Scientific Research Publishing

Open Journal of Emergency Medicine, 2026, 14(1), 84-100
https://www.scirp.org/journal/ojem
ISSN Online: 2332-1814
ISSN Print: 2332-1806

Pain Assessment and Indications for Morphine in Cameroon: Results of a Cross-Sectional Survey among Healthcare Professionals

Ferdinand Ndom Ntock[1,4], Dominique Anaba Ndom[1], Stéphane Kona[3], Jonathan Essoh[3], Wilfried Steve Ndeme Mboussi[2], Olivia Essoh[3], Esther Dina Bell[4], Gérard Beyiha[4], Paul Ndom[3], Junette Metogo Mbengono[1,3,4]

[1]Douala General Hospital, Douala, Cameroon
[2]Department of Biochemistry, The University of Douala, Douala, Cameroon
[3]Faculty of Medicine and Biomedical Sciences, University of Yaoundé 1, Yaoundé, Cameroon
[4]Faculty of Medicine and Pharmaceutical Sciences, University of Douala, Douala, Cameroon
Email: ferdilous@yahoo.fr

How to cite this paper: Ndom Ntock, F., Ndom, D.A., Kona, S., Essoh, J., Mboussi, W.S.N., Essoh, O., Bell, E.D., Beyiha, G., Ndom, P. and Mbengono, J.M. (2026) Pain Assessment and Indications for Morphine in Cameroon: Results of a Cross-Sectional Survey among Healthcare Professionals. *Open Journal of Emergency Medicine*, **14**, 84-100.
https://doi.org/10.4236/ojem.2026.141007

Received: January 30, 2026
Accepted: March 13, 2026
Published: March 16, 2026

Abstract

Background: To address pain management needs, Cameroonian pharmaceutical laboratories have undertaken the production of morphine and its distribution to healthcare facilities. The objective of this study was to assess the level of knowledge regarding pain assessment and indications for morphine among Cameroonian healthcare professionals. **Methods:** We conducted a cross-sectional Knowledge-Attitudes-Practices (KAP) study including 975 Cameroonian healthcare professionals between May and June 2025. Levels of knowledge related to pain assessment and indications for morphine, morphine's mechanism of action and prescribing rules, as well as clinical practices concerning morphine use and pain management, were evaluated using a structured survey questionnaire. **Results:** Most participants were physicians (n = 897; 92%), predominantly from anesthesiology-intensive care specialties (n = 186; 20%), with 1 - 5 years of professional experience (n = 436; 45%), and working in public hospitals (n = 847; 89%). Overall, 80.3% (n = 783) of participants demonstrated adequate knowledge of pain assessment and indications for morphine. Only 1.4% (14/975) had adequate knowledge of morphine's mechanism of action and prescribing rules, while 52.9% (516/975) demonstrated adequate knowledge of clinical practices and pain management. Most respondents (80%; n = 775) recommended the organization of regular training programs on pain assessment and indications for morphine. **Conclusion:** Knowledge levels related to pain assessment and indications for morphine among Cameroonian healthcare professionals were generally high,

whereas understanding of morphine's mechanism of action and prescribing rules remained very low, and practical knowledge of pain management was moderate.

Keywords

Morphine, Pain, Indications, Healthcare Professionals, Cameroon

1. Introduction

Pain remains a major public health problem, particularly in oncology and palliative care, where morphine continues to be one of the cornerstone treatments for moderate to severe pain [1] [2]. Despite decades of international recommendations [3]-[5], gaps persist between theoretical principles such as structured pain assessment, dose titration, and monitoring of adverse effects and their bedside implementation, especially in low- and middle-income countries [6] [7].

Accurate pain assessment is a prerequisite for appropriate therapeutic decision-making. Pain intensity scales, particularly the Numeric Rating Scale (NRS 0 - 10), are widely used and supported by robust evidence of validity and clinical utility across various settings [8]-[13]. However, translating these measurements into rational opioid prescribing requires specific competencies related to morphine's mechanism of action, intravenous and oral titration, prevention of adverse effects (notably constipation), and regulatory considerations [1] [2] [14].

In many sub-Saharan African countries, access to opioid analgesics remains hindered by supply shortages, limited distribution networks, restrictive regulatory frameworks, beliefs regarding the risk of addiction, and insufficient training of healthcare personnel [6] [7] [15]-[17]. Cameroon fits within this broader context. Although recent efforts have aimed to strengthen palliative care services and improve morphine availability, persistent challenges related to policy, training, and supply chains remain [18]. These systemic constraints interact with healthcare providers' knowledge, attitudes, and practices, which previous studies have shown to be highly heterogeneous depending on discipline, professional experience, and practice setting [19] [20].

From a clinical perspective, recommended strategies for cancer pain and certain forms of severe acute pain rely on stepwise approaches that integrate morphine use, dose adjustment, and the addition of adjuvant therapies when necessary, with well-documented benefits that are nevertheless inconsistently translated into routine practice [2] [3] [5] [21]. More recent work has proposed updates to the stepwise approach to incorporate complementary or interventional strategies when analgesic response is insufficient [1] [14]. In this context, assessing healthcare professionals' level of proficiency from pain assessment to indications, mechanisms, and prescribing of morphine is essential to guide targeted training, adapt clinical protocols, and inform public health policies [7] [16] [18]. We therefore conducted

a cross-sectional survey among Cameroonian healthcare professionals to describe levels of knowledge regarding pain assessment and indications for morphine, understanding of morphine's mechanism of action and prescribing rules, and clinical practices related to morphine use and pain management, as well as to identify priorities for training and organizational capacity building within the Cameroonian context.

2. Methods

Study design and setting

We conducted a cross-sectional Knowledge-Attitudes-Practices (KAP) study in Cameroon between 1 May and 30 June 2025 across public and private healthcare facilities (hospitals, clinics, and medical offices).

Questionnaire development and validation

The survey instrument was developed through a structured multi-step process to ensure content validity and internal consistency.

Conceptual framework and domains

The questionnaire was constructed around three predefined domains:

- Domain 1: Pain assessment and indications for morphine (12 items).
- Domain 2: Morphine mechanism of action and prescribing rules (10 items).
- Domain 3: Clinical practices related to morphine use and pain management (10 items).

The total instrument included 32 knowledge/practice items in addition to 8 sociodemographic and professional variables.

Source of items

Items were derived from:

- International guidelines on cancer pain and opioid prescribing (WHO analgesic ladder, palliative care recommendations).
- Peer-reviewed literature on morphine titration, opioid adverse-effect prevention, and pain assessment scales.
- National clinical practice realities in Cameroon (availability constraints, regulatory considerations).

Items were formulated as single-best-answer multiple-choice questions or dichotomous (True/False/Don't know) items. All knowledge items were closed-ended to reduce interpretation variability.

Expert review

The preliminary questionnaire was reviewed by a panel of five experts (two anesthesiologist-intensivists, one oncologist, one palliative care specialist, and one epidemiologist). Reviewers evaluated clarity, relevance, and representativeness of each item within its domain. Minor wording adjustments were made to improve clarity and eliminate ambiguity.

Pilot Testing

A pilot test was conducted among 30 healthcare professionals not included in the final sample. The objectives were to assess comprehension, wording clarity,

average completion time, technical functionality (online and paper formats), and item discrimination. Based on pilot feedback, three items were rephrased and one item with poor discrimination was removed.

Internal Consistency

Internal consistency reliability was evaluated using Cronbach's alpha for each domain in the pilot sample:

- Domain 1 (Assessment/Indications): $\alpha = 0.78$.
- Domain 2 (Mechanism/Prescribing rules): $\alpha = 0.74$.
- Domain 3 (Practices): $\alpha = 0.81$.

These values were considered acceptable for exploratory KAP research and supported the internal coherence of domain-specific scores.

Operationalization of the "Mechanism/Prescribing Rules" Domain

This domain (10 items) was specifically designed to assess operational knowledge required for safe morphine prescribing. Items covered:

- Pharmacodynamic mechanism (μ-opioid receptor agonism, central modulation of nociception).
- Basic pharmacokinetics (oral vs intravenous onset, duration of action).
- Initial dosing principles in opioid-naïve adults.
- Intravenous titration steps in severe acute pain.
- Oral dose conversion after IV titration.
- Equianalgesic conversion principles.
- Recognition of major adverse effects (respiratory depression, sedation).
- Systematic prevention of opioid-induced constipation.
- Contraindications and dose adjustment principles (renal impairment).
- Regulatory and prescription documentation requirements.

Each item was scored dichotomously (correct = 1; incorrect or "don't know" = 0). The domain score ranged from 0 to 10 and was converted into a percentage (0% - 100%). Adequate knowledge was predefined as >60% (≥6/10 correct answers).

Score Distribution and Item-Level Performance

The overall score distribution for this domain in the full sample (n = 975) was markedly skewed toward low values. The median score was 2/10 (20%), with an Interquartile Range (IQR) of 1 - 3 correct answers (10% - 30%). Only 14 participants (1.4%) achieved ≥6/10 correct responses.

Item-level analysis showed heterogeneous performance across technical prescribing components, particularly dose conversion, titration algorithms, and regulatory aspects.

Target Population, Eligibility Criteria, and Recruitment

Eligible participants were practicing healthcare professionals (physicians, nurses, residents, etc.) during the study period who provided informed consent to participate. Recruitment relied on non-probability sampling: the questionnaire was disseminated within hospital departments and clinics and relayed through medical managers and professional networks.

Sample Size

A total of 975 participants were included. The sample size was designed to provide estimates of proportions with a margin of error ≤ 4% for prevalences around 50% and to allow exploratory inter-specialty comparisons with adequate statistical power.

Data Collection Tool and Variables

Data were collected using the standardized questionnaire administered both in person (paper-based, by trained investigators) and online (identical Google Forms version). Variables included sociodemographic and professional characteristics (profession, specialty, years of experience, type of healthcare facility), knowledge of pain assessment and indications for morphine, knowledge of morphine's mechanism of action and prescribing rules, and clinical practices related to morphine use and pain management (titration, prevention of constipation, documentation).

Operational Definitions and Scoring

Each knowledge item was scored 1 point for a correct response and 0 for incorrect or "don't know" responses. Domain scores were calculated as the percentage of correct responses within each domain. Aggregated domain scores were dichotomized into binary variables ("adequate" vs "insufficient") using a predefined threshold of >60% correct responses.

Data Collection Procedures and Quality Assurance

Investigators received brief training focusing on standardization of instructions, neutrality, and management of non-responses. Paper questionnaires were double-entered and reconciled, while online data were exported and merged after consistency checks.

Bias Management

To minimize information bias, questions were closed-ended and neutrally worded; anonymous administration was intended to reduce social desirability bias. Selection bias related to non-probability sampling was acknowledged.

Informed Consent

Participation was voluntary. For paper-based administration, participants received written information explaining the study objectives, confidentiality safeguards, and the right to decline or withdraw without consequences. Written informed consent was obtained before questionnaire completion. For the online version (Google Forms), an electronic information sheet was presented on the first page, and participants were required to actively confirm consent before accessing the questionnaire.

Data Protection and Confidentiality

No directly identifying personal data was collected. Paper questionnaires were stored in locked cabinets accessible only to the principal investigators. Online data were stored on a password-protected institutional account and exported to encrypted files for analysis. Access to the dataset was restricted to the research team. Data were analyzed in aggregated form to prevent individual identification. After completion of the study, data archiving and retention followed institutional and

national data-protection regulations.

Given the mixed paper and online data-collection strategy, special attention was paid to ensuring equivalence of information provided to participants and identical consent language across formats.

Missing Data

Rates of missing data were reported for each variable; comparative analyses were conducted using complete-case analysis when appropriate.

Statistical Analysis

Statistical analyses were performed using R software version 4.5.0 for Windows. Categorical variables were described using counts and percentages. Bivariate comparisons by specialty were conducted using Pearson's chi-square test (or Fisher's exact test when appropriate). Statistical significance was set at $p < 0.05$ (two-sided). Main results are presented in tables.

Multivariable Analysis (Independent Correlates)

To identify independent correlates of adequate knowledge and adequate practices beyond bivariate specialty comparisons, we specified multivariable logistic regression models using the already collected predictors: specialty, profession, prior pain-training status (certification/diploma or prior training vs none), years of professional experience (categorical), and practice setting (public hospital vs other). Separate models were planned for each binary outcome:

1. Adequate knowledge of pain assessment and indications for morphine (yes/no);
2. Adequate knowledge of morphine's mechanism of action and prescribing rules (yes/no);
3. Adequate knowledge of clinical practices related to morphine use and pain management (yes/no).

3. Results

General Characteristics of the Study Population

Most participants were physicians (n = 897; 92%), primarily from anesthesiology-intensive care specialties (n = 186; 20%). Nearly half had 1 - 5 years of professional experience (n = 436; 45%), and the majority practiced in public hospitals (n = 847; 89%) (Table 1).

Table 1. General characteristics.

Variables	N = 975
Profession	
Physician	897 (92%)
Nurse	55 (5.6%)
Resident	23 (2.4%)
Speciality	
Anaesthesiologist-Intensivist	186 (20%)

Continued

General Practitioner	180 (19%)
Oncologist	91 (9.7%)
Surgeon	82 (8.7%)
Cardiologist	49 (5.2%)
Obstetrician-Gynaecologist	46 (4.9%)
ENT (Otolaryngologist)	37 (3.9%)
Emergency Medicine	36 (3.8%)
Anaesthesiology-Intensive Care Resident	24 (2.6%)
Pain Medicine and Palliative Care	20 (2.1%)
Haematologist	16 (1.7%)
Radiologist	16 (1.7%)
Oncology Resident (female)	16 (1.7%)
Neurologist	13 (1.4%)
Paediatrician	13 (1.4%)
Emergency Medicine Resident	13 (1.4%)
Nephrologist	12 (1.3%)
Hepato-Gastroenterologist	11 (1.2%)
Nurse (female)	10 (1.1%)
Internist	10 (1.1%)
Geriatric Internist	9 (1.0%)
Gastroenterologist	8 (0.9%)
Neurology Resident	7 (0.7%)
Radiation Therapy Resident	7 (0.7%)
Radiation Oncologist	5 (0.5%)
Dermatologist	4 (0.4%)
Forensic Physician	4 (0.4%)
Obstetrics and Gynecology Resident	4 (0.4%)
Pediatrics Resident (female)	4 (0.4%)
Infectious Disease Specialist	3 (0.3%)
Surgery Resident	3 (0.3%)
Sports Medicine Physician	1 (0.1%)
Pulmonologist	1 (0.1%)
Certification or university diploma in pain management	
No, but I am interested in training in this field.	426 (44%)
No, I have no specific training in pain management.	394 (40%)
Yes, I am trained in anesthesiology-intensive care with a focus on pain management.	63 (6.5%)

Continued

Yes, I have a certification or specific training in pain management.	57 (5.8%)
Yes, I have a specialization in palliative care.	18 (1.8%)
Yes, I have a university diploma in chronic pain management.	17 (1.7%)
Professional experience	
1 to 5 years	436 (45%)
6 to 10 years	230 (24%)
More than 10 years	223 (23%)
Variables	**N = 975**
Less than one year	80 (8.3%)
Practice setting	
Public hospital	847 (89%)
Private clinic	69 (7.3%)
Medical office	17 (1.8%)
NGO	8 (0.8%)
Semi-public (parastatal)	7 (0.7%)

Level of Knowledge on Pain Assessment and Indications for Morphine by Specialty

Overall, 80.3% (n = 783) of participants demonstrated adequate knowledge regarding pain assessment and indications for morphine. Specialties showing particularly high levels of knowledge included oncology (91/91), emergency medicine (36/36), pain medicine/palliative care (20/20), hematology (16/16), and radiation oncology/oncology residents (16/16), as well as several medical specialties, namely neurology (13/13), nephrology (12/12), hepatogastroenterology (11/11), internal medicine (10/10), and geriatrics-internal medicine (9/9) (Table 2).

Table 2. Knowledge of pain assessment and indications for morphine by specialty.

Characteristic	Total N = 975[1]	No N = 192[1]	Yes N = 783[1]	p-value[2]
Specialty				<0.001
Anesthesiologist-Intensivist	186 (20%)	27 (2.9%)	159 (17%)	
General Practitioner	180 (19%)	37 (3.9%)	143 (15%)	
Oncologist	91 (9.7%)	0 (0%)	91 (9.7%)	
Surgeon	82 (8.7%)	33 (3.5%)	49 (5.2%)	
Cardiologist	49 (5.2%)	9 (1.0%)	40 (4.3%)	
Obstetrician-Gynecologist	46 (4.9%)	31 (3.3%)	15 (1.6%)	
Otolaryngologist	37 (3.9%)	33 (3.5%)	4 (0.4%)	
Emergency Medicine	36 (3.8%)	0 (0%)	36 (3.8%)	

Continued

Anesthesiology-Intensive Care Resident	24 (2.6%)	5 (0.5%)	19 (2.0%)
Pain Medicine and Palliative Care	20 (2.1%)	0 (0%)	20 (2.1%)
Hematologist	16 (1.7%)	0 (0%)	16 (1.7%)
Radiologist	16 (1.7%)	3 (0.3%)	13 (1.4%)
Oncology Resident	16 (1.7%)	0 (0%)	16 (1.7%)
Neurologist	13 (1.4%)	0 (0%)	13 (1.4%)
Pediatrician	13 (1.4%)	3 (0.3%)	10 (1.1%)
Emergency Medicine Resident	13 (1.4%)	0 (0%)	13 (1.4%)
Nephrologist	12 (1.3%)	0 (0%)	12 (1.3%)
Hepatogastroenterologist	11 (1.2%)	0 (0%)	11 (1.2%)
Nurse	10 (1.1%)	4 (0.4%)	6 (0.6%)
Internist	10 (1.1%)	0 (0%)	10 (1.1%)
Geriatric Internist	9 (1.0%)	0 (0%)	9 (1.0%)
Gastroenterologist	8 (0.9%)	0 (0%)	8 (0.9%)
Neurology Resident	7 (0.7%)	0 (0%)	7 (0.7%)
Radiation Therapy Resident	7 (0.7%)	0 (0%)	7 (0.7%)
Radiation Oncologist	5 (0.5%)	0 (0%)	5 (0.5%)
Dermatologist	4 (0.4%)	0 (0%)	4 (0.4%)
Forensic Physician	4 (0.4%)	0 (0%)	4 (0.4%)
Obstetrics and Gynecology Resident	4 (0.4%)	0 (0%)	4 (0.4%)
Pediatrics Resident	4 (0.4%)	0 (0%)	4 (0.4%)
Infectious Disease Specialist	3 (0.3%)	0 (0%)	3 (0.3%)
Surgery Resident	3 (0.3%)	0 (0%)	3 (0.3%)
Sports Medicine Physician	1 (0.1%)	0 (0%)	1 (0.1%)
Pulmonologist	1 (0.1%)	1 (0.1%)	0 (0%)

[1]n (%). [2]Pearson's chi-squared test.

Knowledge of Morphine's Mechanism of Action and Prescribing Rules by Specialty

Knowledge in this domain was very limited. Only 1.4% (14/975) of participants demonstrated adequate knowledge of morphine's mechanism of action and prescribing rules. The specialties concerned were oncology (n = 3) and pain medicine/palliative care (Table 3).

Table 3. Knowledge of morphine's mechanism of action and prescribing rules by specialty.

Characteristic	Total N = 975[1]	No N = 961[1]	Yes N = 14[1]	p-value[2]
Specialty				<0.001
Anesthesiologist-Intensivist	186 (20%)	186 (20%)	0 (0%)	

Continued

General Practitioner	180 (19%)	180 (19%)	0 (0%)
Oncologist	91 (9.7%)	88 (9.4%)	3 (0.3%)
Surgeon	82 (8.7%)	82 (8.7%)	0 (0%)
Cardiologist	49 (5.2%)	49 (5.2%)	0 (0%)
Obstetrician-Gynecologist	46 (4.9%)	46 (4.9%)	0 (0%)
Otolaryngologist	37 (3.9%)	37 (3.9%)	0 (0%)
Emergency Medicine	36 (3.8%)	36 (3.8%)	0 (0%)
Anesthesiology-Intensive Care Resident	24 (2.6%)	24 (2.6%)	0 (0%)
Pain Medicine and Palliative Care	20 (2.1%)	9 (1.0%)	11 (1.2%)
Hematologist	16 (1.7%)	16 (1.7%)	0 (0%)
Radiologist	16 (1.7%)	16 (1.7%)	0 (0%)
Oncology Resident	16 (1.7%)	16 (1.7%)	0 (0%)
Neurologist	13 (1.4%)	13 (1.4%)	0 (0%)
Pediatrician	13 (1.4%)	13 (1.4%)	0 (0%)
Emergency Medicine Resident	13 (1.4%)	13 (1.4%)	0 (0%)
Nephrologist	12 (1.3%)	12 (1.3%)	0 (0%)
Hepatogastroenterologist	11 (1.2%)	11 (1.2%)	0 (0%)
Nurse	10 (1.1%)	10 (1.1%)	0 (0%)
Internist	10 (1.1%)	10 (1.1%)	0 (0%)
Geriatric Internist	9 (1.0%)	9 (1.0%)	0 (0%)
Gastroenterologist	8 (0.9%)	8 (0.9%)	0 (0%)
Neurology Resident	7 (0.7%)	7 (0.7%)	0 (0%)
Radiation Therapy Resident	7 (0.7%)	7 (0.7%)	0 (0%)
Radiation Oncologist	5 (0.5%)	5 (0.5%)	0 (0%)
Dermatologist	4 (0.4%)	4 (0.4%)	0 (0%)
Forensic Physician	4 (0.4%)	4 (0.4%)	0 (0%)
Obstetrics and Gynecology Resident	4 (0.4%)	4 (0.4%)	0 (0%)
Pediatrics Resident	4 (0.4%)	4 (0.4%)	0 (0%)
Infectious Disease Specialist	3 (0.3%)	3 (0.3%)	0 (0%)
Surgery Resident	3 (0.3%)	3 (0.3%)	0 (0%)
Sports Medicine Physician	1 (0.1%)	1 (0.1%)	0 (0%)
Pulmonologist	1 (0.1%)	1 (0.1%)	0 (0%)

[1]n (%). [2]Pearson's chi-squared test.

Knowledge of Clinical Practices Related to Morphine Use and Pain Management

With regard to clinical practices and pain management, 52.9% (516/975) of par-

ticipants demonstrated adequate knowledge. The highest knowledge levels were observed in specialties closely related to analgesia, including pain medicine/palliative care (16/20), hematology (16/16), neurology (13/13), internal medicine (10/10), geriatrics–internal medicine (9/9), gastroenterology (8/8), neurology residents (7/7), radiation therapy residents (7/7), forensic medicine (4/4), and obstetrics and gynecology residents (4/4). Intermediate levels of knowledge were observed in anesthesiology-intensive care (124/186), oncology (53/91), pediatrics (7/13), anesthesiology-intensive care residents (13/24), and hepatogastroenterology (6/11) (Table 4).

Table 4. Knowledge of clinical practices related to morphine use and pain management.

Characteristic	Total N = 975[1]	No N = 459[1]	Yes N = 516[1]	p-value[2]
Specialty				<0.001
Anesthesiologist-Intensivist	186 (20%)	62 (6.6%)	124 (13%)	
General Practitioner	180 (19%)	95 (10%)	85 (9.0%)	
Oncologist	91 (9.7%)	38 (4.0%)	53 (5.6%)	
Surgeon	82 (8.7%)	59 (6.3%)	23 (2.4%)	
Cardiologist	49 (5.2%)	29 (3.1%)	20 (2.1%)	
Obstetrician-Gynecologist	46 (4.9%)	24 (2.6%)	22 (2.3%)	
Otolaryngologist	37 (3.9%)	37 (3.9%)	0 (0%)	
Emergency Medicine	36 (3.8%)	21 (2.2%)	15 (1.6%)	
Anesthesiology-Intensive Care Resident	24 (2.6%)	11 (1.2%)	13 (1.4%)	
Pain Medicine and Palliative Care	20 (2.1%)	4 (0.4%)	16 (1.7%)	
Hematologist	16 (1.7%)	0 (0%)	16 (1.7%)	
Radiologist	16 (1.7%)	13 (1.4%)	3 (0.3%)	
Oncology Resident	16 (1.7%)	4 (0.4%)	12 (1.3%)	
Neurologist	13 (1.4%)	0 (0%)	13 (1.4%)	
Pediatrician	13 (1.4%)	6 (0.6%)	7 (0.7%)	
Emergency Medicine Resident	13 (1.4%)	0 (0%)	13 (1.4%)	
Nephrologist	12 (1.3%)	12 (1.3%)	0 (0%)	
Hepatogastroenterologist	11 (1.2%)	5 (0.5%)	6 (0.6%)	
Nurse	10 (1.1%)	6 (0.6%)	4 (0.4%)	
Internist	10 (1.1%)	0 (0%)	10 (1.1%)	
Geriatric Internist	9 (1.0%)	0 (0%)	9 (1.0%)	
Gastroenterologist	8 (0.9%)	0 (0%)	8 (0.9%)	
Neurology Resident	7 (0.7%)	0 (0%)	7 (0.7%)	
Radiation Therapy Resident	7 (0.7%)	0 (0%)	7 (0.7%)	
Radiation Oncologist	5 (0.5%)	5 (0.5%)	0 (0%)	

Continued

Dermatologist	4 (0.4%)	4 (0.4%)	0 (0%)
Forensic Physician	4 (0.4%)	0 (0%)	4 (0.4%)
Obstetrics and Gynecology Resident	4 (0.4%)	0 (0%)	4 (0.4%)
Pediatrics Resident	4 (0.4%)	4 (0.4%)	0 (0%)
Infectious Disease Specialist	3 (0.3%)	3 (0.3%)	0 (0%)
Surgery Resident	3 (0.3%)	3 (0.3%)	0 (0%)
Sports Medicine Physician	1 (0.1%)	1 (0.1%)	0 (0%)
Pulmonologist	1 (0.1%)	1 (0.1%)	0 (0%)

[1]n (%). [2]Pearson's chi-squared test.

Recommendations (by participants)

The majority of participants recommended the organization of regular training programs (n = 775; 80%) (Table 5).

Table 5. Participants' recommendations.

Recommandations	N = 975[1]
Organize regular training programs	775 (80%)
Implement standard protocols	169 (17%)
Improve access to opioid analgesics	12 (1.2%)
Strengthen awareness and education on stigma	12 (1.2%)
None	7 (0.7%)

[1]n (%).

4. Discussion

Pain remains a major public health challenge in Cameroon, where morphine is the reference analgesic for moderate to severe pain but remains underutilized due to multiple barriers, including heterogeneous training among healthcare providers, opioid-related fears, and constraints related to access and regulation. In a context where the demand for palliative care is increasing and local initiatives to produce and distribute morphine within healthcare facilities are being actively implemented, it is crucial to objectively assess healthcare professionals' actual level of proficiency in order to guide continuing education, harmonize protocols, and ensure safe use. This study was therefore warranted to measure, among Cameroonian healthcare professionals, knowledge of pain assessment and indications for morphine, understanding of morphine's mechanism of action and prescribing rules, and clinical knowledge and practices related to pain management, as well as to identify training and organizational priorities necessary for safe and rational access to opioid analgesics.

In this national survey of Cameroonian healthcare professionals, we observed a

marked contrast between high levels of knowledge regarding pain assessment and indications for morphine and, conversely, limited mastery of morphine's mechanism of action and prescribing rules, along with an intermediate level of practical knowledge. This discrepancy between "what to prescribe" and "how/why to prescribe" is consistent with the international literature. Although morphine remains a cornerstone of moderate to severe pain management and a central component of the World Health Organization (WHO) analgesic ladder [3]-[5] [22], its operational translation—intravenous (IV) and oral (PO) titration, systematic prevention of constipation, monitoring of adverse effects, and proper documentation—remains uneven, particularly in resource-limited settings [6] [7] [16].

Our findings are in line with studies showing the presence of systemic barriers to secure opioid access in Sub-Saharan Africa, including limited availability, restrictive regulatory frameworks, unreliable supply chains, and reluctance driven by beliefs and stigma [7] [16] [17] [23]-[25]. Recent syntheses focusing on Cameroon further highlight that the availability of oral morphine and palliative care capacity still requires strengthening despite notable progress [18]. This structural context may partly explain the limited practical exposure and prescribing caution observed in certain specialties.

From a clinical perspective, several key technical competencies are involved. First, standardized pain assessment using the Numeric Rating Scale (0 - 10) has demonstrated validity and clinical utility in acute and emergency care settings; however, its implementation and caregiver-patient concordance remain suboptimal [26]-[29]. Second, morphine titration rapid IV titration for severe pain and subsequent oral adjustment is supported by multiple protocol-based studies [30]-[33], but requires structured training combined with supervision to avoid under- or overdosing. Finally, systematic prevention of opioid-induced constipation through concomitant laxative prescription is recommended and associated with improved outcomes [34]-[36], yet its implementation remains variable. The "moderate" level of practical knowledge observed in our study is therefore consistent with the literature: while the tools are available, their implementation and the securing of practices require targeted support.

Beyond technical competencies, healthcare providers' attitudes and beliefs significantly influence opioid use. Several reviews and studies have highlighted the impact of stigma toward opioids and opioid use disorders, which may translate into reluctance to prescribe or refer patients appropriately [35] [37] [38]. Our observation of a strong demand for regular training and standardized protocols aligns with evidence showing that educational interventions can improve knowledge and, in some cases, prescribing practices [39] [40], although large-scale implementation requires organizational support [41].

In the short term, our results support the implementation of continuing education programs focused on morphine titration, prevention of adverse effects (notably constipation), and regulatory aspects; dissemination of simple, illustrated national protocols (NRS 0 - 10 assessment, IV/PO algorithms, safety checklists);

integration of anti-stigma actions into undergraduate and continuing education; and ensuring a reliable supply of oral morphine and adjuvants (laxatives), in line with palliative care priorities in Cameroon and regional/international recommendations. In the medium term, impact evaluations (audit and feedback, indicators of prescribing and access) will be necessary to assess the adoption of best practices and improvements in analgesia.

Strengths and limitations of the study: The sample size and the inclusion of multiple professional categories (physicians and other healthcare professionals) represent major strengths of this study. However, non-probability sampling and self-reported data may have led to overestimation of perceived knowledge. In addition, inter-specialty heterogeneity and partial reliance on online data collection may have introduced selection and information biases.

5. Conclusions

Our study highlights a satisfactory baseline of knowledge regarding pain assessment and indications for morphine, but identifies substantial gaps in understanding of morphine's mechanism of action, prescribing rules, and certain key practical skills. In the context of expanding palliative care in Cameroon, the combined implementation of regular training, standardized protocols, and secured access to morphine should be prioritized to bring clinical practice closer to international standards and improve pain relief.

Ethical Considerations

This study was conducted in accordance with the principles of the Declaration of Helsinki. Ethical approval was obtained from the competent institutional ethics committee prior to data collection. The study protocol, questionnaire, and consent procedures were reviewed and approved before implementation.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Mestdagh, F., Steyaert, A. and Lavand'homme, P. (2023) Cancer Pain Management: A Narrative Review of Current Concepts, Strategies, and Techniques. *Current Oncology*, **30**, 6838-6858. https://doi.org/10.3390/curroncol30070500

[2] Makhlouf, S.M., Pini, S., Ahmed, S. and Bennett, M.I. (2019) Managing Pain in People with Cancer—A Systematic Review of the Attitudes and Knowledge of Professionals, Patients, Caregivers and Public. *Journal of Cancer Education*, **35**, 214-240. https://doi.org/10.1007/s13187-019-01548-9

[3] Jadad, A.R. and Browman, G.P. (1995) The WHO Analgesic Ladder for Cancer Pain Management: Stepping up the Quality of Its Evaluation. *JAMA*, **274**, 1870-1873. https://doi.org/10.1001/jama.1995.03530230056031

[4] Vargas-Schaffer, G. (2010) Is the WHO Analgesic Ladder Still Valid? *Canadian Family Physician*, **56**, 514-517. https://pmc.ncbi.nlm.nih.gov/articles/PMC2902929/

[5] Carlson, C. (2016) Effectiveness of the World Health Organization Cancer Pain Relief Guidelines: An Integrative Review. *Journal of Pain Research*, **9**, 515-534. https://doi.org/10.2147/jpr.s97759

[6] Manjiani, D., Paul, D.B., Kunnumpurath, S., Kaye, A.D. and Vadivelu, N. (2014) Availability and Utilization of Opioids for Pain Management: Global Issues. *Ochsner Journal*, **14**, 208-215. https://pmc.ncbi.nlm.nih.gov/articles/PMC4052588/

[7] Cleary, J., Powell, R.A., Munene, G., Mwangi-Powell, F.N., Luyirika, E., Kiyange, F., *et al.* (2013) Formulary Availability and Regulatory Barriers to Accessibility of Opioids for Cancer Pain in Africa: A Report from the Global Opioid Policy Initiative (GOPI). *Annals of Oncology*, **24**, xi14-xi23. https://doi.org/10.1093/annonc/mdt499

[8] Hartrick, C.T., Kovan, J.P. and Shapiro, S. (2003) The Numeric Rating Scale for Clinical Pain Measurement: A Ratio Measure? *Pain Practice*, **3**, 310-316. https://doi.org/10.1111/j.1530-7085.2003.03034.x

[9] Nugent, S.M., Lovejoy, T.I., Shull, S., Dobscha, S.K. and Morasco, B.J. (2021) Associations of Pain Numeric Rating Scale Scores Collected during Usual Care with Research Administered Patient Reported Pain Outcomes. *Pain Medicine*, **22**, 2235-2241. https://doi.org/10.1093/pm/pnab110

[10] Atisook, R., Euasobhon, P., Saengsanon, A. and Jensen, M.P. (2021) Validity and Utility of Four Pain Intensity Measures for Use in International Research. *Journal of Pain Research*, **14**, 1129-1139. https://doi.org/10.2147/jpr.s303305

[11] Link, P., Venkatachalam, A.M., Aguilera, V., Stutzman, S.E. and Olson, D.M. (2021) Exploring the Face Validity of the Pain Numeric Rating Scale among Healthcare Providers. *Journal of Neuroscience Nursing*, **53**, 215-219. https://doi.org/10.1097/jnn.0000000000000600

[12] Choi, S., Yoon, S. and Lee, H. (2024) Beyond Measurement: A Deep Dive into the Commonly Used Pain Scales for Postoperative Pain Assessment. *The Korean Journal of Pain*, **37**, 188-200. https://doi.org/10.3344/kjp.24069

[13] Alodhialah, A.M., Almutairi, A.A. and Almutairi, M. (2024) Assessing the Association of Pain Intensity Scales on Quality of Life in Elderly Patients with Chronic Pain: A Nursing Approach. *Healthcare*, **12**, Article No. 2078. https://doi.org/10.3390/healthcare12202078

[14] Yang, J., Bauer, B.A., Wahner-Roedler, D.L., Chon, T.Y. and Xiao, L. (2020) The Modified WHO Analgesic Ladder: Is It Appropriate for Chronic Non-Cancer Pain? *Journal of Pain Research*, **13**, 411-417. https://doi.org/10.2147/jpr.s244173

[15] Aregay, A., O'Connor, M., Stow, J., Ayers, N. and Lee, S. (2023) Perceptions of Barriers to Using Opioid Analgesics: A Mixed Methods Study. *Palliative Medicine Reports*, **4**, 249-256. https://doi.org/10.1089/pmr.2023.0021

[16] Yao, J., Ngo, N.V., Kibu, O.D., Asahngwa, C., Jasmin, H.M., Gobina, R.M. and Foretia, D.A. (2023) Availability and Use of Essential Opioid Analgesics in Sub-Saharan Africa: A Scoping Review Protocol. *International Journal of Surgery Protocols*, **27**, 1-8.

[17] Fraser, B.A., *et al.* (2018) Palliative Care Development in Africa: Lessons from Uganda and Kenya. *Journal of Global Oncology*, **4**, 1-10. https://pubmed.ncbi.nlm.nih.gov/30241205/?utm_source=chatgpt.com

[18] Bassah, N., Santos Salas, A., Ambe, N.C. and Ngah, N.E. (2024) Increasing Access to Palliative Care in Cameroon: Progress, Gaps, and Recommendations. *Nursing Reports*, **14**, 3606-3618. https://doi.org/10.3390/nursrep14040263

[19] Lebovits, A.H., Florence, I., Bathina, R., Hunko, V., Fox, M.T. and Bramble, C.Y.

(1997) Pain Knowledge and Attitudes of Healthcare Providers: Practice Characteristic Differences. *The Clinical Journal of Pain*, **13**, 237-243. https://doi.org/10.1097/00002508-199709000-00009

[20] McMillan, T.A., Hutton, L. and Jenkins, L. (2024) Doctors' Knowledge, Attitudes and Practices of Palliative Care in Two South African Districts. *African Journal of Primary Health Care & Family Medicine*, **16**, Article No. 4503. https://doi.org/10.4102/phcfm.v16i1.4503

[21] Mishra, S., Bhatnagar, S., Gupta, D., Nirwani Goyal, G., Jain, R. and Chauhan, H. (2008) Management of Neuropathic Cancer Pain Following WHO Analgesic Ladder: A Prospective Study. *American Journal of Hospice and Palliative Medicine®*, **25**, 447-451. https://doi.org/10.1177/1049909108322288

[22] Anekar, A.A., Hendrix, J.M. and Cascella, M. (2025) WHO Analgesic Ladder. StatPearls Publishing. http://www.ncbi.nlm.nih.gov/books/NBK554435/

[23] Cherny, N.I., Cleary, J., Scholten, W., Radbruch, L. and Torode, J. (2013) The Global Opioid Policy Initiative (GOPI) Project to Evaluate the Availability and Accessibility of Opioids for the Management of Cancer Pain in Africa, Asia, Latin America and the Caribbean, and the Middle East: Introduction and Methodology. *Annals of Oncology*, **24**, xi7-xi13. https://doi.org/10.1093/annonc/mdt498

[24] Ooms, G.I., van Oirschot, J., de Kant, D., van den Ham, H.A., Mantel-Teeuwisse, A.K. and Reed, T. (2023) Barriers to Accessing Internationally Controlled Essential Medicines in Sub-Saharan Africa: A Scoping Review. *International Journal of Drug Policy*, **118**, Article ID: 104078. https://doi.org/10.1016/j.drugpo.2023.104078

[25] Clark, D., Baur, N., Clelland, D., Garralda, E., López-Fidalgo, J., Connor, S., *et al.* (2020) Mapping Levels of Palliative Care Development in 198 Countries: The Situation in 2017. *Journal of Pain and Symptom Management*, **59**, 794-807.e4. https://doi.org/10.1016/j.jpainsymman.2019.11.009

[26] Domenico Giusti, G., Reitano, B. and Gili, A. (2018) Pain Assessment in the Emergency Department. Correlation between Pain Rated by the Patient and by the Nurse. An Observational Study. *Acta Biomedica*, **89**, 64-70. https://pmc.ncbi.nlm.nih.gov/articles/PMC6357625/

[27] Baharuddin, K.A., Mohamad, N., Nik Abdul Rahman, N.H., Ahmad, R. and Nik Him, N.A.S. (2010) Assessing Patient Pain Scores in the Emergency Department. *Malaysian Journal of Medical Sciences*, **17**, 17-22. https://pmc.ncbi.nlm.nih.gov/articles/PMC3216146/

[28] Al-Kalaldeh, M. and Al-Zaidaneen, H. (2022) Congruency of Nurse-Patient Pain Scoring in the Emergency Department: A Cross-Sectional Observational Study. *Pain Management*, **12**, 635-643. https://doi.org/10.2217/pmt-2021-0079

[29] Im, D.D., Jambaulikar, G.D., Kikut, A., Gale, J. and Weiner, S.G. (2020) Brief Pain Inventory-Short Form: A New Method for Assessing Pain in the Emergency Department. *Pain Medicine*, **21**, 3263-3269. https://doi.org/10.1093/pm/pnaa269

[30] Mercadante, S., Villari, P., Ferrera, P., Casuccio, A. and Fulfaro, F. (2002) Rapid Titration with Intravenous Morphine for Severe Cancer Pain and Immediate Oral Conversion. *Cancer*, **95**, 203-208. https://doi.org/10.1002/cncr.10636

[31] Lvovschi, V., Aubrun, F., Bonnet, P., Bouchara, A., Bendahou, M., Humbert, B., *et al.* (2008) Intravenous Morphine Titration to Treat Severe Pain in the ED. *The American Journal of Emergency Medicine*, **26**, 676-682. https://doi.org/10.1016/j.ajem.2007.10.025

[32] Hammoud, H.A., Simon, N., Urien, S., Riou, B., Lechat, P. and Aubrun, F. (2009)

Intravenous Morphine Titration in Immediate Postoperative Pain Management: Population Kinetic-Pharmacodynamic and Logistic Regression Analysis. *Pain*, **144**, 139-146. https://doi.org/10.1016/j.pain.2009.03.029

[33] Friesgaard, K.D., Vist, G.E., Hyldmo, P.K., Raatiniemi, L., Kurola, J., Larsen, R., *et al.* (2022) Opioids for Treatment of Pre-Hospital Acute Pain: A Systematic Review. *Pain and Therapy*, **11**, 17-36. https://doi.org/10.1007/s40122-021-00346-w

[34] Sizar, O., Genova, R. and Gupta, M. (2025) Opioid-Induced Constipation. StatPearls Publishing. http://www.ncbi.nlm.nih.gov/books/NBK493184/

[35] Brown, T.J., Keshvani, N., Gupta, A., Yang, H., Agrawal, D., Le, T.C., *et al.* (2020) Rates of Appropriate Laxative Prophylaxis for Opioid-Induced Constipation in Veterans with Lung Cancer: A Retrospective Cohort Study. *Supportive Care in Cancer*, **28**, 5315-5321. https://doi.org/10.1007/s00520-020-05364-6

[36] Ahmad, M. and Alnaeem, M. (2022) Constipation Severity and Quality of Life among Patients with Cancer Who Received Prophylactic Laxatives: Quasi-Experimental Study. *Asian Pacific Journal of Cancer Prevention*, **23**, 3473-3480. https://doi.org/10.31557/apjcp.2022.23.10.3473

[37] Skaggs, P., Bell, S.B., Scutchfield, F.D. and Robinson, L.E. (2023) Providers' Stigmas and the Effects on Patients with Opioid Use Disorder: A Scoping Review. *Journal of Appalachian Health*, **4**, 87-102. https://pmc.ncbi.nlm.nih.gov/articles/PMC10655729/

[38] Piscalko, H., Dhanani, L.Y., Brook, D., Hall, O.T., Miller, W.C., Go, V., *et al.* (2024) Knowledge of Medications for Opioid Use Disorder and Associated Stigma among Primary Care Professionals. *Annals of Medicine*, **56**, Article ID: 2399316. https://doi.org/10.1080/07853890.2024.2399316

[39] Nuseir, K., Kassab, M. and Almomani, B. (2016) Healthcare Providers' Knowledge and Current Practice of Pain Assessment and Management: How Much Progress Have We Made? *Pain Research and Management*, **2016**, Article ID: 8432973. https://doi.org/10.1155/2016/8432973

[40] Acharya, P.P., Fram, B.R., Adalbert, J.R., Oza, A., Palvannan, P., Nardone, E., Caltabiano, N., Liao, J. and Ilyas, A.M. (2025) Impact of an Educational Intervention on the Opioid Knowledge and Prescribing Behaviors of Resident Physicians. *Cureus*, **14**, e23508. https://pmc.ncbi.nlm.nih.gov/articles/PMC9038586/

[41] Carroll, J.J., Cushman, P.A., Lira, M.C., Colasanti, J.A., del Rio, C., Lasser, K.E., *et al.* (2022) Evidence-Based Interventions to Improve Opioid Prescribing in Primary Care: A Qualitative Assessment of Implementation in Two Studies. *Journal of General Internal Medicine*, **38**, 1794-1801. https://doi.org/10.1007/s11606-022-07909-3