

# Criteria Used to Assess Need for Use of Morphine for Adult Cancer Pain Relief in Kakamega County Referral Hospital, Kenya, Africa

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**ABSTRACT**---*The experience of pain in cancer patients is widely accepted as a major threat to quality of life, and its relief has emerged as a priority in oncology care. Although morphine and other opioids is the mainstay of cancer pain management, patients still suffer from moderate to severe pain. This paper investigated the criteria used to assess need for use of morphine for pain relief in cancer patients in Kakamega county referral hospital. The study used a cross-sectional research design. Target population was 295 which included physicians (medical doctors), nurses and clinical officers working at the Kakamega County General Hospital. The study employed focused group discussion and questionnaires to collect data. The study findings revealed that prescribers of morphine face challenges and FGD indicated that health care providers often create barriers to effective pain management. Time constraints and insufficient knowledge regarding pain management of medical professionals were the most commonly encountered barriers to effective pain management for physicians, clinical officers and nurses. There was a significant relationship between criteria used and morphine use in cancer pain relief ( $p=0.013$ ) The study concluded that for one to use morphine to control cancer pain amongst adult, they should consider; the dose and length of time allowed by a single prescription, challenges faced when prescribing morphine, that morphine can only be sold to institutions that have at least a medical officer and the actual cost of morphine.*

**Keywords**--- Break Through Pain, Opioids, Analgesic Ladder

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## 1. INTRODUCTION

Pain is a common experience of cancer. A third of patients with cancer present with pain at the time of diagnosis, and approximately two-thirds of patients with advanced cancer experience pain (Chade, 2015). Morphine is an essential medicine for the treatment of pain that should be available to all people who need it (WHO, 2011).

According to WHO guidelines, opioid analgesics are the mainstay of analgesic therapy and are classified according to their ability to control pain from mild to moderate to moderate severe intensity. Opioid analgesics may be combined with nonopioid drugs such as paracetamol or nonsteroidal anti-inflammatory drugs (NSAIDs) and with adjuvant drugs. The analgesic treatment should start with drugs indicated by the WHO analgesic ladder appropriate for the severity of pain (ESMO, 2012).

Morphine is the last step opioid most commonly used to control severe pain, because of its wide availability, varied formulations, and well-characterized pharmacologic properties (Twycross, 2011). Controlled-release formulations of morphine for oral administration at 12-hour intervals have been the mainstay of the control of chronic cancer pain for the past decade because of the ease of their administration and titration (Hanks, 2007). Oral route is considered as the preferred route of administration (Caraceni, Cherny et al. 2012)

There is no one optimal or maximal dose of morphine as analgesic (Twycross, 2004). The appropriate dose is one that relieves a patient's pain throughout its dosing interval without causing unmanageable side effects. The initial dose should be based on the patient's level of pain and the efficacy of prior analgesic therapy. Subsequent therapy should be based on a continuing assessment of the efficacy of therapy, with the dosage titrated upward as needed (Thiagens, Vervat et al. 2011).

Rescue dose of medications (as required or prn) other than the regular basal therapy must be prescribed for break through pain episodes. Although pain can be controlled in most patients with 240 mg of oral morphine per day or less (Schug, Zech and Dorr 2010), patients with severe cancer pain may require 1200 to 1800 mg of oral morphine per day (Portenoy, Ryan and Krasnoff, 2012). Few patients may require 1000 to 4500 mg of parenteral morphine per hour. Continuous morphine infusions (CMIs) treat pain and dyspnea at the end of life (Foley and Portenoy, 2011).

The WHO recommends that most patients with cancer who have chronic pain should receive oral analgesic therapy, because it is simpler, easier to use, and less expensive than parenteral therapy (Carr and Payne 2004). If a patient cannot swallow tablets or liquids, morphine concentrates and soluble tablets can be administered sublingually (Levy, 2004). The

usefulness of prolonged sublingual administration is limited by the low dosage of available formulations and the need to repeat the dose every four hours.

Health care providers' goal of treating chronic cancer pain is not simply pain relief but also pain prevention (Hanks, 2007). For sustained analgesia in most cases, around-the-clock dosing can be instituted or it can be initiated after the patient has been given a few doses on an as-needed basis to allow an effective dose to be determined. Supplemental, rescue doses of analgesic drugs should be available to patients for breakthrough pain due to activity, stress, or progressive disease (Levy 2004). As a guide, the total dose of as-needed rescue medication available in a specific interval should be equal to the regular dose given during that interval. For example, a patient taking 120 mg of controlled-release morphine every 12 hours should be given 40 mg of immediate-release morphine every 4 hours for unrelieved, breakthrough pain. Without following these criteria patients with cancer suffer in agonizing pain.

Despite published guidelines and educational programs on the assessment and treatment of cancer-related pain, in any stage of oncological disease, unrelieved pain continues to be a substantial world wide public health concern in patients with either solid or hematological malignancies.

Initial and ongoing assessment of pain and of patients with pain at any disease stage should clarify both the need for additional comprehensive evaluation and a rational plan of care. Proper and regular self-reporting assessment of pain intensity with the help of validated assessment tools is the first step towards effective and individualized treatment. The most frequently used standardized scales are visual analogue scales, the verbal rating scale and the numerical rating scale.

## 2. RESEARCH DESIGN AND METHODOLOGY

The study used a cross-sectional research design. The study was carried out in Kakamega County General Hospital, Kakamega County. Target population included physicians -32, nurses-225 and clinical officers -38; making a total of 295 respondents working at the Kakamega County General Hospital.

The researcher adopted Yamane, (1967:886) formula that can be used to calculate a suitable sample size for a study.

$$n = \frac{N}{1 + Ne^2}$$

Where n = Minimum Sample Size; N = population size: - e = precision set at 95 % (5%=0.05)  
 295 (Study population) x0.5 =

$$n = 295 / (1 + 295(0.0025))$$

$$n = 169.78 \approx 170$$

Sample size for the respondents = 170

The desired sample size therefore comprised of 170 respondents

A sample size of 170 respondents was chosen for the study. The study employed stratified sampling and simple random sampling to select respondents.

### 2.1 Sample Size

Specialty	Number	Procedure	Sample Size
Physicians (MO)	32	32/295* 170	18
Nurses	225	225/295* 170	130
Clinical Officers	38	38/295* 170	22
<b>Total</b>	<b>295</b>		<b>170</b>

The study therefore sampled 130 nurses, 18 physicians and 22 clinical officers. The study employed focused group discussion and questionnaires to collect data. Descriptive and inferential statistics were used in the study. The descriptive statistics that were used include the frequency distributions, means and standard deviations. Inferential statistics used multiple logistic regressions and multiple regressions.

### 3. RESULTS

The study results were as follows:

#### 3.1 Demographic information of the Respondents

The study sought to establish the demographic information of the respondents including their age, years of experience, gender; professional discipline, rank of nurses, level of education, practise setting and the department worked. The study results were presented in the table below:

##### 3.1.1 Age and Years of Experience

Age Brackets	Frequency	Percent
Below 25 Years	39	28.2
26-35 Years	68	48.7
36-45 Years	18	12.8
46-55 Years	14	10.3
<b>Total</b>	<b>139</b>	<b>100</b>
Years of Experience	Frequency	Percent
Less than 1 Year	16	11.5
2-5 Years	96	69.2
6-10 Years	9	6.4
Over 10 Years	18	12.8
<b>Total</b>	<b>139</b>	<b>100</b>

##### 3.1.2 Recommended Route for Administration of morphine

For patients with persistent Pain	Frequency	Percent
Intravenous	27	19.2
Intramuscular	21	15.4
Subcutaneous	9	6.4
Oral	82	59.0
<b>Total</b>	<b>139</b>	<b>100</b>
For patients with severe pain	Frequency	Percent
Intravenous	45	32.1
Intramuscular	45	32.1
Oral	50	35.9
<b>Total</b>	<b>139</b>	<b>100</b>

The optimal route of administration of morphine is by mouth. The study findings showed that only 59% of respondents understood that oral morphine is recommended for persistent pain while only 35.9% were aware of these criteria for severe pain.

### 3.1.3 Drug of choice and Equivalent of 30mg Oral Morphine

Drug of choice	Frequency	Percent
Codeine	7	5.1
Morphine	123	88.5
Merepidine	9	6.4
<b>Total</b>	<b>139</b>	<b>100</b>
Equivalent of 30mg Oral Morphine	Frequency	Percent
Morphine 5mg IV	45	32.1
Morphine 15 mg IV	50	35.9
Morphine 30mg IV	18	12.8
Morphine 60mg IV	27	19.2
<b>Total</b>	<b>139</b>	<b>100</b>

The study results revealed that most of the respondents knew that morphine is the analgesic medications considered the drug of choice for the treatment of prolonged moderate to severe pain for cancer patients, but failed to acknowledge codeine as an equally essential analgesic.

The researcher sought to know the criteria of HCPs on conversion of IV doses of morphine administered over a 4-hour period to 30 mg of oral morphine. Only 35.9% understood the formula that gives Morphine 15mg IV.

### 3.1.4 Likelihood of Patients on morphine Developing Respiratory Depression

Likelihood	Frequency	Percent
Less than 1%	34	24.4
1-10%	16	11.5
11-20%	28	20.5
21-40%	27	19.2
41% and Above	34	24.4
<b>Total</b>	<b>139</b>	<b>100</b>

The study results on the likelihood of the patient developing clinically significant respiratory depression in the absence of new comorbidity revealed that 24.4% knew that the likelihood is less than 1%. Another 24.4% responded that it was above 41% which was not true. Some 20.5% thought it was 11-20% likelihood and the rest 11.5% thought it was between 1-10%.

### 3.1.5 Likely Reason, Useful Treatment and Most Accurate Judge of the Patients' intensity of pain

Most likely reason for requesting increased doses	Frequency	Percent
The patient is experiencing increased pain	91	65.4
The patient is experiencing increased anxiety or depression	18	12.8
The patient's requests are related to addiction	30	21.8
<b>Total</b>	<b>139</b>	<b>100</b>
Useful Treatment for cancer pain	Frequency	Percent
Ibuprofen (mortrin)	7	5.1
Hydromorphone (Dilaudid)	102	73.1
Gabapentin (Neurontin)	9	6.4
All of the above	21	15.4
<b>Total</b>	<b>139</b>	<b>100</b>
Most accurate judge of the intensity of pain	Frequency	Percent
Patient's primary nurse	55	39.7
Patient	75	53.8
Patient's Spouse or Family	9	6.4
<b>Total</b>	<b>139</b>	<b>100</b>

The most likely reason a patient with pain would request increased doses of pain medication is because they are experiencing increased pain. Most (65.4%) of the respondents felt the same. However, 12.8% noted that the patient is experiencing increased anxiety or depression while 21.8% noted that the patient's requests are related to addiction.

The study results on the useful treatment for cancer pain showed that 5.1% noted that Ibuprofen (Motrin) was the useful for treatment of cancer pain; 73.1% noted that Hydromorphone (Dilaudid) was the useful for treatment of cancer pain; 6.4% noted that Gabapentin (Neurontin) was the useful for treatment of cancer pain while only 15.4% were right noting that all of the drugs were useful for treatment of cancer pain. This shows that most of the respondents didn't have adequate knowledge on combination of drugs.

The most accurate judge of the intensity of the pain is the patient as cited by 53.7% of the respondents. Some respondents (39.7%) noted that it's the patient's primary nurse while 6.4% felt it was the patient's spouse or family that is the most accurate judge of the intensity of pain.

### **3.1.6 Best Approach for Cultural Considerations in Caring for Patients' pain**

<b>Best Approach for Cultural Considerations</b>	<b>Freq</b>	<b>Percent</b>
There are no longer cultural influences due to the diversity of the population	7	5.1
Cultural influences can be determined by an individual's ethnicity (e.g., Asians are stoic, Italians are expressive, etc.).	18	12.8
Patients should be individually assessed to determine cultural influences	111	79.5
Cultural influences can be determined by an individual's socioeconomic status (e.g., blue collar workers report more pain than white collar workers).	4	2.6
<b>Total</b>	<b>139</b>	<b>100</b>

The study results on the best approach for cultural considerations in caring for patients in pain indicated that 5.1% of the respondents noted that there are no longer cultural influences due to the diversity of the population; 12.8% noted that cultural influences can be determined by an individual's ethnicity (e.g., Asians are stoic, Italians are expressive, etc.); 79.5% noted that patients should be individually assessed to determine cultural influences while 2.6% noted that cultural influences can be determined by an individual's socioeconomic status (e.g., blue collar workers report more pain than white collar workers). Majority of the respondents were of the right opinion that patients should be individually assessed to determine cultural influences.

### **3.1.7 Likelihood of Morphine Addiction and Pain Development**

<b>Likelihood of Morphine Addiction</b>	<b>Frequency</b>	<b>Percent</b>
1%	16	11.5
5%	9	6.4
25%	34	24.4
50%	43	30.8
75%	4	2.6
100%	34	24.4
<b>Total</b>	<b>139</b>	<b>100</b>

<b>Likelihood of Pain development on alcoholic and drug abuse</b>	<b>Frequency</b>	<b>Percent</b>
1%	70	50.0
5-15%	20	14.1
25-50%	25	17.9
75-100%	25	17.9
<b>Total</b>	<b>139</b>	<b>100</b>

Results showed 24% of the respondents noted that there was a 100% likelihood of opioid addiction while the same 24% of the respondents knew that there was only 1% likelihood of addiction

The researcher sought to know the responses on the likelihood that patients who develop pain already have an alcohol and drug abuse problem. Half (50.0%) of the respondents were wrong in their view that there is a 1% likelihood that patients who develop pain already have an alcohol and drug abuse problem. Only 17.9% of the respondents said that there is a 25-50% likelihood of developing pain.

### **3.1.8 Time to Peak Effect for Morphine**

<b>Given IV</b>	<b>Frequency</b>	<b>Percent</b>
15 Mins	112	80.8
1 Hour	18	12.8
2 Hours	9	6.4
Total	139	100
<b>Given Orally</b>	<b>Frequency</b>	<b>Percent</b>
5 Mins	23	16.7
30 Mins	80	57.7
1.5 - 2 Hours	18	12.8
3 Hours	18	12.8
Total	139	100

The peak effect of IV morphine is 15 minutes of administration. The study results showed that 80.8% knew that it is 15 minutes; 12.8% noted 1 hour whereas 6.4% noted 2 hours. The study results on the time to peak effect for morphine given orally indicated that 16.7% of the respondents noted 15 minutes; 57.7% noted 30 minutes; 12.8% noted 1.5 hours – 2 hours while 12.8% noted 3 hours. These study results revealed that majority of the respondents noted 30 minutes which is the time to peak effect for morphine given orally.

### **3.1.8 Manifestation of Physical Dependence for abrupt discontinuation of Morphine**

	<b>Frequency</b>	<b>Percent</b>
Sweating, yawning, nausea and vomiting when the morphine is abruptly discontinued	48	34.6
Impaired control over drug use, compulsive use, and craving	18	12.8
The need for higher doses to achieve the same effect	43	30.8
First and Second	30	21.8
Total	139	100

The researcher sought to establish the HCPs knowledge on the manifestation of physical dependence for abrupt discontinuation of morphine. The study results indicated that 34.6% noted sweating, yawning, nausea and vomiting when the morphine is abruptly discontinued; 12.8% noted impaired control over drug use, compulsive use, and craving; 30.8% noted the need for higher doses to achieve the same effect while 21.8% were right noting both options of sweating, yawning, nausea and vomiting when the opioid is abruptly discontinued and impaired control over drug use, compulsive use, and craving.

FGDs revealed that physicians do not generally employ any specific assessment procedures to measure pain intensity, and they do not separately evaluate different types of pain, even though these could reflect different etiologies. Despite the fact that constipation is a common and expected side effect of drug treatment for pain, few physicians indicated that they prescribed prophylactic laxatives. Over half the physicians and nurses surveyed reported that they had some knowledge deficits in the areas of pain evaluation and treatment. A number of common misconceptions expressed by health care providers' center around the use of morphine, which is one the most commonly used drugs to treat cancer pain.

Approximately half of the physicians surveyed had some misconceptions about drug tolerance, believing that an increased need for morphine was indicative of tolerance, as opposed to increased pain intensity. Over 20% of the doctors surveyed believed that addiction was a concern with the use of morphine for cancer pain management, although few others expressed this misconception. In addition, 57% physicians indicated that parenteral administration is the only route effective when treating severe cancer pain, even though alternative routes of administration are available and suggested. Some physicians misunderstood such side effects as mental clouding and respiratory depression, both in their treatment and prevalence. More nurses 68% reported that most cancer patients suffer pain, whereas 71% physicians and Cos indicated that pain associated with cancer can be treated.

The following observations were further made; the government has not undertaken a review of the drug regulatory laws and policies to determine whether they are overly restrictive and an impediment to accessing morphine. Sometimes the patients rely on donor support to access the drug; when the support ends health care providers are forced to use weaker but more affordable drugs. Recommended drugs for pain such as morphine and other opioids must be available and accessible to all patients enduring pain. Most HCPs are not willing to handle morphine and other controlled substances.

### 3.2 Knowledge of WHO Cancer pain ladder for adults

The study sought to find out if the participants have heard about WHO cancer pain ladder for adults. The results revealed that 88.5% (123) have heard about WHO Cancer pain ladder as compared to 11.5% (16) who have not heard. For those who have heard about WHO Cancer pain ladder, the study was interested to find out how often they have been using it. It was found that 60.98% of the participants used it occasionally, 33.33% used it always and 5.69% did not use it at all.

### 3.3 To maintain freedom from pain, morphine should be given by clock or demand

Respondents were asked if drugs should be given by clock or demand. The results revealed that 61.2% (85) were wrong that morphine should be given by demand as compared to 38.8% (54) who were right indicating that it should be given by clock.

### 3.3 Pain assessment as per standards of WH

Only 18.7% (26) regularly assessed patients for pains regardless on the presence of pain as compared 81.3% (113) who did not bother to assess pain.

#### 3.3.1 Descriptive Statistics on criteria used to assess need for morphine use

	Frequency	Percentage
<b>Have you heard of WHO Cancer pain ladder for adults</b>		
Yes	123	88.5
No	16	11.5
<b>To maintain freedom from pain, morphine should be given</b>		
By Demand	85	61.2
By Clock	54	38.8
<b>Do you regularly assess patients for pains when no pain is reported</b>		
Yes	26	18.7
No	113	81.3

#### 3.3.2 Descriptive Analysis of Criteria used to assess need for use of morphine

Participants were asked to rate their agreement on six eight criteria by completing a 5-level agreement continuum ranging from 1 (strongly disagree) to 5 (strongly agree).

**Table 4.1: Criteria used to assess need for use of morphine**

		SA	A	U	D	SD	Mean	Stdev
Morphine-related adverse effects are normally considered before using it for adult cancer pain relief	f	56	26	2	28	27	2.59	1.62
	%	40.3	18.7	1.4	20.1	19.4		
Morphine titration is used only as a rescue option for adult cancer pain relief.	f	34	26		22	57	3.30	1.70
	%	24.5	18.7		15.8	41.0		
Clinic demographic data is normally considered during determining of morphine dosage	f	24	80	10	16	9	2.32	1.09
	%	17.3	57.6	7.2	11.5	6.5		
The clinical burden of cancer pain is significant in the assessment for use of morphine for adult cancer pain relief	f	66	8		26	39	2.74	1.79
	%	47.5	5.8		18.7	28.1		
Oral Morphine is recommended for pain relief for moderate or severe pain	f	82	36			21	1.71	1.05
	%	59.0	25.9			15.1		
The use morphine for adult cancer pain relief is in accordance of WHO Cancer Pain Relief guidance.	f	14	100	4	16	5	2.26	.921
	%	10.1	71.9	2.9	11.5	3.6		

From Table above, 40.3% (56) of the participants strongly agreed that morphine-related adverse effects are normally considered before using it for adult cancer pain relief and 18.7% agreed with a mean of 2.59 and standard deviation of 1.62. The results also revealed that 24.5% (34) strongly agreed that morphine titration is used only as a rescue option for adult cancer pain relief and further 18.7% agreed with a mean of 3.30 and standard deviation of 1.70. In regards to clinic demographic data is normally considered during determining of morphine dosage, 17.3% (24) and 57.6% (80) strongly agreed and agreed respectively with a mean of 2.32 and standard deviation of 1.09.

The results revealed that 47.5% (66) strongly agreed that the clinical burden of cancer pain is significant in the assessment for use of morphine for adult cancer pain relief and additional 5.8% agreed with a mean of 2.74 and standard deviation of 1.79. Oral Morphine is recommended for pain relief for moderate or severe pain as indicated by 59.0% (82) of the participants who strongly agreed and 25.9% (36) who agreed. Lastly, 10.1% (14) and 71.9% (100) of the participants strongly agreed and agreed respectively that the use morphine for adult cancer pain relief is in accordance of WHO Cancer Pain Relief guidance with a mean of 2.26 and standard deviation of 0.921

### 3.4 Multinomial logistic regression analysis of the Criteria used to assess

Model 1 fitted the association between the dependent variable (morphine use) and the independent variable (criteria used) with those who use morphine as the reference category. Model 2 controlled for clinical experience of the participants. Model 3 controlled for education and Model 4 controlled for course about pain management. From the model fitting information in the analysis, the probability of the model Chi-square was less than the level of significance of 0.05 in the three models.

#### 3.4.1 Multinomial logistic regression analysis of the Criteria used to assess

Variable	Model 1	Model 2	Model 3	Model 4
<b>Use Morphine Versus Not Using Morphine</b>				
Criteria 1	.155*(.026-.942)	.164*(.027-.998)	.151*(0.023-0.981)	0.138*(0.02-0.977)
Criteria 4	1.604*(.21-12.249)	1.765*(.219-14.256)	1.745*(0.216-14.133)	3.145*(.281-35.128)
Criteria 5	.092*(.01-0.839)	.081*(.008-.812)	.087*(0.008-.894)	.048*(0.003-0.708)
Criteria 6	1.77*(1.633-7.068)	1.614*(1.699-7.408)	1.785*(1.526-7.24)	1.613*(1.526-8.352)
Experience		1.101*(.663-1.831)	1.113*(.665-1.863)	1.253*(.529-2.969)
Education			.864*(0.426-1.755)	.903*(0.433-1.883)
Course				3.313*(.736-14.918)
Pseudo R-square	0.269	0.271	0.273	0.308

**Note:** # p < 0.10; \*p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001; 95% confidence interval in parentheses

From Model 1 in Table 4.23, criteria 1, 4, 5 and 6 were significant in differentiating those participants who use morphine and those who do not use morphine in cancer pain management (p < 0.05). Participants who agreed that morphine-related adverse effects are normally considered before using it for adult cancer pain relief were less likely to use morphine in pain management by 84.5% (RRR=0.155, P=0.043, C. I=0.026-0.942). However, the results also revealed that participants who



agreed that the clinical burden of cancer pain is significant in the assessment for use of morphine for adult cancer pain relief were more likely to use morphine in pain management by 60.4% (RRR=1.604, P=0.049, C. I=0.21-12.249). In regard to Oral Morphine is recommended for pain relief for moderate or severe pain, those participants who agreed with this criteria were less likely to use morphine by 90.8% (RRR=0.092, P=0.034, C. I=0.01-0.839). Lastly, participants who agreed that the use morphine for adult cancer pain relief is in accordance of WHO Cancer Pain Relief guidance were more likely to use morphine in pain management by 77.1% (RRR=11.07, P=0.014, C.I=0.21-12.249). In model 2 which controlled for experience, criteria 1, 4, 5 & 6 were all significant (P<0.05) in differentiating those that would use morphine in cancer pain management. The relative risk ratio for criteria one increased from 0.155 to 0.164 implying when experience is taken into consideration, those participants who agreed that Morphine-related adverse effects are normally considered before using it for adult cancer pain relief are less likely to use morphine by 83.6%. Similarly, the relative risk ratio for criteria four increased from 1.604 to 1.765 postulating that those participants who agreed that clinical burden of cancer pain is significant in the assessment for use of morphine for adult cancer pain relief are more likely to use morphine by 76.5%. Relative risk ratio for criteria five reduced from 0.092 to 0.081 implying that those participants who agreed that oral Morphine is recommended for pain relief for moderate or severe pain were less likely to use morphine by 91.9%. Lastly, the relative risk ratio for criteria six reduced from 1.77 to 1.614 implying that those participants who agreed that the use morphine for adult cancer pain relief is in accordance of WHO Cancer Pain Relief guidance were more likely to use morphine by 61.4%.

In model 3 which controlled for education, criteria 1, 4, 5 & 6 were all significant (P<0.05) in differentiating those that would use morphine in cancer pain management. The relative risk ratio (RRR) for criteria one reduced from 0.164 to 0.151 suggesting that when education is taken into consideration, those participants who agreed that Morphine-related adverse effects are normally considered before using it for adult cancer pain relief are less likely to use morphine by 84.9%. Similarly, the relative risk ratio for criteria four decreased from 1.765 to 1.745 implying that those participants who agreed that clinical burden of cancer pain is significant in the assessment for use of morphine for adult cancer pain relief are more likely to use morphine by 74.5%. Relative risk ratio for criteria five increased from 0.081 to 0.087 implying that those participants who agreed that oral Morphine is recommended for pain relief for moderate or severe pain were less likely to use morphine by 91.3%. Lastly, the relative risk ratio for criteria six increased from 1.614 to 1.785 suggesting that those participants who agreed that the use morphine for adult cancer pain relief is in accordance of WHO Cancer Pain Relief guidance were more likely to use morphine by 78.5%.

In model 4 which controlled for course on pain management, criteria 1, 4, 5 & 6 were all significant (P<0.05) in differentiating those that would use morphine in cancer pain management. The Odd ratios (OR) for criteria one decreased from 0.151 to 0.138 implying when course on pain management is taken into consideration, those participants who agreed that Morphine-related adverse effects are normally considered before using it for adult cancer pain relief are less likely to use morphine by 86.2%. Similarly, the odd ratio for criteria four increased from 1.745 to 3.145 implying that those participants who agreed that clinical burden of cancer pain is significant in the assessment for use of morphine for adult cancer pain relief are more likely to use morphine by 214.5%. Odd ratio for criteria five reduced from 0.087 to 0.048 implying that those participants who agreed that oral Morphine is recommended for pain relief for moderate or severe pain were less likely to use morphine by 95.2%. Lastly, the odd ratio for criteria six reduced from 1.785 to 1.613 implying that those participants who agreed that the use morphine for adult cancer pain relief is in accordance of WHO Cancer Pain Relief guidance were more likely to use morphine by 61.3%.

### **3.5 Use morphine by HCPs to relief cancer pain**

The study sought to find out whether the participants use morphine to relief cancer pain. Majority of the participants as indicated by 89.9% (125) have been using morphine to relief cancer pain as compared to 10.1% (14) who did not use morphine to relief cancer pain.

#### **3.5.1 Do you use morphine to relief cancer pain?**

	<b>Frequency</b>	<b>Percent</b>
Yes	125	89.9
No	14	10.1
Total	139	100.0

#### **3.5.2 Multiple Linear Regression Model**

The study performed ANOVA and regression analysis to estimate the relationships between the study variables. The study results were as tabulated in table 4.24 and table 4.25.

## ANOVA Model

Model Summary							
Model	R	R Square	Adjusted Square	R	Std. Error of the Estimate	F	Sig.
1	.936 <sup>a</sup>	0.877	0.868		0.0868	99.676	0.000 <sup>b</sup>

The ANOVA model indicated the simple correlation was 0.936 which indicates a degree of correlation. The total variation in morphine use in cancer pain relief was 87.7% explained by determinants (knowledge, factors and criteria) (R Square=0.877).

The study results further revealed that the ANOVA model predicted morphine use in cancer pain relief significantly well ( $p=0.000^b$ ). This indicated the statistical significance of the regression model that was run and that overall the regression model statistically significantly predicted the morphine use in cancer pain relief (i.e., it was a good fit for the data).

### 3.6 Relationship between Determinants and Morphine use in cancer pain relief

#### Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error			
(Constant)	0.369	0.224		1.648	0.105
Knowledge of HCP	0.263	0.024	0.534	10.744	0.001
Factors influencing	0.17	0.026	0.319	6.604	0.010
Criteria used	0.231	0.024	0.476	9.876	0.013

a. Dependent Variable: Morphine use in cancer pain relief

The regression equation generated for the study was as follows.

$Y$  (Morphine use in cancer pain relief) = 0.369 (Constant) + 0.534 (Knowledge of HCP) + 0.319 (Factors influencing morphine use) + 0.476 (Criteria used) + 0.224 (Std Error).

From the regression equation, knowledge of HCP was the most important variable to morphine use in cancer pain relief contributing 53.4 percent to morphine use in cancer pain relief. Factors influencing and criteria used contributed 47.6% and 31.9% to morphine use in cancer pain relief respectively.

The regression equation further revealed that there was a significant relationship between knowledge of HCP and morphine use in cancer pain relief ( $p=0.001$ ); there was a significant relationship between factors influencing morphine use and morphine use in cancer pain relief ( $p=0.010$ ); there was a significant relationship between criteria used and morphine use in cancer pain relief ( $p=0.013$ ).

## 4. DISCUSSION OF FINDINGS

Various criteria were considered in this study in the use of morphine for cancer pain management. However, criteria on morphine-related adverse effects are normally considered before using it for adult cancer pain relief. The clinical burden of cancer pain is significant in the assessment for use of morphine for adult cancer pain relief, and in this case, oral Morphine is recommended for pain relief for moderate or severe pain. The use of morphine for adult cancer pain relief is in accordance to WHO. Cancer Pain Relief guidance were significant criteria on differentiating those participants who used morphine to relieve pain from those who do not use in model 1. Therefore, those participants who considered these criteria were not likely to use morphine to relieve cancer pain as compared to those who used morphine.

In model two, experience was controlled, while in model three education of the participants was controlled. In the last model (4) course on pain management was controlled. In models 2, 3 & 4, the identified criterion remains significant in differentiating those participants who used morphine from those who did not use it. It was also revealed that patients can still suffer acute exacerbation of pain even when using morphine and this influenced their usage of morphine to relieve cancer pain among adult in Kakamega County General Hospital. Similarly, breakthrough pain can either be predictable or spontaneous when the patient is on morphine and it also influenced participants' decision to use morphine to relieve cancer pain.

The study results on the criteria used to assess need for use of morphine for adult cancer pain relieve revealed that majority of the respondents were of the view that the most likely reason a patient with pain would request increased doses of pain medication was that the patient experiences increased pain; Hydromorphone (Dilaudid) was the useful for treatment of cancer pain; that the patient is the most accurate judge of the intensity of the patient's pain and that patients should be individually assessed to determine cultural influences. This means that the best approach for cultural considerations in caring for patients in pain is through assessment of the patients individually to determine the cultural influences.

These findings are in consonance with findings by Vervat *et al.*, (2011) who asserted that the appropriate dose is one that relieves a patient's pain throughout its dosing interval without causing unmanageable side effects. The initial dose should be based on the patient's level of pain and the efficacy of prior analgesic therapy. Subsequent therapy should be based on a continuing assessment of the efficacy of therapy, with the dosage titrated upward as needed. Rescue dose of medications other than the regular basal therapy must be prescribed for break through pain episodes. Sixty-nine percent of patients rate their worst pain at a level that impaired their ability to function (Ripamonti et al. 2012). Patients must be encouraged to communicate with the physician and/or the nurse about their suffering, the efficacy of therapy and side effects and to not consider morphine as a therapeutic approach for dying patients, thus contributing to reduce opioidophobia. Patient involvement in pain management improves communication and has a beneficial effect on patients' pain experience.

Morphine is the last step opioid most commonly used to control severe pain, because of its wide availability, varied formulations, and well-characterized pharmacologic properties (Twycross, 2011). Controlled-release formulations of morphine for oral administration at 12-hour intervals have been the mainstay of the control of chronic cancer pain for the past decade because of the ease of their administration and titration (Hanks, 2007). Considering the WHO's 3-step ladder for pain management, oral route is considered as the preferred route of administration (Cherny *et al.*, 2012). There is no one optimal or maximal dose of morphine as analgesic (Twycross, 2011) which means, the dose is individualized.

## 5. CONCLUSION

Health care providers do not effectively use morphine in terms of dosage and dose adjustment. Yet, a third of patients with cancer present with pain at the time of diagnosis, and approximately two-thirds of patients with advanced cancer experience pain (Vissers, 2011). The study concluded that patients can still suffer acute exacerbations of pain even when using morphine. Criteria of Morphine Use in Cancer Pain Management should include considering: morphine-related adverse effects; clinical burden of cancer pain; break through pain relief; and, oral morphine recommendation for pain relief for moderate or severe pain and accordance of World Health Organization Cancer Pain Relief guidance. This is because morphine is the mainstay of analgesic therapy and is classified according to their ability to control pain of moderate to severe intensity. Despite availability of oral morphine, there is a gap in level of opioid utilization and statistical data for medical opioid use leaving people with cancer to suffer with pain. Therefore, it's important to establish determinants of morphine use by health care providers on adult cancer pain management.

Health care providers play an important role in pain management and without adequate knowledge level and correct attitudes towards pain management, effective pain management will be hindered and this will retain the suffering of patients. Findings of this study will help in creating awareness on criteria of morphine use and demonstrate need for more emphasis on pain assessment and management. In addition to this, it will guide in safe prescriptions of analgesics and opioids in management of cancer pain.

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