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Citation: Ford, Claire and Park, Laura (2020) Assessing and managing nausea and vomiting in adults. *British Journal of Nursing*, 29 (11). pp. 602-605. ISSN 0966-0461

Published by: Mark Allen Publishing

URL: <https://doi.org/10.12968/bjon.2020.29.11.602>
<<https://doi.org/10.12968/bjon.2020.29.11.602>>

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Assessing and managing nausea and vomiting in adults: At a glance

This article will:

- Define nausea, retching and vomiting and outline common causes of these symptoms
- Provide an introduction to the anatomy and physiology associated with nausea and vomiting
- Provide awareness of how nausea and vomiting can impact on an individual's life and what complications and dangers are associated with vomiting
- Discuss how nausea and vomiting can be holistically assessed and managed
- Outline the uses, actions and side effects of antiemetic medications

Introduction

Nausea and vomiting are unpleasant and potentially distressing symptoms that are commonly experienced by patients, especially for individuals on the perioperative care continuum, during pregnancy and childbirth, patients receiving chemotherapy and by patients in the advanced stages of a disease or at the end of life (Kelly and Ward, 2013; Vidall, 2014; Dye, 2017; Leach, 2019). Nausea and vomiting can also be a sign of more serious impairment, emotional distress or an adverse reaction to therapeutic treatments (Keeley, 2019). The potential impact of nausea and vomiting on the individuals' wellbeing and quality of life can vary depending on the length and severity of the specific episodes, but in some cases can be so severe individuals may decide to stop treatment (Brooker and Waugh, 2013; Kelly and Ward, 2013). Prolonged nausea and vomiting can also result in physiological complications, psychological changes and social difficulties that could have short or long term impacts on health, with the most frequent and severe including dehydration, nutritional deficiencies and electrolyte and acid-base imbalance (*see figure 1*) (Brooker and Waugh, 2013; Patton and Thibodeau, 2018).

Terminology

An understanding of medical terminologies associated with nausea and vomiting is important for reliable and effective assessment and management of patients' symptoms (*see figure 2*) (Waugh and Grant, 2018). However, whilst this is vital when working collaboratively with other healthcare professionals, it also beneficial when communicating with patients, to have an awareness of some of the colloquial language that might be used to describe how they are feeling i.e. 'barf' and 'hurl' to accurately interpret their symptoms.

Anatomy and physiology

The act of emesis is associated with the initiation of the vomiting centre of the brain (Dougherty and Lister, 2015). This can be activated by a variety of receptors (i.e. histamines, acetylcholine, dopamine and 5-hydroxytryptamine) in the gastrointestinal tract, cerebral cortex, vestibular apparatus and chemoreceptor trigger zone, which respond to stimuli such as drugs and toxins, pain and fear, or movement and injury (Brookers and Waugh, 2013) (*see figure 3 and figure 4*). In some cases, the cause of nausea and vomiting and the specific aetiology may be multifactorial i.e. chemotherapy treatment, memory and anxiety as more than one type of receptor and pathway have initiated the vomiting centre (Collis, 2015).

Assessment strategies

Before nausea and vomiting can be treated or the cause reversed, there needs to be a comprehensive assessment of a patient's symptoms and specific clinical features must be examined to find which branch of the emetic pathway has triggered the physiological response (Collis, 2015; Leach, 2019). To assess patients with emetic symptoms there are a variety of assessment tools/scales available to ascertain the severity or intensity of emetic symptoms. These can include numerical rating scales (often incorporated into analgesia infusion charts) and nausea, retching and vomiting questionnaires which are used to obtain more in-depth insight into the person's emetic symptoms and their biopsychosocial

impact on the individual. However, whilst these tools are beneficial, a holistic patient assessment should also include a review of precipitating and relieving factors (i.e. movement, food/fluids, hunger, aromas), characteristics (i.e. duration, frequency), as well as visual inspection of the vomit (i.e. volume, colour, odour, consistency and presence of blood) and if required physical examination (i.e. oral, rectal, abdominal, vital observations) (Dye, 2017; Keeley 2019).

Assessments can also be undertaken in a preventative capacity, whereby the risk of developing nausea and vomiting are examined and calculated to prophylactically manage anticipatory nausea and vomiting (Dougherty and Lister, 2015). These risk assessments are not only beneficial for individualised patient assessments but have also been shown to allow for targeted management strategies, reducing the incidence of postoperative and chemotherapy-induced nausea and improving patient satisfaction (Vidall, 2014; Smith and Ruth-Sahd, 2015). Examples of factors which might be taken into account include age, gender, history of motion sickness, history of previous post-operative or chemotherapy-induced nausea and vomiting, smoking status, type and length of the surgical procedure and type of anaesthetic or analgesic agent (Dougherty and Lister, 2015; Smith and Ruth-Sahd, 2015; Phillips and Perriman, 2017).

Management strategies

Effective management of nausea and vomiting not only influences a patient's symptom response it also improves patient compliance with therapeutic treatments. However, as there is a vast array of management strategies that can be employed depending on the quality of the assessment and the resources available it is essential that healthcare professionals' involve the patient in the decision process, and use a multimodal approach that incorporates both pharmacological and non-pharmacological management methods (Collis, 2015; Dougherty & Lister 2015; Dye, 2017).

Pharmacological management

The most common intervention used in today's healthcare system is the administration of medication as it is often a safe and effective way of managing many signs and symptoms of diseases (NICE, 2015). Concerning the nausea and vomiting, antiemetics (anti-sickness) medication should only be prescribed when the specific cause of nausea and vomiting are known, as antiemetics vary in their mechanism(s) of action (*see figure 6*) depending upon the cause and which receptor has initiated the emetic response (British National Formulary, 2020). For example, an antiemetic medication that is effective in the management of chemotherapy-induced nausea and vomiting may have no role in the prevention and treatment of emetic symptoms due to other causes, e.g. motion sickness (Neal, 2012). Antiemetic medication can also be administered via multiple routes (i.e. intravascular, oral, rectal), therefore it is important to consider the most appropriate route of administration for each patient. Additionally, as there may be more than one cause, individuals may require two or more antiemetics to achieve adequate symptom control (Dye, 2017).

Non-pharmacological

Although antiemetics are used worldwide to manage nausea and vomiting, pharmacological management is only partially effective and for some individuals can cause side effects (i.e. sedation, headache, constipation, and fatigue), therefore alternative strategies may also need to be employed (Lee and Fan, 2011; Yang, 2019).

Acupressure

Globally, acupressure has become a popular alternative therapy for reducing nausea and vomiting during chemotherapy, pregnancy and post-surgery (Byju, Pavithran & Antony, 2018; Yang, 2019). It is a non-invasive therapeutic method, based on traditional Chinese medicine techniques associated with the application of physical gentle pressure to certain acupuncture points (acupoints) by finger,

elbow, hand or with various devices (Hofmann *et al.*, 2017; Yang, 2019). Within Eastern philosophies, acupressure is believed to stimulate or disturb energy, thereby varying responses to negative stimuli (i.e. nausea and vomiting), whereas in western medical philosophies the focus of acupressure on the acupoints is on the triggered release of endogenous endorphins (Hofmann *et al.*, 2017). Acupoints are located at specific places on imaginary lines ‘meridians’ throughout the human body (Byju, Pavithran & Antony, 2018) and acupressure of the P6 point (*see figure 5*) which lies 4cm proximal (three fingers) to the wrist crease of the dominant arm, has proven helpful to some patients in controlling nausea and vomiting, with, minimal side effects (Lee & Fan, 2011).

Ginger

Ginger is a herb belonging to the Zingiberaceae family and has been shown to block the actions of serotonin and acetylcholine which stimulate the vomiting reflex and trigger involuntary stomach contractions in the body (Lete & Allue, 2016; Stanisiere, Mousset and Lafay, 2018). Its use as an adjuvant therapy or as a complementary natural alternative for alleviating symptoms of nausea and vomiting (Tóth *et al.*, 2018) has been researched extensively within pregnancy, chemotherapy, postoperative nausea and vomiting and motion sickness (Stanisiere, Mousset and Lafay, 2018) and it is now regarded as just as effective as pharmacological therapies, with fewer potential side effects (Lete & Allue, 2016).

Nursing care

As well as the use of complementary therapies, to ensure adequate holistic management, there are additional nursing considerations that need to be addressed when caring for patients who are experiencing nausea and vomiting (*see figure 7*) especially in relation to assisting patients with activities of living and biopsychosocial wellbeing.

- **Mouth care:** Following episodes of vomiting bile and acids from the stomach can cause damage to teeth, gums, and throat or skin irritation around the mouth. To ensure the structures and tissues of the mouth remain healthy it is essential to assist patients with oral mouth care

and ensure they have access to equipment to perform oral hygiene (Burns, Cole & Stamford, 2019). Removing the taste through oral hygiene can also help in reducing nausea (Nicol *et al.*, 2012).

- **Privacy and dignity:** Close curtains to provide privacy and promote comfort by keeping clothes clean and ensure that tissues and vomit bowls are easily accessible (Nicol *et al.*, 2012; NICE, 2016)
- **Fluid balance:** Vomiting and nausea can change a patient's hydration status, putting them at risk of dehydration. It is therefore important to keep an accurate fluid balance, if possible, encourage oral intake or administer intravenous fluids (Dougherty & Lister, 2015).
- **Environment:** It is important to consider the stimulation of the vomiting centre following episodes of vomiting via the cerebral cortex, as smells can trigger further episodes of nausea and vomiting. To reduce the stimulus, strong odours should be avoided by moving the patients or opening windows as fresh cool air can help alleviate symptoms of nausea (NICE, 2016).
- **Diet and nutrition:** Nausea and vomiting can lead to a reduction in appetite and/or cause a patient to stop eating. Consequently, food charts should be used and patients should be encouraged to eat small, frequent meals, consisting of bland, non-spicy, non-fatty foods (NICE, 2016).

Conclusion

Pirri *et al.* (2013) state it is imperative that healthcare professional undertake multimodal approaches to assessment and management of nausea and all its associated symptoms, including preventative risk assessments and pharmacological as well as non-pharmacological treatments. However, this can only be achieved effectively and efficiently by working in partnership with the patient and ensuring that up-to-date evidenced-based approaches are used to underpin decisions on which assessments to use, how risks are identified and what management strategies are employed (NMC, 2018).

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Figure 1: The potential impact on nausea and vomiting on the individual

Physical	Psychological	Social
<ul style="list-style-type: none">•airway obstruction•gastric aspiration and aspiration pneumonia•dehydration and electrolyte imbalance•metabolic alkalosis•cardiovascular changes•raised intracranial pressure•hypovolaemic shock•anorexia•impaired nutritional status•fatigue•pain•damage to wound integrity•oesophageal damage•dental decay	<ul style="list-style-type: none">•embarrassment•distress•anxiety•depression•sense of loss of control•altered body image•low self esteem	<ul style="list-style-type: none">•difficulty communicating•withdrawal•social isolation•stigma•labelling•impaired work and leisure activities•financial implications

(Brooker and Waugh, 2013; Patton and Thibodeau, 2018).

Figure 2: Medical terminology associated with nausea and vomiting

Nausea	<ul style="list-style-type: none"> • Subjective experience of feeling sick • Unpleasant feeling often leading to vomiting • Commonly associated with symptoms of hypersalivation and tachycardia
Retching	<ul style="list-style-type: none"> • Movements associated with vomiting without the expulsion of gastrointestinal contents • Often begins with deep inspiration
Emesis	<ul style="list-style-type: none"> • Vomiting
Vomiting	<ul style="list-style-type: none"> • The forceful emptying of stomach contents through the mouth • Usually associated with nausea and follows retching
Emetic symptoms	<ul style="list-style-type: none"> • Nausea, retching and vomiting
Emetogenic potential	<ul style="list-style-type: none"> • Ability of a treatment, e.g. chemotherapy, to cause nausea, retching and vomiting
Antiemetics	<ul style="list-style-type: none"> • Medication used to treat nausea, retching and vomiting
Projectile vomiting	<ul style="list-style-type: none"> • Spontaneous vomiting not preceded by nausea or retching • Normally associated with direct neurological stimulation of the vomiting centre of the brain i.e. brain tumour or gastrointestinal obstruction (pyloric stenosis)
Chemotherapy-induced nausea and vomiting	<ul style="list-style-type: none"> • Acute nausea and vomiting (starting soon after the chemotherapy is given) • Delayed nausea and vomiting (starting more than 24 hours after treatment)
Anticipatory nausea and vomiting	<ul style="list-style-type: none"> • Unusual condition, where a person undergoing chemotherapy has emetic symptoms to a conditioned stimulus before treatment is commenced e.g. the chemotherapy nurse's perfume.

(Roscoe, *et al.* 2011; Vidall, 2014; Dudley-Brown and Huether, 2013; Patton and Thibodeau, 2018;

Waugh and Grant, 2018)

Figure 3: The emetic pathway

PLEASE INSERT PICTURE OF EMETIC PATHWAY

Figure 4: Examples of stimuli and receptors

Vestibular system	Chemoreceptor trigger zone	Gastrointestinal tract	Cerebral cortex
<ul style="list-style-type: none"><input type="checkbox"/> Motion sickness<input type="checkbox"/> Base of skull tumours<input type="checkbox"/> Histamine type 1<input type="checkbox"/> Acetylcholine	<ul style="list-style-type: none">• Chemical disturbances• Opioids• Chemotherapy• Radiotherapy• Anaesthetic agents and surgery• Dopamine type 2• Serotonin type 3• Neurokinin 1	<ul style="list-style-type: none">• Gastric stasis<input type="checkbox"/> Tactile stimuli<input type="checkbox"/> Intramuscular tension<input type="checkbox"/> Constipation<input type="checkbox"/> Handling of the viscera during surgery or accumulation of gas<input type="checkbox"/> Intestinal obstruction• Serotonin type 3 and 4• Dopamine type 2<input type="checkbox"/> Acetylcholine	<ul style="list-style-type: none">• Pain<input type="checkbox"/> Fear<input type="checkbox"/> Anxiety<input type="checkbox"/> Raised intracranial pressure<input type="checkbox"/> Unpleasant sights and odours<input type="checkbox"/> GABA<input type="checkbox"/> Histamine type 1

(Collis, 2015;

Figure 5: Pressure point – P6

PLEASE INSERT IMAGE OR PICTURE OF PRESSURE POINT P6

Figure 6: Types of antiemetics and uses

<u>Types of antiemetics and examples of medications</u>	<u>Uses</u>
<p>Antihistamines</p> <ul style="list-style-type: none"> • cinnarizine • cyclizine • promethazine 	<p>Wide variety of uses, including motion sickness and vertigo.</p>
<p>Phenothiazines and related drugs</p> <ul style="list-style-type: none"> • perphenazine • prochlorperazine • trifluoperazine • chlorpromazine • levomepromazine • droperidol • haloperidol 	<p>Phenothiazines are dopamine antagonists and act centrally by blocking the chemoreceptor trigger zone.</p> <p>Perphenazine, prochlorperazine and trifluoperazine are used in severe nausea and vomiting due to a variety of causes. Droperidol is used to prevent or treat nausea and vomiting following surgery. Haloperidol and levomepromazine are used in palliative care, and chlorpromazine is often prescribed as a last resort for patients who have a terminal illness.</p>
<p>Domperidone and metoclopramide</p>	<p>Metoclopramide hydrochloride is used to prevent postoperative nausea and vomiting and treat a variety of nausea and vomiting causes such as migraine and radiotherapy. It acts directly on the gastrointestinal tract, thus may be more beneficial than phenothiazine for nausea and vomiting associated with gastroduodenal, hepatic and biliary disease. Domperidone is used to treat emetic symptoms, with it acting at the chemoreceptor trigger zone. It has the advantage of being less likely to cause drowsiness and dystonic reactions because it does not readily cross the blood-brain barrier.</p>
<p>5HT₃-receptor antagonists</p> <ul style="list-style-type: none"> • granisetron • ondansetron • palonosetron 	<p>Therapy to prevent postoperative nausea and vomiting include 5HT₃-receptor antagonists. A combination of these medications can be used with choice based on the assessed risk of postoperative nausea and vomiting in each patient. 5HT₃-receptor antagonists are often used with Dexamethasone.</p>
<p>Neurokinin 1-receptor antagonists</p> <ul style="list-style-type: none"> • aprepitant • fosaprepitant 	<p>Administered alongside 5HT₃-receptor antagonist to prevent chemotherapy-induced nausea and vomiting.</p>
<p>Nabilone</p>	<p>Nabilone is a synthetic cannabinoid which can be considered as an add on for treating nausea and vomiting. Cannabinoids are used as a last resort when other antiemetics have failed to control nausea and vomiting due to chemotherapy.</p>
<p>Hyoscine</p>	<p>Hyoscine should be given to prevent motion sickness and should, therefore, be administered before vomiting has started.</p>
<p>Dexamethasone</p>	<p>A steroid used to manage nausea and vomiting during chemotherapy.</p>

(BNF, 2020)

Figure 7: Nursing considerations when caring for patients who are experiencing nausea and vomiting

Nurse in a safe position to protect the airway and remove dentures	Assist with mouth care and personal hygiene (change of clothes etc.)	Use appropriate infection control measures
Maintain adequate ventilation and comfortable environmental temperature	Observe for signs of dehydration	Restrict or provide oral fluids and diet as instructed
Maintain an accurate fluid balance chart - measure and assess vomit	Administer antiemetics as prescribed, evaluate effectiveness and monitor for side effects	Provide vomit bowls and tissues and replace promptly when used
Consider use of other strategies, e.g. acupressure, ginger, aromatherapy.	Referral to another professional may be required e.g. clinical psychologist	Administer intravenous fluid and electrolytes as prescribed
Provide psychological support and education for the patient and family	Insert a nasogastric tube, if instructed	Identify any other strategies the patient finds helpful
Monitor observations, inform the doctor and request a review, as appropriate	Maintain privacy and dignity and provide physical comfort - hold vomit bowl and wipe mouth	Assist with the avoidance of food smells and strong odours

(Brooker and Waugh, 2013; Dye, 2017)