Pain Medicine 2017; 00: 1–10
doi: 10.1093/pm/pnx018

OXFORD

Original Research Article

Protecting Pain Patients. The Evaluation of a Chronic Pain Educational Intervention

Simon Holliday, BMed, FAChAM, FRACGP, FACRRM,[*,†] Chris Hayes, BMed(Hons), FANZCA, FFPMANZCA, MMed,[*,‡] Adrian Dunlop, PhD, FAChAM, GradDipEpi&Biostat,[*,†] Simon Morgan, MBBS, MPH&TM,[§] Amanda Tapley, B Biomed Sci (Hons), M MedStatistics,[§] Kim Henderson, BNurs, Grad Dip. Health Soc. Sci.,[§] Briony Larance, PhD, BSc (Psych) (Hons),[‖] and Parker Magin, MBBS, MFM(clin), MGPP, GDipClinEpi, DPD, PhD[*,§]

*School of Medicine and Public Health, University of Newcastle, Callaghan, New South Wales, Australia; [†]Drug and Alcohol Clinical Services, Hunter New England Local Health District, New South Wales, Australia; [‡]Hunter Integrated Pain Service, New Lambton Heights, New South Wales, Australia; [§]General Practice Training Valley to Coast, Mayfield, New South Wales, Australia; [‖]National Drug and Alcohol Research Centre (NDARC), University of New South Wales, Sydney, New South Wales, Australia

Correspondence to: Simon Holliday, Albert St Medical Centre, PO Box 834, 78 Albert St, Taree NSW 2430. Tel: +61-2-6552-5533; Fax: +61-2-6552-4249; E-mail: simon.holliday@albertstmc.com.

Funding sources: This study was supported by a competitive grant from the Mental Health, Drugs and Alcohol Office of the New South Wales Ministry of Health. The project was also supported by General Practice Training Valley to Coast which itself is funded by the Australian Commonwealth Government.
Dr. Hayes has undertaken sponsored consultancy and educational work with Mundipharma, Janssen, and Pfizer. Dr. Larance is supported by an National Health and Medical Research Council research fellowship (#1073858) and has received untied educational grants from MundiPharma, Reckitt Benckiser and Indivior for postmarketing surveillance studies of opioid medications.

Disclosure and conflicts of interest: Dr. Hayes has undertaken sponsored consultancy and educational work with Mundipharma, Janssen, and Pfizer prior to 2013. Dr. Larance has received untied investigator-driven educational grants funded by Reckitt Benckiser and MundiPharma and Indivior for postmarketing surveillance studies of opioid medications.

Abstract

Introduction. Advocacy and commercially funded education successfully reduced barriers to the provision of long-term opioid analgesia. The subsequent escalation of opioid prescribing for chronic noncancer pain has seen increasing harms without improved pain outcomes.

Methods. This was a one-group pretest-posttest design study. A multidisciplinary team developed a chronic pain educational package for general practitioner trainees emphasizing limitations, risk-mitigation, and deprescribing of opioids with transition to active self-care. This educational intervention incorporated prereadings, a resource kit, and a 90-minute interactional video case-based workshop incorporated into an education day. Evaluation was via pre- and postintervention (two months) questionnaires. Differences in management of two clinical vignettes were tested using McNemar's test.

Results. Of 58 eligible trainees, 47 (response rate = 81.0%) completed both questionnaires (36 of whom attended the workshop). In a primary analysis including these 47 trainees, therapeutic intentions of tapering opioid maintenance for pain (in a paper-based clinical vignette) increased from 37 (80.4%) pre-intervention to 44 (95.7%) postintervention ($P = 0.039$). In a sensitivity analysis including only trainees attending the workshop, 80.0% pre-intervention and 97.1% postintervention tapered opioids ($P = 0.070$). Anticipated initiation of any opioids for a chronic osteoarthritic knee pain clinical vignette reduced from 35 (74.5%) to 24 (51.1%; $P = 0.012$) in the primary analysis and from 80.0% to 41.7% in the sensitivity analysis ($P = 0.001$).

Conclusions. Necessary improvements in pain management and opioid harm avoidance are predicated on primary care education being of demonstrable efficacy. This brief educational intervention improved hypothetical management approaches two months subsequently. Further research measuring objective changes in physician behavior, especially opioid prescribing, is indicated.

Key Words. Pain Management; Pain Training Programs; Opioids; General practice; Family practice; Education, medical graduate; Addiction

Introduction

The provision of analgesia has always been a staple responsibility for doctors, with estimates of the prevalence of painful conditions among American adults as high as 43% [1]. What constitutes quality analgesia has changed over time in response to prevailing advocacy, cultural beliefs, and education about which is the lesser of two evils: the suffering of pain or the deployment of opioids, the latter being coupled with addiction fears [1–3].

For much of the twentieth century in the West, opioids were considered too dangerous even to use in end-of-life cancer patients [4]. The hospice movement revolutionized analgesia for the dying by advocating successfully for liberal access to opioids. In the 1980s, the newly formed speciality of pain medicine argued that pain was not just a sign but a disease that was undertreated [2]. Furthermore, chronic noncancer pain (CNCP) should be, and could be, effectively treated by the "proper" integration of opioids, albeit with education to help physicians overcome their "misunderstandings" and "fear of addiction" [2,3,5–7]. Management principles for palliative care were conflated with those for CNCP and still are [8]. This is despite insufficient to low levels of evidence supporting the efficacy of opioids in CNCP and emerging evidence of associations between longer durations of opioid usage and harms such as hyperalgesia or addiction [1,9]. Opioid use for CNCP has become commonplace, with 3% to 4% of adult Americans prescribed long-term opioid analgesia in 2005 [1] and 11.8% of Australian general practice (GP) patients reporting their use in the previous year [10]. Australian opioid dispensing levels increased four-fold from 1990 to 2014 [11]. As in the United States, increasing opioid analgesic prescribing in Australia has been related to increasing presentations for opioid analgesic dependency management [12] and increasing opioid-related hospitalizations and accidental deaths [13]. The latter are now predominantly from pharmaceutical opioids rather than heroin [13,14]. The differentiation between pharmaceutical and illicit opioids has become blurred due to their similar pharmacodynamics and increased availability for misuse [1]. Transitions from the misuse of opioid analgesics to the initiation of heroin use have been documented [15]. Those who have misused opioid analgesics are 19 times more likely to initiate heroin use [16]. Some have expressed concern that reductions in liberal opioid prescribing will be replaced by increased consumption of heroin [17]. However, across 28 US states, there have been dramatic increases in drug-related overdoses involving both heroin and opioid analgesics [18]. Opioid analgesic prescribing rates vary significantly across Australia, potentially indicating unwarranted or inappropriate prescribing and risks of increased harms [19]. With up to a 10-fold prescribing rate difference between localities, higher prescribing rates are found in more rural localities and areas of lower socioeconomic status [19–21]. Contributing to this variation are prescribing practices, training, knowledge, and attitudes of GPs [19]. Previous cross-sectional data involving GP trainees have shown increased opioid prescribing associated with patient age, male gender, and Aboriginal or Torres Islander status, as well as more rural or disadvantaged localities [21]. To reduce the overmedication of CNCP, the Faculty of Pain Medicine of the Australian and New Zealand College of Anaesthetists (ANZCA) has stated that "it is clear that opioid pharmacotherapy cannot be considered to be a core component of the management of CNCP" [22]. US guidelines go further, indicating in CNCP opioids are "rarely" needed for durations of more than seven days [1].

One of the main "crises" impeding the improvement of pain management today is the inadequacy of education for primary care [3,23]. The US Food and Drug Administration has made continuing medical education (CME) on CNCP central to their Risk Evaluation and Mitigation Strategy (REMS) [24]. The evidence base to determine their most effective form, duration, and provenance, however, is lacking. A systematic review identified 19 studies, but meta-analysis was precluded by the heterogeneity of methodological designs and quality, subject matter, and outcome measures [25]. Based on pre-/postassessment outcome measures, improved clinician knowledge and attitudes have been shown among US hospital residents after two hours of face-to-face or web-based training [26,27], Australian GPs after 6.5 hours of training [28], US physicians (sanctioned for misprescribing) after three days of training [29], and REMS participants [30]. A trial among German GPs on lumbago care found that three interactive seminars plus two academic detailing visits improved patient outcomes at six months compared with the receipt of posted guidelines [31].

Educators of doctors-in-training have been said to have a moral obligation to assume responsibility for improved CNCP care [3]. In order to address the evidence gap in evaluations of continuing medical education on CNCP, we set out to develop, deliver, and evaluate a brief multifaceted non-commercially funded CNCP educational intervention for GPs undergoing vocational training. We aimed to determine whether this intervention, when embedded in a routine training day, reduced the hypothetical opioid prescribing of GP trainees.

Box 1 **Presentation content**

The history of opium and analgesia practice
The escalation in the West of opioid prescribing and associated harms, including overdose and addiction
Chronic noncancer pain (CNCP) neurophysiology including neuro-plasticity, central sensitization, and opioid-induced hyperalgesia
Guideline-concordant and patient-centred management of CNCP
Biopsychosocial assessment in CNCP including past and present psychiatric and substance use problems, in preference to tool-based risk stratification (38)
Use of the Pain Intensity, Enjoyment of Life, General Activity measurement scale (40)
The importance of multidisciplinary and multimodal CNCP management with appropriate referral to physiotherapy, psychology, pain specialists, or addiction treatment services
The nonpharmaceutical self-management management of CNCP
The nonopioid pharmaceutical management of CNCP
The lack of evidence supporting opioids in CNCP in terms of efficacy and safety
The practice, principals, and limitations of universal precautions if or when opioids are used in CNCP
The importance of assessing and responding to the emergence of aberrant behavior
Deprescribing opioids

Methods

We performed a questionnaire-based evaluation of a pragmatic intervention, delivered to GP trainees in the course of their usual training, using a one-group pre-test-posttest study design.

Study Population and Recruitment

The study population was GP registrars (vocational trainees) in one of Australia's 17 Regional Training Providers. These are government-funded, not-for-profit, geographically defined organizations charged (until 2016) with delivery of general practice vocational training. Trainees eligible for this study were in one of the first two of their three mandatory general practice–based training terms. Each term lasts a full-time equivalent of six months and is undertaken after at least two years spent in hospital training.

Trainee inclusion criteria were term 1 and 2 trainees eligible to attend a workshop conducted as part of their vocational training program. All trainees were invited at a previous workshop or via email or post to complete a study questionnaire before the intervention, as well as to complete a questionnaire two months afterwards.

Intervention

The intervention aimed to improve CNCP guideline concordance by emphasizing the transition to active self-management, opioid deprescribing, and the use of opioid prescribing boundaries. It comprised:

1. Selected papers provided online as prereading for the educational session
2. A 90-minute face-to-face educational session conducted as part of a day-long educational release workshop
3. Participant resources to facilitate implementation of guideline-endorsed pain management strategies, provided online postworkshop

A multidisciplinary group contributed to the preparation of the intervention package. The group included a pain physician, two addiction physicians, a public health physician, a psychologist, and several GP medical educators.

Prereading

Readings covered the history, science, and culture of opioid use in CNCP [32]; the integration of the principles of pain medicine and addiction medicine into CNCP management [33]; shared CNCP decision-making [34]; and an introduction to motivational interviewing [35].

Workshop Sessions

Workshop content is summarized in Box 1. Following the lead of Sullivan [27], we developed four two- to three-minute videoed vignettes. These aimed to increase immediacy, to illustrate negotiation skills, and to enhance group discussion. The vignettes involved an actor playing the patient and a GP trainee supervisor playing a doctor commencing at the practice. The first visit involved the doctor running late and seeing an inherited CNCP patient for the first time. The doctor was given numerous challenges to manage including a request for routine repeat oxycodone prescription. The next two scenes in the video vignette showed the patient-centred development of functional goals, an opioid agreement, the implementation of monitoring based on the four "A's" of Passik [6]. Things went

Box 2 **Additional resources provided to every registrar after the workshop**

An opioid conversion table from the Faculty of Pain Medicine (41)
The Pain Intensity, Enjoyment of Life, General Activity "PEG" scale (42)
Details about registration for the National Prescription Shopping Programme (43)
Details about New South Wales Ministry of Health regulatory requirements (44)
A sign for the waiting room explaining practice opioid and benzodiazepine medication policy to patients
A list of contact people from whom to seek advice after the session
A list of further learning opportunities
See online supplementary material Appendices 1 and 2 for more information, including patient education videos and an example of an opioid patient agreement or contract

Box 3 **Clinical vignettes**

Vignette 1
Mrs Bird is a 57-year-old ex-competitive skier. She has a 10-year history of severe osteoarthritis of her lumbar spine with multiple levels involved. She has previously seen an orthopedic surgeon, and her condition is not suitable for surgery. She was prescribed modified-release oxycodone tablets six months ago by another doctor in the practice. Her pain didn't really improve, and now she is experiencing severe back pain. She is currently taking modified-release oxycodone 20 mg bd, regular modified-release paracetamol, and occasional meloxicam 15 mg. There are no red flags that warrant further investigation.
Vignette 2
Mr Wilson is age 68 years and has a long history of osteoarthritis particularly affecting his knees. He continues to have mild pain in his right knee and severe pain in his left knee, on which he has had a total knee replacement (one year ago, with a difficult postoperative course leaving him with marked pain and stiffness). The pain causes marked limitation of activities. He takes regular modified-release paracetamol and frequent nonsteroidal anti-inflammatory drugs, with only modest effect on his pain.

awry with a dose escalation negotiated following pressure from the patient who claimed undertreatment of pain. The final vignette revealed accumulating aberrant behaviors. Discussion between the doctor and patient resulted in agreement to gradually deprescribe (i.e., taper or discontinue) opioids and commence more multimodal care. The videos are freely available from links given in the online supplementary material. The style of the presentation was interactive, with trainees encouraged to reflect on and compare and contrast their attitudes and practice. Approximately half the duration of the presentation involved viewing the vignettes and discussing them as a group in the context of their own practice. The facilitator linked discussions of each vignette back to the clinical processes described in the presentation, reinforcing the key messages regarding biopsychosocial assessment of CNCP (including psychiatric and substance use problems), assessment of pain and its impact on daily functioning, universal precautions as they apply to opioids, monitoring aberrant behavior, and deprescribing (Box 1).

Postworkshop Resources

Resources provided to trainees, including those absent from the presentation, are listed in Box 2, with links provided in the online supplementary material.

The lead presenter of the educational session was a GP supervisor of trainees and addiction physician (SH). Other presenters were the director of the regional pain service (CH) and the senior medical officer in addiction for the state (AD).

Questionnaires

The multiple-choice questionnaire was developed by the multidisciplinary group. It covered attitudes toward the use of long-term opioids in CNCP, as well as the management of two case-based CNCP clinical vignettes. The vignettes concerned chronic back pain uncontrolled with current opioid medication and knee osteoarthritis pain uncontrolled with nonopioid pharmaceuticals. See Box 3 for the two vignettes.

Outcome Factors

The primary outcome factors addressed our study aim of evaluating whether our intervention reduced the hypothetical opioid prescribing of GP trainees.

The primary outcomes were pre- to postworkshop change in proportion of hypothetical opioid management responses on the two clinical vignettes. The preintervention questionnaires were completed three weeks

prior to the prereading being made available (i.e., four weeks prior to the workshop). The postintervention questionnaires were completed two months postworkshop.

For the chronic back pain vignette, responses were dichotomized to those involving opioid dose maintenance or increase and those entailing dose reduction or cessation. For the opioid-naïve knee osteoarthritis pain vignette, responses were dichotomized to those entailing initiation of an opioid and those not entailing initiation of an opioid.

Secondary outcomes were:

1. Changes to proportion of patients for whom individual opioids would be initiated for the opioid-naïve knee osteoarthritis pain vignette

2. Changes to proportion of patients in which referrals to individual medical or allied health services would be made for the opioid-naïve knee osteoarthritis pain vignette

3. Changes in opinions regarding whether opioids are underprescribed or overprescribed in CNCP (scored on a five-point Likert scale from 1 = underprescribed to 5 = overprescribed and later dichotomized to underprescribed/neutral (scores of ≤ 3) vs overprescribed scores >3)

Statistical Analyses

Pre-post changes on all parameters were tested using McNemar's test. If cell numbers were small, we used an Exact McNemar's. Our primary analyses included all trainees who provided both pre-intervention and postintervention data, whether or not they had attended the workshop or used the papers or resources. We also performed sensitivity analyses including data of only those trainees who attended the workshop. For all analyses, statistical significance was set at a *P* value of less than 0.05.

Ethical Approval

Ethics approval for the study was obtained from the Human Research Ethics Committee of the University of Newcastle (approval number: H-2009-0323).

Results

There were 58 registrars enrolled in either term 1 or 2, with 43 attending the workshop. Forty-seven trainees (response rate = 81%) completed both questionnaires (36 of whom attended the workshop). Their demographics may be found in Table 1. There were no significant differences in the characteristics of those who completed both questionnaires (N = 47) and those who completed a questionnaire at one time point only (N = 11). Responses are given in Table 2.

Primary Outcomes

For the back pain scenario, there was a decrease in maintaining and/or increasing opioid analgesia. In the primary analysis, there was a statistically significant increase in intended deprescribing of opioids from 37 participants (80.4%) to 44 participants (95.7%; $P = 0.039$). Among those who attended the workshop, intentions to deprescribe increased from 28 participants (80.0%) to 34 participants (97.1%; $P = 0.070$).

For the knee osteoarthritis scenario, there was a statistically significant decrease in the proportion intending to initiate opioids, from 35 participants (74.5%) to 24 participants (51.1%; $P = 0.012$). Among workshop attendees, intended opioid initiation reduced from 28 participants (80.0%) to 15 participants (41.7%; $P = 0.001$).

Secondary Outcomes

There was a statistically significant reduction in intended initiation of immediate-release oxycodone ($P = 0.004$ in the primary analyses and 0.008 among workshop attendees) and a nonsignificant trend to reduced intention to initiate modified-release oxycodone ($P = 0.063$ in both analyses). There were no significant changes in intention to initiate any other specific opioids or referrals. There was a nonsignificant trend for more registrars to regard opioid analgesics for CNCP as overprescribed ($P = 0.248$) in primary analyses.

Discussion

A brief educational package on CNCP management was prepared and delivered by a multidisciplinary team. Responses to the questionnaire two months later showed changed attitudes toward opioid monotherapy, with increased intended deprescribing.

Comparisons with Other Studies

While teaching the curriculum recommended by the International Association for the Study of Pain has been estimated to require up to 74 hours [34], the brevity of this CNCP education package is meaningful. There is a diversity of approaches by US states to relevant CME for physicians [23], reflecting the lack of evidence base regarding how much (or how little) education is needed and whether education regarding the role of opioids in the management of CNCP is effective. Very few US states mandate relevant CME and those that do only require one-off or periodic training of a similar duration to this package. Still about half of US physicians report having never undertaken CME on the nonopioid management of CNCP [23]. The US Food and Drug Administration (FDA) planned the REMS CME to be mandatory for opioid prescribers, but almost one-third (31.2%) of Pennsylvanian GPs indicated that they would rather discontinue prescribing opioids altogether than undertake the proposed four to eight hours involved

Table 1 Participating trainee and practice characteristics (N = 58)

Variable	Class	Only pre or postquestionnaire (N = 11)		Both questionnaires (N = 47)	
		No. (%)	95% CIs	No. (%)	95% CIs
Trainee variables					
Gender	Female	7 (63.6)	31.9–86.7	33 (70.2)	55.3–81.8
Enrolled pathway	General (vs rural)	3 (27.3)	8.3–60.9	18 (38.3)	25.3–53.3
Qualified as a doctor in Australia	Yes	8 (72.7)	39.1–91.7	35 (74.5)	59.7–85.2
Age, years	Mean (SD)	31.9 (3.5)		34.6 (6.7)	
Training term	Term 1	5 (45.5)	18.9–74.8	33 (70.2)	55.3–81.8
	Term 2	6 (54.6)	25.2–81.1	14 (29.8)	18.2–44.7
Working full-time	Yes	7 (63.6)	31.9–86.7	35 (74.5)	59.7–85.2
Practice variables					
Routine bulk billing	Yes	2 (18.2)	4.1–53.4	6 (12.8)	5.7–26.2
No. of GPs working there	1–4	4 (36.4)	13.3–68.1	18 (38.3)	25.3–53.3
	5–10+	7 (63.6)	31.9–86.7	29 (61.7)	46.7–74.7
Location rurality	Major city	7 (63.6)	31.9–86.7	23 (48.9)	34.7–63.4
	Inner regional	3 (27.3)	8.3–60.9	21 (44.7)	30.8–59.4
	Outer regional, remote or very remote	1 (9.1)	1.1–47.5	3 (6.4)	2.0–18.6
Location SEIFA index (decile)	Mean (SD)	5.7 (2.1)		5.1 (2.0)	
Workshop attendance		7 (63.6)	31.9–89.7	36 (76.6)	62.0–86.8

CI = confidence interval; GP = general practitioner; SEIFA =Socioeconomic Index for Area (SEIFA) Relative Index of Disadvantage [44].

Table 2 Scenario management

Vignette	Management response (N = 47)		Analysis of all eligible registrars			Analysis of registrars who attended workshop		
			Prequestionnaire No. (%)	Postquestionnaire No. (%)	McNemar's chi-square *P*	Prequestionnaire No. (%)	Postquestionnaire No. (%)	McNemar's chi-square *P*
Opioid refractory back pain	Would you:							
	a. Increase dose or maintain dose of oxycodone	Yes	9 (19.6)	2 (4.4)		7 (20.0)	1 (2.9)	
	b. Wean off and/or add in anti-epileptic and/or low-dose tricyclic	Yes	37 (80.4)	44 (95.7)	0.0391*	28 (80.0)	34 (97.1)	0.0703*
Opioid-naïve chronic knee osteoarthritis pain	Would you prescribe opioids for this patient?	Yes	35 (74.5)	24 (51.1)	0.0116	28 (77.8)	15 (41.7)	0.0008
	Type of opioid prescribed—if any†							
	a. Short-acting oxycodone	Yes	15 (31.9)	6 (12.8)	0.0039*	13 (36.1)	5 (13.9)	0.0078*
	b. Modified-release oxycodone	Yes	7 (14.9)	2 (4.3)	0.0625*	6 (16.7)	1 (2.8)	0.0625*
	c. Codeine	Yes	10 (21.3)	13 (27.7)	0.4054	7 (19.4)	8 (22.2)	1.0000
	d. Tramadol	Yes	10 (21.3)	6 (12.8)	0.2482	8 (22.2)	5 (13.9)	0.5078
	e. A fentanyl patch	Yes	5 (10.6)	4 (8.5)	1.0000	5 (13.9)	2 (5.6)	0.4531*
	Referrals made to a:							
	Physiotherapist	Yes	46 (97.9)	42 (89.4)	0.2188*	35 (97.2)	34 (94.4)	1.0000*
	Psychologist for CBT	Yes	7 (14.9)	7 (17.0)	1.0000*	4 (11.1)	7 (19.4)	0.3750*
	Pain management group	Yes	11 (23.4)	15 (31.9)	0.2850	8 (22.2)	11 (30.6)	0.5078*
	Pain specialist	Yes	23 (48.9)	23 (48.9)	1.0000	18 (50.0)	20 (55.6)	0.5271
	Rheumatologist or orthopedic surgeon	Yes	21 (44.7)	15 (31.9)	0.2393	18 (50.0)	11 (30.6)	0.1266
Concerning opioid use in patients with chronic noncancer pain	Do you think they are:							
	a. Underprescribed	Yes	12 (25.5)	8 (17.0)		9 (25.0)	7 (19.4)	
	b. Overprescribed	Yes	35 (74.5)	39 (83.0)	0.2482	27 (75.0)	29 (80.6)	0.5271

CBT = Cognitive Behavior Therapy
*Exact McNemar significance probability used.
†No trainee selected: short-acting morphine, modified-release morphine, or methadone.

[24]. The REMS has been rolled out as a voluntary three hours of live or online training [30].

Scenario Management

The duration of opioid maintenance for new episodes of CNCP has been found to be strongly associated with rates of incident opioid use disorders [36]. In the case involving chronic back pain refractory to opioids, trainees in the primary analysis significantly increased their rate of proposed opioid deprescribing. The importance of this is that opioid deprescribing in CNCP is rare among Australian GPs, with 89% in one survey reporting never or only "occasionally" doing so, even when faced with addictive behaviors [37]. GP trainees predominantly prescribe opioids as repeat prescriptions to regular practice CNCP patients [21], reflecting the significant barriers to deprescribing [38].

The proposed management of the opioid-naïve knee osteoarthritis pain case saw the number of trainees intending to initiate opioids reduce by approximately one-third and one-half, respectively, in the primary and sensitivity analyses. Recent guidelines do not support the use of opioid analgesics in CNCP, even when envisaged as a time-limited trial [1,39,40]. Reduced oxycodone initiation (statistically significant for the immediate-release formulations in our study) is important given that oxycodone has been found to be the second most highly prescribed opioid by trainees [21] and accounted for 38% of the total opioid dispensings in Australia [14].

Strengths and Limitations

Despite the plethora of mainly commercially funded CNCP educational packages available to GPs, few have been evaluated, with none being evaluated for GP trainees. A strength of our study is that we carefully developed the content and format of the package based on multidisciplinary input, previous pain educational research, and observational data of opioid prescribing in this population [21]. We then tested it in a "real world" situation of GP trainees' routine educational programs. Conducting an analysis of all trainees—including those who did not receive all or any elements of the intervention—best approximates the real-world logistics of delivering education in vocational education programs. By way of comparison and to better evaluate the efficacy of the actual workshop, we conducted a sensitivity analysis of those trainees who attended the workshops.

A limitation of the study is that our outcome variable was expressed management intentions rather than actual clinical practice (where the practical barriers to deprescribing must be confronted). The sample size, particularly in the sensitivity analysis, may have prevented some effects of the intervention reaching statistical significance. The lack of a control group is also a limitation of the study, but given the short time frame involved, these data are unlikely to reflect more widespread changes in trainee analgesia practice. The parameters of the registrar training day did not allow for more active modalities of learning such as individualized skill rehearsal and feedback, serial online learning units, clinical audits, or educational outreach visits [25]. A further limitation may be social desirability bias of trainees wishing to report changes sanctioned by their educators. Relying on a duration of two months for the administration of our postintervention questionnaire may be regarded either as a strength or a limitation due to the inconsistency of outcomes reported in the literature [25].

Implications for Practice and Further Research

This study demonstrates how a complex, non-commercially funded educational intervention, delivered as part of a usual education program and with face-to-face contact of only 90 minutes, can change trainees' intended CNCP management. Relevant noncommercial training has been previously associated with better quality CNCP care in terms of increased guideline concordance [37]. Further research has been called for to evaluate changes in actual CNCP management, as opposed to expressed intentions, with the employment of a control group [28]. This should strengthen program development and improve learner, patient, and health care outcomes [29].

While a reduction of non-evidence-based CNCP management in the form of long-term opioid prescribing is an important goal, it is not the only indicator of quality care. Of crucial importance is the education of GPs about appropriate evidence-based alternatives to opioids. Accessible, pragmatic educational models of nonpharmacologic management of CNCP will have to be constructed, implemented, and evaluated. These would address better patient education about the neurobiology of pain and the need for lifestyle modification, as well as improving GP skills for the psychological and functional management of pain and opioid deprescribing [23].

Conclusion

Our interactional educational package aimed to both improve CNCP care and reduce poor opioid care. The readings, provision of resources, and the single interactive and vignette-based workshop produced significant changes to trainees' judgments about, and intentions toward, long-term opioid analgesia maintained at two months. It is important that any educational interventions to be disseminated in primary care have effectiveness that is evidence based. The contents and mode of dissemination of models of analgesia education should thus improve patient outcomes and protect them from iatrogenic harm.

Acknowledgments

The authors wish to thank the GP trainees for completing the questionnaires and allowing the use of their results. We also wish to thank Prof. Anthony Shakeshaft for his comments on the questionnaire and GP Medical Educators at Valley to Coast, including Tony Saltis and

Chris Starling, for their collaboration on the draft educational package.

Supplementary Data

Supplementary Data may be found online at http://painmedicine.oxfordjournals.org.

References

1 Dowell D, Haegerich T, Chou R. CDC guideline for prescribing opioids for chronic pain—United States, 2016. MMWR Recomm Rep 2016;65(1):1–49.

2 Crowley-Matoka M, True G. No one wants to be the candy man: Ambivalent medicalization and clinician subjectivity in pain management. Cult Anthropol 2012;27(4):689–712.

3 Loeser JD, Cahana A. Pain medicine versus pain management: ethical dilemmas created by contemporary medicine and business. Clin J Pain 2013;29 (4):311–6.

4 McCarberg B. Washington state opioid prescribing guidelines. Pain Med 2015;16(8):1455–6.

5 Kao JMC, Minh LC, Huang GY, Mitra R, Smuck M. Trends in ambulatory physician opioid prescription in the United States, 1997–2009. PM R 2014;6(7):575–82.e4.

6 Passik SD, Weinreb HJ. Managing chronic nonmalignant pain: Overcoming obstacles to the use of opioids. Adv Ther 2000;17(2):70–83.

7 Sullivan MD, Ballantyne JC. Must we reduce pain intensity to treat chronic pain? Pain 2016;157(1):65–9.

8 Currow DC, Phillips J, Clark K. Using opioids in general practice for chronic non-cancer pain: An overview of current evidence. Med J Aust 2016;204 (8):305–9.

9 Chou R, Deyo R, Devine B, et al. The effectiveness and risks of long-term opioid treatment of chronic pain. Evidence report/technology assessment No. 218. AHRQ Publication No. 14-E005-EF. Rockville, MD: Agency for Healthcare Research and Quality; 2014. Available at: www.effectivehealthcare.ahrq.gov/reports/final.cfm (accessed June 5, 2016).

10 Britt H, Miller G, Henderson J, et al. General practice activity in Australia 2013-14. General practice series No. 36. 2014. Sydney University Press; Sydney Australia. available at: http://ses.library.usyd.edu.au/handle/2123/11882 (accessed Nov 14, 2014).

11 Karanges EA, Blanch B, Buckley NA, Pearson S-A. Twenty-five years of prescription opioid use in Australia: A whole-of-population analysis using pharmaceutical claims. Br J Clin Pharmacol 2016;82(1):255–67.

12 Nielsen S, Roxburgh A, Bruno R, et al. Changes in non-opioid substitution treatment episodes for pharmaceutical opioids and heroin from 2002 to 2011. Drug Alcohol Depend 2015;149:212–9.

13 Roxburgh A, Bruno R, Larance B, Burns L. Prescription of opioid analgesics and related harms in Australia. Med J Aust 2011;195(5):280–4.

14 Blanch B, Pearson S-A, Haber PS. An overview of the patterns of prescription opioid use, costs and related harms in Australia. Br J Clin Pharmacol 2014;78(5):1159–66.

15 Banerjee G, Edelman EJ, Barry DT, et al. Non-medical use of prescription opioids is associated with heroin initiation among US veterans: A prospective cohort study. Addiction 2016;111(11):2021–31.

16 Muhuri PK, Gfroerer JC, Davies MC. Associations of nonmedical pain reliever use and initiation of heroin use in the United States. Rockville, MD: Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality; 2013. Available at: http://www.samhsa.gov/data/sites/default/files/DR006/DR006/nonmedical-pain-reliever-use-2013.htm (accessed Dec 29, 2015).

17 Compton WM, Jones CM, Baldwin GT. Relationship between nonmedical prescription-opioid use and heroin use. N Engl J Med 2016;374(2):154–63.

18 Rudd RA, Paulozzi LJ, Bauer MJ, et al. Increases in heroin overdose deaths—28 States, 2010 to 2012. MMWR Morb Mortal Wkly Rep 2014;63:849–54.

19 Australian Commission on Safety and Quality in Health Care. The Australian atlas of healthcare variation, chapter 5: Opioids. Canberra; 2015. ACSQHC Sydney, Australia. Available at: http://www.safetyandquality.gov.au/atlas (accessed 26th Nov, 2015).

20 Degenhardt L, Gisev N, Cama E, et al. The extent and correlates of community-based pharmaceutical opioid utilisation in Australia. Pharmacoepidemiol Drug Saf 2016;25(5):521–38.

21 Holliday S, Morgan S, Tapley A, et al. The pattern of opioid management by Australian general practice trainees. Pain Med 2015;16(9):1720–31.

22 Australian and New Zealand College of Anaesthetists. Recommendations regarding the use of opioid analgesics in patients with chronic non-cancer pain. 2015. Faculty of Pain Medicine, Melbourne, Australia, 1-10. Available at: http://www.fpm.anzca.

edu.au/resources/professional-documents/documents/PM1%202010.pdf (accessed Dec 12, 2016).

23 Davis CS, Carr D. Physician continuing education to reduce opioid misuse, abuse, and overdose: Many opportunities, few requirements. Drug Alcohol Depend 2016;163:100–7.

24 Slevin KA, Ashburn MA. Primary care physician opinion survey on FDA opioid risk evaluation and mitigation strategies. J Opioid Manag 2011;7(2):109–15.

25 Ospina MB, Taenzer P, Rashiq S, et al. A systematic review of the effectiveness of knowledge translation interventions for chronic noncancer pain management. Pain Res Manag 2013;18(6):e129–41.

26 Sullivan MD, Gaster B, Russo J, et al. Randomized trial of web-based training about opioid therapy for chronic pain. Clin J Pain 2010;26(6):512–7.

27 Sullivan MD, Leigh J, Gaster B. Brief report: Training internists in shared decision making about chronic opioid treatment for noncancer pain. J Gen Intern Med 2006;21(4):360–2.

28 Slater H, Briggs AM, Smith AJ, et al. Implementing evidence-informed policy into practice for health care professionals managing people with low back pain in Australian rural settings: A preliminary prospective single-cohort study. Pain Med 2014;15(10):1657–68.

29 Dewey CM, Ghulyan MV, Swiggart WH. Misprescribing controlled substances: An evaluation of a professional development program. Subst Abuse 2016;37(3):412–8.

30 Alford DP, Zisblatt L, Ng P, et al. An evaluation of an opioid risk evaluation and mitigation strategy continuing education program. Pain Med 2016;17(1):52–63.

31 Becker A, Leonhardt C, Kochen MM, et al. Effects of two guideline implementation strategies on patient outcomes in primary care: A cluster randomized controlled trial. Spine 2008;33(5):473–80.

32 Holliday S, Hayes C, Dunlop A. Opioid use in chronic non-cancer pain: Part 1: Known knowns and known unknowns. Aust Fam Physician 2013;42(3):98–102.

33 Holliday S, Hayes C, Dunlop A. Opioid use in chronic non-cancer pain: Part 2: Prescribing issues and alternatives. Aust Fam Physician 2013;42(3):104–11.

34 Nicolaidis C. Police officer, deal-maker, or health care provider? Moving to a patient-centered framework for chronic opioid management. Pain Med 2011;12(6):890–7.

35 Rollnick S, Butler CC, McCambridge J, et al. Consultations about changing behaviour. BMJ 2005;331(7522):961–3.

36 Edlund MJ, Martin BC, Russo JE, et al. The role of opioid prescription in incident opioid abuse and dependence among individuals with chronic noncancer pain: The role of opioid prescription. Clin J Pain 2014;30(7):557–64.

37 Holliday S, Magin P, Dunbabin J, et al. An evaluation of the prescription of opioids for chronic nonmalignant pain by Australian general practitioners. Pain Med 2013;14(1):62–74.

38 Anderson K, Stowasser D, Freeman C, Scott I. Prescriber barriers and enablers to minimising potentially inappropriate medications in adults: A systematic review and thematic synthesis. BMJ Open 2014;4(12):e006544

39 NSW Therapeutic Advisory Group Inc. Preventing and managing problems with opioid prescribing for chronic non-cancer pain. Sydney, Australia: NSW Therapeutic Advisory Group Inc.; 2015. Available at: http://www.ciap.health.nsw.gov.au/nswtag/reviews/guidelines.html (accessed July 29, 2015).

40 Hunter Integrated Pain Service. Reconsidering opioid therapy. Hunter New England Local Health Network, Newcastle, Australia. Available at: http://www.hnehealth.nsw.gov.au/Pain/Documents/Reconsidering_opioid_therapy_May%202014.pdf (accessed Nov 27, 2014).

41 Faculty of Pain Medicine, Australian and New Zealand College of Anaesthetists. Opioid dose equivalence. Calculation of oral morphine equivalent daily dose (oMEDD). 2014. Available at: http://www.fpm.anzca.edu.au/resources/professional-documents/OPIOID%20DOSE%20EQUIVALENCE.pdf (accessed October 2015).

42 Krebs EE, Lorenz KA, Bair MJ, et al. Development and initial validation of the PEG, a three-item scale assessing pain intensity and interference. J Gen Intern Med 2009;24(6):733–8.

43 Department of Human Services. Prescription shopping programme. Australian Government; 2015. Available at: http://www.humanservices.gov.au/health-professionals/services/prescription-shopping-information-service (accessed Dec 13, 2015).

44 New South Wales Health. Pharmaceutical Services 2015. Legislative requirements and guides. http://www.health.nsw.gov.au/pharmaceutical/pages/default.aspx (accessed Dec 13, 2015).