The effect of an evidence based bowel protocol on time taken to return to normal bowel function in post operative total hip and total knee replacement patients

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Chapter 3 - Frame of Reference

This chapter will discuss and present the theoretical framework which underpinned this study.

The theoretical framework for this study was based on the Neuman Systems Model (NSM). This model was developed by Dr Betty Neuman and first published in 1972 in an article entitled “A model for teaching total person approach to patient problems” (Neuman & Young, 1972). The NSM was developed in response to a perceived need to assist University of California, Los Angeles (UCLA) nursing students conceptualise a systems approach to patient care (Fitzpatrick & Whall, 2005). Neuman initially developed the model as a teaching aid and not as a specific conceptual model of care (Fawcett, 2001) however she cited multiple influences in her development of the Systems Model including de Chardin’s philosophic beliefs about the wholeness of life (1955); von Bertalanffy’s (1968) description of a general system theory; Caplan’s (1964) work on the development of primary, secondary and tertiary prevention strategies (common in a public health context); Gestalt psychology which looks at the human mind and behaviour as a whole entity and Selye’s Theory of Stress which was based on scientific work by the Hungarian endocrinologist Hans Selye (1950).

Whilst the NSM has remained essentially unchanged, the ten underlying assumptions which underpin the model have been more clearly articulated to ensure they remain relevant to current nursing practice (Fitzpatrick & Whall, 2005):

1. Each individual is unique with composite innate characteristics and possess a normal range of responses.

2. The client as a system constantly changes energy with the environment.
3. There are many types of known, unknown and universal stressors which may upset a client’s equilibrium (normal line of defence). The interrelationship of the five client variables determines the degree of protection offered by the flexible line of defence.

4. Over time each client develops a normal range of responses called the client’s normal lines of defence.

5. The cushioning, accordion-like flexible line of defence protects the client against stressors. When it cannot, the stressor upsets the client system equilibrium and interrelationships among the five variables determine the degree of reaction.

6. Wellness is a dynamic composite of the interrelationship of the five client variables and represents a continuum of available system energy.

7. Following a stressor reaction, internal resistance lines attempt to stabilise the client by returning to a normal or enhanced wellness state.

8. Primary prevention assessment and intervention identifies and allays risk factors associated with stressors. Included in primary prevention is health promotion.

9. Secondary prevention relates to symptom identification and implementation of interventions to deal with system disruption.

10. Tertiary prevention assists client adjustment as reconstitution is initiated and maintenance factors move the client back toward primary prevention (Fitzpatrick & Whall, 2005)

The NSM encompasses a holistic approach to patient care where the nurse and patient work in partnership to achieve optimal health retention, restoration and maintenance (Fitzpatrick & Whall, 2005). It has two primary areas of focus: how a patient responds to stressors and the nurse’s
interventions to assist the patient cope with these stressors. The NSM defines a stressor as something which has the potential to impact on the patient’s ‘steady state’ and may be positive or negative. Positive stressors may increase self-awareness or assist personal growth or development whereas negative stressors may result in deleterious outcomes and a deviation from wellness (Fitzpatrick & Whall, 2005). The nursing process within the NSM consists of three components: a nursing diagnosis based on a nursing assessment; goals based on active patient participation and outcomes related to mutually set goals (Fitzpatrick & Whall, 2005). This collaborative approach to optimising health outcomes is one of the reasons the NSM is so widely used not only by nurses but by other multidisciplinary teams (Memmott, Marett, Bott, & Duke, 2000).

Within the NSM the client (patient) can be defined as both an individual or group of people (i.e. family) consisting of five interacting variables:

1. physiological (bodily structure and internal function);
2. psychological (mental processes and interactive environmental effects both internal and external);
3. sociocultural (combined effects of social-cultural conditions and influences);
4. developmental (age-related development processes and activities);
   and
5. spiritual (spiritual beliefs and influences).

The Neuman Systems Model is reproduced in Figure 3.1. The model describes the patient as the central core consisting of basic survival factors (normal temperature range, genetic structure, response pattern, organ strength/weakness, and ego structure). The patient is surrounded by both solid and flexible lines. The flexible line of defence acts as a protective buffer to
prevent stressor invasion of the patient’s normal line of defence (or wellness state). Stressors may be intra, inter or extra personal and regular exercise, adequate sleep and good nutrition are examples of practices that will expand the flexible line of defence (Memmott, et al., 2000).

The integrity of the normal line of defence is crucial to maintaining wellness with a variance from wellness occurring when it is penetrated. The flexible lines of resistance are denoted as ‘accordion-like’ because they move towards and away from the normal line of defence. When they are expanded greater protection is provided to the patient and when they move closer to the normal line of defence their ability to provide protection is decreased. When the normal line of defence is penetrated the lines of resistance are reactions that occur within the patient and serve to stabilise and return the patient to a state of equilibrium and good health. Neuman advocates interventions either before or after the lines of resistance are penetrated. Reconstitution represents the return and maintenance of system stability following treatment for stressor reactions. It is important to remember that reconstitution may vary depending on the patient’s reaction (influenced by individual variables including basic structure differences, natural and learned resistance and time exposed to the stressor) and whilst the goal is to return the patient to their usual wellness state, they may actually return to a higher or lower level of wellness after their illness (Neuman, 2002). Neuman sees the nurse as an intervenor whose role is to reduce or mitigate stressors. This can be undertaken by appropriate prevention at the primary, secondary or tertiary level (Neuman, 2002).

A model of nursing care based on the NSM was developed to guide this study and is conceptualised in Figure 3.2. The post operative orthopaedic patient
(central core), represented in the inner circle is influenced by both intrapersonal, extrapersonal and interpersonal stressors described in more detail in Table 3.1. Interventions are included within primary and secondary prevention i.e. identifying, reducing or eliminating actual or potential risks of constipation and early identification and treatment of symptoms. Acknowledgement of made of the fact that patients respond differently to stressors and that reconstitution aims to return the patient to their usual wellness state. For this study the stressors and the variables which influence them have been summarised in Table 3.1.
Table 3.1

*Stressors Affecting the Post-Operative Arthroplasty Patient*

<table>
<thead>
<tr>
<th>Stressor</th>
<th>Definition</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extrapersonal</td>
<td>Forces external to the patient</td>
<td>• Hospitalisation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Constipation-causing medications</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reduced mobility</td>
</tr>
<tr>
<td>Interpersonal</td>
<td>Forces occurring between one or more individuals (i.e. nursing care)</td>
<td>• Privacy concerns</td>
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<td></td>
<td></td>
<td>• Embarrassment about bowel management</td>
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<td></td>
<td></td>
<td>• Variable bowel management according to</td>
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<tr>
<td></td>
<td></td>
<td>different views and practices amongst medical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and nursing staff</td>
</tr>
<tr>
<td>Intrapersonal</td>
<td>Forces occurring within a patient</td>
<td>• Reduced gut transit time</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Response to anaesthetics, opioids and other</td>
</tr>
<tr>
<td></td>
<td></td>
<td>medications known to cause constipation</td>
</tr>
</tbody>
</table>
Figure 3.1

The Neuman Systems Model. (Original diagram copyright© 1970 by Betty Neuman.)

- **Primary prevention**
  - Reduce possibility of encounter with stressors
  - Strengthen flexible line of defence

- **Secondary prevention**
  - Early case-finding
  - Treatment of symptoms

- **Tertiary prevention**
  - Readaptation
  - Re-education to prevent future occurrences
  - Maintenance of stability

- **Interventions**
  - Can occur before or after resistance lines are penetrated in both reaction and reconstitution phases
  - Interventions are based on:
    - Degree of reaction
    - Resources
    - Goals
    - Anticipated outcome

- **Stressors**
  - Identified
  - Classified as to knowns or possibilities:
    - Loss
    - Pain
    - Sensory deprivation
    - Cultural change

- **Basic structure**
  - Basic factors common to all organisms:
    - Normal temperature range
    - Genetic structure
    - Response pattern
    - Organ strength or weakness
    - Ego structure
    - Known commonalities

- **Lines of resistance**
  - Normal line of defence
  - Flexible line of defence

- **Reconstruction**
  - Could begin at any degree or level of reaction
  - Range of possibility may extend beyond normal line of defence

**NOTE:**
- Physiological, psychological, socio-cultural, developmental and spiritual variables are considered simultaneously in each client concentric circle.
Figure 3.2

Model of Nursing Care for the Management of Constipation in Post Operative Arthroplasty Patients (adapted from Neuman, 1989)

**Primary Prevention**
Prevent opioid induced constipation by:
1. Increased fluid and dietary fibre
2. Ensuring private toileting facilities
3. Daily monitoring of bowel habits to identify early signs of constipation
4. Adequate analgesia to ensure early mobilisation

**Secondary Prevention (Interventions)**
1. Early identification of constipation
2. Interventions as per Murdoch Bowel Protocol

**Stressors**
1. Opioid use
2. Anaesthetic administration
3. Altered diet and fluid intake
4. Decreased mobility

**Tertiary Prevention**
1. Education re ongoing risk of constipation related to opioid analgesia post discharge
2. Recommend Movicol® after discharge as required

**Outcomes (Reactions)**
Return to normal bowel function whilst still hospitalised

**Reconstitution**
Aim to restore patient to usual or higher state of wellness

**Flexible Line of Defence**
**Normal Line of Defence**

**Post operative arthroplasty**

**Outcome (Reaction)**
Maintain normal bowel function post discharge whilst still using opiate analgesia
The lines of resistance surrounding the patient represent interventions which aimed to protect against stressors and maintain a healthy existence. In this study, examples of such nursing interventions included encouraging early mobilisation, ensuring privacy for toileting, decreasing or ceasing constipation-causing medications (where appropriate) and administering aperients as per the Murdoch Bowel Protocol.

The normal line of defence represents the patient’s normal state of wellness which is considered dynamic because of the way it changes over time. The normal line of defence is influenced by many factors including coping mechanisms, lifestyle factors, developmental, spiritual and cultural influences (Ume-Nwagbo, DeWan, & Lowry, 2006). The flexible line of defence moves both towards and away from the normal line of defence and serves as a protective buffer. In this study examples of stressors which may have compromised the flexible line of defence included the administration of an anaesthetic agent and opioid medications, altered diet and fluid intake and reduced mobility. These factors served to draw the flexible line of defence closer to the normal line of defence providing reduced protection against stressors.

Neuman proposed that nurses ‘enter into the patient’s world’ to promote stability and balance (Ume-Nwagbo, et al., 2006) while the NSM emphasises primary, secondary and tertiary prevention as key concepts (Memmott, et al., 2000).

In this study, primary level interventions which aimed to strengthen the flexible line of defence and reduce risk factors included:
- maintaining a high fibre diet;
- ensuring adequate fluid intake;
- ensuring private toilet facilities;
- ensuring daily monitoring of bowel habits to identify early signs of constipation; and
- ensuring adequate analgesia to encourage early mobilisation and resumption of normal activities.

At a secondary level, interventions which aimed to restore the patient to a state of equilibrium by treating symptoms which occurred after the line of defence was penetrated included:

- early identification of constipation; and
- bowel management as per the Murdoch Bowel Protocol®.

At a tertiary level interventions which aimed to support and educate the patient so that they could readapt and resume wellness included:

- providing education about the ongoing risk of constipation associated with opioid medication post discharge; and
- ensuring continued use of Movicol® as required post discharge.

Whilst working collaboratively with the patient to ensure a successful return to wellness, it was important that nurses assessed each of the five variables: physiological, psychological, sociocultural, developmental and spiritual to ensure targeted, holistic nursing care which would achieve the best possible patient outcome. ‘One size’ does not fit all patients thus primary, secondary and tertiary interventions needed to be tailored to each patient’s individual lifestyle and circumstances.
Summary of the Chapter

This chapter has provided an overview of the Neuman Systems Model, a theoretical framework for explaining and supporting the study hypothesis that opioid related post operative constipation may be prevented or treated with primary, secondary and tertiary prevention measures.

The framework supported the hypothesis for the study: that patients who undergo a knee or hip replacement and receive the study bowel protocol will experience a statistically significant reduction in time taken to return to normal bowel function compared with patients who receive standard bowel management.