

# Pain in cardiothoracic surgery numerical rating for pain nursing essay



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Pain is frequently experienced post-operatively, after cardiothoracic surgery, and is thus a core component of nursing practice (Kalso, Perttunen, and Kaasinen, 2002). This assignment introduces the concept of pain and highlights the importance of the accurate assessment of pain in terms of the Nursing and Midwifery (NMC, 2008) Code of Practice and recommended guidelines. This is followed by an evaluation of pain assessment outcome measures, with particular focus on the Numerical Rating Scale (NRS) for pain. The NRS, when used as a self-report outcome measure, is the 'gold standard' for pain assessment. It is a psychometrically and operationally robust pain assessment measure, as supported by the evidence presented within this assignment. Not only is the NRS associated with a number of beneficial patient outcomes, but it has also been found to facilitate communication between patients, healthcare professionals, and multidisciplinary teams (de Rond et al., 2001).

## **Pain in Cardiothoracic Surgery: The Numerical Rating Scale for Pain Assessment**

This assignment introduces the concept of pain and highlights the importance of the accurate assessment of pain within the cardiothoracic surgery setting. This is followed by an evaluation of pain assessment outcome measures, with particular focus on the 'gold standard' self-report outcome measure, the Numerical Rating Scale for pain.

### **Background**

In the UK, over 10, 000 cases of thoracic surgery are carried out each year, with pain being frequently reported post-surgery (Perttunen, Tasmuth, and Kalso, 1999; Maguire et al., 2006). One study found that persistent pain

lasting more than 6-months was reported by 44% of patients after a thoracotomy (Kalso, Perttunen, and Kaasinen, 2002). The prevalence of chronic pain after thoracic surgery has been reported as a significant problem that is consistently rated by patients as being one of the most difficult problems following surgery; it can impact a patient's life for several years, severely depleting their quality of life (Maguire et al., 2006).

Despite the prevalence and burden of pain, the literature highlights many cases of poor clinical practice in the assessment and management of post-operative pain (Dihle et al., 2006; Schoenwald and Clark 2006). This is regardless of past quality improvement initiatives and changes to practice, which comprised the establishment of clinical nurse specialists, multidisciplinary pain teams, and standardised pain assessment tools (The Royal College of Surgeons of England and College of Anaesthetists, 1990).

Inadequate assessment and management of post-operative pain poses a number of implications for the patient and the NHS. For example, pain can result in increased levels of anxiety, sleep disturbance, restlessness, irritability, and aggression, as well as limitations in mobility (Macintyre and Ready, 2001; Carr et al., 2005). More importantly, post-operative pain is an unnecessary ordeal that causes heightened distress (Macintyre and Ready, 2001; Carr et al., 2005). It can also have physiological effects on patients, which may lead to complications and delayed discharge from hospital, including increases in heart rate and blood pressure, delayed gastric emptying, nausea, vomiting, and paralytic ileus (paralysis of the intestine). Difficulties coughing, resulting from increased pain on exertion, can result in chest infections and additional problems, such as deep vein thrombosis and <https://assignbuster.com/pain-in-cardiothoracic-surgery-numerical-rating-for-pain-nursing-essay/>

pulmonary embolus (Sjostrom et al 2000; Macintyre and Ready, 2001). At worst, unrelieved pain can be life-threatening, especially in older people with comorbidities (Hamil, 1994).

Pain is the ‘ fifth vital sign’ in the physiological assessment of patients, making it a core component of nursing practice (Chronic Pain Policy Coalition, 2008). The Joint Commission on Accreditation of Healthcare Organisations has made it mandatory for hospitals to assess pain in patients (Krebs, Carey, and Weinberger, 2007). Nurses are morally and ethically responsible for the accurate assessment of post-operative pain (Dimond, 2002), since this is vital for identifying the nature and severity of pain as well as for administering pain relief interventions and ascertaining the effectiveness of such interventions (Mackintosh, 2007). As an example, pain scores can be used alongside the WHO (1990) three-step analgesic ladder in the administration of pain relief.

The assessment of pain is complex and decisions are required as to the most accurate method of assessment within different clinical environments and with different patients. One such complex decision is whether to measure pain observationally or via self-reports and this decision is most likely to be led by conceptions of pain. If defined as a subjective experience, or as described by McCaffery and Beebe (1968, p. 95) as, “ whatever the experiencing person says it is, existing whenever the experiencing person says it does,” then choice of assessment is most likely to be self-report.

Self-report is the ‘ gold standard’ for measuring pain since subjective experiences can only be measured from the perspective of the patient

(Wood, 2004). The importance of self-report pain assessment is highlighted in a study by Whipple et al. (1995) whereby, out of 17 trauma patients admitted to an intensive care unit, 95% of doctors and 81% of nurses felt that the patients had adequate pain relief; in contrast, 74% of patients rated their pain as moderate or severe. Many other studies confirm this inconsistency between the subjective pain reported by patients and the objective pain reported by healthcare professionals (Sjostrom et al., 2000; Marquie et al., 2003; Sloman et al., 2005).

There are a vast array of patient-reported outcome measures for assessing pain, including uni-dimensional scales that measure one element of pain (such as intensity) and multidimensional scales that measure more characteristics of pain and its impact (Macintyre et al., 2010). Whilst multidimensional tools might be better for chronic long-term conditions, uni-dimensional scales have been reported to be effective for acute pain, which can be experienced in the cardiothoracic surgery setting (Wood, 2008). Multi-dimensional measures of pain are rarely used post-surgery as they are more complex and time-consuming (Coll et al., 2004). Therefore, this assignment evaluates selected literature on uni-dimensional outcome measures within this context, with particular focus on the measure recommended by the Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine in their guidance on ' Acute Pain Management: Scientific Evidence' (Macintyre et al., 2010): The Numerical Rating Scale for Pain.

## **Methodology**

Literature pertaining to the Numerical Rating Scale (NRS) for pain was searched in order to identify articles on the NRS and comparative pain assessment tools. The following keywords were used within the search strategy: “ pain” AND “ numerical rating scale” OR “ NRS” AND “ surgery.” The search was limited to articles comprising adult participants. The search was also limited to records no earlier than 2005 in an effort to obtain the most recent evidence examining the NRS. Nevertheless, where these records have cited earlier research assessed as being applicable to this assignment, these records have also been obtained and used as evidence.

## **Results**

A total of 88 records were retrieved from the pre-defined search criteria, 28 of which were not relevant to this assignment. A total of 60 records were evaluated for evidence to be included within this assignment. In synthesising the evidence within these records and the utilised pain assessment tools, a framework created by Fitzpatrick et al. (1998) was adopted. This framework, designed to facilitate the selection of the most appropriate patient-reported outcome measures, promotes a consideration of the following psychometric properties and operational characteristics: appropriateness of the instrument to the purpose and setting; reliability; validity; responsiveness; precision; interpretability; acceptability; and feasibility.

Examples of three of the most frequently utilised uni-dimensional pain assessment measures, as discussed within the following appraisal of the literature, can be found in appendix 1.

## Literature Appraisal

The reviewed evidence suggests that the four most commonly utilised uni-dimensional pain assessment tools are the verbal rating scales (VRS), numerical rating scale (NRS), visual analogue scale (VAS), and pictorial rating scale (PRS). Such tools were developed due to the lack of feasibility associated with using multidimensional outcome measures within the clinical environment (Wood, 2004). Uni-dimensional tools such as the VRS, NRS, VAS and PRS enable health professionals to quantify pain intensity from a subjective perspective without being too time-consuming and without creating a burden for patients.

Verbal rating scales are descriptive in nature, allowing patients to rate their pain intensity on a scale of ‘no pain,’ ‘mild pain,’ ‘moderate pain,’ or ‘severe pain’ (Wood 2004; Williamson and Hoggart, 2005). They have been reported as being one of the easiest tools to understand and use, whilst also offering the option of being completed verbally or in written format. The VRS has been adopted and integrated into acute settings, with numbers to rate pain being used in observation charts (e. g. 1= mild pain; 2= moderate pain, etc.). Such integration into standard practice increases the feasibility of the scale, whilst using numbers to document pain provides ease of interpretability. Of caution, however, is that although verbal rating scales are easy to use, the adjectives do not necessarily represent equal intervals of pain. Indeed, patients may wish to express their pain in via a word not appearing within the list of adjectives they have been presented with (Schofield, 1995). Due to the use of words to describe pain, the VRS is dependent on both the respondent’s interpretation and understanding of the

terms, as well as the health professionals' interpretation. It has, therefore, been suggested that this scale lacks the sensitivity and accuracy of other pain rating scales (Baillie 1993). Jensen et al. (1994) suggested that the lack of sensitivity of the VRS could lead to an over or underestimation of changes in pain being experienced and, as such, could make it difficult to manage pain appropriately and effectively.

In contrast to the VRS, the visual analogue scale (VAS) uses a 100mm horizontal or vertical line with extremes of pain placed at either end of the line so that the patient marks their pain intensity along the continuum. The distance to the line can then be measured and documented. A VAS rating of greater than 70mm is usually the threshold indicative of severe pain (Aubrun et al., 2008). However, the VAS poses a number of limitations within the clinical setting. It requires a greater degree of cognitive functioning, physical dexterity, and concentration than other measures of pain, and thus it is not suitable for some patients, including older patients and those with visual difficulties (Krulwich et al., 2000). Indeed, Chapman and Syrjala (1990) estimated that 7-11% of adults would have difficulty using the VAS, whilst Wood (2004) went on to find that about 20% of patients are either unable to complete the VAS or find it confusing. Also, because it is administered verbally, it might be difficult to use after general anaesthesia or administration of some analgesics. In addition, the VAS has been found to be highly sensitive to changes in levels of pain, which can make it difficult to use (Bird and Dickson, 2001). Overall, the VAS has been found to be the least suitable uni-dimensional pain assessment measure, especially if administered after cardiac surgery (Pesonen et al., 2008).



Numerical rating scales (NRS) offer an alternative to descriptive measures of pain by assessing pain intensity numerically, on a scale of 0 (no pain) to 10 (worst pain imaginable). A value of four or more is most often used as a threshold to guide clinical intervention (Mularski, 2006). On the other hand, the most recent guidance from the World Union of Wound Healing Societies (WUWHS, 2007) makes no reference to pain score thresholds, merely offering that change in pain level may indicate a need to reassess the patient.

The NRS has been found to be highly acceptable to patients when compared to other pain scales (WUWHS, 2007) and, like the VRS, it has the advantage of being validated for verbal or written administration, which makes it feasible for use with patients who have differing levels of ability to complete such assessments (Paice and Cohen, 1997). It has been shown that older patients, post-operative patients, and patients with poor motor coordination are able to use the NRS (Rodriguez, 2001; Aubrun et al., 2003). It is not recommended, however, for patients with post-operative confusion (Ferrell et al., 1995). The NRS is more sensitive than the VRS, although some patients might find it difficult to describe their pain numerically (Carpenter and Brockopp, 1995).

The NRS for pain is recommended by the The Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine developed guidance on 'Acute Pain Management: Scientific Evidence' (Macintyre et al., 2010), which is endorsed by the Faculty of Pain Medicine, Royal College of Anaesthetists in the UK as well the International Association for the Study of Pain. The

guidance aims to combine a review of the best available evidence for acute  
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pain management with current clinical practice and was designed to provide information based on best evidence. The support cited within the document shows a good correlation between the VAS and NRS, indicating good levels of convergent validity with a measure purporting to assess the same construct. However, this correlation is not as strong in cardiothoracic patients compared to non-cardiothoracic patients (Ahlers et al., 2008).

The document also highlights that the NRS is usually preferable, most certainly among patients (Herr et al., 2004). This is likely due to its feasibility in terms of burden to patients and staff since it only takes 30 seconds to complete (Downie et al., 1978). Importantly, the NRS has been found to be responsive to interventions such as patient-controlled analgesia (Li, Liu and Herr 2009), making it an effective instrument for monitoring pain management. The scale is also highly Downie et al. (1978) also found the NRS to have superior accuracy when compared to the VAS and simple descriptive measures of pain such as the VRS. It could be argued that the NRS provides a compromise between the VRS, which offers only a few descriptors for patients to choose from, and the VAS, which has been reported to offer too much choice and to be confusing.

In terms of comparability against observer-based measures of pain, the NRS has been found to be more sensitive to detecting pain than the Behavioural Pain Scale (BPS) in both cardiothoracic and non-cardiothoracic patients (Ahlers et al., 2008). The authors rationalise that when using the NRS, health professionals tend to gather more background information on the patient, taking into consideration pain over time. In contrast, the BPS measures pain at one point in time, is objective, and lacks a contextual basis for

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interpretation. Therefore, the authors recommend that the BPS is only used alongside the NRS (Ahlers et al., 2008). This again supports self-reported pain as being the 'gold-standard' for pain assessment and management.

Importantly, studies have demonstrated that improvements in pain assessment and documentation frequently lead to more effective pain management (Erdek and Pronovost, 2004). In terms of the NRS, the evidence suggests that using this scale frequently results in favourable clinical outcomes such as decreased incidence of pain and agitation, as well as a decrease in the duration of mechanical ventilation (Chanques et al., 2006). It also enhances the nurse-patient relationship by providing acknowledgment of pain (Briggs, 2003). These positive outcomes are likely related to the fact that healthcare professionals are less liable to underestimate a patient's level of pain when using the NRS than when compared to not using it. One study showed that of patients experiencing pain, where a discrepancy was reported between patient and nurse ratings, the NRS had not been used in 45% of such cases (Lorenz et al., 2009). This problem is especially apparent when patients rate their pain as being unacceptable; nurses tend to underestimate the level of pain if not collecting pain ratings from patients using the NRS (Ahlers et al., 2008). In this sense, the NRS and, indeed, other pain measures are invaluable for facilitating patient communication of pain and expression of pain (Wood, 2004). The NRS also offers a number of practical advantages in that it is easy to teach to all staff and patients, as well as being easy to score and document. The documentation of all measures of pain is fundamental for the delivery of effective care, and it also

facilitates communication between multidisciplinary team members (American Pain Society, 1995).

The NRS is a valid and reliable measure of pain, but does still need to be used with caution and professional judgment as some studies have found a lack of consistency between ratings of pain. For example, one study found that whilst a patient might express a reduction in pain after an intervention, their score on the NRS remains the same (Mackintosh, 2005). Furthermore, a rating of, for example, seven by one patient might have a different meaning to another patient (Sloman et al., 2000). However, provided that such limitations are taken into consideration and efforts made to supplement the information gathered from the NRS, the instrument can be a highly effective tool for the assessment and management of pain (Mackintosh, 2005). Such supplementary enquiry might include observation and history taking, as recommended by McCaffery and Pasero (1999).

## **Implications for Practice**

Despite the many benefits to uni-dimensional outcome measures of pain, such tools need to be used with caution as they only focus on limited aspects of the pain experience, arguable oversimplifying the complexity of the experience (Wood, 2004). They also pose the risk of being misinterpreted, a risk that cannot be rectified via descriptive tools since interpretation difficulties are also present when using the VRS. For example, what constitutes ‘ moderate pain’ might vary across patients and health professionals, as well as be dependent on factors such as personality, culture, and experience (Closs et al., 2004).

The validity and reliability of all pain assessment tools, including the NRS, can be enhanced by familiarising the patient with the assessment tool and explaining the reasons for its use. Indeed, Giordano, Abramson and Boswell (2010) have emphasised the importance of listening to the patient's subjective descriptions of pain and being consistent in the documentation of any pain assessment. At the same time, it is imperative to acknowledge that a pain assessment tool is only one aspect of the overall assessment of the patient's pain (Duke, 2006). In the cardiothoracic setting, pain assessment should include static (rest) and dynamic (sitting, coughing, etc.) pain assessment and management (Macintyre et al., 2010).

Although the assessment process should not be rushed, it does need to commence soon after surgery since studies have shown that high levels of pain immediately after surgery are associated with increased risk of developing chronic pain (Katz et al., 1996). In the clinical environment, it is not always feasible to carry out extensive assessments of pain, but the benefit of utilising a tool such as the NRS is that it provides an initial brief assessment of pain intensity. This, in turn, provides vital information on whether pain relief is required or whether a previously administered intervention has been effective. It is understood, however, that awareness of other pain measures is essential for the purpose of providing equal care to patients who might not be able to complete the NRS. For example, patients with cognitive impairments might find the Abbey Pain Scale easier to complete (Abbey et al., 2004), whilst patients with learning disabilities might prefer Zwakhalen et al.'s (2004) scale of non-verbal indicators.

## **Conclusions**

Effective pain management needs to commence with effective pain assessment, as well as the identification of factors requiring urgent intervention (Fear, 2010). The Numerical Rating Scale for pain provides a psychometrically robust method of assessing pain intensity and monitoring pain reduction interventions. As well as being psychometrically robust, the scale is acceptable to patients and feasible within busy clinical environments such as the cardiothoracic surgery setting. The best available evidence suggests the Numerical Rating Scale for pain is a suitable tool for the assessment and management of post-surgery pain and using this tool thus adheres to the Nursing and Midwifery (NMC, 2008) Code of Practice for providing a high standard of evidence-based practice at all times. Not only does this scale provide improved patient outcomes, but it also promotes communication between the patient, nurse, and multidisciplinary team (de Rond et al., 2001). More research is needed on the accuracy and effectiveness of the NRS, as well as exploration as to any potential improvements to the instrument (Krebs, Carey, and Weinberger, 2007); however, until then, the evidence suggests that the NRS is an acceptable and efficacious screening tool for measuring pain in patients.

## **Appendix 1: Pain Rating Scales**

### **Visual Analogue Scale (VAS)**

### **Numerical Rating Scale (NRS)**

### **Faces Rating Scale (FRS)**