlled substances in chronic cases. The following actions can be taken to address these concerns:

- Opioids and other controlled substances should only be prescribed after a thorough evaluation of the patient and alternatives have been explored.
- Treatments should be tailored to patient's peculiarity such as having substance use disorder, consulting the patient as an important component of the decision-making process.
- Physicians and other health professionals should recognize that tolerance and physical dependence are normal consequences of sustained use of opioid analgesics, and are not synonymous with drug use disorders or addiction.
- Physicians and other health professionals should discuss the risks and benefits of the use of controlled substances with the patient, persons designated by the patient, or with the patient's surrogate or guardian if the patient is incompetent. It is important to get informed consent from the patient.
- To minimize substance use disorders, it is important to have one physician and pharmacist provide all pain medication prescription, while simultaneously having many team members responsible for monitoring the patient and providing regular feedback to the physician. This will reduce the opioid dose to minimum effective dose.

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If the patient is determined to be at high risk for medication misuse or have a history of substance use disorder behavior, the physician and pharmacist may employ the use of a written agreement between physician and patient outlining patient responsibilities.

The responsibilities of the patient may include:

- providing urine/serum medication levels screening when requested,
- providing verification of the number and frequency of all prescription refills, and
- providing consent that if the agreement is violated, the physician will protect the health of the patient first by removing the medication while enhancing non-pharmacological pain relief interventions.

If a physician is uncomfortable treating such a patient, the physician should be willing to refer the patient when necessary, for additional evaluation and treatment in order to achieve treatment objectives. The management of pain in patients with a history of substance abuse or with a comorbid psychiatric disorder could require extra care, monitoring, documentation, and consultation with or referral to an expert in the management of such patients.

At reasonable intervals, based upon the individual circumstance of the patient, the physician and pharmacist should review the course of treatment and any new information about the aetiology of the pain. Continuation or modification of therapy should depend on the physician's evaluation of progress toward stated treatment objectives, such as improvement in patient's pain intensity and improved physical and/or psychosocial function (ability to work, need of health care resources, activities of daily living, and quality of social life). If treatment goals are not achieved, despite medication adjustments, the physician and pharmacist should re-evaluate the appropriateness of continued treatment including compliance monitoring.

3.1.2 Recommendations related to use of controlled medicines

RECOMMENDATIONS:

Patients with a history of behaviours related to drug use disorders should be afforded the full spectrum of non-pharmacological and pharmacological interventions for pain management following an assessment and close monitoring.

Developing a relationship of trust between patient, physician and pharmacist is critical in preventing relapse and supporting a patient's positive adherence to the prescribed treatment plan.

References:

1. Christopher D, Robert G, Karl E. Successful pain management for the recovering addicted patient; Journal of Clinical Psychiatry,2002;4(4):125-131
2. Dowell D, Haegerich T, Dowell D.CDC guidelines MWWR for prescribing opioids for chronic pain United States 2016

3.2 CANCER PAIN

People with cancer often feel severe or constant pain. Pain can be dependent on the type of cancer, the stage and therapy received. This pain can be defined or described as a complex sensation that reflects both damage to the body and the body's response to the damage.

3.2.1 Overview

Cancer pain is poorly understood and treated. Cancer pain syndromes may also result from release of substances (hormones, protein) produced by cancers that affect the function of the other tissues and organs. It may also follow surgery, radiation therapy or chemotherapy.

The cancer pain can be described as dull, aching, pressure, burning or tingling. Tingling and burning sensation arise from damage to nerves whereas damage to internal organs will be described as pressure.

Cancer pain usually involves complex relationship between complicating factors especially from para-neoplastic syndromes that follow cancers. The psychological effects have been found to be very devastating thus leading to helplessness, anxiety, depression and despair.

Cancer pain may affect sufferers in the following four areas of their life:

1. Physically, such as feeling weak
2. Psychologically, being unable to cope
3. Socially, often relationships suffer
4. “Spiritually”, a time of questioning beliefs

Proper assessment and evaluation of the type of cancer and the stage is imperative in the diagnosis. In some cases, pain is relieved by treating the cancer either through surgery, reducing size by radiation or addressed during chemotherapy.

Pharmacological treatment should follow the WHO Ladder.

3.2.2 Recommendations related to cancer

RECOMMENDATIONS:

Patients with a cancer diagnosis must be treated for the cancer and pain resulting from the cancer itself, or resulting as a side effect of the cancer treatment. These must be addressed concurrently.

Cancer patients present with complex, multi-factorial challenges that require a consultative and coordinated approach with a group of professionals and caregivers sharing information and monitoring different components.

3.3 CHRONIC PAIN MANAGEMENT

Chronic pain is often difficult to treat. While some people with chronic pain may benefit from opioid treatment, non-opioid medicines are also recommended, depending on whether the pain originates from tissue damage or is neuropathic. Psychological treatments may include cognitive behavioural therapy or other psychosocial interventions.

Chronic pain may contribute to decreased physical activity due to fear of exacerbating pain, and fluctuations in weight. Severe chronic pain has been associated with increased 10-year mortality, particularly from heart disease and respiratory disease. People with chronic pain tend to have higher rates of depression, anxiety, and sleep disturbances, and it is often not clear how the factors are related.

3.3.1 Overview

Chronic pain is defined as pain that typically lasts more than 3 months or pain that persists beyond the anticipated time of normal tissue healing.¹

The management of chronic pain, or pain that persists for more than three months, will also follow proper assessment and evaluation as discussed for patients in general. As a first priority, physicians should pursue a course of treatment for the underlying cause of the pain, with the use of pharmacological and non-pharmacological approaches to pain management. Treatment strategies and options include interventional techniques, cognitive and behavioral methods, rehabilitation approaches, and the use of medications, including, where medically indicated, opioids. Opioids as an intervention can be combined with other treatments to improve pain management, enhance the quality of life and decrease suffering. However, it is advised that physicians consider the use of opioids only when expected benefits outweigh the risks to the patient.

3.3.1a Conditions for prescribing opioids in cases of chronic pain

The American Academy of pain medicine² advocates that chronic opioid therapy (COT) should be reserved for those who have intractable chronic pain that is not adequately managed with more conservative or interventional methods. Before starting opioids treatment for chronic pain, providers should establish treatment goals with all patients including realistic goals for pain and function and how to discontinue therapy.

The CDC has provided a checklist for prescribing opioids for primary care clinicians who are prescribing opioids for chronic pain outside of active cancer treatment, palliative care, and end-of-life care.³

Areas of consideration during treatment of chronic pain include, but are not limited to the following:

1. Selection, dosing, duration, follow up and cessation
 - a. Always utilize regular immediate release products
 - b. Start with lowest doses. Doses should not be more than 90milligram morphine equivalents (MME) per day.
 - c. Physician must prescribe in a manner calculated to avoid addiction, diversion, respiratory depression, dependence, and other adverse effects.
 - d. Before escalating doses, there must be a careful evaluation. This can be done every 3 months.
2. Risk assessment and how it can be addressed
 - a. Clinicians should assess patients before starting treatment and periodically during treatment.
 - b. Risk mitigation plans should form part of treatment.
 - c. Monitor factors that increase the risks of overdose, such as history of overdose, history of substance disorder, higher opioid dosage >50MME/Day or concurrent benzodiazepine use are present.
 - d. Review of patient's history of controlled substance prescriptions using prescription drug monitoring programme (PDMP) data, where available.
 - e. Use of urine drug testing before starting opioid treatment. Avoid combined use of opioid and benzodiazepine as much as possible.
 - f. Use evidence based treatment.

3.3.2 Recommendation for Chronic Pain

RECOMMENDATIONS:

Patients with chronic pain have a right to adequate treatment.

Medications are not the sole focus of treatment in managing chronic pain and should be used when needed to meet overall goals of therapy in conjunction with other treatment modalities

Chronic pain patients should receive appropriate pain treatment based on a careful consideration of the benefits and risks of treatment options.

Opioids are not a first-line therapy for chronic pain management, but they may be useful if prescribed in a judicious manner as part of a logical progression of treatment.

References:

1. International Association for the Study of Pain. Classification of chronic pain. Descriptions of chronic pain syndromes and definitions of pain terms. Prepared by the International Association for the Study of Pain, Subcommittee on Taxonomy. *Pain Suppl* 1986;3:S1–226
2. American Academy of Pain Medicine 2013.
3. CDC Guideline for Prescribing Opioids for Chronic Pain — United States, 2016

3.4 UNIQUE PATIENTS

There are some medical situations in which the clinicians involved need to give special considerations when instituting a pain management regimen. It is important to highlight that the basic guidelines which a clinician should adhere to before prescribing any medication should be followed.

3.4.1 Overview

Management of a ‘unique population’ comprising patients with sleep disorders, pregnant women, children, patients with sickle cell disease, the elderly, the cognitively impaired and others should be tailored to their particular needs. A number of examples are detailed below but each patient should be considered an individual with unique circumstances and with diverse challenges in the healthcare setting.

1. Patients with sleep apnea and other forms of sleep disordered breathing

Patients with certain medical conditions like heart failure and obesity are at risk of sleep disorders. Opioids should be used with careful monitoring in those with mild sleep disorders, while avoiding prescribing opioids to patients with moderate or severe forms because of the risks of associated respiratory depression.¹

2. Pregnant women

Care must be taken in prescribing any medication to a pregnant woman. There are medications which may be tolerated by the mother but may have untoward effects on the unborn child. Safety of both mother and the foetus must be considered in prescription of any pain medication in pregnancy. In some cases, opioid use in pregnancy has led to neonatal opioid withdrawal syndrome. It implies that the risks and benefits must be weighed before initiating opioid therapy in pregnancy.

Clinicians caring for pregnant women receiving opioids for chronic pain should arrange for delivery in a facility prepared to monitor, evaluate for, and treat neonatal opioid withdrawal syndrome.

Non-steroidal anti-inflammatory drugs (NSAIDs) may cause foetal and neonatal adverse effects. There are increased risks of miscarriages and malformations associated with NSAIDs use in early pregnancy. Exposure to NSAIDs after 30 weeks

gestation, is associated with an increased risk of premature closure of foetal ductus arteriosus and oligohydramnios. Foetal and neonatal adverse effects affecting the brain, the kidney, lung, skeleton, gastrointestinal tract and cardiovascular system have been reported.²

3. Patients with renal or hepatic insufficiency

Dosage adjustments are necessary in the setting of renal and hepatic diseases because of the decreased ability to either excrete or metabolize medications. It is advised that clinicians should be more cautious and should also monitor any patient with renal or hepatic insufficiency who is placed on pain relieving medications. The dosages of some pain-relieving medications, particularly NSAIDs, are usually adjusted based on the patients GFR and majority of NSAIDs are contraindicated in end-stage kidney disease. Analgesics should be given only when necessary and with adequate monitoring to patients with liver disease. Opioids are contraindicated in patients with hepatic encephalopathy.¹

4. Patients with mental health conditions

It is important that clinicians assess the level of psychological distress in their patients before instituting appropriate pain intervention. This is because psychological distress may interfere with improvement of pain in patients with chronic pain. Additional caution and increased monitoring will help lessen the risk for opioid use disorder among patients with mental health conditions. Clinicians are advised to consider behavioral health specialist's consultation for any patient with a history of suicide attempt or psychiatric disorder. Treatment for any identified mental health condition must be optimized. Patients with mental health conditions are more likely to receive benzodiazepines, which can exacerbate opioid induced respiratory depression, and increase the risk for overdose.¹ Treatment should be multi-disciplinary in nature, with multiple professionals involved in the development of a treatment plan and a variety of interventions to relieve pain.

5. Patients with cognitive impairment

The challenge in the management of pain for these patients involves difficulties in communication, which eventually affects obtaining informed consent. Therefore, patient education is critical when working with these patients. The use of medication with these patients requires a significant focus on compliance with the treatment plan, and on ensuring a patient has a basic understanding of what is happening with their body.

6. Children from the premature to age 16 years

Children may be more vulnerable to poor pain management as a result of myths that children experience less pain. Moreover, often when children are sick, they are subjected to additional procedural pain.

It is critical to assess pain that children may be experiencing. The following are important concepts to support assessing pain in children:

- a. Observe the way in which the patient walks, holds their body or moves, and the way the body is positioned when lying down. This is particularly important in young children and those unable to verbalize their pain.
- b. Note: a sleeping child, a very quiet child, even a child that is playing is not necessarily pain-free. Movement might be painful, or the child might be too sick or too tired to move.
- c. It is important to include, where possible, parents or caregivers in the assessment of pain in children. Children may not report pain for several reasons, including their being: frightened of talking to doctors, fear of finding out they are sick, unwilling to receive an injection, etc.

Other considerations when managing children with pain include the difficulty in assessing pain, especially in pre-verbal years. And due to organ immaturity in early life, as well as a different metabolism, children may require lower doses of medicines than the young adult patients. Also, please note that, whenever possible, medications used with children should have been medically tested, and found to be effective with children.

7. Elderly

Pain prevalence ranges from 13-49% among those aged 65 years and older world wide, and 25% prevalence rate for pain in the older adult in Nigeria.¹ Unrelieved pain in the elderly, is associated with impaired physical function, isolation, depression, reduced quality of life, impaired sleep, development of chronic pain and an increased socio-economic burden.² With increasing age, there is increased frailty with attendant increased co-morbidities, including dementia and deafness.

Aging is also associated with pharmacokinetic and pharmacodynamic changes in drug handling. Reduction in hepatic and renal functions lead to careful dosing requirements.

Pain management in the elderly requires accurate pain assessment. The elderly tend to under-report pain, leading to under treatment in this group of individuals. Moreover, pain assessment in the cognitively impaired elderly is fraught with difficulties. When they are able, self-report remains the best method of taking pain

history. A thorough initial pain assessment and investigation may reveal treatable conditions that can be readily managed.³ Complex pain conditions should be managed in a multidisciplinary manner, and specialty specific pain conditions should be promptly referred to the appropriate specialist.

8. Sickle cell patients

Sickle cell patients have multiple organs affection, and as such, must be carefully assessed and evaluated with dosage consideration and peculiar medications. Details on their treatment can be seen in the national guidelines on management of sickle cell disease.

3.4.2 Recommendations for unique populations

RECOMMENDATIONS:

Analyze policies and materials to ensure attention is paid to unique needs of all patients.

Promote proper assessment, monitoring and evaluation of all patients.

Take a holistic approach to pain management, with a multidisciplinary team when appropriate.

References:

1. Antonucci R, Zaffanello M, Puxeddu E, Porcella et al. Use of non-steroidal anti-inflammatory drugs in pregnancy: impact on the fetus and newborn. *Curr Drug Metab.* 2012;13(4): 474-90.
2. Dowell D, Haegerich T, Dowell D. CDC guidelines MWWR for prescribing opioids for chronic pain United States 2016
3. Ferrell BA. Pain. In: Osterweil D, Brummel-Smith K, Beck JC, eds. Comprehensive Geriatric Assessment. New York: McGraw Hill, 2000. P. 381–397.
4. Gureje O, Ademola A, Olley BO. Depression and disability: comparisons with common physical conditions in the Ibadan study of aging. *J Am Geriatr Soc.* 2008; 56(11):2033-8. doi: 10.1111/j.1532-5415.2008.01956.x.
5. American Geriatrics Society Panel on Pharmacological Management of Persistent Pain in Older Persons. Pharmacological management of persistent pain in older persons. *J Am Geriatr Soc.* 2009; 57(8):1331-46. doi: 10.1111/j.1532-5415.2009.02376.x.

4.0 HEALTH SERVICE DELIVERY

The health systems are a combination of the organizations, structures, operations, processes and procedures in the health sector, that contribute to patient health.

*Therefore, any person experiencing pain is likely to interact with the health system.
Will the system meet the patients' pain needs?*

4.1 OVERVIEW

Pain management is interdisciplinary with team approach centered on patient care, and as a subset of healthcare delivery system; it is an off-shoot of health-related laws, regulations and policies.

The highest decision-making body on health matters in Nigeria is the National Council on Health (NCH), which comprises the Honourable Minister of Health as the Chairman, the Honourable Minister of State for Health, and the Honourable Commissioners for Health from the 36 States of the Federation, and the Secretary for Health of the Federal Capital Territory (FCT) as members. The existence of health matters on the concurrent list of the 1999 Constitution as amended, explains why each State of the Federation can legislate on health matters, and also why the Honourable Commissioners are the Chairmen of their respective State Councils on Health where they exist.

The Federal Ministry of Health offers leadership and governance role generally on health matters, while its agencies and parastatals offer training, research, healthcare and/or regulatory services. There is replication of institutional framework and functions at the State level.

Three levels of healthcare delivery are recognized in consonance with the provision of 1999 Constitution. The provision of pain management services would resultantly present at these 3 levels, both in the public and private sectors. However, the quantum of services shall depend on the capacity and competence of the healthcare providers in the healthcare facilities. There are three (3) main categories of healthcare facilities based on the level of services they offer, and they operate as either public or private providers. These are primary, secondary and tertiary healthcare facilities.

4.1.1 Primary Healthcare Facilities

They are charged with the responsibility of delivering general health services of preventive, promotive, curative and rehabilitative nature. The Local Government Councils are in charge of the primary healthcare facilities, while the National Primary Healthcare Development Agency (NPHCDA) undertakes national coordination of the activities of these facilities. The complement of healthcare providers available at these facilities include doctors (where available), nurses, community health officers (CHOs), community extension health workers (CHEWs), pharmacy technicians, laboratory technicians (where available) and pharmacists (where available).

4.1.2 Secondary Healthcare Facilities

They are charged with specialised services such as laboratory, diagnostic, blood bank, rehabilitation, physiotherapy, etc. The State Governments are in charge of these facilities. The complement of healthcare providers available at these facilities include doctors, visiting or resident specialists (where applicable), nurses, laboratory scientists, pharmacists, pharmacy technicians, among others.

4.1.3 Tertiary Healthcare Facilities

They are charged with highly specialised services. The Federal Government, and at times, State Governments are in charge of these facilities. The complement of healthcare providers available at these facilities include specialist doctors, dentists, nurses, laboratory scientists, pharmacists, among others.

These three levels cover facilities in public and private sectors. For example, private clinics/hospitals, community pharmacies, and patent medicine shops are also involved in pain management.

In considering pain management financing options, it is worthy of note that the Federal Government of Nigeria has established a National Health Insurance Scheme (NHIS), where the Federal public servants have been enrolled on the scheme. Efforts are ongoing to expand the coverage to other Nigerians. However, the major source of financing pain management is out-of-pocket, alongside others, such as free health service/exemption & deferred payment, community/social Insurance, and donor funding.

Patients present with pain symptoms in any and all settings including, but not limited to, urban and rural hospitals and clinics, and offices and casual meetings. Additionally, patients will be seen in outpatient settings, as well as in-patient settings.

While the assessment and diagnostic steps would remain the same, there may be differences in the way in which patients are monitored or participate in follow up activities. Outpatient compliance with the treatment plan remains essential but may require the following:

1. Intensive patient education
2. More frequent follow up appointments with patient
3. Clear and defined involvement of the caregiver

In-patient compliance may be considered to be more convenient as the patient can be more closely monitored while in residential care, but it still may require the following:

1. Significant education of nurses care and other healthcare workers
2. Changes to the record keeping, such as charting pain as a vital sign
3. Frequent follow up initiated by the physician

4.2 RECOMMENDATIONS

RECOMMENDATIONS:

NHIS minimum healthcare package should include pain management interventions.

The most cost-effective and affordable delivery should be adopted for pain management in order to improve access to quality care.

Explore mechanisms to sustain funding for pain management including reimbursement for exemptions and referral, as well as increased budget line.

References:

1. The Constitution of the Federal Republic of Nigeria, 1999, as amended.
2. The National Health Act, 2014.

5.0 BUILDING CAPACITY

Pain management is an integral part of healthcare that needs to be championed by all staff members who provide services in healthcare settings across the country. Hence the needs for skill development in pain management for all health care providers. Capacity building is an act of improving skill toward having resources and ability to address problems or challenges.

Inadequate training and awareness as well as poor attitude of health workers are major barriers to improving pain management. The curricula for health workers in most of our training institutions do not provide sufficiently for specific education on pain management.

5.1 OVERVIEW

Pain is the most common reason individuals visit health care facilities. Worldwide, inadequately managed pain is the source of human and economic costs for patients, their families and the society.

Healthcare professionals such as doctors, nurses, pharmacists, social workers, psychologists, physiotherapists, and nutritionists, should be trained to ensure comprehensive planning and delivery of effective pain management that guarantees maximum improvement in function and quality of life.

It is critical that healthcare providers learn how to build a therapeutic relationship among themselves, the patient and their family. This will allow caregivers to be effective while communicating with patient/family, to be skilled at facilitating care team formation and function and to be effective while facilitating change in the illness experience.

5.2 COMPONENTS OF TRAINING

Healthcare professionals and others such as administrators, regulators, policy makers, consumers and caregivers, should be trained in the six essential steps involved in providing effective pain management:

1. Assessment
2. Documentation
3. Decision making
4. Care planning
5. Care delivery and coordination of care amongst team members
6. Advocacy to include increasing awareness, sensitization and education.

It is essential to build the knowledge and understanding of healthcare professionals. In doing so, a curriculum/manual should be provided as guide by the healthcare facility or government with assessment tools for assessing healthcare professionals and facilities, through a feedback mechanism from patients and employers. This can be done in two general ways:

1. Formal Education of health providers: The health professionals, need to be equipped to manage pain. Government Universities, and Professional Associations in Nigeria have a critical role to play with regard to the improvement of undergraduate, postgraduate, and continuing medical education in clinical pharmacology, therapeutics, essential drug list and medicines information issues, to promote pain management.
2. Continuing Medical Education (CME) for established health professionals should be

PAIN-FREE HOSPITAL INITIATIVE [PFHI] – Increasing Facility-Based Pain Management Through a Low-Cost Training Initiative

Nigeria is home to over 170 million people. In 2013, there were 162,257 people dying of HIV or cancer with untreated moderate or severe pain. The Federal Ministry of Health in collaboration with the American Cancer Society's Treat the Pain Program is implementing Pain-Free Hospital Initiative [PFHI] across fourteen federal tertiary hospitals.

PFHI is a one-year quality improvement project to integrate effective pain treatment into hospital-based service with the measured goal of decreasing patient pain scores, improving pain management knowledge and attitude, and increasing rational prescription and consumption of oral morphine and other opioids.

PFHI is strategically implemented by motivating healthcare providers to evaluate and treat pain, supply appropriate drugs to treat pain, equip healthcare providers with skills and tools to effectively manage pain, measure the impact of the project and document impact of project.

As at date, over 11,000 healthcare providers, including doctors, nurses, pharmacists and physiotherapists, have been trained; patients reporting severe pain has decreased by an average of 63%; knowledge of healthcare providers in pain management has increased by 20% and use of opioids in treating moderate or severe pain has tripled and significantly mitigated opioidphobia.

encouraged to keep them updated through attending seminars, conferences, and other continuing professional development programmes.

It is also necessary to build the knowledge and understanding of the public in order to provide an effective feedback that the healthcare professional can use to effectively improve pain management in the healthcare system. This can be done by:

1. Continuous Health professional–Public Interaction: The health professionals, need to receive a feedback from his patients and the public on his pain management style to improve his process. Also, the public (patients and caregivers) needs to be continuously monitored on compliance with treatment. These can be further improved upon by:
 - a. Continuing Peer-to-Peer Community: The Professionals community and the patients community
 - b. Continuing Professional-to–Patient community
 - c. Pain Support groups: All stakeholders involved in pain management as well as NGOs, CSOs and Policy makers.
2. Continuous Lay persons – Public Interaction
 - a. Continuing Peer-to-Peer Community: The Lay persons community
 - b. Continuing Lay persons-to–Patient community: Chronic pain self management programmes.

5.3 RECOMMENDATIONS

RECOMMENDATIONS:

A comprehensive approach to capacity building must be taken to strategically target all persons involved in the care of patients in pain.

Initial education must be followed up with booster sessions and skill building

References:

1. Revised Nigeria Human Resources for Health (2016 – 2020).
2. National Policy on Controlled Medicines, 2017.

APPENDIX I – PROFORMA

PROFORMA FOR HISTORY TAKING AND PHYSICAL EXAMINATION

Hospital/Clinic:.....

Initials _____ Age _____ Gender _____ Hospital No _____
HB Genotype _____ Ethnic Group _____ Phone No _____

A. Patient's History:

- History of present illness _____
- Current Pain History:
Onset _____ Duration _____ Location _____ Periodicity _____
Character: Burning Piercing Colicky Dull ache
Radiation to other areas _____ Aggravating factors _____
Relieving factors _____ Psychosocial effects _____
Impact of pain on activities of daily living _____
Previous pain conditions _____
- Relevant Past Medical and Surgical history _____
- Mental Health history:
Depression Anxiety Suicidal ideation Others _____
- Drug history: Previous analgesics use _____
Current analgesic use _____
Effectiveness of current analgesics: Adequate Inadequate
Previous adverse events _____
- Substance use history: No Yes (Self Family Peer)
- Marital Status _____ No of Dependents _____
- Current employment status: Employed Profession _____ Unemployed
- Socio-economic status:
History, and legal history, other behavioural patterns (i.e. impulsive behaviours)
- Review of systems: CNS _____ Respiratory _____ CVS _____
GI _____ Genito-Urinary _____ MSS _____
- Allergies: No Yes If Yes please state _____
- Abuse: No Yes Sexual Physical Mental

B. Physical examination

- General examination relevant findings _____
- Systemic examination relevant findings _____

C. Investigation findings _____

D. Clinical Diagnosis _____

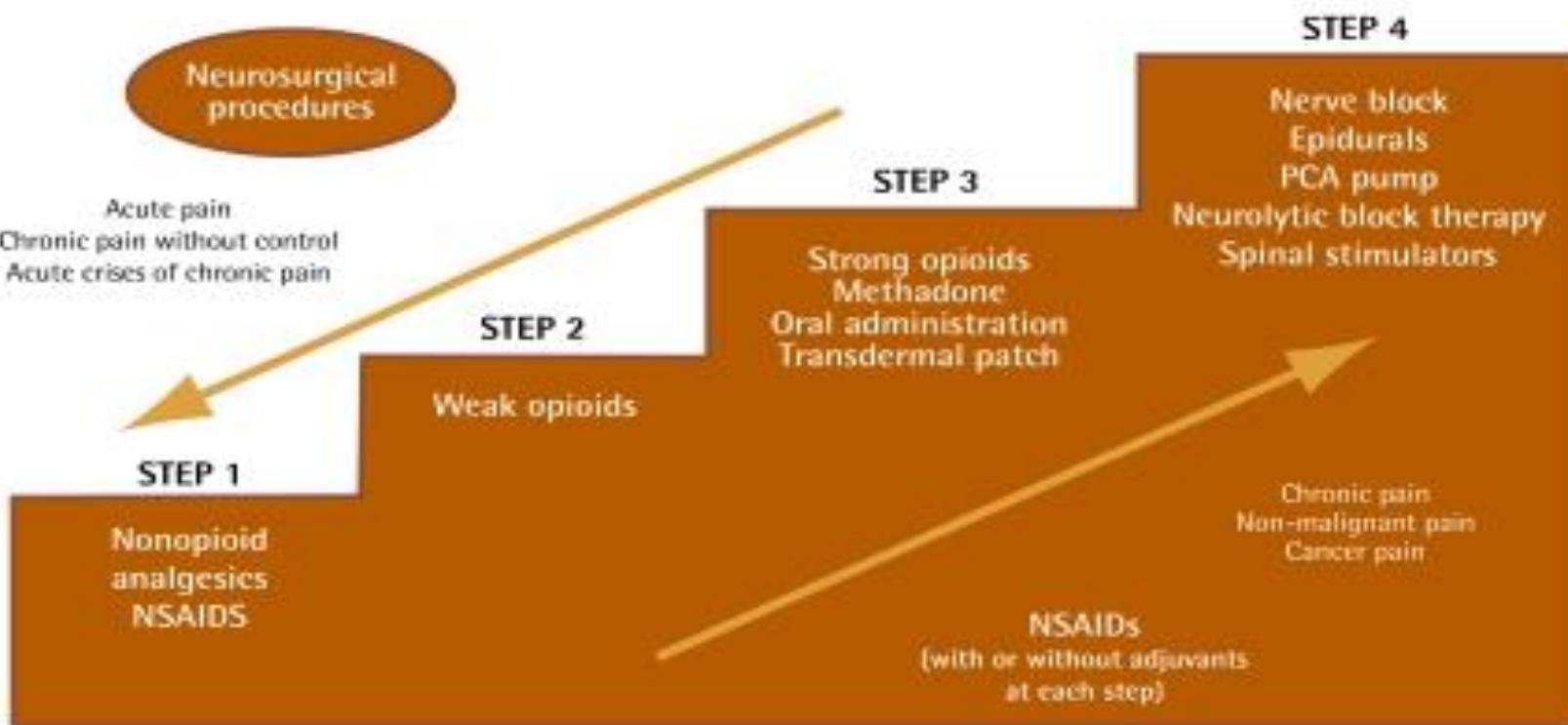
E. Management Plan _____

APPENDIX II – ASSESSMENT TOOLS

APPENDIX III – PAIN LADDER – MODIFIED WHO

Figure 1: The new analgesic ladder.⁵

Figure 2. New adaptation of the analgesic ladder



APPENDIX IV – CLASSIFICATIONS OF PAIN

The International Association for the Study of Pain (IASP) defines pain as, “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage” (2). The definition emphasizes both the physical and emotional nature of pain. An additional note is pertinent to pain experienced by children: “The inability to communicate verbally does not negate the possibility that an individual is experiencing pain and is in need of appropriate pain-relieving treatment. Pain is always subjective” (3).

CLASSIFICATION SYSTEMS

There are five systems most commonly used for classification: [Refs: 1: Beating Pain, 2nd Ed, APCA 2012, 2: IASP, 3: WHO guidelines for the treatment of persisting pain in children]

1. Duration of pain (acute or chronic)
2. Mechanism of pain (nociceptive or neuropathic pain)
3. Anatomic location of pain
4. Aetiology (malignant or non-malignant)
5. Situation (Incidental pain, breakthrough pain, procedural pain)

Duration of Pain

Acute Pain: It is usually due to a specific or definite acute injury or illness. It has a definite onset and its duration is limited and predictable. It is usually accompanied by anxiety and clinical signs of sympathetic over-activity; and is almost invariably the first step in the development of chronic pain. Typical examples are pain arising from trauma, surgery or inflammation.

Chronic Pain results from a chronic pathological process. It may have a gradual or ill-defined onset, continues unabated and may become progressively more severe, persist longer than the expected healing time for the injury or illness in question, and often leads to the patient appearing depressed or withdrawn and possibly being labelled as ‘not looking like somebody in pain’. Inadequate treatment of acute pain can lead to changes in the central nervous system that result in chronic pain. It offers no protective benefits, serves no purpose and has detrimental effects causing changes at the level of the nervous system as well as psychological burden. The treatment is directed at the underlying disease where

possible, along with regular use of analgesics to relieve pain and prevent recurrence as well as psychological supportive care.

Pathophysiological Mechanism

1. Nociceptive Pain: is that produced by stimulation of specific sensory receptors in the viscera and somatic structures although the nerves are intact. Its characteristics are:

- **Somatic Pain:** This is caused by tissue damage and is seen most frequently with trauma or injury to bone or musculoskeletal structures. Incisional pain is typically somatic. Somatic pain can further be subdivided into two:
 - ✓ **Superficial:** arising from skin, subcutaneous tissue and mucous membranes. Usually well localized, sharp, pricking, throbbing or burning. It is transmitted by A_δ fibres.
 - ✓ **Deep:** arising from deep tissues such as muscle, tendon, joints or bones. Usually described as constant, aching, throbbing, gnawing, less well localized. It is more diffuse and dull.

Somatic nociceptive pain responds well to opioids and to non-steroidal medications.

- **Visceral pain:** This arises from the body organs. It comes from nociceptive impulses generated in sympathetically innervated organs, whether the disease mechanism or the traumatic mechanism comes from infiltration or compression. It is characteristically dull and poorly localized, often described by patients as a deep or dragging sensation or they may describe it as squeezing or pressure. If it happens to be a hollow viscus that is affected such as a gallbladder, ureter, or bowel, for example, pain may well be colicky and associated with autonomic symptoms: diaphoresis, tachycardia, nausea, etc. The sensation of this is often referred to a cutaneous site, as in hepatic capsular distension being referred to the subscapular area or the shoulder.

2. Neuropathic Pain: is produced by damage to the central or peripheral nervous system. Neuropathic pain is described as burning pain (dysaesthesia), shooting pain (lancinating), prickling, stinging, pins and needles, insect crawling under skin, numbness, hypersensitivity, electric shock or aching sensation. It may be caused by infiltration by cancer, HIV infection or herpes zoster, drugs-related peripheral neuropathy, central nervous system injury, or surgery. It may manifest as increased sensitivity to a pain stimulus (hyperalgesia) or to a stimulus that is not normally painful (allodynia).

Neuropathic pain is a clinical description. It is typically not a diagnosis which requires a demonstrable lesion, or a disease that satisfies established neurological diagnosis criteria.

3. Mixed Pain: Neuropathic pain may coexist with nociceptive pain. In some disease conditions, patients may have mixed pain consisting of somatic, visceral, and neuropathic

pain all at different times. The different pathophysiological mechanisms described above can operate together to produce mixed pain. Examples include trauma that damages tissues and nerve, burns affecting skin as well as nerve endings and cancer that causes external nerve compression as well as damaging nerves by infiltration.

Anatomical location

The anatomic location or organ affected by pain can also be used for classification. Examples include (i) body parts (e.g. low back or neck pain) or (ii) the anatomic function of the affected tissue (e.g. myofascial, rheumatic, skeletal, neurological and vascular). Location and function solely address the physical dimension and do not include the underlying mechanism.

Aetiological classification

For the purpose of broad treatment, pain is often classified into neoplastic (often called cancer-related) and non-neoplastic (also called non-cancer related). This strictly emphasizes the peculiarity of severity and treatment needs of patients with cancer-related pain as well as the need for treatment of the underlying cancer to achieve pain relief.

Situation classification

1. **Incident pain:** is that pain which occurs only in certain circumstances (e.g. after a particular movement);
2. **Breakthrough pain:** a sudden, temporary flare of severe pain that occurs on a background of otherwise controlled pain;
3. **Procedural pain:** is related to procedures or interventions.

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APPENDIX V – PHARMACOLOGICAL INTERVENTIONS

Drug	Description and Preoperative Indications	Cautions and Contraindications	Side Effects	Dose (paediatric)	Dose (adult)
Alfentanil	Short-acting, potent, opioid analgesic duration 10min		Respiratory depression, bradycardia, hypotension	15-50µg/kg over 5min, then 0.5-1µg/kg/min	250-750ug (5-10µg/kg). Attenuation of CVS response to intubation 10-20µg/kg`
Bupivacaine	Amide type local anaesthetic used for infiltration, epidural, and spinal anaesthesia. Slower onset than lidocaine. Duration 200-400min (slightly prolonged by adrenaline), pKa 8.1	Greater cardiotoxicity than other local agents. Do not use for IVRA. Adrenaline-containing solutions contain preservative	Toxicity, tongue/circumoral numbness, restlessness, tinnitus, seizures, cardiac arrest	Infiltration/epidural maximum dose dependent upon injection site-2mg/kg/4hr recommended	0.25-0.75% solution. Infiltration/epidural, maximum dose dependent upon injection site-2mg/kg/4hr. (2mg/kg with adrenaline). 0.75% solution contraindicated in pregnancy
Clonidine	Selective α_2 agonist. Reduces requirement for opioids and volatile anaesthetics. Enhances epidural analgesia	Rebound hypertension on acute withdrawal of chronic therapy	Hypotension, sedation	3-5µg/kg slowly. PO premed: 4µg/kg. Caudal-1µg/kg	150-300ug over 5min. epidural 150µg in 10ml saline
Codeine phosphate	Opioids used for moderate pain		Nausea, vomiting, dysphoria, drowsiness, constipation	PO/PR 1mg/kg 6 hourly (max 3mg/kg/d)	PO: 30-60mg 4 hourly (max 240mg/d)
Cyclizine	Antihistamine, antimuscarinic emetic agent	anti-	Caution in severe heart failure	Drowsiness, dry mouth, blurred vision, tachycardia	IV/IM: 1mg/kg up to 50mg tds

Diamorphine	Potent opioid analgesic	Spinal/epidural use associated with risk of respiratory depression, pruritus, nausea	Histamine release, hypotension, bronchospasm, nausea, vomiting, pruritus, dysphoria	IV/SC:50ug/kg then 15µg/kg/hr Epidural:2.5mg in 60ml 0.125% bupivacaine at 0.1-0.4ml/kg/hr intranasal: 100ug/kg in 0.2ml saline	IV/IM/SC: 2-5-5mg 4-hourly, Epidural 2.5mg diluted in 10ml local anaesthetic/saline, then 0.1-0.5mg/hr, spinal: 0.25-0.5mg
Diazepam	Long-acting benzodiazepine, sedation or termination of status epilepticus, alcohol withdrawal	Thrombophlebitis: emulsion (Diazemuls ^R) less irritant to veins	Sedation, circulatory depression	0.2-0.3mg/kg Rectal:0.5m/kg or may use IV preparation	2-10mg repeat if required
Diclofenac sodium	Potent NSAID analgesic for mild to moderate pain	Hypersensitivity to aspirin, asthma, severe renal impairment, peptic ulceration	Gastrointestinal upset or bleeding, bronchospasm, tinnitus, fluid retention, platelet inhibition	PO/PR, 1mg/kg tds Maximum 3mg/kg/day (>1yr)	PO/PR 25-50mg tds (or 100mg 18-hourly), maximum 150mg/d
Dihydrocodeine	Opioid used for moderate pain		Nausea, vomiting, dysphoria, drowsiness	PO/PR: 0.5-1mg/kg 4-hourly	PO:30-60mg 4-hourly
Doxapram	Respiratory stimulant acting through carotid chemo-receptors and medulla. Duration 12min	Epilepsy, airway obstruction, acute asthma, severe CVS disease	Risk of arrhythmia, hypertension	1mg/kg slowly. Infusion: 0.5-1mg/kg/hr for 1 hr	1-1.5mg/kg over 30s. infusion: 2-4mg/min
EMLA	Eutectic mixture of 2.5% Lidocaine and 2.5% Prilocaine. Topical anaesthesia	Absorption of anaesthetic depends on surface area and duration of application. Avoid use on abrasions or mucous membranes	Methaemoglobinaemia in high doses	NR < 1 yr	Apply under occlusive dressing 1hr before procedure (maximum 60g)
Fentanyl	Synthetic phenylpiperidine derivative opioid analgesic high lipid solubility	Reduce dose in elderly. Delayed respiratory depression and pruritus if epidural/spinal	Circulatory and ventilatory depression. High doses may produce muscle rigidity	1-5µg/kg up to 25µg/kg during postoperative ventilation. Infusion: 2-4µg/kg/hr	1-5ug/kg (up to 50µg/kg). Epidural: 50-100µg (diluted in 10ml saline/local anaesthetic). Spinal: 5-20ug

	cardiostability. Duration 30-60min				
Flumazenil	Benzodiazepine receptor antagonist. Duration 45-90min	Benzodiazepine dependence (acute withdrawal), re-sedation if long-acting benzodiazepine	Arrhythmia, seizures	5µg/kg, then up repeat to 40µg/kg. Infusion: 2-10µg/kg/hr	200µg then 100µg at 60s intervals (up to maximum 1mg). Infusion 100-400ug/hr
Ibuprofen	NSAID analgesic for mild to moderate pain. Best side-effect profile of NSAIDs	Hypersensitivity to aspirin, asthma, severe renal impairment, peptic ulceration	Gastrointestinal upset or bleeding, bronchospasm, tinnitus, fluid retention, platelet inhibition	PO: 10mg/kg tds or 5mg/kg qds (>7kg)	PO: 400mg qds
Ketorolac	NSAID analgesic for mild to moderate pain. Not licensed for preoperative use	Hypersensitivity to aspirin, asthma, severe renal impairment, peptic ulceration	Gastrointestinal upset or bleeding, bronchospasm, tinnitus, fluid retention, platelet inhibition	Slow IV/IM: 5mg/kg up to 30mg qds	Slow IV/IM: 10mg then 10-30mg every 4-6hr (maximum daily dose 90mg, but 60mg in elderly)
Levobupivacaine (Chirocaine)	Levorotatory(s) enantiomer of bupivacaine with reduced cardiotoxicity	See bupivacaine	See bupivacaine	See bupivacaine	See bupivacaine Max dose: 150mg Max/24hr: 400mg
Lidocaine (lignocaine)	Amide type local anaesthetic Treatment of ventricular arrhythmias Reduction of pressor response to intubation Local anaesthetic -rapid onset, duration 30-90min (prolonged by adrenaline) pKa 7.7	Adrenaline-containing solutions contain preservative. Maximum dose dependent upon injection site- 3mg/kg/4hr (6mg/kg with adrenaline)	Toxicity: tongue/circumoral numbness, restlessness, tinnitus, seizures, cardiac arrest. Prolongs action of neuromuscular blockers	Antiarrhythmic 1mg/kg then 10-50µg/kg/min Attenuation of pressor response: 1.5mg/kg Local anaesthesia: 0.5-2% solution	Antiarrhythmic 1mg/kg then 1-4mg/min Attenuation of pressor response: 1.5mg/kg Local anaesthesia 0.5-2% solution
Morphine	Opioid analgesic for moderate and severe pain	Prolonged risk of respiratory depression,	Histamine release, hypotension,	PO: 0.3-0.5mg/kg 4-hourly, IV boluses: 50-100ug/kg.	PO: 0.3-0.5mg/kg 4-hourly IV boluses: 50-

		pruritus, nausea when used via spinal/epidural	bronchospasm, nausea, vomiting, pruritus, dysphoria		100ug/kg.
	Naloxone	Pure opioid antagonist. Can be used in low doses to reverse pruritus associated with epidural opiates and in depot IM injection in newborn of mother given opioids	Beware of renarcotisation if reversing long-acting opioid. Caution in opioid addicts – may precipitate acute withdrawal. Duration of action 30min	5-10ug/kg Infusion: 5-20ug/kg/hr. IM depot in newborn 200ug Pruritus: 0.5ug/kg	200-400ug titrated to desired effect. Treatment of opioid/epidural pruritus: 100ug bolus plus 300ug added to IV fluids
	Naproxen	NSAID analgesic for mild to moderate pain	See ibuprofen	See ibuprofen	PO: 5mg/kg bd (5yr) PO: 500mg bd
	Ondansetron	Serotonin (SHT ₃) receptor antagonist anti-emetic		Hypotension, headache, flushing	>2yr. Slow IV: 100ug/kg (maximum 4mg) qds Slow IV/IM/Oral: 4mg qds
	Oxycodone	Opioid used for moderate pain, often in palliative care IV preparation available: dose 1-10mg 4 hourly		Nausea, vomiting, dysphoria, drowsiness	PO: Oxynorm ^R 5mg 4-6 hourly increased up to 400mg/d as required. Oxycontin 10mg bd, increased up to 400mg/d as required
	Paracetamol	Mild to moderate analgesic and antipyretic	Neonates: 10-15mg/kg 6-hourly (5mg/kg if jaundiced). Max 60mg/kg/d	Liver damage	PO/PR: 20mg/kg 6-hourly. Rectal loading dose 30-40mg/kg (>44wk post conception) PO: 0.5 – 1g qds Slow IV: 05-1g qds
	Parecoxib (Dynastat)	See celecoxib. Pro-drug of valdecoxib Cox II inhibitor. Licensed for acute pain	See celecoxib. Reconstitute with 0.9% saline		IV/IM: 40 mg, then 20-40mg 6-12 hourly (max 80mg/d)
	Pethidine	Synthetic opioid: 1. Analgesia (agent of choice in asthma).	Seizures possible in high dosage – maximum daily dose 1g/d (20mg/kg/d).	Respiratory depression, hypotension, dysphoria	IV/IM/SC: 0.5-1mg/kg infusion: 5mg/kg in 50ml 5% dextrose at 1-3ml/hr IM/SC: 25-100mg 3-hourly. IV: 25-50mg Epidural: 25-50mg in

	2. Postoperative shivering	MAOI		(100-300µg/kg/hr)	10ml saline or LA. PCA: 10mg/5 min lockout. Shivering: 10-25mg
Piroxicam	NSAID analgesia for moderate pain. High incidence of side effects	Hypersensitivity to aspirin, asthma, severe renal impairment, peptic ulceration. Avoid in porphyria	Gastrointestinal upset or bleeding, bronchospasm, tinnitus, fluid retention, platelet inhibition		PO/PR 10-30mg od
Prilocaine	Amide type local anaesthetic. Less toxic than lidocaine. Used for infiltration and IVRA. Rapid onset. Duration 30-90min (prolonged by adrenaline)	Adrenaline-containing solutions contain preservative. Significant methaemoglobinemia if dose > 600mg	Toxicity: tongue/circumoral numbness, restlessness, tinnitus, seizures cardiac arrest	NR < 6 months	Local anaesthesia: 0.5-2% solution. Maximum dose dependent upon injection site – 6mg/kg/4hr (8mg/kg with adrenaline)
Ropivacaine	Amide type local anaesthetic agent. Possibly less motor block than other agents. Duration similar to bupivacaine, but lower toxicity pKa 8.1			0.2-1% solution. Maximum dose dependent upon injection site – 3-4mg/kg/4hr	0.2-1% solution. Infiltration/epidural: maximum dose dependent upon injection site – 3-4mg/kg/4 hr
Sufentanil	More potent thiamyl analogue of fentanyl (five times potency). Analgesia: Duration 20-45min	See fentanyl	See fentanyl		Analgesia: 10-30µg (0.2-0.6µg/kg) Anaesthesia: 0.6-4µg/kg
Tetracaine (Amethocaine Ametop)	Ester type local anaesthetic. Topical analgesia prior venipuncture.	Apply only to intact skin under occlusive dressing. Remove after 45min. rapid absorption through mucosa		As adult. NR in <1 month	Each tube expels 1.5g (sufficient for area 6x 5cm)
Tramadol	Opioid analgesic thought	Only 30% antagonized by	Nausea, dizziness, dry	NR	PO: 50-100mg 4-hourly.

	<p>to have less respiratory depression, constipation, euphoria, or abuse potential than other opioids. Has opioid and non-opioid mechanisms of action</p>	<p>naloxone, caution in epilepsy, previously not recommended for intra-operative use. MAOI</p>	<p>mouth, increased side effects in conjunction with other opioids</p>		<p>Slow IV/IM: 50-100mg 4-hourly (100mg initially then 50mg increments to maximum 250mg). Maximum 600mg/d</p>
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APPENDIX VI – NON-PHARMACOLOGICAL PAIN SUMMARY CHART

Below is an outline of some non-pharmacological intervention for some specific conditions of acute and chronic pain.

NON-PHARMACOLOGICAL MANAGEMENT OF ACUTE PAIN

PAIN TYPE OR SOURCE	PHYSICAL METHODS	PSYCHOLOGICAL METHODS	OTHERS
Acute illness	Vibration or cold for immobilization	<ul style="list-style-type: none"> • Patient education • Relaxation • Imagery • Distraction 	
Perioperative pain	<ul style="list-style-type: none"> • Exercise or immobilisation • Massage • Application of heat or cold • Electro analgesia 	<ul style="list-style-type: none"> • Patient education • Relaxation • Distraction • Acupuncture • Imagery • Biofeedback • Hypnosis 	Acupuncture
Trauma	<ul style="list-style-type: none"> • Rest, Ice, Compression, Elevation • Physical therapy (e.g. stretching, strengthening, thermal therapy, TENS, Vibration) 	<ul style="list-style-type: none"> • Relaxation • Hypnosis • Distraction • Supportive Psychotherapy • Copying skills training 	
Burns	<ul style="list-style-type: none"> • Limb elevation • Minimise number of dress changes 	<ul style="list-style-type: none"> • Patient education • Deep relaxation • Distraction • Imagery • Music relaxation 	
Procedural	<ul style="list-style-type: none"> • Application of cold (pre and post procedure) • Counter irritation (simple) 		

	<p>massage, scratching, pressure)</p> <ul style="list-style-type: none"> • Rest or immobilization (post procedure) 		
Obstetrics		<ul style="list-style-type: none"> • Patient education • Relaxation • Breathing • Distraction 	

NON-PHARMACOLOGICAL MANAGEMENT OF CHRONIC PAIN

PAIN TYPE OR SOURCE	PHYSICAL METHODS	PSYCHOLOGICAL METHODS	OTHERS
Arthritis	TENS, Applied heat or cold, low impact aerobics, ROM exercise, joint protection, (splinter brace and massage)	PE (rest, exercise, nutrition), and social support	Acupuncture Nutritional Supplement
Low back pain 89	SCS, cryoanalgesia, radiofrequency, coagulation, exercise, PT, OT, TENS, brace, vibration	PE 'back school', biofeedback, Psychotherapy	Acupuncture, Manipulation Therapy
Fibromyalgia	Applied heat massage, gentle aerobics and stretching, attention to proper posture, PT, TENS, vibration	PE, psychotherapy, relaxation, hypnosis	Acupuncture
Sickle cell disease	Careful hydration, applied heat, massage, ultrasound, PT, TENS, possibly SCS, applied heat or cold massage	PE, psychotherapy, deep breathing and relaxation technique, distraction, imagery, meditation, biofeedback	Acupuncture
Peripheral neuropathy	Good skin and food care, PT, TENS	PE, psychotherapy, relaxation, biofeedback	Acupuncture
Migraine and other types of headache	Applied heat or cold, exercise, (prophylaxis), vibration	PE, relaxation, biofeedback	

APPENDIX VII – OPIOID COMPARATIVE TABLE

<i>Drug</i>	<i>Oral/Rectal Route</i>	<i>Parenteral Route</i>	<i>Conversion Ratio to Oral Morphine</i>	<i>Equianalgesic Dose of Oral Morphine</i>
<i>Morphine sulfate</i>	30mg Oral morphine	10mg of parenteral morphine	Parenteral morphine is 3 times as potent as oral morphine	30mg Oral morphine
<i>Oxycodone</i>	20mg of oral oxycodone	NA	Oral Oxycodone is roughly 1.5 times more potent than oral morphine	30mg Oral morphine
<i>Hydrocodone</i>	20mg of oral hydrocodone	NA	Oral hydrocodone is roughly 1.5 times more potent than oral morphine	30mg Oral morphine
<i>Hydromorphone</i>	7mg of oral hydromorphone	1.5mg of parenteral hydromorphone	Oral hydromorphone is about 4-7 times as potent as oral morphine Parenteral hydromorphone is 20 times as potent as oral morphine	30mg Oral morphine
<i>Fentanyl</i>	NA	15 micrograms/hr	Transdermal fentanyl is approximately 80 times as potent as morphine (This is based on studies converting from Morphine to fentanyl. Currently, there are no empirical studies converting fentanyl to morphine).	30mg Oral morphine
<i>Pethidine</i> <i>Pethidine is not a recommended drug in a palliative care setting and is to be avoided.</i> <i>If a patient with chronic pain is on pethidine, convert patient to an</i>	300mg of oral pethidine	75mg parenteral pethidine	Oral Morphine is about 10 times more potent than oral pethidine and about twice more potent as parenteral pethidine (mg for mg)	30mg Oral morphine

<i>equianalgesic dose of one of the other opioids listed in this table.</i>				
<p>IMPORTANT CONSIDERATIONS</p> <p><i>Parenteral forms of opioids are more potent than the oral formulation, milligram for milligram</i></p> <p>Always remember to convert to the correct dosage and double check before administration.</p> <p><i>Never give a sustained release oral opioid more often than every eight hours</i></p> <p>Long acting formulations, when dosed more often than recommended by the manufacturer often accumulate in the body and can cause adverse side effects like respiratory depression etc.</p> <p><i>Never crush a sustained release opioid and give it through a gastrostomy or jejunostomy tube.</i></p> <p>The time release properties of the pill are controlled by the membrane in which it is encapsulated. When the pill is crushed, the drug behaves like its rapid release form.</p> <p><i>Never order a sustained release opioid for breakthrough pain (as a prn).</i></p> <p>Only short acting forms of the drug should be prescribed for break-through pain.</p> <p><i>Avoid pethidine in a palliative care setting.</i></p> <p>With chronic administration of pethidine, its metabolite normeperidine accumulates in the body. Normeperidine is a CNS stimulant with a longer half-life than the parent compound and causes adverse reactions like tremors, muscle twitches, and even seizures especially in the elderly and in patients with renal failure.</p> <p><i>Reference- Stanford School of Medicine</i></p>				

APPENDIX VIII – GLOSSARY OF TERMS

ACUPUNCTURE: is an alternative form of medicine i.e. a pseudoscience, in which thin needles are inserted into the body; it is a Traditional Chinese Medicine practice

ADHERENCE: is a degree to which a patient correctly follows medical advice. It depends not only on the acceptance of information about the health threat itself, but also on the practitioner's ability to persuade the patient that treatment is worthwhile and on the patients perception of the practitioner's creditability, empathy, interest and concern

ADJUVANT: agent that amplifies the effects of other agents; a substance which enhances the body's immune response to an antigen, a therapy applied after initial treatment for cancer, especially to suppress secondary tumour formation

ANXIOLYTIC: a drug used to reduce anxiety

ASSESSMENT: An appraisal or evaluation of a condition

CAPACITY BUILDING: planned development of knowledge, output rate, management, skills and other capabilities through acquisition, incentives, technology and/or training

CAREGIVER: individual who provide assistance to another person with activities of daily living

CHRONIC: persisting for a long time or constantly recurring

COMMUNITY: an interacting population of various kinds of individuals in a common location or a group of people with a common characteristic or interest living together within a larger society

COMPLIANCE: the act of obeying a rule or order of healthcare provider by a patient regarding his/her treatment

CONCORDANCE: to be in agreement

CONVERSION: changing into different properties or form

DEBILITATING: making someone very weak and infirm or tending to weaken something/ someone

DRUG OVERDOSE: taking more than recommended amount of a drug or enough to have a harmful effect on body functions

DRUG USE: refers to administration of any drug with the intent to derive beneficial health effect

GERIATRICS: an old person especially one receiving special care. Refers to someone 60years and above

INFLAMMATION: a localised reaction that produces redness, warmth, swelling and pain as a result of infection, irritation or injury

INVESTIGATION: procedures performed to detect diseases

LAXATIVE: a drug which tends to stimulate or facilitate evacuation of bowels

MILD: not severe, serious or harsh

MODERATE: average or less extreme in amount, intensity, rigour, quality and degree.

NEONATES: a new born child, an infant less than 4 weeks

NON-PHARMACOLOGICAL: It is a therapy that does not involve medicines but achieve the purpose of helping the patient decrease pain or give more control over pain

OUTLINE: a general description or plan showing the essential features of something but not all the details

PAEDIATRICS: branch of medicine that deals with medical care of infants, children and adolescents

PAIN MANAGEMENT: process of providing medical care that alleviates or reduces pain

PALLIATIVE CARE: involves caring for terminally ill individuals and their families; this is the attention or care given to terminally ill and their families, especially as provided by an organized health service. It is also an approach that improves the quality of life of patients and their families facing the problem associated with life-threatening illness, through the prevention and relief of suffering

PHARMACOLOGICAL: therapy relating to drugs

PHYSIOTHERAPY: treatment of disease, injury or deformity by physical methods such as massage, heat treatment and exercise rather than by drugs

PSYCHOTHERAPY: treatment of mental disorder by psychological rather than medical means

REGULATORY BODY: a public authority or government agency responsible for exercising autonomous authority over some area of human activity in a supervisory capacity

REDUCE: to make smaller or less in amount, degree, or size

RELIEF: a feeling of reassurance and relaxation following release from anxiety or distress

SEVERE: very great and intense

STAKEHOLDER: any person with an interest or concern in any matter relating to pain

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