Tanzania Journal of Health Research
Volume 16, Number 1, January 2014
Doi: http://dx.doi.org/10.4314/thrb.v16i1.7

Postoperative pain management outcomes among adults treated at a tertiary hospital in Moshi, Tanzania

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Abstract: Inadequately controlled postoperative pain (POP) subjects individuals to complications which may be fatal or leading to prolonged hospital stay. Complications from inadequately controlled POP may alleviate the existing shortage of hospital human resource for health in health facilities in developing countries. The burden and challenges of POP management at health facilities in Tanzania is not known. This study was therefore carried out to evaluate postoperative pain management and patient satisfaction with care given at Kilimanjaro Christian Medical Centre (KCMC). This descriptive prospective hospital based study, was conducted at the Kilimanjaro Christian Medical Centre in Moshi, Tanzania from August 2011 to March 2012. POP and patients' satisfaction with pain relief scores were assessed using pain and satisfaction numerical rating scales. Pain assessment was done at 24 hours and 48 hours after operation. Satisfaction was assessed on 48 hours post surgery. All adult patient aged 18 years and above whom were operated in general surgery ward, KCMC and accepted by signing consent were involved in the study. Patients suffering from nervous system were excluded from the study. A total number of 124 patients were recruited and participated in the study. Sixty-five (52.4%) were males and 59 (47.6%) females. Mean age (SD) years 40.9 ± 15.4. The largest percentage of individuals had mild pain both at rest (45.2%) and during movement (44.4%). Patients whose analgesia was administered intravenously were more likely to be satisfied with POP management than those given intramuscular analgesics (*P*= 0.028). Analgesia used in combination increased significantly the proportion of pain free individuals 48 hours postoperative compared to 24 hours postoperative (*P*= 0.003). In conclusion, the postoperative pain management is still a challenge in our centre as nearly half of the patient had mild pain in the first 48 hours post surgery.

Keywords: Postoperative pain, adults, treatment, satisfaction, hospital, Tanzania

Introduction

Postoperative pain (POP) is a form of acute pain following surgery. It results from tissue injury during surgical procedure like skin incision, tissue dissection, manipulation and traction. The POP is one of the immediate postoperative complications. Globally the prevalence of POP ranges from 50% to 75% of postoperative patients (Philip *et al.,* 2007). In United Kingdom (UK), a recent study has reported that 30% of postoperative patient experienced pain post surgery (A. Hussain, unpubl).In sub-Saharan Africa, there are variations of POP prevalence reported from one place to another. In Nigeria, one study reported that 95% of postoperative patients experienced various degrees of POP (Kolawole *et al.*, 2003). In Kenya, a study conducted in 2000 at Kenyatta national hospital on postoperative pain management following major abdominal and thoracic operations found that 60% of patients experienced pain postoperative (Ocitti & Adwok, 2000). In Tanzania, the pain following surgery accounted for 40% of all postoperative complications at Muhimbili National Hospital (Pole pole D & Mwafongo V, 2011).

The inadequate control of pain creates anxiety to patient, fear to ambulate and hence subjecting an individual to postoperative complications of which may be fatal (Wai, 2007). A postoperative patient who is experiencing pain cannot ambulate, therefore may develop deep vein thrombosis. Again a patient who is experiencing chest pain may have suppression of cough reflex, therefore develop lung infection (Chaturvedi & Chaturvedi, 2007). A patient who underwent

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thoracotomy can develop lung atelectasis due to fear of doing chest physiotherapy (Wai, 2007; Chaturvedi & Chaturvedi, 2007).

Health staffs like nurses are supposed to deliver analgesia to patients on time as prescribed. The existing problems of shortage of health staff may result in delay in giving analgesia to patient hence interfere with patient pain control. Poorly controlled postoperative pain delays patient recovery therefore increase number of days of hospital stay. Relatively small number of hospital bed capacity in surgical ward (35 beds) and prolonged hospital stay results in overcrowding of inpatient. The end result of this vicious cycle is poor health care delivery. Adequately controlled POP facilitates reduction of postoperative complications and hence quick recovery (Chaturvedi & Chaturvedi, 2007).

In many parts of the world postoperative pain management is challenging and the problem is big (Naccache, 2008). Information on magnitude of POP management outcomes and associated challenges in Tanzania is unknown. Therefore there is a need to explore postoperative pain management outcomes and its encountered challenges in our setting. In so doing we may have a starting point on ways of tackling this problem and ultimately improve health care delivery in our hospitals.

Materials and Methods

Descriptive prospective hospital based study was conducted at the Surgical Ward of the Kilimanjaro Christian Medical Centre. KCMC is a referral centre in northern Tanzania with a catchment area of 15 million people, mainly from northern Tanzania and some patients are referred from Republic of Kenya. Postoperative pain management is initiated by a surgeon who operated the patient .The analgesia prescription is based on surgeon preferences and availability of analgesics in the hospital. The commonest analgesics prescribed are tramadol , pethidine diclofenac and paracetamol in the form of intramuscular, intravenous and tablet. The patient analgesia may be changed or added after review by attending doctor normally 24 hours postoperative.

The study was conducted for a period of eight months from August 2011 to March 2012. A purposeful sampling technique was used where 124 postoperative adult patients 18 years and above whom fulfilled the inclusion criteria were involved in the study. Data was collected using a Kiswahili translated and tested structured questionnaire. The independent variables included age, sex, education level and occupation. The dependent variables included postoperative pain and satisfaction with postoperative pain management.

The POP assessment was conducted at 24 hours and 48 hours post surgery. The POP was assessed using pain numerical rating scale (NRS) -a linear tool widely used to measure pain adults (Fletcher *et al.*, 2008; Mitera *et al*., 2010). In the current study, assessment was done when a patient was at rest and during movement, change of position or physiotherapy. Patient was asked to score his pain during assessment. The level of pain ranged from 0 when a patient felt no pain at all to 10 when experiences severe pain. Pain Score obtained was put into the following pain groups a= no pain (0), b= mild pain (1-4), c= moderate pain (5-6) or d= severe pain (7-10). The pain scores group letters obtained was entered in a data sheet.

Management of a postoperative patient includes pain treatment. If postoperative pain is controlled, patient gets relief and subsequently satisfied. Patient satisfaction with pain treatment can indirectly be used to measure the level of pain control (Kolawole & Fawole, 2003). Patient satisfaction with pain control treatment in this study was assessed using satisfaction scale on second day post surgery. The satisfaction scale is similar to pain NRS described above (Fletcher D *et al*., 2008). Patient was asked how much satisfied he was with pain control treatment given .He had to score the level of satisfaction from 0 if was not satisfied at all to 10 if was completely satisfied. Patient satisfaction scores obtained were grouped into a= not satisfied at all (0), b= mild satisfied (1-

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4), c=moderately satisfied (5-6) or d=completely satisfied (7-10). The satisfaction scores group letter obtained was entered in a data sheet.

Data analysis

Pain and satisfaction scores obtained were entered into computer software SPSS version 16 for analysis. Results obtained were presented into frequencies, mean, standard deviation (SD) proportions, and percentage which were summarized into tables and figures. The association between variables was tested using Chi square test and odds ratio in 95% CI. A p-value of < 0.05 was considered significant.

Ethical consideration

Permission to conduct this study was sought from Medical Director of KCMC. Research ethical clearance was obtained from KCMC Ethics Committee of Tumaini University Makumira. The aim of the study and the way it was going to be conducted was explained to the patient who was willing to participate in the study. Patient information obtained during this study was treated confidently and not used for other purposes. Those accepted were given a consent form to sign. Treatment assurance was given to those who were not willing to participate in the study.

Results

A total number of 124 patients were recruited, 65 (52.4%) were males and 59 (47.6%) females. The mean age was 40.9 ± 15.43 years with a median of 38 year. Majority 68 (54.8%) of study participants were self employed engaged in either business or subsistence farming. Thirty-seven (29.8%) were employee and 19(15.4%) were non employee. Majority of patients had primary school education 67(54%), followed by those who had secondary school or higher 42(33.9%).The remainder didn't attend formal school.

Out of total patients, 106(85.5%) patients experienced various degree of POP 24 hours post surgery at rest. The remainder 18 (14.5%) were pain free. Among the patients, 96 (77.4%) of them experienced various degree of POP 48 hours post surgery at rest. The remainder 28 (22.6%) experienced no pain. The distribution of pain scores obtained at rest namely none, mild, moderate and severe pain were 18 (14.5%), 56 (45.2%), 33 (26.6%) and 17 (13.7%), respectively (Figure 1).

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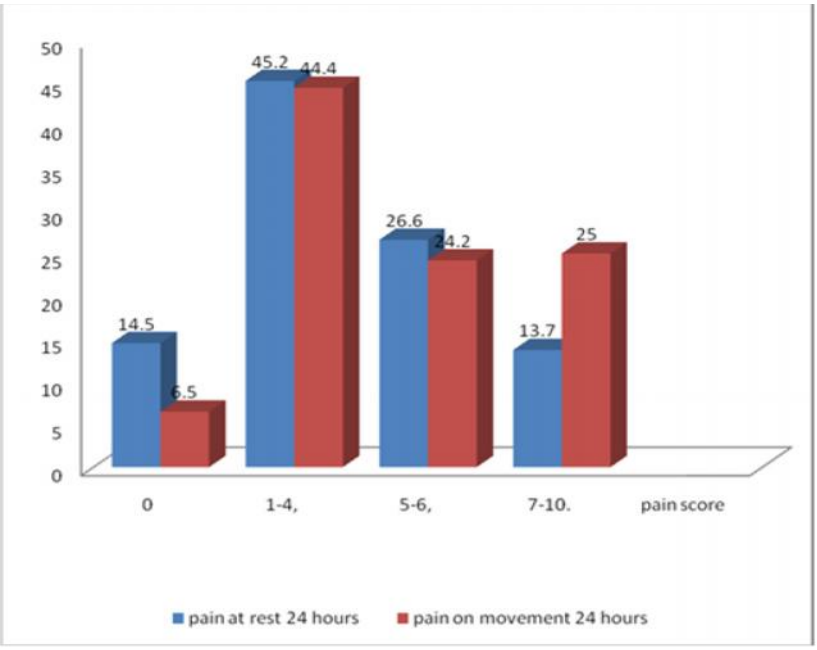

Figure 1: Percentage distribution of patients' pain scores done at 24 hours postoperative

Based on assessment done at 24 hours, the largest percentage of individuals had mild pain (1-4) both at rest and during movement, 56 (45.2%) and 55(44.4%) respectively (Figure 1). Pain scores percentages obtained on assessment conducted 24 hours post surgery at rest were slightly greater than scores obtained during movement, position changes or physiotherapy; except for severe pain score (7-10).

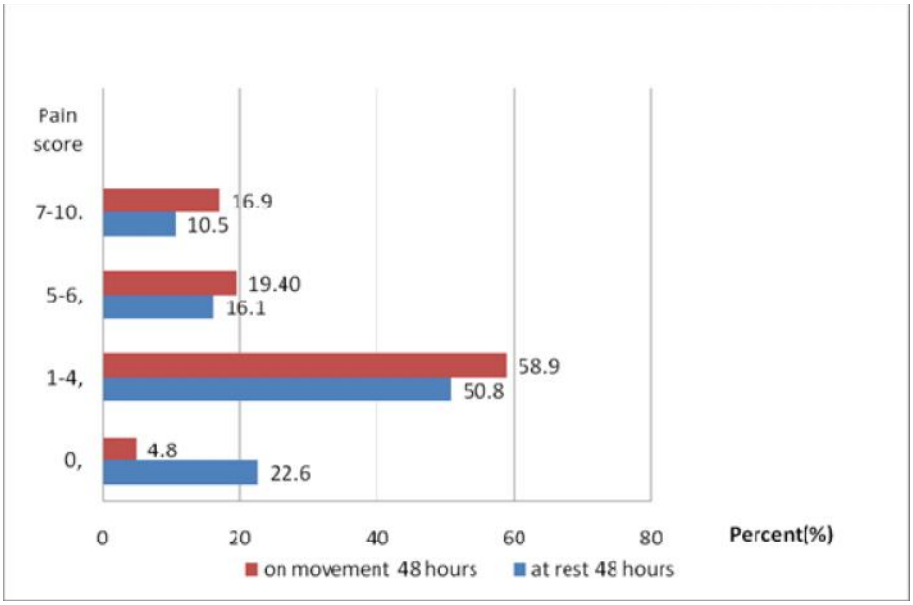

Figure 2: Percentage distribution of patients' pain scores done at 48 hours postoperative

POP assessment was conducted at 48 hours postoperative when a patient was at rest and during ambulation or physiotherapy. With the exception of the patients whose POP scored 0 (no pain) at

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rest and during movement, the largest proportion of the candidates experiences POP when the assessment was conducted on movement than when at rest (Figure 2).

Table 1: Patient's type of surgery associated with postoperative pain scores

Type of surgery	Pain at 24 hours		Pain at 48 hours		Total N (%)
	No(n =18)	Yes(n=106)	No(n=28)	Yes(n=96)	
	N (%)	N (%)	N (%)	N (%)	
Head or neck	5(13.5)	32(86.5)	7(18.9)	30(81.1)	37(100)
Perineal or lower limb	4(23.5)	13(76.5)	5(29.4)	12(70.6)	17(100)
Abdominal	8(15.1)	45(84.9)	14(26.4)	39(73.6)	53(100)
Chest	1(5.9)	16(94.1)	2(11.8)	15(88.2)	17(100)
	P = 0.536		P = 0.509		

The majority of patients who had chest surgeries experienced various degrees of POP at 24 (94.1%) and 48 hours (88.2%) compared to other types of surgeries. Patients who had perineal or lower limb surgery formed least percentage of those with various degrees of pain (Table 1). Intramuscular injection was the commonest route of administration of analgesia, accounting for 154 (76.6%). (Table 2) Less than half (41.1%) of the patients were moderately satisfied with postoperative management given. Some 7.3% of the study participants were completely unsatisfied with postoperative management given.

Table 2: Route of analgesia and demography associated with patient satisfaction of postoperative pain management

Variable	Total satisfaction			OR	95% CI	P value
	Yes	No	Total			
	N (%)	N (%)	n (%)			
Age >35 years	27 (36)	48 (64)	75 (100)			
Age ≤35 years	9 (18.4)	40 (81.6)	49 (100)	0.4	0.169-0.948	0.043
IM analgesia	25 (24.8)	76 (75.2)	101 (100)			
IV analgesia	11 (47.8)	12 (52.2)	23 (100)	2.79	1.09-7.09	0.028
Male	17 (26.2)	48 (73.8)	65 (100)			
Female	19 (32.2)	40 (67.8)	59 (100)	1.34	0.616-2.918	0.459
Secondary or higher	18 (42.9)	24 (57.1)	42 (100)			
Primary and below	18 (22)	64 (78)	82 (100)	0.375	0.168-0.838	0.015
Total	36 (29)	88 (71)	124 (100)			

In our findings, the difference was statistically significant between young adults ≤ 35 years and adults >35 years old with Odds ratio 0.4 in 95% CI (0.169-0.948) and p value of 0.043. The patients whose analgesia was administered intravenously were significantly more likely to be satisfied with POP management than those who had analgesia administered intramuscularly (p=0.028) (Table 2). The proportion of patients satisfied with pain management was increasing with the increase in patient level of education

Table 3: The association of postoperative pain with analgesia combination commonly used postoperative

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Attribute	Analgesia combination			OR	95% CI	P- value
	Yes n (%)	No N (%)	Total N (%)			
Pain free in 24 hrs	6 (33.3)	12 (66.7)	18 (100)	0.83	0.29 – 2.37	0.8
Pain in 24 hours	40 (37.7)	66 (62.3)	106 (100)			
Pain free in 48 hrs	17 (60.7)	11 (39.3)	28 (100)	3.57	1.49-8.56	0.003
Pain in 48 hours	29 (30.2)	67 (69.8)	96 (100)			
Total	46 (37.1)	78 (62.9)	124 (100)			

Analgesia used in combination (more than one analgesia used to one patient at the same time for the purpose of controlling pain) increased significantly the proportion of pain free individuals 48 hours postoperative compared to 24 hours postoperative (P = 0.003) (Table 3).

Table 4: Frequency distribution of analgesia per dose per interval used postoperative

Analgesic	Dose (mg)	Analgesia dose interval				No. of patients
		Immediately	6 hourly	8 hourly	12 hourly	
Pethidine	50	1	34	14	1	50
Pethidine	100	-	30	23	-	53
Diclofenac	50	-	-	11	-	11
Diclofenac	75	-	-	42	-	42
Tramadol	50	-	4	22	-	26
Tramadol	100	-	3	16	-	19
Total						201

Pethidine was the most commonly used analgesic, followed by diclofenac, tramadol and paracetamol in the first 48 hours post surgery (Table 4). Different strengths of analgesia were used with or without combination. Pethidine was commonly used as 50 mg administered six hourly. Diclofenac was used by 53 patients with intramuscular 75 mg being the commonest, used by 42 of postoperative patients. Among tramadol analgesia used, tramadol 50 mg eight hourly was the commonest, used by 22 patients.

Discussion

Postoperative pain (POP) experienced in the first 48 hours post surgery is prevalent in our setting. Our study findings have shown that, among the patients involved in the study, 85.5% and 77.4% of patient experienced POP ranging from mild to severe in 24 and by 48 hours post operative respectively. Similar findings have been reported in the USA by Hutchison (2007). A relatively higher POP prevalence has been reported in Sudan (Bagi, 2003). Our study reports prevalence of moderate to severe pain at rest at 24 hours post operative to be 40.3%. The methodological difference between our study and the study in Sudan (Bagi, 2003) may have accounted for the differences between the prevalence rates observed. We assessed pain at 48 hours while Bagi (2003) assessed at 18 hours. In this study, the proportion of patients who had their pain assessed during movement at 24 hours and 48 hours respectively showed a difference in their presentation when compared to assessment done at rest in the same period of time. The postoperative pain scores percentages obtained when assessment conducted at rest at 24 hours exceeded that was obtained on movement in pain free

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individuals, mild and moderate pain with the exception of severe pain. This was contrary to what was observed in 48 hours pain assessment scores percentages at rest and during movement. The fact that during the first 24 hours postoperative, most of these patients were still immobile therefore hadn't started ambulation. Therefore the assessment scores obtained were mainly from patient position changes and not full ambulation as that was obtained from 48 hours of assessment. When these patients were doing physiotherapy, their pain perception was destructed, hence their cognitive focused away from pain, as a result POP scored less than that was obtained at rest. Also physiotherapy may have contributed to muscle relaxation thereby reducing muscular tension which reduces pain perceived during this period.

In the current study findings, there was association of type of surgery a patient underwent with POP perceived, though it was not statistically significant. Patients who had major surgery like thoracotomy were found to experience more pain post surgery compared to the ones who had other types of surgery. Such patients with major surgeries should have special or multimodal analgesia approaches of controlling pain. For instance application of local analgesia at wound site, intercostal nerve blocks by local anaesthesia in thoracotomy, and other analgesia types (Philip *et al.*, 2007; Chaturvedi & Chaturvedi, 2007). This may reduce the POP prevalence post major surgery.

Majority of postoperative patients in the current study received analgesia administered through intramuscular route, with only a few receiving intravenous analgesics. This method has an impact on pain perception and affects patient's satisfaction. This probably contributed to a large POP prevalence rate observed in this study. It was found that a patient who had analgesia administered intravenously was more likely to be satisfied with POP treatment given compared to the one whom analgesia was administered intramuscularly. Analgesia administered intramuscularly has been associated with increased postoperative pain few hours post surgery even when potent ones are used (Hutchison, 2007). In a study conducted in Nigeria, Kolawole *et al*. (2003) reported a higher prevalence of moderate to severe POP than that observed in our study. The difference in prevalence between our study and the Nigerian study is likely to be due to the difference in the route of analgesia administration used. The main problem with intramuscular route of analgesia administration is the unpredictable absorption of the drug particularly after surgery. Peripheral perfusion post surgery may be reduced and therefore uptake of analgesia from muscles prolonged, giving an uneven level of analgesia in the body (Ocitti & Adwok, 2000).

Post operative pain management effectiveness can be assessed using the level of satisfaction a patient has (Philip, 2007; Chaturvedi & Chaturvedi, 2007). In our study findings, despite a high prevalence rate of POP, the percentage of patient satisfied with POP treatment was very high .Similar findings have been reported in Sweden (Svesson, 2001). A relatively slightly lower satisfaction rate has been reported from a study in Finland (Niemi-Murola *et al*., 2007). Both higher POP and satisfaction rates have been reported in other studies elsewhere (Kolawole & Fawole, 2003; Sauaia *et al*., 2005). The expected pattern is that when the prevalence of POP is high, then the prevalence of satisfaction would be relatively low and vice versa. This poses a challenge of using patient satisfaction score as a means of assessing effectiveness of POP treatment in our settings as previously described (Kolawole & Fawole, 2003).

Level of satisfaction in our study was influenced by patient's level of education. The proportion of patients satisfied with pain management was increasing with the increase in patient level of education. The difference was evident in patients with secondary school and college education compared to patients with primary school education and below. In this study patient's age was observed to influence satisfaction to POP management. The rate of satisfaction was differed between young adults and adult patients. The findings are similar to those reported by Bonnin (2011) who emphasized the association of POP with the age of the patient.

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The most common analgesic drugs used in the first 24 to 48 hours post operative were pethidine and tramadol. The analgesic drugs were used either alone or in combination with each other. The limited availability of more analgesic drugs may have decreased freedom to choose from a range of available analgesia or prescriber's preference dominated the choice of analgesics used during this study period. Affordability and availability of these drugs in resource limited countries may have contributed too. This practice of pethidine prescription is far from its pharmacological facts. Studies have shown that pethidine is ineffective in controlling POP in about 50% of population and has a short half life of about 4 hours (Clegg-Lamptey & Hodasi, 2005). Not surprising that in the current study, despite of pethidine being the commonest and most potent analgesia used for controlling POP in the first 48 hours, the prevalence of POP remained to be high (Edwards *et al.*, 1982). The findings of this study also concur with findings reported from Nigeria (Faponle *et al*., 2001).

In conclusion, the postoperative pain is prevalent in the first 48 hours of surgery at KCMA. The mode of analgesia prescription for postoperative patient should be modified. The use of analgesics should follow their pharmacological action in order to optimize their pain control effect. The analgesics may be used in combination taking advantage of their synergistic effect so that we optimize pain control to postoperative patients.

Acknowledgements

We are also thankful to KCMC administration for allowing us to use their facilities in conducting this study. We appreciate the valuable contribution and support of staffs in general surgery ward KCMC. This study received financial support from the Ministry of Health and Social Welfare, Tanzania.

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