

BRIEF COMMUNICATION

Retrospective Review of Outcomes of a Multimodal Chronic Pain Service in a Major Teaching Hospital: A Preliminary Experience in Universiti Sains Malaysia

Nizar ABDUL JALIL¹, Zaharah SULAIMAN², Mohamed Saufi AWANG³, Mohamarowi OMAR¹

¹ Department of Anaesthesiology and Intensive Care, School of Medical Sciences, Universiti Sains Malaysia Health Campus, Jln Raja Perempuan Zainab II, 16150 Kubang Kerian, Kelantan, Malaysia

² Department of Community Medicine, School of Medical Sciences, Universiti Sains Malaysia Health Campus, Jln Raja Perempuan Zainab II, 16150 Kubang Kerian, Kelantan, Malaysia

³ Department of Neurosciences, School of Medical Sciences, Universiti Sains Malaysia Health Campus, Jln Raja Perempuan Zainab II, 16150 Kubang Kerian, Kelantan, Malaysia

Submitted: 29 Oct 2008

Accepted: 27 Sep 2009

Abstract

Background: Chronic pain is a common medical issue. Beside chronic devastating pain, patients also suffer dysfunction more generally, including in the physical, emotional, social, recreational, vocational, financial, and legal spheres. Integrated multidisciplinary and multimodal chronic pain management programmes offer clear evidence for relief of suffering and return to functional lifestyles.

Materials and Methods: This retrospective review was performed in order to evaluate one-year outcomes among all newly referred patients of the multimodal chronic pain service at Hospital Universiti Sains Malaysia (HUSM). All patients received multimodal pain therapy, including pharmacological, physical, and psychological therapy, exercise, and pain intervention. The variables evaluated were based on a patient's global pain assessments, which were made using the Visual Analogue Scale (VAS) and Oswestry Disability Index (ODI), modified by patient self-report, and were taken within days to months of commencing our multimodal pain regime.

Results: A total of 169 patients were enrolled in this study. Out of this number, 102 (60.4%) were seen at the pain clinic, and 67 (39.6%) were referred while they were inpatients. About one-third of the patients had chronic pain due to cancer. Our data showed that 128 (75.7%) of our chronic pain patients were successfully managed when $\geq 50\%$ of pain relief (as measured by their VAS score) was achieved at any point during the course of the study period. In addition, 104 patients (61.5%) showed improvement in their modified ODI by 50% or more.

Conclusion: A multimodal chronic pain service plays a significant role in managing chronic pain patients in a major hospital, as it is capable of delivering comprehensive and attainable care to manage refractory and intractable chronic pain.

Keywords: chronic pain service, visual analogue scale, modified Oswestry Disability Index, multimodal pain therapy, multidisciplinary pain management, medical sciences

Introduction

Chronic pain is defined as pain that persists beyond three to six months after tissue injury. Nonmalignant chronic pain is a condition in which pain continues despite completed healing of damaged tissue and for which no biologic cause has been demonstrated (1,2). Musculoskeletal pain is most common and includes arthritis, low back pain, myofascial pain syndrome, neuropathic pain, and chronic headache (3). The most common malignant chronic pain (cancer pain) is from

tumours that metastasize to the bone (4).

The prevalence of chronic pain has been reported to be high in many studies. A World Health Organization (WHO) cross-continental survey, conducted in 26 000 primary care patients in 15 centres in Asia, Africa, Europe, and the Americas, indicated that one in five adults suffers from chronic pain (range, 6–33%) (5). This agrees with epidemiological studies that have estimated similar ranges of chronic pain prevalence in the general adult population to be about one in six (range 2–40%) (6). Another prevalence study

found that severe or significant chronic pain occurs in 6–14% of the general population of Scotland (7).

Chronic pain is a multidimensional problem that can detrimentally affect physical and psychological aspects of an afflicted individual's life, daily activities, and work (5,7) and may greatly impact healthcare expenditures (8). These in turn, lead to enormous social costs in the form of lost productivity and unrelenting, needless suffering. Internationally, pain is recognized as an impediment to health and dignity, and hence, alleviating pain and maintaining dignity even through the terminal phases of an illness is recognized as a necessity (9,10). Despite its widespread occurrence and measures to improve pain management, the current evidence indicates that pain continues to be under-treated and under-diagnosed for a variety of reasons, even in major service hospitals (1,11). With regards to this issue, the International Association Study Of Pain (IASP) and the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) now encourages hospitals to develop comprehensive programmes for assessment, treatment, and documentation of pain, as well as the institution of quality improvement efforts related to pain management (10).

The primary goal in chronic pain treatment is to improve the patient's level of function and capacity for return to work (RTW), while decreasing as much as possible the frequency and intensity of pain while simultaneously reducing medication consumption (12,13). The multimodal or comprehensive pain management approach in a biopsychosocial model has been accepted as a standard chronic pain management strategy. It is an integrated multidisciplinary treatment for groups with a closely coordinated therapeutic approach (1). Numerous meta-analyses and critical reviews of integrated multidisciplinary chronic pain management programmes offer clear evidence that this treatment approach can offer relief of suffering and return to a functional lifestyle (12,14). The multimodal regimen is superior to unimodal pain treatments (including surgery, pharmacologic intervention, spinal stimulators and intrathecal opioid pumps) in terms of pain reduction, improved physical functioning, and returning patients to the workforce (15). Nevertheless, implementation of the concept of multimodal and multidisciplinary chronic pain management is still beginning in various Asian countries (16). This study evaluates our preliminary experience and overall achievements one year after commencing this service in our institution.

Materials and methods

This retrospective review evaluates the outcomes of our one-year-old chronic pain service, from May 2007 to May 2008 in Hospital Universiti Sains Malaysia (HUSM). All new referrals for chronic pain management of cancer pain and non-cancer pain that came from either the pain clinic or inpatient wards were enrolled into this study. Patient data were obtained from the pain management unit registry. The cohort was divided by source (pain clinic or ward referral) of the patients entering multimodal (combined) chronic pain therapy. All chronic pain patients were subjected to standard multimodal pain therapy as appropriate, which consisted of physical, exercise, occupational, pharmacological, and psychological therapy, as well as interventional pain management.

Physical therapy mainly consisted of heat therapy (hot packs, ultrasound or short wave), transcutaneous electrical nerve stimulation (TENS), massage, and myofascial release, whereas therapeutic exercise involved active and passive stretching, as well as strengthening exercises in suitable cases. Oral medications consisted of paracetamol, nonsteroidal anti inflammatory drugs (NSAIDs), muscle relaxants, antineuropathic agents, antiresorptive agents, steroids, and opioids (OxyContin or slow-release morphine) when appropriate. The parenteral analgesic agent of choice was either intravenous parecoxib (Dynastat) or morphine sulphate, which was only given to inpatients. A fentanyl patch was advocated when a switch to a slow-release opioid was considered. Counselling and cognitive behaviour therapy was performed informally by one pain physician during each consultation, due to a shortage of staff. Patients with significant psychological disorders such as psychosomatic and somatisation disorders were referred to a psychiatrist for expert treatment. Pain intervention was defined as an injection performed under fluoroscopic guidance and was indicated when patients failed to respond to conservative treatment (physical therapy, exercise and oral medication). The number of patients were then compared and analyzed by variables such as demographic characteristics and patient responses to intervention, including measuring pain intensity by the Visual Analogue Scale (VAS) and functional disability by the modified Oswestry Disability Index (ODI), version 2.0 (17).

As an objective measurement of pain, a linear 100 mm VAS was routinely used in all patients at the first visit and upon improvements in pain if they occurred within the year. Similarly, assessment of the modified ODI was routinely

carried out using a questionnaire that consisted of ten questions. Patients were required to choose the best answer for each section to describe their pain and limitation. The maximum points possible for each question was five, and the maximum score for ten questions was fifty. The total modified ODI score from each patient was expressed as a percent. The modified ODI scoring and relevant level of disability is summarized in Table 1.

For outcomes measurement, improvement in pain (measured by the VAS) and functional/physical activity (assessed by the modified ODI) were measured within the year-long study period after commencing our multimodal pain regimes, regardless of the total number of follow-up examinations and pain interventions done. Re-evaluation of the VAS and modified ODI were done during follow-up appointments for pain clinic patients, whereas ward referral patients were evaluated on a daily basis at the pain clinic upon discharge from the ward. To measure the overall effectiveness of the multimodal pain management strategy, the VAS and modified ODI were categorized into two groups: the first group; patients who exhibited a reduction by $\geq 50\%$ in both variables, the second group; patient who showed a reduction of less than 50%. Reassessment of the modified ODI was performed regardless of the patients' VAS score throughout the study period. Fifty percent was taken as a standard figure when quick and brief assessments for improvement in pain and disability status were made. This figure has been widely used as a simple assessment tool in many pain studies and practices. The number and percentage of variables in pain management outcomes were then compared between the two groups of chronic pain patients.

Table 1: The modified Oswestry Disability Index (ODI)

Modified ODI score (%)	Level of disability
0–20	Minimal disability
21–40	Moderate disability
41–60	Severe disability
61–80	Cripple, pain impinges on all aspects of patient's life
81–100	Patients are bed-bound or exaggerating their symptoms

Results

A total of 169 new chronic pain patients were managed by the HUSM chronic pain service between May 2007 and May 2008. Of this figure, 57 (33.7%) were male, and 112 (66.3%) were female (Table 2). Of these new cases, 102 (60.4%) were seen in the pain clinic, and 67 (39.6%) belonged to the ward referral group. The proportion of orthopaedic patients was the highest, with 106 (62.7%) patients, followed by 18 (10.7%) neurosurgical patients (Table 3). The subgroups divided by aetiology showed that non cancer-related chronic pain and chronic back pain patients were the highest in proportion, accounting for 102 (60.3%) and 101 (59.7%) patients, respectively (Table 3). Patients with cancer-related pain dominated the ward referral group, accounting for 55 (84.6%) of these patients, whereas chronic back pain were more

Table 2: Sociodemographic characteristics of 169 new patients treated by the HUSM chronic pain service (from pain clinic and ward referral) from May 2007 to May 2008.

Patient distribution (n=169)	Numbers n(%)
Age	
Years (means \pm SD)	44.7 \pm 15.5
Gender	
Male	57 (33.7)
Female	112 (66.3)
BMI	
Under weight	30 (17.8)
Normal	42 (24.9)
Overweight	75 (44.4)
Obese	22 (13.0)
Ethnicity	
Malay	144 (85.2)
Chinese	20 (11.8)
Indian	5 (3.0)
Marital status	
Married	109 (64.5)
Not married	60 (35.5)
Occupational status	
Employed	121 (71.6)
Unemployed	73 (28.4)

Data are presented as n (%) or mean \pm standard deviation

common in the pain clinic group, accounting for 80 (79.8%) of patients.

Our data also showed that modified ODI and VAS scores were higher in the ward referral group as compared to the pain clinic group (48±5.0 vs. 24±4.2 [ODI] and 8.2±1.3 vs. 6.5±1.4 [VAS], respectively). Patients who belonged to the ward referral group were more likely to be severely disabled, whereas patients from the pain clinic were moderately disabled. Our data showed that 128 (75.7%) of our chronic pain patients were successfully managed by achieving a reduction in the VAS ≥50% at any point during the study period (Table 4). Between groups, a reduction of the VAS ≥50% was more often observed in the ward referral group compared to the pain clinic group (91% vs. 65.7%). Evidence for functional/physical restoration was also apparent, as 104 (61.5%) patients showed improvement in their modified

ODI by ≥50%; this effect was predominantly noted in the pain clinic group (67.6%) (Table 4). The total number of pain intervention procedures performed under fluoroscopy was 111 cases, which were done on a total of 76 new chronic pain patients (45%) (Table 5).

Discussion

Chronic pain is a common experience and is costly for both the individual and the health service. International prevalence rates of chronic pain (IASP criteria specifies duration of at least three months) range from 11.5–55.2%, with a weighted mean prevalence of 35.5% across the nation (18). Chronic pain, especially if left untreated, is associated with general physical, psychological, and social distress. Employment, daily activities, and measured dimensions of

Table 3: Demographic characteristics of new chronic pain patients from the pain clinic and from inpatient ward referral who were managed by the HUSM chronic pain service from May 2007 to May 2008.

Patient distribution	Pain clinic n=102	Ward referral n=67	Total n=169
Relevant disciplines			
Orthopaedic surgery	81	25	106
Neuroscience	10	8	18
Surgery	5	9	14
Medicine	3	4	7
Oncology	5	8	13
Family medicine clinic	4	0	4
ENT	0	4	4
Obstetrics and gynaecology	2	0	2
Cancer/non cancer in origin			
Cancer-related pain	12 (11.5)	55 (84.6)	67 (39.6)
Non cancer-related pain	90 (88.5)	12 (15.3)	102 (60.3)
Spine in origin			
Back pain	80 (79.8)	18 (27.7)	101 (59.7)
Non back pain	22 (20.2)	49 (72.3)	68 (40.3)
Pain duration			
Years, average ± SD	4.3 ± 2.4	2.5 ± 1.8	
VAS* at first visit			
(0-10 cm scale, average ± SD)	6.5 ± 1.4	8.2 ± 1.3	
Modified Oswestry Disability Index at first visit			
(% ± SD)	24 ± 4.2	48 ± 5.0	

Data are presented as n (%) or mean ± standard deviation
* VAS= Visual analogue scale

Table 4: Pain score based on Visual Analog Scale (VAS) and general improvement in functional/physical activity score based on modified Oswestry Disability Index (ODI) among new chronic pain patients following multimodal pain therapy, divided into ward referral and pain clinic groups

Patient responses	Patient group		Total n(%)
	Pain clinic n(%)	Ward referral n(%)	
Reduced VAS by $\geq 50\%$			
Yes	67 (65.7)	61 (91)	128 (75.7)
No	35 (34.3)	6 (9.0)	41 (24.3)
Improvement in modified ODI by $\geq 50\%$			
Yes	69 (67.6)	35 (52.2)	104 (61.5)
No	33 (32.4)	32 (47.8)	65 (38.5)

general health are increasingly and negatively affected by the presence of chronic pain (7). These patients have typically lost their independence and are reliant upon medications and the aid of others, contributing to the development of behavioural patterns of general passivity. Thus, due to these inter-related biopsychosocial distresses, chronic pain patients are finally subjected to disability (19).

In addition to the negative psychological and physiological effects, undermanaged pain imposes a heavy economic burden. In the United States, lost productive time (measured in terms of absenteeism as well as reduced productivity while at work) due to common pain conditions such as arthritis, back pain, headache, and other musculoskeletal pain cost \$61 billion a year (in 2002 US\$) (20). In addition to lost productive time, chronic pain increases healthcare utilization due to more frequent primary care visits and hospital admissions (a 2-fold increase) as well as emergency department visits (a 5-fold increase), compared with no chronic pain (8).

The primary goal in the treatment of chronic pain is to improve the patient's level of function and capacity to RTW by decreasing as much as possible the frequency and intensity of pain while simultaneously reducing medication consumption and additional use of health care resources (12,13). Unfortunately, chronic pain has a low rate of recovery. The average annual recovery rate from chronic pain was reported to be 5.4% after a four-year follow-up period in a study that examined the course of chronic pain in a community study population (13). Nevertheless, other data from a 30-year experience suggested that treatment of patients with chronic pain is best achieved via a multimodal and multidisciplinary team approach (12). Numerous meta-analyses and critical reviews

of integrated multidisciplinary chronic pain management programmes offer clear evidence of opportunities to relieve suffering and allow patients' return to functional lifestyles (12,14). In a review of 13 multidisciplinary chronic pain management centres, multimodal therapy was found to be superior to unimodal pain treatments (including surgery, pharmacologic intervention, spinal stimulators and intrathecal opioid pumps) in terms of pain reduction, improved physical functioning, and ability to return patients to the workforce (15). Furthermore, multidisciplinary treatment of chronic pain has been associated with reduced utilization of medical services compared to chronic pain patients treated with other approaches, even in countries with national health insurance (15). In terms of longevity of the benefits of integrated multidisciplinary programs, a follow-up study of patients seen 13 years after treatment supported maintenance of gains from therapy (12,14). Cognitive-behavioural therapy (CBT) is a well-known, important subset that is incorporated into multidisciplinary pain management programmes. This structured programme requires active participation from patients and is based on intensive mental, emotional, and physical rehabilitation in order to improve coping skills and health-related quality of life (12).

We would like to emphasize that our subject population of 169 patients is an underestimation of the actual number of new chronic pain patients seen in our hospital over the course of a year. For example, referral rates of chronic pain patients from the family medicine clinic were still low (2.3%), despite its potential for eventually becoming the main source of chronic pain patients. In addition, many neuropathic pain patients were successfully managed by the neurological team and

Table 5: List of pain intervention procedures done under fluoroscopic guidance on a total of 76 chronic pain patients from May 2007 to May 2008

Pain procedure	Frequency (n)	Percent (%)
Epidural steroid	28	25.2
Epiduroplasty	12	10.8
Sacroiliac joint injection	11	9.9
Piriformis injection	10	9.0
Facet joint injection		
Lumbar	11	9.9
Cervical	3	2.7
Paravertebral block	3	2.7
Radiofrequency ablation		
Sacroiliac joint	5	4.5
Lumbar facet	3	2.7
Neuroma	1	
Large-joint injection (triamcinolone or hyaluronic acid)	8	7.2
Discogram	2	1.8
Subscapularis muscle injection	3	2.7
Prolotherapy	2	1.8
Brachial plexus block	2	1.8
Others	7	6.3
Total	111	100

were only referred to pain clinic if the physician was unable to manage refractory or intractable pain cases. From our observations, we believe that some clinicians were still unaware of the new chronic pain service. HUSM is a tertiary-care hospital that serves a population of five million in northeast Malaysia. Obviously our figures are underestimated, if comparisons are made with previous epidemiological studies in US that have estimated the chronic pain prevalence in the general adult population at about one in six (range 2–40%) (6), whereas severe or significant chronic pain occurs in 6–14% of the general population (7). Nevertheless, data describing the prevalence of chronic pain in Asian countries are limited. The prevalence of chronic pain in the Hong Kong population has been reported to be 10.8%, which is comparable to rates in western countries (16). However, we report that our 169 new chronic pain patients should be taken as clinically significant, as they had refractory and/or intractable chronic pain that required expert management from pain specialists. Presumably, prior to the establishment

of chronic pain service, the number of chronic pain patients remained high, with these cases likely being under-treated, which led to persistent pain and disability.

Chronic pain is undertreated

Current evidence indicates that chronic pain continues to be undertreated. A recent nationwide survey of the general population showed that 75% of subjects who had experienced moderate to very severe pain within the previous two weeks had sought medical attention, but 44% of those who did so had not had significant pain relief (21). Likewise, in a European survey of more than 46,000 respondents, 40% of adults with chronic pain were found to be inadequately managed (22). A similar issue was observed in our study, in which the mean VAS in the pain clinic and ward referral groups at the first visit was quite high, at 6.5±1.4 and 8.2±1.3, respectively. The VAS was exceptionally high in the ward referral group, as most patients (84.6%) had pain from advanced cancer. This finding is consistent with previous studies that

have shown that 90% of patients with advanced cancer experience severe pain. In addition, as many as 50% of patients may be undertreated for cancer pain (23,24). A paucity of knowledge and skill pertaining to pain management among clinicians was identified as the main reason contributing to inadequate pain management, especially for cases of intractable and refractory pain (11,25,26). This fact is consistent with our observation that most patients had already been treated with analgesics (single or multiple-drug regimens) by the time of referral by their primary physician, and yet their pain was still uncontrolled. Conversely, a study performed by Vallerand et al. (11) showed that caregivers with greater knowledge of pain management had significantly fewer barriers to treatment, supporting the importance of increasing caregiver's understanding of cancer pain management (11).

Other factors in the undertreatment of pain may arise from inadequacies and restrictions in healthcare systems, attitudes, beliefs, and fear on the part of physicians, patients, families, and society, all of which may contribute to the widespread undertreatment of pain in our society (11,23,25). With respect to attitudes and beliefs, Fishbain et al. (17) has mentioned two possible reasons why treatment at a pain facility was not considered. First, the attending orthopaedic physician did not know or did not believe that treatment in a multidisciplinary pain facility would be of value. Second, the patient's insurance may not have covered such treatment. Such a situation would have forced the attending orthopaedic physician to proceed with an alternative treatment (27).

Our sociodemographic data revealed that rates of increased age, gender (female), weight and obesity remained high with high incidences of chronic pain (Table 2). Studies have reported that overweight or obesity early in life is a risk factor for pain and that both pain and overweight or obesity negatively affect quality of life (28). The prevalence of chronic pain has been reported to be higher among women than men (20% versus 16%) and was increased with age; these results were consistent with our findings (29). Our data also showed that 71.6% of chronic pain patients were employed civilians. We agree that this data should be correlated with the specific nature of the job in order to be more meaningful. A more recent survey in Spain found that the most important work-related pain problems derived from maintaining the same posture and carrying out repetitive tasks (30).

Our data showed that orthopaedic patients comprised the largest proportion (62.7%) among the subgroups. The pain clinic was noticeably and predominantly attended by chronic back pain patients (79.8%), whereas the ward referral group was mostly composed of cancer-related chronic pain patients (84.6%) (Table 3). This finding agrees with the fact that low back pain is a worldwide major health and socioeconomic problem. Over 26 million adults experience frequent back pain, and two-third of Americans will have back pain during their lifetime (30). Meanwhile, other studies have reported that approximately 80% of Americans experience low back pain during their lifetime (3,30).

Improvement of VAS and modified ODI: the explanation

The VAS is recommended by the Agency for Health Care Policy and Research (AHCPR) as a pain assessment tool and is widely used in pain research (31), whereas the ODI is currently considered the "gold standard" for researchers to measure permanent functional disability, especially among chronic back pain patients (17). Improvement by 50% or more on the VAS and ODI is taken as an indicator of significant improvement, and this simple assessment tool is commonly used in clinical practice and researches. Most pain researchers have reported using the "pain reduced by $\geq 50\%$ " metric to denote significant pain relief following intervention (32). Our study showed that 75.7% of our patients had $\geq 50\%$ reductions in VAS score, which might be considered to be an overestimated value. Chronic pain is reported to have a low rate of recovery without intervention. For example, the average annual recovery rate from chronic pain was 5.4% after a follow-up period of 4 years in a study that examined the course of chronic pain in the community (13). Turk et al. (12) found that pain reduction across studies following multidisciplinary pain therapy was 37%, which was comparable to other pain treatment modalities; however the rate of return to functional work ranged from 48–65%, a significant improvement beyond pain reduction itself (15).

The high success rate in our multimodal pain treatment (75.7%) was strongly increased by a reduction in the VAS by $\geq 50\%$ among the ward referral group (91.0%) which was dominated by cancer-related pain patients. We believe that our cancer-related pain patients responded much better to our pain treatment regime than non-cancer-related pain patients did for several reasons. Patients underwent proper assessment of pain in terms of severity, type, and cause of pain, resulting

in correct goals and direction of treatment regimes. We also noticed that most patients did well with slow-release opioid analgesics (OxyContin, slow-release morphine, fentanyl patches) and anti-neuropathic agents (gabapentin, amitriptyline, carbamazepine, clonazepam). Our finding is consistent with a longitudinal follow-up study done by Meuser T et al. (33), who reported that efficacy of pain treatment was good in 70%, satisfactory in 16%, and inadequate in 14% of patients, after the WHO guidelines for cancer pain relief were followed (33). Conversely, non-cancer-pain patients (chronic benign pain patients) tolerated both groups of medications poorly, as most of them suffered from adverse effects of the medications. We also noticed that some of our cancer patients benefited from regional nerve blocks while undergoing titration of opioid or antineuropathic agents to therapeutic levels. This technique was often employed for an intractable and mixed type of cancer pain. Another factor that also may play a role in our high success rate was the existence of a well-established oncology and radiotherapy department at HUSM, in which most of our cancer patients underwent complimentary radiotherapy or chemotherapy as part of our multimodal chronic pain therapy. None of our cancer patients required intrathecal catheterization for neuraxial opioid therapy.

Nevertheless, $\geq 50\%$ reduction in VAS is a rather rough assessment of quantity of pain relief and is less specific. Previous pain studies often incorporated functional or physical activity scores along with the pain score in order to evaluate outcomes in a more meaningful way (15). Thus, we concluded that restoration of patients' functional or physical activity was an important complement to our overall assessment of patient responses. In our study, the degree of patient disability was measured by the modified ODI, which reported moderate (24 ± 4.2) and severe (48 ± 5.0) disability in the pain clinic and ward referral groups, respectively. This finding correlates with VAS scores, which yielded higher scores in ward referral group. Our data showed that overall improvement in the modified ODI by $\geq 50\%$ was recorded in 61.5% of the patients and was more often observed in the pain clinic group (67.6%) (Table 4). Although improvement in pain score was greater in the ward referral group, improvement in their modified ODI was subtle (52.2%). We conclude that this was due to the characteristics of patients in the ward referral group because most of them had significant comorbidities and debility due to their status as advanced cancer patients. Nevertheless, it is known that level of activity does not necessarily correlate with pain intensity (34).

The psychosocial assessment of chronic pain

Even though functional measurements of pain such as the ODI have gained popularity, self-reports of some functional measurements may still be unreliable. Ideally, a single-dimension metric is not the best pain assessment tool, as chronic pain can have a significant psychosocial impact. Compared to people without chronic pain, those with chronic pain have a 4-fold increased risk for depression or anxiety (7). Estimates of the prevalence of depression among patients with chronic pain range from 31% to 100%, while pain complaints in depressed individuals range from 34% to 66% (35,36). In our work, counselling and cognitive behaviour therapy were done informally by a single pain physician during consultation, due to a shortage of staff. Patients who presented with significant psychological disorders such as psychosomatic and somatisation disorders were referred to a psychiatrist for expert treatment. Other more realistic psychosocial inventories such as the Beck Depression Inventory (BDI) or Pain Catastrophizing Scale (PCS) would be a better option for the variables measured in this kind of study. Alternatively, other multiple-dimensional methods for reporting pain, such as the McGill Pain Questionnaire (MGPQ) or Short Form Health Survey (SF-36), will be valuable if incorporated into the assessment of chronic pain patients in future studies (37). The SF-36 is a comprehensive pain measurement tool that is frequently used for measuring Health Related Quality Of Life (HRQL) and for following changes in HRQL after clinical treatments. It consists of eight scales that measure physical functioning, physical role (limitations in daily activities), bodily pain, general health, vitality, social functioning, emotional role (limitations in daily activities), and mental health.

Interventional pain management

Pain intervention procedures under fluoroscopic guidance were indicated when patients failed to respond to conservative treatment (refractory) and had persistently high VAS (VAS 7–10). This step is in accordance with the WHO fourth analgesic ladder recommendation, which states that interventional pain procedures are called for when the third analgesic ladder of pain management strategy has failed (12,14). The total number of pain interventions performed under fluoroscopy was 111 cases in 76 patients, who comprised 45% of our new chronic pain patients (Table 5). This high pain intervention rate can be attributed to several reasons. Some patients underwent multiple pain procedures at one time, as they presented with multiple pain diagnoses.

In addition, most pain procedures required repetition, either as recommended by protocol or as pain recurred. The list of intervention procedures is given in Table 5. Epidural steroid injection was the most common pain intervention procedure performed (25.2%), followed by lumbar and cervical facet joint injection (12.6%), epiduroplasty (10.8%), sacroiliac joint injection (9.9%), and piriformis injection (9.0%). However, no analysis was done to define the efficacy of the pain interventions employed, as this requires a randomized, double-blinded controlled trial. The improvement in our patients' pain and disability actually reflected the overall multimodal treatment regimens used in the biopsychosocial approach, rather than unimodal therapy. We conclude that vast skill and knowledge in pain management, the presence of up-to-date techniques, and drugs relevant to pain management that are delivered through multimodal pain therapy approaches are the main keys for success in chronic pain management.

Study Limitations

Because this survey was based on respondents' self-report, the quality and accuracy of the data cannot be determined, particularly for the extremely subjective disability score. In future studies, the modified ODI should also be administered during the pre- and post-treatment course so that outcomes can be compared. As another option, more objective tools for measuring disability may be utilized, such as the Short Form Health Survey (SF-36). In addition, our survey documented only two specific symptoms (pain intensity and physical disability), which are known to be associated in chronic pain. Clearly, many other conditions which have not been explored, such as psychological status, may interfere with the total picture of chronic pain.

The documentation of dependent variables (VAS and ODI) was completed serially. Patients who developed recurrent pain over the course of the study period were not re-entered into the study sample. On the other hand, patients who initiated treatment later in the study period probably did not have enough time to respond to the comprehensive biopsychosocial model of pain treatment; this clearly will affect the study outcome.

Implications for health care authorities

Despite the demonstrated effectiveness of multidisciplinary approaches for the treatment of chronic pain, only a small group of patients took advantage of the multidisciplinary pain clinics. Extra effort must be applied to promote awareness

of this relatively new service among caregivers and chronic pain sufferers. In addition, although specialty pain clinics may be perceived as expensive ventures, their treatment outcomes can result in lower levels of patient disability. They are thus likely to impact on health care utilization and the economics of health care such that high front-end investments may result in long-term health care savings for the system as a whole.

Conclusion

A chronic pain service plays a significant role in managing chronic pain patients in a major hospital, as it is capable of delivering comprehensive care and management of refractory and intractable chronic pain. More patients will benefit from this novel service if referrals for pain management can be made early and often.

Author's contributions

Conception and design, drafting of article, critical revision of article: NAJ

Data analysis and interpretation; statistical expertise: ZS

Provision of patients; administrative support: MSA
Administrative, technical and logistic support: MO

Correspondence

Dr Nizar Abd. Jalil
Department of Anaesthesiology and Intensive Care
School of Medical Sciences
Universiti Sains Malaysia
16150 Kubang Kerian
Kelantan, Malaysia
Tel: +609-767 6095
Fax: +609-765 3370
Email: nizar@kb.usm.my

References

1. Arnold B, Brinkschmidt T, Casser HR, Gralow I, Irnich D, Klimczyk K et al. Multimodal pain therapy: principles and indications. *Schmerz* 2009;**23**(2):112-120.
2. Paris PM, Yealy DM. Pain management. In Marx J, Adams J, Rosen P et al. editors. *Rosen's Emergency Medicine: Concepts and Clinical Practice*, 6th ed (Chapter 187). Philadelphia, PA: Mosby.2006.
3. Katz WA. Musculoskeletal pain and its socioeconomic implications. *Clin Rheumatol.* 2002;**21**(suppl 1):S2-S4.
4. Cleeland CS, Gonin R, Hatfield AK, Wagler KS, Pandya KJ. Pain and its treatment in out patients with metastatic cancer. *N Engl J Med.* 1994;**330**:592-596.

5. Verhaak PF, Kerssens JJ, Dekker J, Sorbi MJ, Bensing JM. Prevalence of chronic benign pain disorder among adults: a review of the literature. *Pain*. 1998;**37**:215–222.
6. Smith BH, Elliott AM, Chambers WA, Smith WC, Hannaford PC, Penny K. The impact of chronic pain in the community. *Fam. Pract*. 2001;**18**:292–299.
7. Gureje O, Von Korff M, Simon GE, Gater R. Persistent pain and well-being: a World Health Organization Study in Primary Care. *JAMA*. 1998;**280**:147–151.
8. Blyth FM, March LM, Brnabic AJ, Cousins MJ. Chronic pain and frequent use of health care. *Pain*. 2004;**111**:51–58.
9. Paul H. The Right to the Highest Attainable Standard of Health..The Lancet article 12 of the International Covenant on Economic, Social and Cultural Rights (CESCR), General Comment, 2000. [Internet]. 2007 [cited 2009 Apr 20]. Available from: <http://www.doctordeluca.com/Library/Pain/NoReliefInSight97-C.html>.
10. Berry PH, Dahl JL. The new JCAHO pain standards: Implications for pain management nurses. *Pain Mgmt Nurs*. 2000;**1**:3–12.
11. Vallerand AH, Collins-Bohler D, Templin T, Hasenau SM. Knowledge of and barriers to pain management in caregivers of cancer patients receiving homecare. *Cancer Nurs*. 2007;**30**(1):31–37.
12. Turk, D. Efficacy of multidisciplinary pain centers in the treatment of chronic pain. In :C.J.e. Cohen MJM, editor. Pain treatment centers at a crossroads: A practical and conceptual reappraisal. Seattle: IASP Press. 1996.
13. Elliott AM, Smith BH, Hannaford PC, Smith WC, Chambers WA. The course of chronic pain in the community: results of a four-year follow-up study. *Pain*. 2002;**99**:297–307.
14. Phillips DM. JCAHO pain management standards are unveiled. *JAMA*. 2000;**284**:428–429.
15. Turk DC Clinical effectiveness and cost-effectiveness of treatments for patients with chronic pain. *Clin J Pain*. 2002;**18**:355–365.
16. Ng KF, Tsui SL, Chan WS. Prevalence of common chronic pain in Hong Kong adults. *Clin J Pain*. 2002;**18**:275–281.
17. Fairbank JC, Pynsent, PB. The Oswestry Disability Index. *Spine*. 2000;**25**(22):2940–2953.
18. Harstall C, Ospina M; Systematic review of prevalence studies on chronic pain International Society of Technology Assessment in Health Care. Meeting (19th :2003:Canmore, Alta.). *Annu Meet Int Soc Technol Assess Health Care Int Soc Technol Assess Health Care Meet*. 2003; **19**: abstract no. 130.
19. Blyth FM, March LM, Cousins MJ. Chronic pain-related disability and use of analgesia and health services in a Sydney community. *MJA*. 2003;**179**:84–87.
20. Stewart WF, Ricci JA, Chee, E, Morganstein D, Lipton R. Lost productive time and cost due to common pain conditions in the US workforce. *JAMA*. 2003;**290**:2443–2454.
21. Shi Q, Langer G, Cohen J, Cleeland CS. People in pain: how do they seek relief? *J Pain*. 2007;**8**:624–636.
22. Breivik H, Collett B, Ventafridda V, Cohen R, Gallacher D. Survey of chronic pain in Europe: prevalence, impact on daily life, and treatment. *Eur J Pain*. 2006;**10**:287–333.
23. Von Roenn JH, Cleeland CS, Gonin R, Hatfield AK, Pandya KJ. Physician Attitudes and Practice in Cancer Pain Management. *Ann Intern Med*. 1993;**119**:121–126.
24. Weinstein SM, Thoruby JI, Lorimor RJ, JR Hill CS, Thrope DM, Merrill JM, et al. Medical Students’ Attitudes Toward Pain and the Use of Opioid Analgesics: Implications for Changing Medical School Curriculum. *South Med J*. 2000;**93**(5):472–478.
25. Drayer RA, Henderson J, Reidenberg M. Barriers to better pain control in hospitalized patients. *J Pain Symptom Manage*. 1999;**17**:434–440.
26. Sullum J. No Relief in Sight. ReasonOnline (January 1997). [Internet]. 2007 [cited 2009 Apr 5]. Available from: <http://www.doctordeluca.com/Library/Pain/NoReliefInSight97-C.html>.
27. Fishbain D, Cutler RB, Rosomoff HL, Steele Rosomoff RS: What is the quality of the implemented meta-analytic procedures in chronic pain treatment meta-analyses? *Clin J Pain*. 2000;**16**:73–85.
28. Janke EA, Collins A, Kozak AT. Overview of the relationship between pain and obesity; what do we know? Where do we go next? Adapted from *J Rehabil Res Dev*. 2007;**44**(2):245–262.
29. Millar WJ. Chronic pain. *Health Rep*. 1996;**7**(4):47–53.
30. Dionne CE. Low back pain. In: Crombie IK, Croft PR, Linton SJ, et al. editors. Epidemiology of pain. Seattle: IASP Press. 1999.
31. Dexter F, Chestnut DH. Analysis of statistical tests to compare visual analog scale measurement among groups. *Anaesthesiology*. 1995;**82**:896–902.
32. Olcott C, Eltherington LG, Wilcosky BR, Shoerr PM, Zimmerman JJ, Fogarty TJ. Reflex sympathetic dystrophy-the surgeon’s role in management. *J Vasc Surg*. 1991;**14**:488-492; discussion 492-495.
33. Meuser T, Pietruck C, Radbruch, Stute P. Symptoms during cancer pain treatment following WHO-guidelines: a longitudinal follow-up study of symptom prevalence, severity and etiology. *Pain*. 2001; **93**(3):247–257.

34. Linon SJ. The relationship between activity and chronic back pain. *Pain*. 1985;**21**:289–294.
35. Romano JM, Turner JA. Chronic pain and depression: Does the evidence support a relationship? *Psychol Bull*. 1985;**97**:18–34.
36. Smith GR. The epidemiology and treatment of depression when it co-exists with somatoform disorders, somatization, or pain. *Gen Hosp Psychiat*. 1992;**14**:265–272.
37. Pateman JA. Measurement of pain. In: Dolin SP, Nicholas PJ. *Pain Clinic Manual*. 1st edition. New York: Butter Worth-Heinemann. 1996; p. 12–13.