PRIMARY CARE & HEALTH SERVICES SECTION

Original Research Article

Prescription and Administration of Opioids to Hospital In-patients, and Barriers to Effective Use

Bridin P. Murnion, MBChB, FRACP, FFPMANZCA,*†‡
Danijela Gnjidic, BSc(Hons),†‡ and
Sarah N. Hilmer, MBBS, PhD, FRACP†‡

*Drug Health Services Royal Prince Alfred Hospital,

†Department of Clinical Pharmacology, Royal North Shore Hospital, Sydney, and

‡Faculty of Medicine, University of Sydney, NSW, Australia

Reprint requests to: Bridin Murnion, MBChB, FRACP, FFPMANZCA, Drug Health Service, Royal Prince Alfred Hospital, Missenden Rd, Camperdown, NSW 2050, Australia. Tel: +61 2 9515 6419; Fax: +61 2 9515 8970; E-mail: bmurnion@med.usyd.edu.au.

Abstract

Objective. This study aimed to describe prescribing and administration of opioids in a tertiary referral teaching hospital. Secondary aims were assessment of staff knowledge of opioid pharmacology and available preparations, and of perceived barriers limiting opioid use.

Design. A cross-sectional survey of in-patients requiring opioid analgesia was performed. An anonymous semi-structured questionnaire was administered to medical and nursing staff.

Setting. Australian tertiary referral teaching hospital.

Patients. All patients prescribed opioids on study wards over 3 months (N = 190).

Results. Oxycodone was the most frequently prescribed opioid (51.4%). The majority (64.7%) of participants had incomplete pain relief, which was significantly associated with having opioid related side effects. There was no association between pain relief and prescribed daily dose or received daily dose of opioids. Limited understanding of opioid preparations, tolerance, and dependence was demonstrated by staff. The most common perceived barriers to opioid use included difficulties in identifying the right dose, staff time required to prescribe and monitor, and large numbers of preparations. While prescription of inadequate doses was perceived as a barrier, this study identified that submaximal doses were administered. An opioid educational session improved knowledge of opioid formulations.

Conclusion. The majority of participants had incomplete pain relief and the maximum prescribed doses of opioids were not administered. Reported barriers included staff knowledge of opioid dose titration and opioid preparations, and time constraints. Identified barriers included poor knowledge of opioid preparations.

Key Words. Opioid; Prescription; Administration; Barriers; Knowledge

Introduction

Significant pain is common in both medical and surgical acute hospital inpatients and is often undertreated. Pain of at least moderate severity has been described in 86% of patients post-operatively [1] and in 43% of general medical in-patients [2]. Patient-related factors that may contribute to undertreatment of pain include inadequate patient information, expectations, knowledge of pain and its treatment, and underreporting of pain [1,3]. Staff factors may include inadequate pain assessment, analgesic prescribing and administration, expectations, knowledge and skill base, and concerns about adverse events associated with analgesic medications [1–3].

Opioid analgesics have a pivotal role in the management of pain. Poor prescribing or administration of opioids may contribute to inadequate treatment of pain [2]. Many factors interact to influence prescribing behavior for any medication including patient factors, cost, personal habit,

therapeutic traditions, influence from colleagues, guidelines, and marketing [4]. Factors which may impact specifically on opioid prescribing include concerns about potential adverse events such as constipation, respiratory depression [5,6], tolerance, addiction, and associations with drug abuse [6,7]. Prescriber training, experience, familiarity with the medication, and fear of regulatory scrutiny and patient ethnicity and age may also influence opioid prescribing [8–11]. There is much variability in opioid prescribing among physicians, and indeed when given the same clinical scenarios, physicians can have opposing interpretations of the same cues [12]. Administration of opioids by nurses depends on nurses' knowledge of pain assessment and opioid titration, and attitudes toward pain relief and opioids [13–16].

The aim of this study was to identify prescribing and administration patterns of opioids in a tertiary referral university teaching hospital. Secondary aims were to assess staff knowledge of opioid pharmacology and available preparations, and to assess perceived barriers.

Methods

A cross-sectional survey of patients admitted to orthopedic, acute geriatric medicine and oncology wards at Royal North Shore Hospital, a tertiary referral university teaching hospital in Sydney, Australia, was conducted from June 1 to September 1 2006. All patients admitted were screened. Inclusion criteria were that a patient be prescribed opioid analgesics, give informed written consent, and be able to engage in an interview in English. Exclusion criteria were no prescription of opioids, inability to speak English, severe cognitive or hearing impairment and age less than 18 years. The study was approved by the Northern Sydney Central Coast Health Human Research and Ethics Committee.

Data were collected from medication charts, medical notes, and interviews with patients. Maximal pain intensity was assessed using the visual analog scale (VAS) [17]. In patients unable to complete the VAS, the verbal numerical rating scale was used. The degree of pain relief was graded using the terms no pain relief, moderate pain relief and complete pain relief [17]. No pain relief and moderate pain relief were classified as incomplete pain relief.

Opioid doses were calculated as intramuscular/subcutaneous morphine equivalents according to equianalgesic dose tables from the Australian Medicines Handbook [18]. Data on tramadol was included. The prescribed daily dose (PDD) was calculated by adding the total regular and as required (PRN) opioid dose prescribed per day. Received daily dose (RDD) was calculated by adding the dose of regular and PRN opioids actually received by a patient per day. If the opioid dose and/or the frequency of administration were unavailable or unclear, they were excluded from the PDD and RDD calculation (N = 21 opioid prescriptions).

An anonymous semi-structured questionnaire was designed and administered to hospital medical and nursing staff to assess knowledge of opioids. The questionnaire was comprised of three sections [1] a series of true/false questions on knowledge of and attitudes to opioids and pain management, [2] identification of opioid preparations, and [3] a free text response to the question "What do you see as the main difficulty for opioid prescription in hospitals?" Interns and resident medical staff were administered the questionnaires during a teaching session on pain management by an investigator (B.M.). Other junior medical officers, registrars and consultant staff were given the questionnaire during departmental continuing education sessions, which were not related to opioids or pain management. Clinical Nurse Educators distributed the questionnaires to nursing staff.

Statistical Analyses

Data were recorded and analysed using SPSS (Version 14, Chicago, IL). Descriptive statistics were generated. The t-test and ANOVA were used to compare the differences between groups and to examine associations between continuous variables. The chi-square (χ^2) test was used for comparison of categorical variables. All tests were two tailed and statistical significance was set at $P < 0.05$.

Results

Of the 463 patients who were screened, 208 were prescribed opioids and 190 of these agreed to participate. The study population (N = 190) was predominantly Caucasian (91.1%) and female (60.5%) with a mean age of 61 ± 21 years (range 19–98) (Table 1). The most common presenting problems included trauma (36.8%), joint pain (24.7%), and back pain (14.2%). The mean numbers of medications and co-morbidities were lower in orthopedic patients than in geriatric medicine and oncology patients (not significant [ns]). The most common co-morbidities were arthritis (37%), hypertension (35%), depression (9%), and asthma (8%).

Oxycodone was the most frequently prescribed regular and PRN opioid (Table 2), with tramadol the second most common regular and morphine the second most common PRN opioid. Of 451 opioid prescriptions, pethidine was prescribed only twice. All participants (100%) were prescribed paracetamol, 23.6% received a nonsteroidal anti-inflammatory drug, 2.6% gabapentin and 1.6% pregabalin. In participants with more severe pain, compared to those with less severe pain, there were nonsignificant trends toward higher PDD and RDD of opioids (Figure 1a and b) and a higher proportion of those with more severe pain was prescribed both regular and PRN opioids (Figure 1c).

Of the 190 patients enrolled in the study, 123 (64.7%) had incomplete pain relief. Pattern of prescription was nonsignificantly associated with degree of pain relief. All participants who were prescribed only regular opioids had incomplete pain relief. Only those prescribed PRN or PRN with regular opioids reported complete pain relief.

Table 1 Characteristics of the patient sample (N = 190)

| Variable	Orthopedic Ward	Geriatric Ward	Oncology Ward	Total
Number of patients	139	29	22	190
Age (years)	56.4 ± 20.4	84.3 ± 7.4	59.7 ± 14.7	61.1 ± 20.8
Gender				
Female	79 (56.8)	25 (86.2)	11 (50)	115 (60.5)
Number of comorbidities	2.0 ± 2.1	3.8 ± 1.4	2.3 ± 1.8	
Number of medications	9.7 ± 3.9	12.6 ± 3.5	11.6 ± 4.5	
Ethnicity				
Caucasian	125 (89.9)	27 (93.1)	21 (95.5)	173 (91.1)
Asian	7 (5.0)	1 (3.4)	0 (0)	8 (4.2)
Other	7 (5.0)	1 (3.4)	1 (4.5)	9 (3.7)
Residence				
Home/retirement village	136 (97.8)	25 (86.2)	22 (100)	183 (96.3)
Hostel/nursing home	3 (2.2)	4 (13.8)	0 (0)	7 (3.7)
Smoking status				
Nonsmoker	74 (53.2)	16 (55.2)	94 (40.9)	99 (52.1)
Previous smoker	15 (10.8)	2 (6.9)	4 (18.2)	21 (11.1)
Current smoker	50 (36)	11 (37.9)	9 (40.9)	70 (36.8)
Alcohol consumption				
None	68 (48.9)	16 (55.2)	16 (72.7)	100 (52.6)
Once a week	19 (13.7)	0 (0)	1 (4.5)	20 (10.5)
1–2 standard drink/day	39 (28.1)	12 (41.4)	5 (22.7)	56 (29.5)
2–4 standard drinks	9 (6.5)	1 (3.4)	0 (0)	7 (3.7)
>4 standard drinks	4 (2.9)	0 (0)	0 (0)	4 (2.1)
Presenting problem				
Trauma*	56 (40.3)	13 (44.8)	1 (4.5)	70 (36.8)
Joint pain	44 (31.7)	2 (6.9)	1 (4.5)	47 (24.7)
Back pain	16 (11.5)	8 (2.8)	3 (13.6)	27 (14.2)
Cancer	2 (1.4)	0 (0.0)	14 (63.6)	16 (8.4)
Other	21 (15.1)	6 (20.7)	3 (13.6)	30 (15.8)
Chronic pain	70 (50.4)	11 (37.9)	16 (72.7)	97 (51.1)

* Trauma; falls and motor vehicle accidents.
Continuous variables are presented as mean ± standard deviation. Categorical variables are presented as number of participants (percentage within group).

Table 2 The prevalence of regular and as needed opioid prescriptions within each study ward

	Orthopedic Ward		Geriatric Ward		Oncology Ward		Frequency (% of Total)
Opioid	Reg	PRN	Reg	PRN	Reg	PRN	Total
Oxycodone	52	108	25	14	16	17	232 (51.4)
Tramadol	27	23	1	0	3	0	54 (12.0)
Morphine	3	100	2	10	1	13	129 (28.6)
Fentanyl	1	17	1	1	1	0	21 (4.7)
Buprenorphine	2	0	1	0	0	0	3 (0.7)
Methadone	1	0	0	0	1	0	2 (0.4)
Codeine	0	4	0	3	0	1	8 (1.8)
Pethidine	0	2	0	0	0	0	2 (0.4)
Total	86	254	30	28	22	31	451

Reg = regular opioid therapy; PRN = as required.

A

B

C
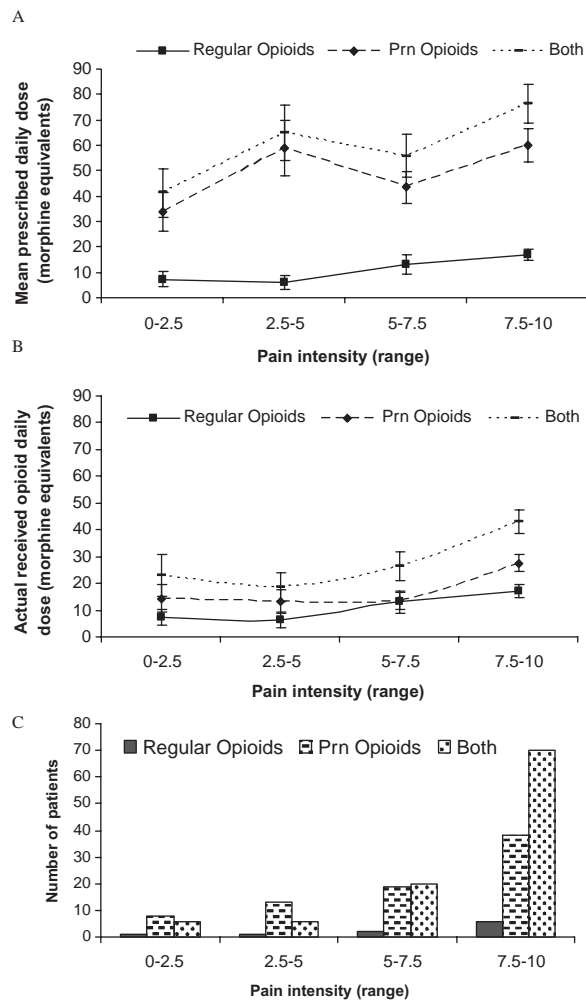
Figure 1 The association between pain intensity and (A) mean prescribed daily dose (PDD) of opioids; (B) mean received daily dose (RDD) of opioids (C) and the prescription pattern of opioids (PRN, as required).

However, even among those prescribed both PRN and regular opioids, the majority (51.2%) experienced incomplete pain relief. Of the 44 patients receiving PRN opioids via patient controlled analgesia (PCA) 16 reported complete pain relief, predominantly in the group who also received regular opioids (Table 3).

There was no association between PDD or RDD of opioids and the degree of pain relief. The proportion of prescribed opioid that was not administered, measured with the equation (PDD − RDD)/PDD, was slightly greater for those with complete pain relief (0.57 ± 0.31) than those with incomplete pain relief (0.45 ± 0.39, $P < 0.03$) (Table 3) (i.e., patients who had complete pain relief received a smaller proportion of their total prescribed opioid). The presence of acute vs chronic pain did not predict pain

relief (Table 3). Presence of side effects was associated with incomplete pain relief ($P < 0.05$). Commonly reported side effects included nausea (40%), dizziness (21.2%), vomiting (21.2%), sweating (15.3%), constipation (14.7%), itching (14.7%), and sedation (13.7%). No significant relationship was observed between pain control and the route of administration. Data on the associations between age, analgesia, side effects, and opioid dose from this study have been published previously [19].

Questionnaires were completed by 106 nursing staff and 66 medical staff to assess knowledge and understanding of the use of opioid analgesia in hospital. Table 4 shows the percentage of correct responses for the true/false questions of the knowledge section of the survey. The risk of addiction was correctly identified by 78.7% of the medical and 79.2% of the nursing staff. In relation to opioid tolerance, 75.8% of the medical and 63.2% of the nursing staff chose the correct answer. Few respondents (22.7%) recognized that oxycodone dose does not require adjustment in renal impairment. Among medical staff the percentage of correct responses for true/false questions differed significantly across study wards. Those on the oncology service generally scored better than those on the orthopedic and geriatric medicine wards ($P < 0.05$). The percentage of correct responses for true/false questions completed by the nursing staff employed on different study wards was not significantly different.

We detected a lack of knowledge of morphine and oxycodone preparations. The numbers of participants correctly recognising each opioid preparation, brand and/or generic name are shown in Table 5. Medical residents recruited from teaching sessions on opioids scored significantly higher on the test of knowledge of opioid preparations than medical staff recruited from study wards ($P < 0.05$). However, knowledge of opioid preparations by nursing staff did not vary between the study wards or between study wards and other hospital nursing staff.

Reported barriers to opioid prescribing were grouped thematically into three categories of knowledge, workflow, and perceived limitations of other staff (Table 6). Knowledge barriers included knowledge of the wide range of opioid preparations available, choosing the right dose, particularly in the elderly, poor understanding of dependence, experience of what combinations are "allowed" and concern about side effects. A number of workflow issues were proposed, including time constraints and inadequate time for reviewing patients, prescribing errors, legibility, equipment reliability, and the complexities of prescribing a controlled substance. Nursing staff felt that inadequate doses were prescribed, while medical staff believed that inadequate doses were administered.

In terms of frequency of concerns about opioid use in hospital raised by respondents, 14 felt that prescribed opioid doses were inadequate, 14 (medical staff only) suggested that choosing the right dose was problematic, nine felt that patients prescribed opioids required more

Table 3 The association of degree of pain relief with opioid dose, regimen, adverse events and chronic pain history. Characteristics of participants with complete vs incomplete pain relief were compared using χ^2 test for categorical and t-tests for continuous variables

	Pain Relief		
	Complete (n = 67)	Incomplete (n = 123)	*P* value
Dose (mg)			
PDD (Mean ± SD)	82.6 ± 94.8 mg	59.6 ± 52.9 mg	0.04
RDD (Mean ± SD)	41 ± 53.7 mg	30.7 ± 33.2 mg	0.09
(PDD – RDD)/PDD	0.57 ± 0.31	0.45 ± 0.39	0.03
Opioid regimen* (PCA excluded)			
Regular (n = 10)	0	10	
PRN (n = 78)	28	50	
Both regular and PRN (n = 102)	39	63	
PCA*			
PCA + regular opioids (n = 29)	13	16	
PCA only (n = 14)	3	11	
Side effects			
Present (n = 103)	29	74	0.03
Absent (n = 87)	38	49	
Chronic pain			
Yes (n = 97)	33	64	0.72
No (n = 93)	34	59	

* Numbers too small to generate *P* values.
PDD = Prescribed Daily Dose; RDD = Received Daily Dose; PCA = Patient Controlled Analgesia; PRN = as required; SD = standard deviation.

frequent chart and patient review, and that this was a disincentive for staff. Nine respondents suggested that there were too many preparations available, many of which had similar names, seven that prescribing errors around immediate and controlled release and frequency were problematic, seven (nursing staff only) that illegible writing by doctors was problematic, and six that it was hard to access medical and nursing staff to prescribe and administer opioids. Four of the nursing staff stated that PCA delivery systems were inadequate and unreliable. Three medical staff felt they were unable to assess pain adequately. Only two respondents identified lack of education around opioids as a barrier while one (medical staff) suggested that nursing staff did not administer PRN medi-

Table 4 Participants responding correctly to each component of a questionnaire testing staff knowledge and understanding of opioid analgesia in hospital patients

Statement (Correct Response)	Medical Staff n = 66 (% of Total)	Nursing Staff n = 106 (% of Total)
Controlled-release preparations of opioids can be crushed. (F)	61 (92.4%)	104 (98.1%)
Less than 1% of patients taking opioids for pain relief become dependant. (T)	52 (78.7%)	84 (79.2%)
Sedation, hallucination and itching may be side effects of opioids. (T)	66 (100.0%)	105 (99.1%)
Patients who develop tolerance to opioid analgesics exhibit a pattern of compulsive drug use and crave opioids for effects other than pain control. (F)	50 (75.8%)	67 (63.2%)
Cognitively impaired and elderly patients experience significantly less pain and therefore may require smaller dosages of opioids. (F)	61 (92.4%)	95 (89.6%)
Oxycodone and morphine have to be dose adjusted in patients with renal impairment. (F)	13 (19.7%)	26 (24.5%)
Breakthrough pain is less likely to be treated with rapidly acting opioid analgesic. (F)	59 (89.4%)	83 (78.3%)
MS Contin is appropriate analgesic for breakthrough pain. (F)	62 (93.9%)	97 (91.5%)

N = number; T = true; F = false.

Table 5 Correct responses in the test of knowledge of opioid preparations

Generic Name	Preparation	Brand Name	Medical Staff (n = 66) (% of Total)	Nursing Staff (n = 106) (% of Total)
Morphine	IR	Ordine (R)	14 (21.2%)	51 (48.1%)
Morphine	CR (R)	Kapanol	43 (65.2)	80 (75.5%)
Oxycodone	CR	Oxycontin (R)	44 (66.7%)	65 (61.3%)
Oxycodone (R)	IR	Endone	50 (75.8%)	71 (67.0%)
Tramadol	CR (R)	Tramal SR	42 (63.6%)	86 (81.1%)

R = response required; IR = immediate release; CR = controlled release; SR = slow release.

cations with adequate frequency. Only one respondent (medical staff) identified side-effects as a potential barrier.

Discussion

Our study identifies that the majority of acute inpatients who were prescribed opioids on the geriatric medicine, orthopedics, and oncology wards of a tertiary referral hospital experienced incomplete analgesia. There was no significant association between prescribed or received opioid dose and pain intensity. Although (PDD – RDD/PDD) was significantly different (i.e., those with incomplete pain relief had less residual unadministered opioid relative to total prescribed), 45% of prescribed opioid was not administered in this group despite incomplete pain relief. This is in contrast to the belief that inadequate doses were prescribed that was expressed by respondents in our questionnaire and suggests barriers to administration of prescribed opioids.

Reported barriers to opioid administration include limited knowledge of pain assessment and opioid dose titration, and attitudes to opioids and pain relief [13–16,20]. Nurses are more likely to respond to patients' behaviour than reported pain scores. Opioid administration correlates more strongly with nurses' pain ratings than patient ratings. A number of respondents in the qualitative component of our study identified that assessing pain was problematic. A concomitant multisite study of which our hospital was a study site identified documentation of at

Table 6 Thematic analysis of barriers to opioid prescribing from staff questionnaires

	Nursing Staff	Medical Staff
Knowledge	Lack of understanding of acute/chronic pain Lack of education about opioids Similar drug names Too many brand and generic names Reluctance to give rapid acting opioids due to misconceptions	Inadequate knowledge of available opioid preparations Inability to assess pain adequately confused patients don't ask for pain relief Choosing the right opioid dose False views (e.g., dependence) Lack of experience of what combinations are allowed Side effects and dosing in the elderly Not knowing patients history (e.g., drug dependence)
Workflow	Patients require more frequent observation PCA delivery systems—inadequate and unreliable	Extra S8 Script takes too much time Legality—all the information required for S8 script Knowing who is allowed to prescribe what Unavailability of medication charts Time constraints Charts poorly defined
Other staff	Underprescribed by doctors Interns reluctant to order higher opioid doses Residents don't realise what it interacts with Illegible writing by doctors on charts Doctors don't fill all the blanks Errors in prescribing—immediate and slow release opioid preparations Inadequate dose and frequency	Nurses often don't give PRN meds

least one pain score in only 47% of post-operative patients, which increased to 70% after an educational intervention [21]. There are a number of well validated easily administered uni-dimensional pain assessment tools, including those used in this study [17]. Assessment of pain, and assessment of response to therapy guides modifications to the therapeutic regimen [17]. Increased education on pain assessment and its role in dose adjustment may improve opioid administration, and ultimately analgesia [20,21].

Among the determinants of prescribing behavior are knowledge and access to information, experiential factors and safety and efficacy concerns [4,22,23]. Lack of knowledge of an ever-increasing array of opioid preparations was identified in the qualitative component of this study. This was confirmed in the quantitative component (Table 5). In 1992, four opioid preparations were available in Australia through the Pharmaceutical Benefits Scheme. In 2007, 70 preparations were available [24]. Knowledge of oxycodone preparations, the most commonly prescribed opioid in our study, was limited. Errors arising from "sound alike" naming of the various opioid products, variety of available strengths and different rates of release are recognised, and strategies to limit this have been developed [25]. Those respondents who attended a teaching session about pain management performed better in the questionnaire on knowledge of opioid preparations than other respondents. This identifies a role for education, although this study did not assess long-term benefit.

While theoretical knowledge of opioids was reasonable, there was poor understanding of tolerance and addiction (Table 4). This may reflect poor understanding of the concepts [26], or lack of clarity in the terminology describing the concepts [27]. The American Academy of Pain Medicine (AAPM) definition of tolerance is comparable to the DSM IV–TR definition of tolerance. However, DSM IV-TR withdrawal and AAPM physical dependence describe similar phenomena. DSM IV-TR defined substance dependence and AAPM definition of addiction are broadly comparable [28,29]. Therefore, interpretation of the questionnaire statement "Less than 1% of patients taking opioids for pain relief become dependent" may be confounded by respondents having different understanding of the term "dependence" from the different classification systems.

In terms of experiential barriers, many prescribers in our study identified choosing the right dose as problematic. There is wide inter-individual variability in opioid dose requirements [30,31]. Prescribers may attempt to address this by providing PRN dosing. In this study, patients did not receive maximal doses of PRN opioid. Pasero and colleagues [20] argue that education of those administering analgesia around pain assessment and opioid dose titration is vital to optimising analgesia, and that inflexible opioid prescription is likely to worsen analgesia. This is supported by our findings, where no patients prescribed only regular analgesia experienced complete pain relief.

Although no concerns about efficacy were identified in the qualitative data, concerns about side effects were identified by one respondent. In the quantitative component of our study, patients with side effects were more likely to experience incomplete pain relief. Opioid side effects are dose related [32] and increase length of stay and cost [33,34]. Use of opioid sparing strategies, such as regular paracetamol, which was used by all participants in this study, may improve analgesia and reduce cost [35]. Evaluation of appropriate use of opioid sparing techniques, prevention and treatment of adverse events (e.g., adherence to guidelines for prophylaxis of post-operative nausea and vomiting) and identification of barriers to implementation of such strategies may improve the efficacy and safety of analgesia.

A common concern raised by questionnaire respondents was that patient and chart review was time consuming. This finding is consistent with the findings of Pearson and colleagues [36], who identified that time pressures were perceived by interns as a barrier to development of good prescribing habits. Medical staff reported frustration in prescribing opioids as a result of stringent regulatory requirements. Although some authors argue for reducing the legal controls around these medications [37], concerns around misuse and diversion are significant. A regulatory framework is necessary to prevent misuse [38].

Strengths of this study include that validated, reliable pain assessment tools were used and a single investigator performed all assessments. The study population is a representative sample of patients from both medical and surgical specialities, and 91% of eligible patients entered the study. The staff sample was broad representing multiple grades from different clinical services. In addition, data on nonopioid and adjuvant analgesics is presented. The combination of qualitative and quantitative data allows for reciprocal interpretation of both data sets.

There are several limitations to our study. The study outcome of "complete pain relief" may not be achieved without unacceptable opioid related side effects, and may not be a realistic goal of therapy [39]. Patients' expectations and understanding of analgesia were not assessed and may influence reported pain severity and degree of pain relief. Reporting bias may limit the interpretation of these data. The study was performed in one site with a small sample, which may limit the general applicability of the findings. Interpretation of the statement "Oxycodone and morphine have to be dose adjusted in patients with renal impairment" was difficult. Indeed, the significant proportion of medical and nursing staff who responded "True," may positively reflect an understanding that dose modification should be considered in impaired renal function for some opioids, if not for oxycodone.

Conclusion

This cross-sectional study identified that only 35% of acute inpatients prescribed opioids in a tertiary referral university teaching hospital achieved complete pain relief.

Patients with incomplete pain relief were not administered all of their prescribed opioids. Incomplete pain relief was associated with presence of side effects. Further studies are required to investigate the management of side effects and any barriers to this. Only patients prescribed PRN and regular opioid combined, or PRN opioid alone achieved complete pain relief. There was poor knowledge of the available opioid preparations with immediate benefit from education. Knowledge of opioid preparations, dose selection, work activity related to prescribing and administration, prescribing errors and illegible prescribing were the barriers to opioid prescribing and administration most commonly suggested by staff. Investigation of opioid use in other institutions with different opioid prescribing policies and practice would assist in further elucidating barriers to opioid use, prescribing patterns, and prescriber attitudes and beliefs.

Education of all staff around pain assessment using validated pain assessment tools may guide appropriate dose titration and administration, and improve pain relief. Education about available opioid preparations, in conjunction with industry and regulatory authority liaison to modify packaging and brand names may reduce confusion and error associated with the lack of knowledge of a complex array of available opioid preparations.

Conflicts of Interest

None.

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