THE IMPACT AND EFFECTIVENESS OF NURSE-LED CARE IN THE MANAGEMENT OF ACUTE AND CHRONIC PAIN: A REVIEW OF THE LITERATURE

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ABSTRACT

Background
A diverse range of models of care exist within the services available for the management of acute and chronic pain. Primary studies have been conducted evaluating these models, but, review and synthesis of the findings from these studies has not been undertaken.

Aims and objectives
To systematically identify, summarize and critically appraise the current evidence regarding the impact and effectiveness of nurse-led care in acute and chronic pain.

Method
Systematic searches of Pubmed (NLM) Medline, Cynahl, Web of Knowledge (Science Index, Social Science index) from January 1996 until March 2007. The searches were supplemented by an extensive hand search of the literature through references identified from retrieved articles and by contact with experts in the field.

Results
Twenty five relevant publications were identified and included findings from both primary and secondary care. The areas, in which nurses, caring for patients in pain are involved, include assessment, monitoring, evaluation of pain, interdisciplinary collaboration, and medicines management. Education programmes delivered by specialist nurses can improve the assessment and documentation of acute and chronic pain. Educational interventions and the use of protocols by specialist nurses can improve patients understanding of their condition and improve pain control. Acute pain teams, led by nurses, can reduce pain intensity and are cost effective.

Conclusions
Findings of the review are generally positive. However, there are methodological weaknesses and under researched issues e.g. the prescription of medicines by nurses, that point to the need for further rigorous evaluation.

**Implications for clinical practice**

Nurse-led care is an integral element of the pain services offered to patients. This review highlights the effect of this care and the issues that require consideration by those responsible for the development of nurse-led models in acute and chronic pain.

*Key word:* Pain management, nurse-led care, medicines management, education
CONTEXT AND BACKGROUND TO THE REVIEW

Acute pain commonly occurs in the post operative period. Non surgical acute pain is associated with low back pain, burns, trauma and a number of medical conditions e.g. myocardial infarction. Chronic pain, including headache, arthritis, and low back pain, is experienced by approximately 7% of the population at any one time. It is evident that effective pain management improves patients’ quality of life, and lessens the socio-economic burden of unrelieved acute, chronic and cancer pain (Clinical Standards Advisory Group (CSAG) 2000).

Early pain services in the United Kingdom (UK) date back to the late 1940’s. These services were developed by anaesthetists and were aimed at patients with terminal cancer pain. Specialist pain services, aimed at acute and chronic pain and associated disabilities, now exist in most teaching and district general hospitals. The majority of hospitals developed acute pain teams following the recommendations made in the ‘Pain after Surgery’ report (The Royal College of Surgeons and College of Anaesthetists (RCSCA) 1990). These teams typically comprise of an anaesthetist and one or more specialist nurses (who often have a strong educational role) and provide hands on pain management, staff training, monitoring of treatments, and the introduction of guidelines (CSAG 2000). Chronic pain services are provided in outpatient clinics in the hospital setting or, in a primary care facility (outreach clinics), inpatient ward referrals, oncology and palliative care units within the hospital, or on external sites (The Royal College of Anaesthetists and the Pain Society (RCAPS) 2003).
Nurse-led services are one means of improving health care provision (Department of Health (DoH) 1999, DoH 2000). Nurses have developed and extended their knowledge and skills and have key roles to play in a number of areas, especially chronic diseases (Campbell 2004, McKee & Nolte 2004, Raftery et al. 2005, Courtenay & Carey 2006). The role of the specialist nurse is emphasised for the safe management of acute and chronic pain, and new roles, such as nurse prescribing, should lead to an extended role for these nurses (RCAPS 2003).

A diverse range of models of care exist within the services available for the management of acute and chronic pain. This review was therefore conducted in order to evaluate specifically the activity and effects of nurse-led care in acute and chronic pain to date, and to identify areas for further research.

**AIM OF THE REVIEW**

The literature review was conducted to systematically identify, summarize, and critically appraise the current evidence regarding the impact and effectiveness of nurse-led care in acute and chronic pain.

**SCOPE OF THE REVIEW**

We conducted systematic searches of Pubmed (NLM) Medline, Cinahl, Web of Knowledge (Science Index, Social Science index) from January 1996 to March 2007. It is evident that nurses have key roles to play in the management of acute and chronic pain in a number of countries (Pellino 2002, Brown & Richardson 2006, Musclow 2002) therefore; the searches were not restricted to the UK. The same key words, alone and in combination, were used to search each database and included: ‘nurse-led

Three hundred and eighty seven results were identified from the searches. However, many of these were duplicated citations through combining search terms. Furthermore, many were not research based and only provided descriptive accounts of the nurses’ role in a variety of clinical settings and so were excluded. A total of 25 relevant publications met our criteria and included findings from both primary (n=9) and secondary care (n=16).

**FINDINGS**

Studies were both evaluative and descriptive and can be categorised in to three main areas:

- Descriptions of the activities of nurses in acute and chronic pain (n=8)
- Evaluation of pain education programmes on service delivery (n=4)
- Evaluation of nurse-led interventions on patient outcomes (n=13)
Within each area, a number of themes were identified. Each of these themes is discussed.

**Description of the activities of nurses working in acute and chronic pain**

**Clinical, educational, administrative**

Pellino *et al.* (2002) surveyed 3063 nurses practicing in the area of acute and chronic pain with adult patients in the hospital setting in the States. Although the response rate was poor (i.e. less than a quarter of the completed questionnaires were returned), and so the risk of serious response bias high, it was evident that the main activities in which these nurses were involved included assessment, monitoring, and evaluation of pain. Further support for these findings is provided by Musclow (2002) in a survey of Canadian nurses’ working in the hospital setting in acute pain management. Although less than 40% of the participants responded, it was evident from the completed questionnaires that assessment and treatment management were primary role responsibilities of these nurses. A further activity included the education of patients and staff and outside organisations.

Education was also one of the role components of the pain resource nurse (PRN) identified by McCleary *et al.* (2004). These Canadian researchers used focus groups to examine the role components of the PRN (a designated clinical nurse whose main function is to act as a support and resource for other nurses and so improve acute and chronic pain management at the bedside) in a paediatric teaching hospital. Role components included educator of nurses and other members of the multidisciplinary team.
Interdisciplinary collaboration and communication

Interdisciplinary collaboration and interpersonal skills have been cited by nurses, in recent studies, as important facets of pain management (Brown & Richardson 2006, Johnston & Smith 2006). Brown & Richardson (2006) undertook a survey of nurse members of the Pain Society, working across the UK, about their beliefs about pain management in an attempt to understand the roles and responsibilities of members of the pain team. Although the response rate was unknown, 103 completed questionnaires were returned. Multidisciplinary team working was endorsed as an important facet of pain management. Similar findings were identified by Johnston & Smith (2006). In an attempt to gain an understanding of the concept of palliative care and the expert palliative care nurse, these researchers undertook 44 in-depth interviews with registered nurses and patients working both in acute and hospice settings in Scotland. A cohesive multidisciplinary team was considered by nurses as the key concept to effective palliative nursing care. The most important concept of palliative care and the expert palliative care nurse, as perceived by patients, was good communication skills and effective nurse-patient relationship. Communication and interdisciplinary collaboration were also highly rated activities identified by nurses surveyed by Pellino et al. (2002) and Musclow (2002).

Medicines management

There is some evidence to suggest that medicines management is a further activity in which nurses are involved. This was a highly rated activity cited by nurses in Pellino et al.’s (2002) research, and a more recent study by Kohr & Sawhney (2005). These
Canadian researchers surveyed Advanced Practice Nurses (APNs) with respect to their role in acute and chronic pain. Although it is unknown how many questionnaires were distributed (and so the response rate unknown), one hundred and sixteen completed questionnaires were returned by APNs working across a broad range of specialties. Fifty eight percent of respondents said their patients had pain or were looking for pain relief. Most of these nurses cited advising doctors and pharmacists on prescribing decisions and using medical directives as an important element of their role. A lack of prescriptive authority was seen as a barrier by these nurses to effective pain management.

Influence on medical decision making with regards to pain management and acting as the patients advocate are additional activities that have been identified as comprising the role of the nurse working in pain management. It is evident from the findings of interview data collected by Söderhamn & Idvall (2003) that Swedish nurses working in post operative pain management have important roles to play with regards to influencing medical decision making surrounding pain management and acting as the patients advocate. Similar findings were identified by Holley et al. (2005) in focus groups involving PRNs who had undergone advanced training in acute pain assessment and management. Participants felt they had an important role to play with regards to advocates for patients and their pain management.

**Evaluation of pain education programmes on service delivery**

**Nurse benefits**

There is some evidence to suggest that the implementation of pain education programmes have a positive effect on service delivery with regards to nursing benefits
(Törnkvist et al. 2003, White 1999, Barnason et al. 1998). Törnkvist et al. (2003) examined the effects of a training programme for district nurses (DNs) who had adopted the role of pain adviser. Questionnaires examining satisfaction with chronic pain management, pain knowledge, pain assessment and documentation, were disseminated to DNs working across a number of Swedish primary health care centres (PHCCs) before and after the implementation of an education programme. Four DNs, who covered a number of the PHCCs underwent the educational programme and adopted the role of pain adviser. Although it is unclear whether those nurses who completed questionnaires after the intervention were the same nurses who completed baseline questionnaires, it was evident from the findings that DNs, who worked in the PHCCs in which the adviser worked, had a better understanding of pain, had improved with regards to the assessment and documentation of pain, and were more satisfied with pain management routines.

Further support for these findings is provided by White (1999) and Branson et al. (1998). White (1999) used self report scales in order to obtain baseline measures of nursing documentation (related to acute pain management) prior to the implementation of a pain management programme delivered by a Clinical Nurse Specialist (CNS). The self report measures used to collect baseline data were repeated at intervals up to 2 years following the programme. Statistical and clinical improvements were seen in the documentation related to pain management (including the use of pain rating scales before and after an intervention), timing of post operative pain assessments, and the use of pharmacological and non-pharmacological methods to treat pain. Barnason et al (1998) identified similar improvements in chronic pain management by nurses working in a community hospital in the United States (US).
who had undertaken a self study pain management module that had been developed by a group of CNS. The module was designed to provide nurses with clinical pain management strategies and facilitate the integration of research finding into practice. Self report data collected from nurses before and after the intervention identified an improvement in nurses’ knowledge of pain and clinical pain management, participants in this study had also implemented clinical nursing standards for pain management.

Patient benefits

Patients benefits have also been identified following the implementation of pain education programmes (White 1999, Barnason et al. 1998, Mac Lellan 2004). As well as improvements by nurses in the management of pain, White (1999) identified through patient self report data that the 4 week educational programme decreased patient’s experiences of pain. Similar findings were identified by Barnason et al. (1998). It was evident from patient interview data that the majority of patients were able to identify their own ‘acceptable’ level of pain. Findings also demonstrated an overall high level of understanding by patients of the use of pain rating scales. They were also positive about the way in which their pain was managed by nurses.

Additional support for these findings is provided by MacLellan (2004). This researcher compared patient pain scores within 2 comparable hospitals (intervention and control) following the introduction of pain charts to the ward areas, the implementation of a pain education programme, the hosting of a national conference, and poster displays at 4 study days. Baseline data was compared with that collected following the intervention. There were significant reductions in the mean pain scores
of patients in the intervention group. There was no significant reduction in the mean pain scores of patients treated in the control hospital.

**Evaluation of nurse-led interventions on patient outcomes**

**Education**


Ahles *et al.* (2000) randomly assigned over 700 patients, registered with several primary care centres in the US, and suffering from mild to severe chronic pain, to either an intervention or usual care group. Intervention patients received educational material or educational material and a nurse educator telephone intervention. The usual care group received routine care. Although differences in demographic data across the two groups limits the findings of this study, patients in the intervention group scored significantly higher in assessment questionnaires indicating that they had a more favourable health state, a better understanding of their pain, and felt better able to control it.

Further evidence in support of these findings is provided in a number of studies involving cancer patients. It is evident from work in Australia (Yates *et al.* 2003) and De Wit *et al.* (1997) from the Netherlands, that education and individualised instructional techniques, delivered by experienced registered nurses, trained as
counsellors, can increase patient’s knowledge of pain, their perceived control over pain, reduce their willingness to tolerate pain, and reduce their concerns about addiction and side effects. Additionally, self report data collected by Ward et al. (2000), from the States, indicates that information provided by nurses over the telephone to patients with gynaecological cancers can help to reinforce information given during nurse home visits.

Although looking at chronic pain, LeFort et al. (1998) reported similar positive findings when examining the effects of a low cost community based nurse delivered group psycho-education programme in patients with mixed idiopathic chronic pain. The programme involved patients attending a nurse-led weekly session for six weeks. One hundred and ten patients were assigned to the treatment and the control groups. Patients in the treatment group showed significant short term improvements in pain, dependency, vitality, aspects of role function, life satisfaction, self efficacy (SE) and resourcefulness.

Significant improvements in pain intensity scores were similarly identified in patients experiencing chronic pain by Wells-Ferdman et al. (2002). Evaluating the effects of a cognitive behavioural programme led by advanced practice nurses, these American researchers also identified significant improvements in pain intensity scores in chronic pain patients being treated at a tertiary referral centre. Although there was no control and exclusive reliance upon self report data, baseline and questionnaire data from 154 patients who completed a 10-visit outpatient cognitive behavioural programme in order to help them manage their pain was collected. Significant improvements were seen in pain intensity, SE, disability and depressive symptoms.
**Education and protocols**

There is some evidence to suggest that education combined with the use of medicines and pain management protocols can reduce pain intensity, increase the use of non-pharmacological treatments, and decrease the use of analgesia without increasing pain. Benor *et al.* (1998) allocated patients, who suffered from a variety of cancers and treated by radiation and/or chemotherapy (and attended a day care unit at a large medical centre in Israel), to an intervention or control group. Patients in the control group received standard care. The intervention group received visits from a nurse who assessed symptoms and advised, educated patient in the relevant areas, and used a pain assessment tool to assess patient’s pain. Results identified significant improvements in pain intensity in intervention group patients. An important finding was an increase in patients independence ratings by these patients i.e. patients were able to assume responsibility for their own treatment. West *et al.* (2003) reported similar findings in the States in cancer patients with metastatic bone pain who were provided with an educational intervention (including information on the management of analgesia and concept of tolerance addiction dependence) from a research nurse experienced in oncology and pain management. In addition to a reduction in pain scores, the intake in analgesia increased.

Positive findings have also been reported by researchers examining the effects of a nurse educational intervention in chronic pain. Mazuca *et al.* (2004), assessed the effects of a nurse intervention and algorithms (for treatment modalities and pain regimes) on patients with knee osteoarthritis (OA). Patients with knee OA were allocated into either one of two control or two intervention groups. The intervention
was carried out by registered nurses with extensive experience in the instruction of patients with OA in self care. During the intervention, the nurse followed a detailed algorithm for implementing and monitoring the response to non-pharmacological treatment modalities (i.e. leg strengthening exercise, counselling of joint protection, and use of non-thermal modalities). Algorithms were also used to reduce and discontinue the dose of non-steroidal anti-inflammatory drugs (NSAIDs) taken by patients. Findings from baseline and follow up assessments identified that three quarters of the patients in the intervention group implemented the non-pharmacological modalities (mostly exercise) compared to less than a quarter of the patients who received routine care. Over a quarter of the patients in the intervention group, as compared to 5% in the control groups, underwent changes in drug treatment (i.e. reduction or discontinuation of NSAID or switch to other analgesia). Although 28% of each group declined to undergo pain and function scores throughout the study, the scores collected indicated no deterioration in pain control or function. Glasgow & Glasgow (2002) in their evaluation of a nurse-led chronic pain management clinic in the UK reported similarly positive findings. As well as being responsible for an initial patient assessment, nurses in this research provided patients with information on breathing, relaxation exercises and managed medicines by protocols. Over the 2 year period pain scores fell and there was no increase in total drug costs.

Acute pain teams

Several studies have examined the inception of a nurse-led acute pain team on the pain experiences of patients. Stadler et al. (2004) analysed the cost effectiveness and cost utility of the inception of a nurse-led team in a general hospital in Belgium. Nearly 2000 inpatients that had undergone various types of surgery were included in
the study. A baseline survey of patient visual analogue scale (VAS) scores was initially undertaken. The nurse-led model, which included standard analgesic protocols, regular assessment and documentation of pain intensity, and documentation of post-operative analgesia, was then implemented. All costs related to the model were identified. Four months following its implementation, a further survey conducted on consecutive surgical patients and personnel costs related to the service were calculated. VAS scores decreased in the post model phase. Although the cost of analgesia and disposal nursing hours increased, there was some reduction of post op complications in some surgical patients. There was no change with regards to duration of hospital stay and mortality rates. The researchers concluded that the nurse-led pain management model was overall cost effective as it improved post operative pain and morbidity.

Shapiro et al. (2004) similarly evaluated the implementation of a nurse-led team in Israel. In addition to documentation of pain intensity and the introduction of protocols for analgesia regimes, ward staff involved in the delivery of the service underwent a training programme co-ordinated and taught by the pain team doctors and nurses. Data sets from over 4000 patients, collected between 1999 and 2002, were examined. Although there was no comparison group, VAS scores were low, there were no complications resulting in sustained morbidity or mortality, and over 95% of the patients described their satisfaction with the service as good or excellent.

Further support for these findings are provided by Mackintosh & Bowles (1997). These researchers evaluated an acute pain service delivered by a CNS. The service included the provision of pre-operative information for patients, educational material
for staff, pain management guidelines, daily pain rounds, the documentation of pain intensity scores, and the promotion of best practice for prescribing analgesia. Baseline data was collected from 100 patients in 1992 by means of structured interviews. Interviews focused on pre-operative information given to patients about their surgery, pain intensity, and analgesia. The same data was collected from 106 patients in 1995. Fewer patients in 1992 (as compared to 1995) recalled being given any pre-operative information. A greater number of patients in 1992 reported that they experienced pain worse than discomfort, and higher numbers of patients in 1995 received patient controlled analgesia. The use of intramuscular analgesia fell between 1992 and 1995.

**DISCUSSION**

The evidence emerging from the literature indicates that nurses in a number of countries have key roles to play in the management of acute and chronic pain. It is evident from the findings of research undertaken in the hospital setting that there are specific areas of care, in which nurses caring for patients with both acute and chronic pain are involved. These areas include assessment, monitoring and evaluation of pain, and the education of patients, staff and outside organisations. Where these nurses have developed advanced knowledge and skills with regards to pain management, they have adopted such roles as APNs. These nurses work across a wide range of specialities. In addition to assessment, monitoring and evaluative skills, these nurses report that they provide advice to doctors and pharmacists about prescribing decisions and have an important contribution to make with regards to acting as the advocate for patients and their pain management. Multidisciplinary teamwork has been cited as an important facet of pain management by nurses working across a variety of settings in
both acute and chronic pain. A cohesive multidisciplinary team is considered a key concept to effective palliative care nursing.

In some countries, for example Canada and Sweden, staff nurses working in the hospital settings and dealing with acute pain, and district nurses working in the community and dealing with chronic pain, have adopted the role of PRN. The main function of these nurses is to act as a resource and support for other nurses and so improve pain management. It is evident from the research examining this role that these nurses improve the pain knowledge and documentation of pain by nursing staff, and increase the satisfaction of nursing staff with regards to pain management.

The introduction of specialist nurses in the hospital setting is another means by which pain management has been improved at the bedside. An important component of the role of these nurses is the education of ward staff through pain management programmes. Where these nurses have implemented these programmes, the documentation of pain and use of pain rating scales have increased. Additionally, the timing of post-operative assessment and the treatment management of pain has improved. Patients also report a decrease in pain intensity and a much better level of understanding of pain scales.

It is evident that specialist nurses working across a number of specialities within chronic pain (including cancer pain and pain experienced by patients suffering from degenerative diseases such as OA), and adopting an educational role can make an important contribution to pain management. The use of written material and written instructions, and audiotapes, by these nurses, combined with home visits and
telephone follow-ups, can increase patients understanding about their condition, improve pain control, reduce peoples concerns about addiction and side effects, decrease pain intensity, and encourage people to assume greater responsibility for their own treatment. Similar positive findings have been identified where advanced practice nurses have led cognitive behavioural programmes for patients in tertiary care. Patients undertaking these programmes have shown improvements in SE and decreases in pain intensity. In addition to the adoption of an educative role by specialist nurses, the use of algorithms by these nurses working in chronic pain management clinics has been shown to increase the use of non-pharmacological methods of improving pain relief and decrease or discontinue NSAIDS. Patient pain scores have also been found to fall with no increase in drug cost.

Several studies have examined the development of a nurse-led acute pain team. These teams have implemented standard analgesia protocols, regular assessment and documentation of pain intensity, the documentation of post-operative analgesia, and training for ward staff. It is evident that these initiatives can reduce pain scores and reduce post op complications.

There are several areas with regards to nurse-led care in pain management that require further exploration. One of these areas is the activities of nurses, practicing in the area of chronic pain, outside of the hospital setting (evidence to date predominantly involves the activities of these nurses in the hospital setting). Furthermore, if these nurses are involved in the delivery of pain management programmes to nursing staff, it would be interesting to evaluate their effectiveness. The prescription of medicines by nurses (a relatively new role for nurses) working in acute and chronic pain has not
been evaluated. Educational interventions delivered by nurse specialists to patients experiencing chronic pain in different disease areas also requires exploration.

Although a variety of research methodologies have been used to explore nurse-led care in acute and chronic pain, study quality is poor. The research evaluating nurse-led activities are predominantly questionnaire surveys. These surveys are confined to specific areas of practice (there is little or no research examining nurse-led activities outside of the hospital setting), the numbers of participants receiving questionnaires are frequently unknown and response rates are low. Findings are therefore limited in their generalizability. Studies evaluating nurse-led interventions are predominantly randomised controlled trials (RCTs). However, the generalizability of findings is limited by several factors. These include the geographical locations and health care settings across the world in which the studies have been undertaken, the methods used to report outcomes (i.e. mainly patients self report), convenience and unmatched samples, short follow-up periods, and poor descriptions of nurse interventions. Caution must therefore be taken when interpreting these findings.

**CONCLUSION**

Nurses play key roles in the diverse range of models of care that exist in acute and chronic pain. There are methodological weaknesses, in particular the use of patient self report data to measure outcomes, and under researched issues e.g. the prescription of medicines by nurses for patients with acute and chronic pain, that point to a need for further rigorous evaluation.

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