



Satakunnan ammattikorkeakoulu  
Satakunta University of Applied Sciences

ANJANA BHANDARI

**Enteral Feeding and Medication Administration  
via Percutaneous Endoscopic Tube  
Gastrostomy Tube**

Educational Digital Book for Nursing Students

DEGREE PROGRAMME IN NURSING

2023

Author Bhandari, Anjana	Type of Publication Bachelor's thesis	Date: 2023.05.09
	Number of pages 51	Language of publication: English
Title of publication: Enteral Feeding and Medication Administration via Percutaneous Endoscopic Gastrostomy Tube: Educational Digital Book for Nursing Students		
Degree Program in Nursing		
<p data-bbox="312 667 424 696"><b>Abstract</b></p> <p data-bbox="312 741 1441 1429">Percutaneous Endoscopic gastrostomy tube (PEG) is a stoma used for the implementation of nutrition when a person's ability to swallow is impaired. PEG tube is an enteral nutrition feeding for patients who have preserved absorption and motility function of the gastrointestinal tract but, unable to swallow solid or liquid food due to many disorders. Maintaining adequate nutrition is the utmost important goal in PEG tube. The purpose of the thesis was to produce comprehensive educational material in English as a booklet on Enteral Feeding and Medication Administration via Percutaneous Endoscopic Tube Gastrostomy Tube based on evidence-based for nursing students of Satakunta University of Applied Science (SAMK). The primary objective of this functional thesis was to create educational materials for students of SAMK. Educational materials focus on evidence-based knowledge and will help to enhance the knowledge on the subject matter. The final product is in the form of a digital book created with the help of online graphic design tool Canva©.</p> <p data-bbox="312 1458 1441 1653">The project management used on this project was Hybrid methodology. Hybrid methodology is a combination of the waterfall and agile methodology. Hybrid methodology allows authors to implement the changes at a later stage of the project. It is flexible in nature as it allows change after receiving feedback from the supervisor.</p>		
<p data-bbox="312 1843 448 1872"><b>Keywords</b></p> <p data-bbox="312 1883 1318 1944">Percutaneous Endoscopic Gastrostomy, enteral feeding, nutrition, medication, educational material</p>		

## Table of Contents

<b>1 INTRODUCTION</b> .....	<b>4</b>
<b>2 KEY CONCEPTS</b> .....	<b>5</b>
2.1 Percutaneous Enteral Gastronomy (PEG) insertion .....	5
2.2 Enteral Feeding through PEG tube.....	8
2.3 Administration of nutrition through PEG tubes in hospital setting.....	9
2.4 Medication administration through PEG Tube.....	11
2.5 Management of PEG Tube .....	14
2.5.1 Stoma care.....	17
2.5.2. Oral care.....	17
2.5.3 PEG Tube Care .....	17
<b>3 PURPOSE, OBJECTIVES AND TASK OF PROJECT</b> .....	<b>18</b>
<b>4 IMPLEMENTATION OF PROJECT</b> .....	<b>18</b>
4.1 Project methodology.....	18
4.2 Stages of project .....	19
4.3 Description of target group.....	20
4.4 Literature retrieval .....	21
4.5 Digital booklet as educational materials.....	21
4.6 Formulation of digital book in CANVA© Platform .....	22
<b>5 EVALUATION</b> .....	<b>23</b>
5.1 Resources and SWOT .....	23
5.2 Ethical Consideration .....	25
<b>6 DISCUSSION</b> .....	<b>26</b>
 REFERENCES	
APPENDICES	

## 1 INTRODUCTION

Percutaneous endoscopic gastrostomy tube (PEG) was first introduced by Gauderer in 1980 as an internal nutrition therapy. Since that time PEG has become the preferred technique for treating individuals whose long-term oral nutrition restriction is visible or imminent. A Percutaneous endoscopic gastrostomy tube (PEG) is a stoma used for the implementation of nutrition when a person's ability to swallow is impaired. A PEG tube is a flexible tube insertion directly into the stoma through the abdominal wall. (Hitawala & Mousa 2022). It is mostly performed endoscopically with a success rate of more than 95% (Hitawala & Mousa 2022) and safest with a 0.5% mortality rate (Friginal-Ruiz & Lucendo, 2015).

PEG tube is an enteral nutrition feeding for patients who have preserved absorption and motility function of the gastrointestinal tract but are unable to swallow solid or liquid food due to many disorders. Maintaining adequate nutrition is the utmost important goal in PEG tubes. (Friginal-Ruiz & Lucendo, 2015). PEG tube is the most common existing enteral nutrition for patients who need nutritional supplementation that exceeds three to four weeks. PEG can be installed in patients of all age groups whether they are children or elderly people. PEG tube insertion depends upon patients' needs. (Wei, Ho & Hegde, 2021).

The main objective of the thesis was to create a comprehensive educational material in English as a booklet on Enteral Feeding and Medication Administration via Percutaneous Endoscopic Gastrostomy Tube for the nursing students of Satakunta University of Applied Science (SAMK). The digital book also provides practical guidance on administration of PEG Tube in a hospital setting. Educational materials are focused on evidence-based knowledge and will help to enhance the knowledge of the subject matter. Therefore, the purpose of this thesis was to create a comprehensive educational material in English as a booklet on Enteral Feeding and Medication Administration via Percutaneous Endoscopic Gastrostomy Tube for the nursing students of SAMK.

The cooperation partner of this project is SAMK located in Satakunta, Pori targeting the nursing students. SAMK's economic and industrial structure is to provide a wide

range of education research opportunities in the field of health care and social services, business, and technology which contains approximately 600 students with 40 different degree programs. It promotes international students, teachers, and researchers for studying and working. (Website of Satakunta University of Applied Science, 2020).

## 2 KEY CONCEPTS

In this chapter, the described key concepts are Percutaneous Enteral Gastronomy (PEG) insertion, Enteral Feeding through PEG tube, Administration of nutrition through PEG tube in hospital setting, Medication administration through PEG tube and Management of PEG tube.

### 2.1 Percutaneous Enteral Gastronomy (PEG) insertion

Basically, there are two methods of PEG tube insertion, pull-through methods, and push methods. In both methods, the mouth endoscopic insertion is done to visualize the patient's stomach to localize the best spot for the PEG tube. After finalizing a suitable place with the help of endoscopic and palpation from outside the stomach, the medical team of two endoscopists and a nurse perform the procedure. Mostly PEG tube insertion procedures are performed under local anesthesia. It is the best-suited place for insertion in midline of abdomen as it prevents hematoma formation and infections in the recut compartments. At the finalized spot, skin is numbed and punctured with a puncture cannula, through the stomach wall a guide wire is threaded into the stomach. The primary tube has a backing plate on the side of the stomach that holds the tube in place in the stomach and a fixing plate whose function is to prevent the hose from slipping too far to the side of the stomach. The first tube is changed after four to five weeks until the ostomy channel is formed. (Friginal-Ruiz & Lucendo, 2015).

According to the Friginal-Ruiz & Lucendo (2015) "Patients with potentially reversible diseases in which it is expected that the PEG can be removed once the progress solved and patient who have irreversible diseases with prolonged survival in which the PEG is placed permanently and helps improve their quality of life". There are a significant number of people who can benefit medically from PEG placement procedure. Likewise, indications for short term are chemotherapy and radiotherapy for head and neck cancer, anorexia nervosa, severe burns, illnesses of esophagus, multiple injuries

and facial trauma, transplants with prior malnutrition, anorexia and so on. Indications for long term are Neurological diseases such as ALS, multiple sclerosis and dementia, Parkinson's diseases, head and neck tumors, inflammatory bowel diseases, oropharynx tumors, cystic fibrosis and so on (Table 1). Likewise, contraindication for short-term PEG tube insertion is non swelling esophageal obstruction, active gastric pathology, total gastrectomy, extreme obesity and previous midline laparotomy and contraindication for long-term PEG tube are colonic interposition, partial or subtotal gastrectomy, massive ascites, sepsis and coagulation disorder (Table 2). (Friginal-Ruiz & Lucendo, 2015).

Table 1. Indications for short term and long-term PEG Insertion (Modified from Friginal-Ruiz & Lucendo, 2015)

<b>Indications for short term PEG Insertion</b>	<b>Indications for long term PEG Insertion</b>
Chemotherapy and radiotherapy for head and neck cancer	Neurological diseases such as ALS, multiple sclerosis, and dementia
Anorexia Nervosa	Head and neck tumors
Severe Burn	Inflammatory bowel diseases
Illness of Esophagus	Parkison's diseases
Multiple injuries and facial trauma	Oropharynx tumors
Transplants with prior malnutrition	Cysric fibrosis

Table 2. Contraindications for short term and long-term PEG Insertion (Modified from Friginal-Ruiz & Lucendo, 2015)

<b>Contraindications for short term PEG</b>	<b>Contraindications for long term PEG</b>
Non swelling esophageal obstruction	Colonic interposition
Active gastric pathology	Partial or subtotal gastrectomy

Total gastrectomy	Massive ascites
Extreme obesity	Sepsis
Previous midline laparotomy	Coagulation disorder

In addition, to the medical needs, the health care professionals need to consider other various factors before inserting the PEG tube. Health care professionals have an ethical duty to ascertain prognosis by analyzing history and current clinical status of the patients. They need to consider various psychological factors that contribute to the sound health, mental and behavior disorder, the experience of trauma, stress, anxiety, and depression. Likewise, patients always have right to know about diagnoses and care options, so health care professional have an obligation to tell the truth and obtain informed consent from the patient to the performance of a procedure/treatment. PEG tube should be used if there is clinical evidence of patients benefits which outweigh its risks and burdens. The possible patient's outcome for PEG tube insertion should be either improving mortality rate or improving quality of life. So, health care professional should assess the benefits, risks and burdens of PEG tube prior PEG tube insertion and decline to place PEG tubes under the circumstances not shown to benefit from them. (Rai, 2019). The various factors to be considered prior of PEG tube insertion is further illustrated in the figure 1 below (Hueckel, & Gottrand, 2015):

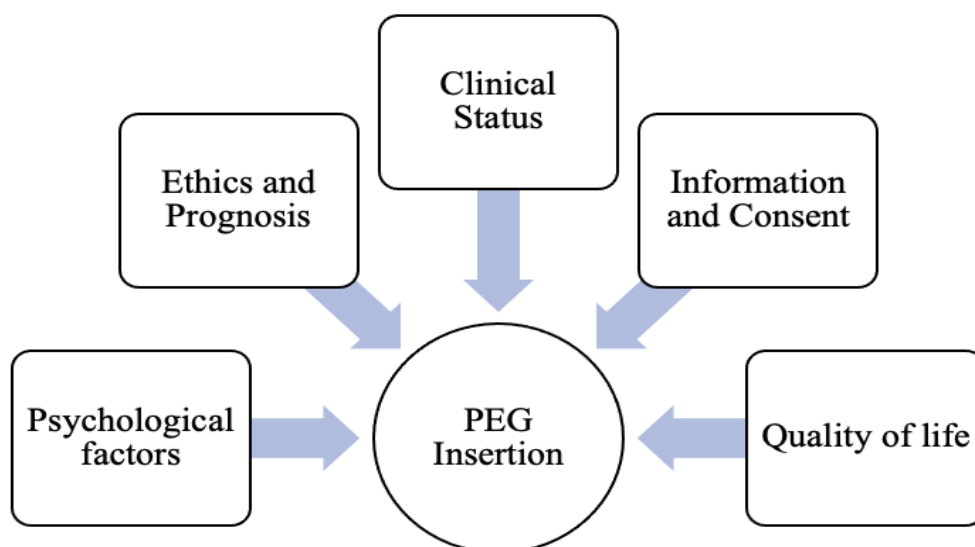


Figure1: Factors to consider prior of PEG Insertion (Hueckel, & Gottrand, 2015)

It is suggested patients should take bed rest for at least six hours post insertion of PEG tube. Nurses should closely monitor vital signs, any pain especially abdominal pain, saturations, bleeding, and abdominal distension. (Friginal-Ruiz & Lucendo, 2015).

## 2.2 Enteral Feeding through PEG tube

Enteral feeding through a PEG tube is a supportive therapy for chronically ill patients who have functional gastrointestinal tract but cannot meet their nutritional needs orally. The nutritional support offered consists of water, minerals, vitamins, fiber, carbs, protein or amino acids, and fat. (Vudayagiri, Hoilat & Gemma, 2022).

Enteral nutrition therapy may decrease complications as well as hospital length of stay and improve the progress in discharge (Allen & Hoffman, 2019). Enteral feeding through a PEG is recommended to the patients who need long-term nutritional support for more than 30 days (Aguila, Lontok & Francisco, 2020). People who suffered from dysphagia, ischemia, heart problems, and other people who became disabled for extended periods will require ongoing, expensive care, up to 30 %–50 % of very ill hospital patients rate these outcomes, which include relying on feeding tubes for nourishment, being unable to get out of bed, and needing constant care for recovery (Hawang et al., 2018).

The need for enteral feeding comes down to a plethora of conditions and diagnoses. Approximately, congenital abnormalities represent 42 % of the indications for tube feeding, followed by perinatal problems at 38 %, and lastly neurologic diseases at 16 %. (Krom et al., 2019). There are varieties of nutritional formulas in the markets which are designed to enrich nutritional needs.

Formula feeding is preferable rather than grinded food to avoid higher water and oil consumption to meet a balanced diet. The feeding formula should be at room temperature while administered and always start with low volume to the patient's tolerance. The unused product or food can be stored at a temperature for 24 hours. The nurses should maintain the position of the patients before tube feeding. The

recommended tube feeding position is 30 to 40 degrees in the sitting position to reduce the reflux (Table 3). (Rahnemaiazar et al., 2014).

Table 3. Nursing Consideration in Enteral Feeding

<b>Good To Remember</b>
<ul style="list-style-type: none"> <li>• Formula feeding is preferred over grinded food to avoid higher water and oil consumption (Rahnemaiazar et al., 2014).</li> <li>• The feeding formula should be store in a dry place at normal room temperature while administered and always starting with low volume to the patient’s tolerance. If handled aseptically, the preparation can be kept open and connected to the feeding device at room temperature for a maximum of 24 hours, otherwise a maximum of 8 hours (Rahnemaiazar et al., 2014).</li> <li>• The unused product or opened package should be closed and stored in a refrigerator at a room temperature for 24 hours (Rahnemaiazar et al., 2014).</li> <li>• The nurses should maintain the position of the patients before tube feeding. The recommended tube feeding position is 30 to 40 degrees in the sitting position to reduce the reflux ((Rahnemaiazar et al., 2014).</li> <li>• Using a syringe to deliver large volumes of feed (bolus) at agreed time slots 6-8 times a day (Brady, McCann &amp; McCane 2014).</li> <li>• Inspect the patient’s tube areas for any redness dislodgement (Website of Western Australia Government 2019).</li> <li>• After finishing feeding, flush with lukewarm water i.e., 30 ml of water (Website of Western Australia Government 2019).</li> <li>• Ensure upright position of patient where possible after feeding for at least 30 minutes to avoid aspiration (Website of Western Australia Government 2019).</li> </ul>

### 2.3 Administration of nutrition through PEG tubes in hospital setting

Administration of nutrition through PEG tubes in hospital settings is mainly done by nursing staff through the feeding tube. There are different types of tube feeding. Some contain fiber, some provide more calories per milliliter than others, and the electrolytes

level may differ between feeds. Generally, feeds are packed in a ready to use sterile container that can be hung for a maximum 24 hours, and remaining feeds if any should be discarded accordingly. (Brady, McCann & McCane 2014, 55-56). A feed can be delivered through an enteral feeding tube in various ways such as:

- continuously through a pump (pump providing a set rate of feed over a specified number of hours)
- Intermittent infusion (With or without pump) and
- Using a syringe to deliver large volumes of feed (bolus) at agreed time slots 6-8 times a day. (Brady, McCann & McCane 2014, 55-56).

The method of administration always depends upon the patient's medical condition, their capacity to tolerate the feed, their nutritional requirements, and their preferences. (Brady, McCann & McCane 2014, 55-56). Nurses should adhere to Medication Management procedure while preparing and administering medication through PEG Tube.

#### **Nursing Considerations:**

- Explain the procedure to the patients.
- Washing hands before starting the procedure is important.
- Always remember formulas for enteral feeding should be prepared as per the doctor's order.
- Enteral feed is stored and should be administered at room temperature to prevent any gastric discomfort associated with the administration of cold feed.
- Correct placement of the PEG TUBE should be ensured prior of medication. (Website of Western Australia Government, 2019).

#### **Position:**

- The position of the patients should be supine with the head of the bed raised to 30 to 40 degrees to reduce the aspiration. Any enteral tube should not be used unless the position is clinically correct. (Website of Western Australia Government, 2019).

**Procedures:**

- Inspect the patient's tube areas for any redness dislodgement.
- A big catheter syringe's plunger should be removed, and the tip should go into the connecting tube.
- Flushing the tube with water (room temperature water) and monitoring the patient's tolerance level for tube feeding like abdominal pain, cramps, Increased bowel sounds, diarrhea, vomiting, and so on.
- Fill the syringe with the formula. To make the formula go in more quickly, raise the syringe. To proceed more slowly, lower the syringe.
- After finishing feeding, flush with lukewarm water i.e., 30 ml of water.
- Ensure upright position of patient where possible after feeding for at least 30 minutes to avoid aspiration.
- Proper documentation is needed after the procedure. (Website of Western Australia Government, 2019).

#### 2.4 Medication administration through PEG Tube

Administration of medication through a PEG tube is important for long-term illness patients and its primary goal is to optimize the drug's therapeutic actions without interfering with enteral nutrition. Medication via PEG tube is indicated when nasogastric feeding is impossible for example due stroke, bowel obstruction, tumor, or excessive vomiting. Most medication formulation is suitable through the gastrointestinal tract. Although other routes like intravenous, subcutaneous, or intramuscular injection can be used with 100 % absorption. But it can be cost-effective repeated injections that can lead to compaction and are not suitable for long-term use. (White & Bradham, 2015).

Chewable, cytotoxic preparations or sublingual tablets should not be crushed, nor should enteric -coated or sustained- release pills so it is not advised to use a PEG tube for administration. Tablets that form large masses, like Metamucil®, are not allowed. Drugs that are hypertonic and concentrated can be applied after being diluted in water.

Warfarin® is not recommended to provide phenytoin, morphine sulfate, and aluminum-containing antacids together. Compared to solid versions, liquid drugs are preferable because they prevent the occlusion of silicone PEG tubes (Table 4). (Friginal-Ruiz & Lucendo, 2015).

Table 4. Considerations before administration of medication through PEG (Modified from Friginal-Ruiz & Lucendo, 2015).

- Chewable, cytotoxic preparations or sublingual tablets should not be crushed, nor should enteric-coated or sustained-release pills.
- Tablets that form large masses, like Metamucil® are not allowed.
- Drugs that are hypertonic and concentrated can be applied after being diluted in water.
- Warfarin® is not recommended to provide phenytoin, morphine sulfate, and aluminum-containing antacids together.
- Liquid drugs are preferable compared to solid versions to prevent the occlusion of silicone PEG tubes.

Suspension formulas like granular suspension and the viscosity of the formation must be considered before administration through a PEG tube. For example, medicine like ciprofloxacin and clarithromycin caution should be exercised to avoid changing absorption characteristics. Drug administration via enteral tubes can increase the risk of nursing errors and technical errors such as blockage of the tube due to incorrect drug preparation, risk of cross-contamination between different drugs because of inappropriate handling, along with hazardous exposure to the same. (White & Brahdam, 2015).

### **Preparation of medication**

It is crucial to wash your hands before the process to lower the containment of the toxins. Before administering the drug, prepare all the necessary supplies, such as a 60 ml syringe, medications, water for a flush, dry towels, and non-sterile gloves. Before administering a medication, always verify the patient's identity and current prescription. (White & Bradman 2015, 7–20).

The proper route of administration, such as a gastrostomy, must be indicated on the prescription. Clean the gastrostomy tube with 40-50 ml of fresh water before delivering medication through it. For rinsing, saline solution is not recommended as it can crystallize inside the tube and block it. So, the research has shown that the water flushing is the most effective method for preventing clogging of the supply hose. Shake well any liquid medications to precisely measure tiny doses of liquid medications, use a small enteral syringe. It will be simpler to draw up the medication and less likely to spill if a bottle bung is used in the drug bottle and connected to the syringe. The soluble tablet should be dissolved in 10–15 ml of water first. Measure the water to be used for dilution of the medication using a 50/60-ml syringe, and then add it to the medication pot. Be aware that the patient consumes fluids in addition to the water used to administer the medication. In individuals whose fluid intake is restricted, caution is advised. (White & Bradman 2015, 7–20).

To minimize reflux aspiration, a sitting position, or an angle of 30 degrees should be maintained. Before administering the medication, practice good hand hygiene once more. Put on clean gloves. Do not combine prescription drugs with formula or other medications. Verify that the dosage, amount, and medicine name correspond to the doctor's prescription and mix it appropriately. Explain the procedure to the patients or their relatives. To minimize the aspiration, it is also important to avoid administering air to the stomach. Secure the gastrostomy tube with the clamp. On the gastrostomy tube's end, remove the cap. Connect the syringe to the extension tube's medication port and put the recommended dosage of medicine in the syringe. Place the syringe at a height above the stomach and allow the medication to gradually flow through the extension tubing by opening the clamp on the extension tubing. Then, attach the extension tube clamp. Fill the syringe with the recommended amount of water. Flush the tube with 30 ml of water (sterile water or tap water). Keep in mind that you need to flush with 10 ml of water between the crushed and liquid medications. After all the medication is administered, flush the tube again with 30 ml of water. Remove the gloves and complete the documentation properly. (White & Bradman 2015, 7–20).

A clear pathway of administration of medication through PEG tube is shown in the figure 2 below:

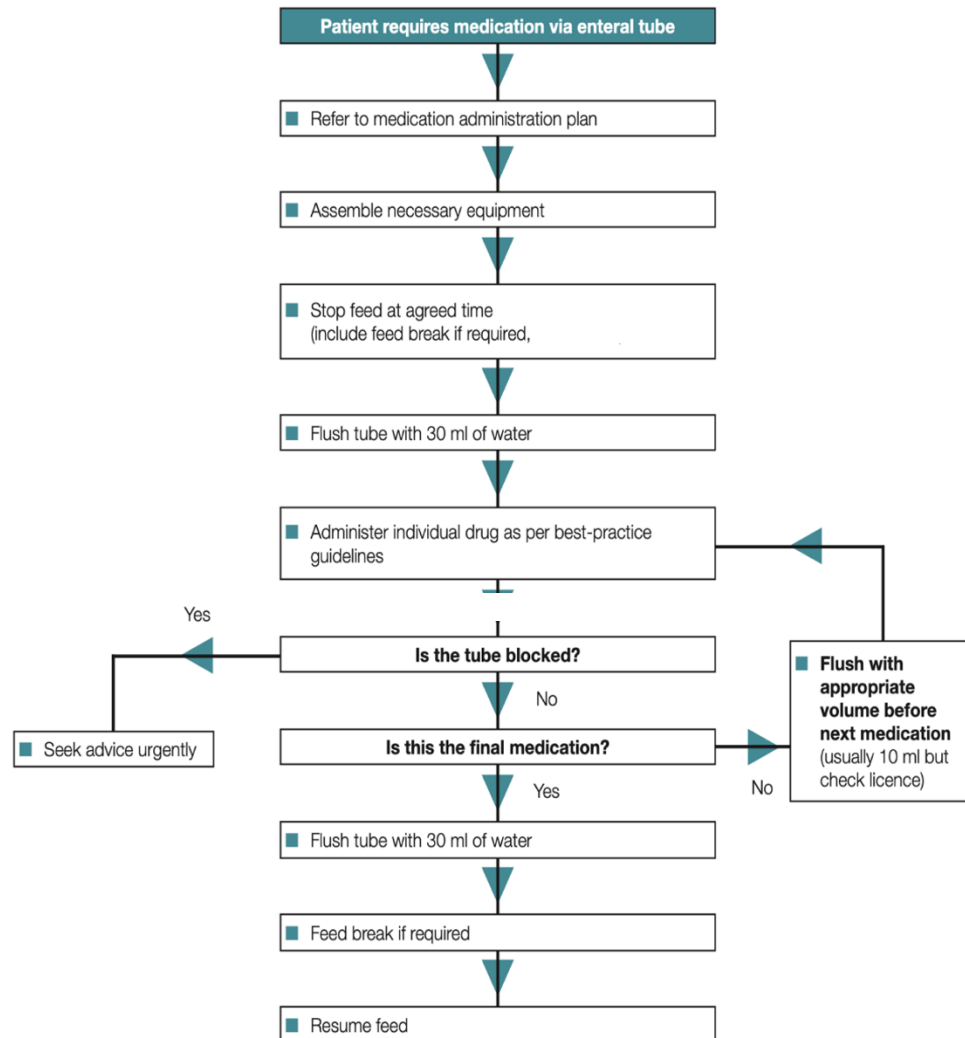


Figure 2: Flowchart of Administration of Medication through PEG tube (Wright et al. 2019, 12).

### 2.5 Management of PEG Tube

After the insertion of a PEG tube, complications may arise so nurses should check or monitor the complications from time to time. Minor complications (incidences range 13% to 40%) like granuloma formation, local wound infection, peristomal leakage, tube dislodgement, gastric outlet obstruction, and pneumoperitoneum. Major complications (incidences range 0.4% to 4.4%) after insertion of a PEG tube are bleeding, aspiration pneumonia, internal organ injury, necrotizing fasciitis, and buried bumper syndrome. Therefore, nurses should be well trained, and educated to manage the pre-and post-operative consequences. (Sealock & Munot, 2018).

Nutrition support through PEG tube is considered as a minor surgical procedure and less complicated procedure to other enteral feeding. However, it is associated with complications like pain, wound infection, catheter displacement, leakage, catheter obstruction, diarrhea, constipation, and irritation in skin around it. (Mahmodabadi, 2020).

Nurses play meaningful role in prevention and identification of PEG tube complication by proper accessing the stoma site, stoma care, proper position and location of PEG tube, pain management, cleaning around the stoma skin, flushing the tube, using proper technique to feed, aseptic technique, rotating tube, documentation and notifying doctors if any problem notices. (Anne, 2020). Infection and complication can be observed through drainage, wound secretion, odor, pain tube blockage, necrotic discoloration, leakage, malposition. So, nurses should be qualified to provide care to PEG patients. (Cyrany & Rejchrt, 2016).

The various potential complications encountered in/after insertion of PEG tube are infection, peristomal leakage, colonic perforation, bleeding, tube dislodgement, tube malfunction, burred bumper syndrome and pain. Among these complications, tube malfunction is the most observed one which incidence ranges from 25 – 60 % infection with ranges 5 – 30 % and other complications incidence ranges are below 20 %. The least observed complications are peristomal leakage, bleeding and burred bumper syndrome with the incidence ranges from 1-2 % 1-2.5 %, 0.3- 2.4 % respectively. (Sealock & Munot, 2018). The complication of PEG Tube is graphically presented in the figure 3 below:

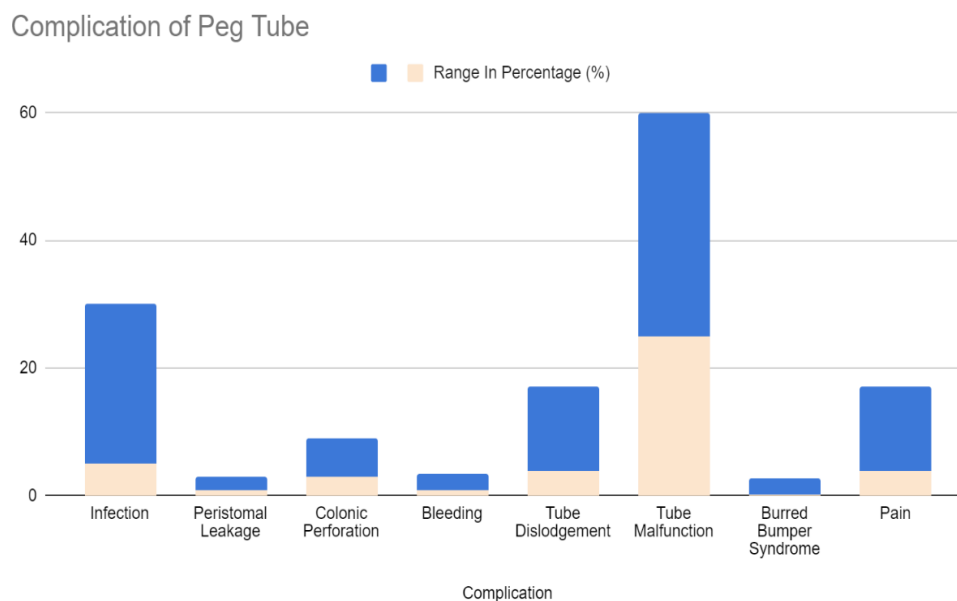


Figure 3: Complication of PEG Tube (Sealock & Munot, 2018)

Frequent assessment is very crucial after insertion of PEG tube to identify any complications and avoid its consequences. In such a case, nurses play a significant role in preventing and minimizing the risk of complications through various support, caring, therapeutic approaches, PEG care and medication. (Mahmodabadi, 2020).

Patient guidance is the core of nursing care. “The patient must be given information about their state of health, the significance of the treatment, alternative forms of treatment and their effects, as well as other matters relating to the treatment that are significant in terms of treatment decisions. Before the procedure, the patient and their family members are informed about the procedure, and its pros and cons”. (Act on the Status and Rights of Patients 785/1992). After the procedure, the patient and their relatives are taught about the use of a PEG tube, PEG care and how to use it. Patients and family members need special education that helps to familiarize themselves with devices and methods of feeding and acquire clear information regarding long-term care. Patients should be instructed not to pull the tube forcefully or to avoid any pressure in the stoma site. Nutritional counseling should be provided to PEG patients. (Heuschkel & Gottrand, 2015).

### 2.5.1 Stoma care

Stoma care is a fundamental part of nursing care in PEG tube patients. During the two weeks post insertion, the peri-stoma skin should be cleaned daily using soft soap and water, inside out technique, letting it completely dry. Assessment of the dressing site, any kind of abnormalities, color, order, smell, or small liquid secretion from the wound site during the first week is expected. (Friginal-Ruiz & Lucendo 2015.) Patients should shower at least once a week in case there are not any signs of infection present (Alsunaid et al. 2021). Swimming and sauna are not recommended for at least two weeks following PEG tube insertion (Heuschkel & Gottrand 2015).

### 2.5.2. Oral care

Maintaining good oral hygiene is critical to live a healthy and happy life. When the patient does not receive nutrition orally, the importance of oral care is emphasized. Inability to chew, swallow food, or use of enteral feeding methods contributes to dental disease. When the food intake through the mouth decreases, likewise the production of saliva decreases leading to dry mouth. Improper oral hygiene may directly lead to oral infection, tooth decay or tooth loss or oral cancer. Brushing teeth or dentures twice a day with a soft brush plays an important role in maintaining hygiene and preventing tooth decay. Dry mouths are treated with regular application of lip balm, mouth moistening gels or sprays. Patients with dentures should use mouthwash or gargle. If a patient's mouth is sore, dry, crack, or mucous membranes are broken, it is recommended to use mouth gargle instead of toothbrush to prevent further damage for example chlorhexidine. Regular inspection of the mouth cavity must be done for early identification of oral illness. Early identification plays a crucial role in preventing tooth decay or oral illnesses and being treated in time. (Wang et al., 2021.)

### 2.5.3 PEG Tube Care

PEG tube may be started shortly after the insertion, despite that it is recommended to wait from three to six hours before administering solution through the tube to prevent any early complications. Before administering the full prescribed volume nutrition solution, lesser amounts of water or formulation should administer primarily and upgrade volume within two to three days. (Friginal-Ruiz & Lucendo 2015). Daily

rotating the tube clockwise and anticlockwise helps in prevention of decubitus ulcer which might form between the abdominal and gastric walls (Alsunaid, Holden et al. 2021). Supporting the tube with soft wrist restraints, mittens, tape, or abdominal belts prevent the tube from dislodge (O'rear et al. 2015).

### 3 PURPOSE, OBJECTIVES AND TASK OF PROJECT

The purpose of this thesis was to create a comprehensive educational material in English as a booklet on Enteral Feeding and Medication Administration via Percutaneous Endoscopic Gastrostomy Tube for the nursing students of Satakunta University of Applied Science (SAMK). The digital book also provides practical guidance on administration of PEG Tube in a hospital setting.

The main objective of this project was to expand the knowledge of nurse students of SAMK based on the topic. Educational materials focus on evidence-based knowledge and will help to enhance the theoretical knowledge on the subject matter.

The product of the thesis was concluded as educational material in English, a digital booklet, on **Enteral Feeding and Medication Administration via Percutaneous Endoscopic Tube Gastrostomy Tube** for nursing students of SAMK. Author produces an e-service booklet using an online design graphic tool called Canva©. All the information in the booklet is relevant, and evidence-based that conveys the educational target group. The tasks that need to be considered are self-evaluation, peer-evaluation, feedback, and risk analysis.

### 4 IMPLEMENTATION OF PROJECT

#### 4.1 Project methodology

Author implements a hybrid project management method. Project methods are an integral part of the project which contributes to improving project performance. The hybrid methodology is a combination of the waterfall and agile methodology, that focuses on gathering and analyzing requirements beginning. The hybrid approach

allows overlapping phases, breakdown plans, and applying new adjustments, without waiting for the previous one to finish. (Kukhnavets, 2020).

The author selected the hybrid method as it allows us to implement the changes at a later stage of the project. It is flexible in nature and helps authors correct or improve the project quality after receiving feedback from teachers and supervisors. New adjustments in the project can help the author to avoid the same mistake, instantly implement feedback from the teachers, avoid delay, minimize risk, and deliver a good quality product on time. (Kukhnavets, 2020).

#### 4.2 Stages of project

The author of the project clarified the four steps of the project, initiating, planning, executing, and closing. Thesis started at the end of August (2021) when the thesis topic was chosen. In the initiation phase, selection of a topic, seminar of a different thesis, identifying the purpose and objectives, dividing the role and responsibilities of project members, familiarizing the topic and project methods, scheduling timetable, identifying project stakeholders, and research of thesis topic. After the project plan was approved, it needed to be sent to stakeholders to sign it. After the approval from stakeholders, the project moved to the second stage. Likewise, the activities considered in various stages of the thesis are presented in the Table 5 below.

Table 5: Stages of the thesis project

<b>Project phase</b>	<b>Project date</b>	<b>Task list</b>
Initiating	December 2021	<ul style="list-style-type: none"> <li>- Project topic selection</li> <li>- Identify project purpose and objectives</li> <li>- Identify the target group</li> <li>- Familiarize the topic</li> <li>- Pre-plan meeting</li> </ul>

Planning	December 2022 – January 2023	<ul style="list-style-type: none"> <li>- Planning schedule</li> <li>- Resources analysis</li> <li>- Risk analysis</li> <li>- Theoretical background</li> <li>- Review the related articles or literature.</li> <li>- Evaluation plan</li> <li>- The thesis agreement with SAMK</li> </ul>
Executing	February 2022 – March 2023	<ul style="list-style-type: none"> <li>- Product planning</li> <li>- Evaluating progress</li> <li>- Documentation</li> <li>- Communication with supervisor</li> <li>- Receiving feedback</li> </ul>
Closing	October 2022 – May 2023.	<ul style="list-style-type: none"> <li>- Completion of project</li> <li>- Delivering the final project</li> <li>- Project implementation</li> <li>- Project report</li> </ul>

#### 4.3 Description of target group

This thesis is implemented as a functional thesis, the output of which is a digital booklet. The thesis is a project -based, which focuses on the nurse's significant role to provide adequate nutrition and medication via PEG tube by providing quality care. Considering the language barriers for international students, the booklet will be published in English. Hence, the majority targeted nursing students of the Satakunta University of Applied Science who are studying for a bachelor's degree in Nursing English will be the ultimate target group. Besides, the thesis is also beneficial for Finnish students who speak and write in English.

#### 4.4 Literature retrieval

Evidence-based is the core of this project. Different literature retrieval is used to acquire evidenced-based information through reliable databases like an electrical book from SAMK Finna, PubMed, CINAHL, Google Scholar, and Theseus. Additionally, the trustworthy websites of the organization which is totally free to use are also used. Based on this database, relevant search terms such as “percutaneous endoscopic and gastrostomy tube” were entered to find concise information on the thesis topic.

The articles search was limited to 2015-2022 while doing a literature search. Author have limited references since these resources are updated and provide the newest discoveries, theories, and newest practices. Filters applied on the database were free full text, English, and timeframe from 2015-2022. Brief outline of the literature retrieval from database is provided on the table in the Appendix 1. Information was found using various search terms such as percutaneous endoscopic gastrostomy tube (PEG), enteral feeding, PEG care, oral care in PEG, PEG pump, medication via PEG tube, and nutrition via PEG tube. Table 6 below briefly explains the inclusion and exclusion criteria.

Table 6. The Inclusion and Exclusion Criteria of literature retrieval.

Inclusion Criteria	Exclusion Criteria
- Studies published timeframe from 2015-2022	- Studies published timeframe before 10 years
- English language	- Sources in other languages
- Free to use	- Require fees or cost burden
- Articles relevant to topic	- Articles out of topic
- Peer reviewed	- Non-peer reviewed.

#### 4.5 Digital booklet as educational material

A digital booklet makes the learning process more interesting and engaging. Readers are more likely to notice a visually appealing booklet. Therefore, an appealing design is essential to attract the reader's interest in the content. Hence, the author chose the digital booklet because of the current development of the digital era, making it easier

for everyone to access information digitally. (Website of Wisegeek, 2023). The final product of this thesis was to develop a digital booklet for nursing students who are studying at SAMK university. In the booklet, the author included a nursing procedure about how to administer medication and nutrition through PEG tubes in hospital settings. It also includes pictures to support the theoretical parts and keep the readers interested and engaged. The digital booklet is designed so that nursing students can easily access materials and enhance their knowledge during their practical training in hospitals.

#### 4.6 Formulation of digital book in CANVA© Platform

Author preferred Canva©, an online graphic design tool to create the digital book. It is a powerful online design and publishing tool with a primary objective to allow everyone in the world to design anything without any cost. It provides free access to its users and offers paid subscriptions such as Canva Pro© and Canva© for additional functionality and features. It has collections of thousands of free, high quality and readymade templates on any subjects to support or assist the users in the studies, presentations, thesis, posters, videos and so on. Likewise, it also provides step-by-step tutorials to the new users so that they can create digital contents faster without any complications and problems. (Website of Canva). As it is a powerful free tool that provides access to thousands of ready-made templates and functions, easy to use and understandable features, the author used it to create the digital booklet.

The digital book on **`Enteral Feeding and Medication Administration via Percutaneous Endoscopic Tube Gastrostomy Tube`** consists of a total 18 pages beginning with cover page, table of contents, introduction, key concepts, nursing care, patient guidance and references. The key concepts include descriptive information of nutrition through PEG and medication through PEG along with relevant pictures. Some of the pictures were taken from source: Adobe stock© and some of them were clicked by the author. The citations and references were properly disclosed complying with the relevant guidelines. The screenshot of the digital book is attached in the Appendix 2.

## 5 EVALUATION

The final product of the thesis is prepared in the form of digital book on ` **Enteral Feeding and Medication Administration via Percutaneous Endoscopic Tube Gastrostomy Tube** targeting the nursing students of SAMK. The feedback will be provided by the nursing students of SAMK through evaluation, assessment, and analysis of the usefulness, reliability, and relevance of the product. The screenshots of digital book are attached in the Appendix 2. The link to the digital book is mentioned <https://publuu.com/flip-book/132168/338948>

### 5.1 Resources and SWOT

Resources are the prerequisites needed to complete the product on a predetermined deadline. It includes people, equipment, supplies, capital, software, or anything that are crucial to thesis writing. In addition, resources also consist of information resources such as databases, journals, articles, books, and information technology and, intellectual resources such as problem-solving skills, communication skills, critical thinking skills, time management skills and so on. Similarly, resources also describe other resources of the project including skills assessments, and physical resources needed for the project. (Heldam 2018, 139). Thesis writing demands optimum allocation of available resources to all the activities of the thesis as per predetermined plan and procedure.

The author and the respective supervisors were the most notable personnel resources for the thesis. The laptop being a working device and good internet connections, databases, uses of information technology, books, journals were other widely required and used resources in the thesis. Likewise, CANVA© website and its templates were the most significant intangible resources for the formulation of digital book for the nursing students of SAMK. In addition, reliable databases like an electrical book from SAMK Finna, PubMed, CINAHL, Google Scholar, and Theseus are other resources used to acquire evidenced-based information.

Risk is a potential threat to or potential opportunities that do exist on the project. Project risk starts from the beginning of the planning process and lasts until the closing

date and might occur in any phase of the project. A risk impacts the project's product and outcome. So, it is important to pre-analyze the potential threats and potential opportunities to develop plans and strategies to avoid and mitigate risk impacts. (Heldam 2018, 148).

Initially, this thesis project was a group work of two people, allocating the activities and work among the thesis partners. We carried out assessment of literature retriever, framed out the theoretical and conceptual background, set the objectives of the thesis and identified the key concepts together. Unfortunately, due to the health issues of the thesis partner, the thesis could not be continued further. Later, with the prior permission and approval from the supervisor, the remaining thesis was carried out by the author independently.

The project risk analysis was carried out with the help of SWOT analysis (Strength, Weakness, Opportunities and Threats). The strength and weaknesses were identified from the internal environment, and opportunities and threats are assessed from external factors. The strength and opportunities should be matched to attain competitive and strategic advantages. Likewise, any weaknesses and vulnerable threats that have a negative impact on the project should be critically assessed to mitigate its consequences and take corrective and preventive actions on time.

SWOT analysis helped authors to recognize the possible potential threats and opportunities which are shown in the figure 4 below:

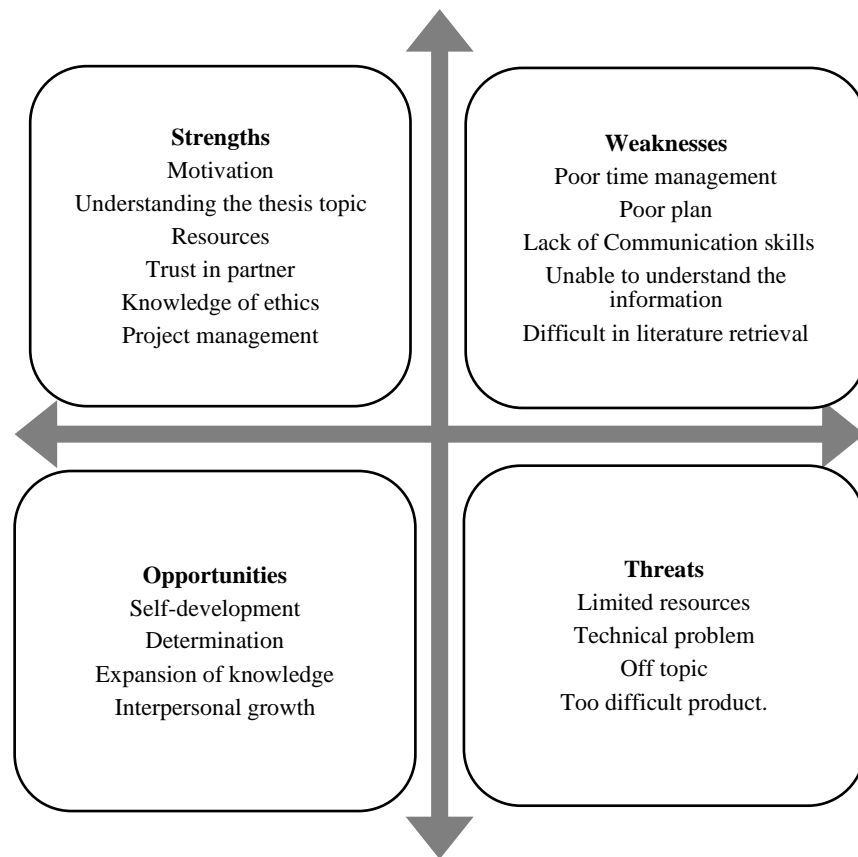


Figure 4: SWOT Analysis of the project

Author, being the student with minimum exposure and experience of thesis writing, the role of supervisors was highly appreciable in taking preventive and corrective actions to mitigate risks associated with the project. Opportunities were grabbed and matched with the strengths through comprehensive planning, segregation of work schedule and effective communication process. Through constant dedication, hardship and supervision, the author was able to improve the weaknesses and achieve interpersonal as well as professional growth.

## 5.2 Ethical Consideration

The word ethics is derived from the Greek word ethos which refers to custom, habit, character, disposition, right or wrong. Similarly, In Finnish the term research ethics typically known as tutkimusetiikka is a general concept covering all the ethical

principles, frameworks and assessment related to science and research. (Finnish National Board on research integrity TENK, 2012).

The Ministry of Education and Culture, Finland has appointed The Finnish National Board on Research Integrity TENK to develop standardized guidelines to promote responsible conduct of research, minimize research misconduct and advocate research integrity in Finland. All the academic disciplines carried out in Finland must follow the RCR (Responsible conduct of research) guidelines to enhance research integrity. The board has further categories of research misconduct as Fabrication, Falsification (Misrepresentation), Plagiarism, and Misappropriation. (Finnish Advisory Board on Research Integrity 2012, 28-32).

Before initiating the thesis, the author carefully read and understood the applicable standards of research, ethical considerations and SAMK instructions for the thesis writing to draft an ethically reliable and acceptable report. Likewise, the author gave topmost priority to the principles of research ethics such as informed consent, fairness, confidentiality, honesty, and professional behavior in writing the thesis.

The Copyright Act strongly recommends obtaining prior approval or permit from the respective authority to use any pictures, any artistic work, or other audio-visual materials (Copyright Act 404, 1961). In compliance with the Copyright act the author considered taking permission from the material subject owner, unless otherwise set by rules and regulations on limitation, by properly disclosing the sources of used background information, and original authors on a thesis. In addition, the writer gave total credit to the original writer by mentioning the authors and year, providing subject descriptions, outlining the reasons why the specific sources were used, and how it was relevant to the topic discussed.

## 6 DISCUSSION

The author initiates the thesis through extensive planning and procedures for each phase of research. As planning is the predominant aspect of every research, a detailed and meticulous plan with segregation of duties, functions, and time frame helped the

author to draft the research paper in an organized manner. Prior to ascertaining the scope of the thesis, the author went through tremendous efforts and spent hours on expanding the knowledge base and conceptual frameworks of the topic to conclusively set out the objectives, and scope of the study. With the dedicated and constant supervision and guidance from the respective mentors, through numerous seminars, research guidelines on ethical considerations, and university's standardized guidelines, the author acquired primary research skills, knowledge of different research methodologies, general preview and working procedure of how an effective and reliable research is formulated. In the process, the author realized the significance of time management skills and designated sufficient time and resources to smoothly carry forward the study, work, and thesis work schedule.

At the initial phase of literature retrieval, the author faced challenges to effectively express the opinions, and perspectives of various writers, techniques of citations and ethical considerations to be followed to avoid research misconduct, copyright issues, and plagiarism. The author was able to overcome the hindrance by going through Guidelines and Recommendations from The Finnish National Board on Research Integrity TENK, University research guidelines and consultation with the supervisors, review of others 'thesis and hence was able to abide by good research practices. Considering the sophisticated nature and wide scope of thesis writing, the author prepared a checklist of questionnaire of ethical principles and other considerations to ensure all the relevant and applicable guidelines are properly encapsulated within it. As the author followed hybrid methodology, any deficiencies, misinterpretations, and errors identified in the thesis were properly addressed and updated. The author also focused on developing a digital book, its reliability, usefulness, and effectiveness for the nursing students. All the processes of the thesis writing were well documented and utmost priority was given to ensure the reliability of the product from the initiation to the final approval of the project. All the references and citations were properly quoted, and significant aspects of the project were also attached in appendices.

While reflecting on the process and experience of research writing, the writer acquired comprehensive knowledge of the topic and research working procedures, improved time management skills, and academics skills. It enhanced my level of confidence,

improved communication skills, critical thinking, and analytical skills. The knowledge and skills acquired in the process are beneficial for both professional as well as interpersonal growth.

Thesis writing is really a challenging task in a way to duly reflect your opinions and perceptions in compliance with the objectives and scope of the study and deliver the same to the targeted groups. The passion to learn and create a reliable thesis motivated to overcome all challenges and problems. The author summarized the whole journey of the thesis writing as a challenging but equally exciting learning process. Author also thoroughly enjoyed the learning process of creating digital book and considered it as a wonderful blend of technology and knowledge to develop a visually appealing product.

The thesis was a joint project of two authors which was later carried out independently due to the health issue of the thesis partner. As certain portions of the project such as literature retriever, theoretical frameworks, background, key concepts, and objectives were done together, with the recommendation of the supervisor the task of preparing the digital book and its evaluation portion were segregated between the author and previous thesis partner. Hence, the evaluation section of the project will be carried out by previous thesis partner in another thesis by collecting responses from SAMK nursing students via feedback form. Therefore, this thesis includes only the feedback provided by the SAMK orderer (Appendix 3). The brief narrative of the feedback was inclusion of reliable but old sources of information, mismatched layout in the guide creating somehow confusing picture to the reader and suitably deliver a reliable and relevant information related to the PEG hose to the reader.

## REFERENCES

Act on the Status and Rights of Patients 785/1992. Referred 16.10.2022.

<https://www.finlex.fi/en/laki/kaannokset/1992/en19920785.pdf>

Allen, K. & Hoffman, L. 2019. Enteral Nutrition in the Mechanically Ventilated Patient. Referred 18.10.2022.

<https://aspenjournals.onlinelibrary.wiley.com/doi/10.1002/ncp.10242>

Aguila E., Lontok, M. & Francisco, C. 2020. Follow your Gut: Challenges in Nutritional Therapy During COVID-19 Pandemic. Referred date 18.10.2022.

<https://pubmed.ncbi.nlm.nih.gov/32480010/>

Brady, A. M., McCabe, C & McCann, M. 2014. Fundamentals of Medical- surgical nursing: A systems Approach. Ireland: John Wiley & Sons Ltd, 55-56.

Cyrany, J. & Rejchrt, S. et al. 2016. Buried Bumper Syndrome: A Complication of Percutaneous Endoscopic Gastrostomy Tube. Referred 18.10.2022

<https://pubmed.ncbi.nlm.nih.gov/26811611/>

Finnish National Board on Research Integrity TENK. 2017. Referred on 20.01.2021

<https://tenk.fi/en/advice-and-materials/RCR-Guidelines-2012>

Friginal-Ruiza, A.B., & Lucendo, A. J. 2015. Percutaneous Endoscopic Gastrostomy. Society of Gastroenterology Nursing and Associates. Referred 18.10.2022

<https://uat-nursing.ceconnection.com/ovidfiles/00001610-201509000-00005.pdf>

Heldam, T. 2018. Project Management Jumpstart. Fourth Edition. Pg 139, 148. USA: John Wiley & Sons., Inc., Referred 14.10.2022

<https://ebookcentral.proquest.com/lib/samk/reader.action?docID=5510587>

Hueckel, R. B., Gottrand, F. et al. ESPGHAN Position Paper on Management of Percutaneous Endoscopic Gastrostomy. 2015. Journal of Pediatric Gastroenterology and Nutrition 60(1). Referred 18.10.2022

[https://journals.lww.com/jpgn/FullText/2015/01000/ESPGHAN\\_Position\\_Paper\\_on\\_Management\\_of.27.aspx](https://journals.lww.com/jpgn/FullText/2015/01000/ESPGHAN_Position_Paper_on_Management_of.27.aspx)

Hitawala, A. A., & Moua, O. 2022. Percutaneous Gastrostomy and Jejunostomy. Referred on 10.10.2022

<https://www.ncbi.nlm.nih.gov/books/NBK559215/>

Hwang, F., Boardingham, C et al., 2018. Establishing Goals of Care for Patients with Stroke and Feeding problems. Referred 18.10.2022

<https://www.sciencedirect.com/science/article/pii/S0885392418303154>

Kukhnavets, P. 2020. What is the Hybrid Approach in Project Management? Referred 04.10.2022.

<https://hygger.io/blog/what-is-the-hybrid-approach-in-project-management/>

Krom, H., Van Zundert, S. M. C., Otten, M.-A.G.M., van der sluijs veer, L, Benninga, M.A., & Kindermann, A. (2019). Prevalence and side effects of tube feeding. Referred 17.10.2022.

[https://www.clinicalnutritionjournal.com/article/S0261-5614\(18\)30047-5/fulltext](https://www.clinicalnutritionjournal.com/article/S0261-5614(18)30047-5/fulltext)

Mahmodabadi, Z. A., Zakerimoghadam, A. et al. Nursing empowerment by simulation in percutaneous endoscopic gastrostomy short-time complication: Protocol study. J Educ Health Promote. 2020. Referred on 15.10.2022

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7652070/>

O'rear, J. M. & Prahlow, J. 2015. Early Percutaneous Endoscopic Gastrostomy Tube Dislodgment. American Journal of Nursing. 115(6). Pg 26-31. Referred 18.10.2022

[https://journals.lww.com/ajnonline/Fulltext/2015/06000/CE\\_Early\\_Percutaneous\\_Endoscopic\\_Gastrostomy\\_Tube.24.aspx](https://journals.lww.com/ajnonline/Fulltext/2015/06000/CE_Early_Percutaneous_Endoscopic_Gastrostomy_Tube.24.aspx)

Rahnemai-Azar, A. A., Rahnemaiazar, A. A., Naghshizadian, R., Kurtz, A., & Farkas D.T. World Journal of Gastroenterology. 2014. Percutaneous endoscopic gastrostomy: Indications, technique, complications. Referred 18.10.202.

[https://www.cghjournal.org/article/S1542-3565\(18\)30803-6/fulltext](https://www.cghjournal.org/article/S1542-3565(18)30803-6/fulltext)

Rai, Lalita. 2019. Nursing Concepts Theories and Principles. Fourth edition. Chhetrapati, Kathmandu: Akshav Publication. Referred 01.04.2023

Sealock, J.R. & Munot, K. (2018). Common Gastrostomy Feeding Tube Complication and Troubleshooting. Referred 18.10.2022.

[https://www.cghjournal.org/article/S1542-3565\(18\)30803-6/fulltext#secsectitle0015](https://www.cghjournal.org/article/S1542-3565(18)30803-6/fulltext#secsectitle0015)

Vudayagiri, L., Hoilat, G. J. & Gemma, R. (2022). Percutaneous Endoscopic Gastrostomy Tube. Referred 18.10.2022.

<https://europepmc.org/article/med/30570992#free-full-text>

Wang, C.C., Chen, Y., et al. Association between teeth loss and nasogastric tube feeding dependency in older adults from Taiwan: A retrospective cohort study. BMC Geriatric 21, 640(2021). Referred 15.10.2022

<https://bmcgeriatr.biomedcentral.com/articles/10.1186/s12877-021-02596-x#citeas>

Wright, D., Griffith, R., Merriman, H., Smithard, D., Smyth, J & Welsh, N. 2019. Medication management of patients with nasogastric (NG), percutaneous gastrostomy ( PEG ), or other enteral feeding tubes. Referred 02.04.2023

[https://img.medscapestatic.com/vim/live/professional\\_assets/feedingtubeswpg\\_839713.pdf](https://img.medscapestatic.com/vim/live/professional_assets/feedingtubeswpg_839713.pdf)

Website of Finlex. Act on the status and rights of the patients. Referred 10.10.2022.

[en19920785.pdf \(finlex.fi\)](#)

Website of Satakunta University of Applied Science. Referred 10.10.2022

<https://www.samk.fi/>

Website of Western Australia government Health Service. Eternals Tube and Feeding: Adult Clinical Practice Standards. Referred 18.10.2022.

<https://www.wacountry.health.wa.gov.au/~media/WACHS/Documents/About-us/Policies/Enteral-Tubes-and-Feeding---Adults-Clinical-Practice-Standard.pdf?thn=0&fbclid=IwAR0kumsLIrFgK-ID7GHhugvJwSn89AmMhp58I3Cc6lj0MwSL5P07EPGIM8s>

Website of wisegeek, 2023. What are the digital books? referred 12.03.2023.

<https://www.wisegeek.net/what-are-digital-books.htm>

Wei, M., Ho, E., & Hegde, P. An Overview of Percutaneous Endoscopic Gastrostomy Tube Placement in Intensive Care Unit. 2021. Journal of Thoracic Diseases 13(8). Referred 19.10.2022

<https://jtd.amegroups.com/article/view/40228/html>

White, R., & Bradnam, V. (2015). The British Pharmaceutical Nutrition Group. Handbook of drug administration via enteral feeding tubes (3rd ed., p. 7–20).

<https://books.google.fi/books?id=yyikBwAAQBAJ&printsec=frontcover&d#v=onepage&q&f=false>

## APPENDIX 1

### Literature retrieval database

<b>Database</b>	<b>Search term</b>	<b>Results</b>	<b>Selected sources</b>
PubMed	Percutaneous endoscopic gastrostomy tube	272	9
SAMK finna	Percutaneous endoscopic gastrostomy tube	5	0
Google scholar	PEG tube nursing intervention	25	8
CINHAL	Percutaneous endoscopic gastrostomy	30	0

APPENDIX 2

ENTERAL FEEDING AND MEDICATION  
ADMINISTRATION  
VIA PERCUTANEOUS ENDOSCOPIC TUBE  
GASTROSTOMY TUBE

DIGITAL BOOK  
BY BHANDARI ANJANA



Source: PEG Insertion  
Adobe Stock

# TABLE OF CONTENTS

<b>INTRODUCTION</b>	<b>3</b>
<b>KEY CONCEPTS</b>	
PEG TUBE Insertion	5
Enteral Feeding through PEG Tube	7
Administration of nutrition through PEG tube in hospital setting	9
Medication administration through PEG Tube	11
Management of PEG tube	14
<b>REFERENCES</b>	<b>18</b>

# Introduction

## Definition

Percutaneous Endoscopic Gastrostomy (PEG) is a medical procedure that can be used to insert a feeding tube into the stomach over the abdominal wall to patients who are unable to take medication orally (White & Bradnam, 2015).

PEG tube is an enteral nutrition feeding for patients who have preserved absorption and motility function of the gastrointestinal tract but are unable to swallow solid or liquid food due to many disorders (Friginal-Ruiz & Lucendo 2015).

## Background

- Introduced by Gauderer in 1980 as internal nutrition therapy (Hitawala & Mousa 2022)
- Mostly performed endoscopically with a success rate of more than 95% (Hitawala & Mousa 2022).
- Safest with a 0.5% mortality rate (Friginal-Ruiz & Lucendo 2015)
- Can be installed in patients of all age groups (Wei, Ho & Hegde 2021) .

---

PEG tube is the most common existing external nutrition for patients who need nutritional supplementation that exceeds three-four weeks. (Wei, Ho & Hegde 2021)

## Percutaneous endoscopic gastrostomy (PEG)

Use a feeding tube and balloon latch locked as a device inserted into your stomach through the abdomen to supply nutrients on their own by syringe.

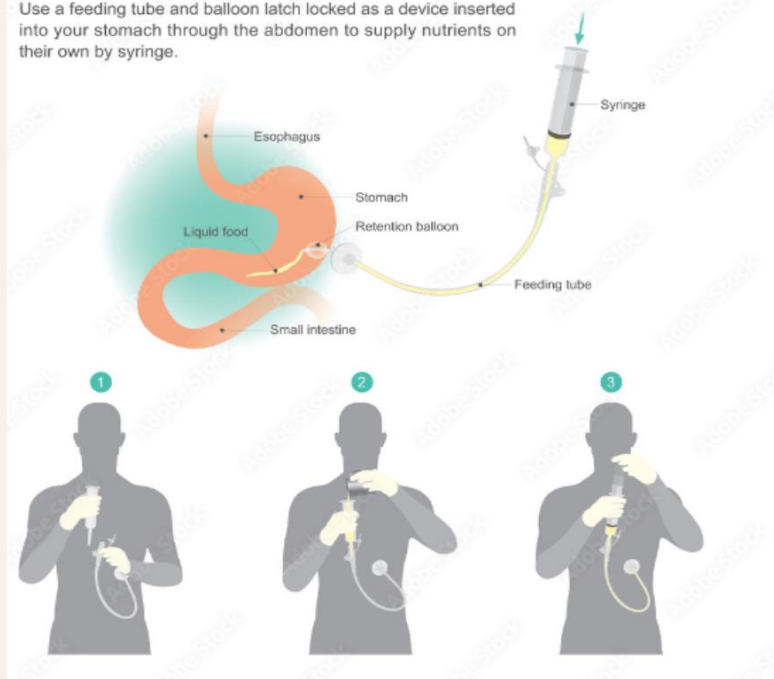


Image: PEG (Adobe stock)

- A Percutaneous endoscopic gastrostomy tube (PEG) is a stoma used for the implementation of nutrition when a person's ability to swallow is impaired. A PEG tube is a flexible tube insertion directly into the stoma through the abdominal wall (Hitawala & Mousa 2022.)
- PEG tube insertion depends upon patients' needs. (Wei, Ho & Hegde 2021.)

## KEY CONCEPTS



# PEG Tube Insertion

Basically, there are two methods of PEG tube insertion, pull-through methods, and push methods. In both methods, the mouth endoscopic insertion is done to visualize the patient's stomach to localize the best spot for the PEG tube (Friginal-Ruiz & Lucendo 2015).

### Process:

- ▶ After finalizing a suitable place with the help of endoscopic and palpation from outside the stomach, the medical term of two endoscopists and a nurse perform the procedure. (Friginal-Ruiz & Lucendo 2015.)
- ▶ The best-suited place for PEG insertion is in midline of abdomen as it prevents hematoma formation and infections in the recut compartments (Friginal-Ruiz & Lucendo 2015.)
- ▶ At the finalized spot, skin is numbed and punctured with a puncture cannula, through the stomach wall a guide wire is threaded into the stomach (Friginal-Ruiz & Lucendo 2015.)
- ▶ The first tube is changed after four to five weeks until the ostomy channel is formed. (Friginal-Ruiz & Lucendo 2015.)

### Factors to be considered before PEG Insertion

- Psychological Factors
- Ethics and Prognosis
- Clinical Status
- Information and Consent
- Quality of Life (Hueckel, & Gottrand 2015)

### Notes

Mostly PEG tube insertion procedures are performed under local anesthesia. (Friginal-Ruiz & Lucendo 2015).

# Indications & Contraindications for PEG Tube Insertion

## Short Term PEG Insertion

- Chemotherapy and radiotherapy for head and neck cancer
- Anorexia Nervosa
- Severe Burn
- Illness of Esophagus
- Multiple injuries and facial trauma
- Transplants with prior malnutrition (Friginal-Ruiz & Lucendo, 2015).

## Contraindications for Short Term PEG Insertion

- Non swelling esophageal obstruction,
- Active gastric pathology,
- Total gastrectomy
- Extreme obesity
- Previous midline laparotomy (Friginal-Ruiz & Lucendo, 2015).

## Long Term PEG Insertion

- Neurological diseases such as ALS, multiple sclerosis, and dementia
- Head and neck tumors
- Inflammatory bowel diseases
- Parkinson's diseases
- Oropharynx tumors
- Cystic fibrosis (Friginal-Ruiz & Lucendo, 2015).

## Contraindications for Short Term PEG Insertion

- Colonic interposition
- Partial or subtotal gastrectomy
- Massive ascites
- Sepsis
- Coagulation disorder (Friginal-Ruiz & Lucendo, 2015).

## Enteral feeding through PEG tube



Nutrison energy multi fibre  
Image: Anjana Bhandari 2023

- Enteral nutrition through a PEG tube is a supportive therapy for chronically ill patients who have functional gastrointestinal tract and cannot meet their nutritional needs orally (Vudayagiri, Hoilat & Gemma, 2022)
- Varieties of nutritional formulas are available which are designed to enrich nutritional needs (Krom, et al, 2019).

**NOTES:** Congenital abnormalities represent 42 % of the indications for tube Feeding, followed by perinatal problems at 38 %, and lastly neurologic diseases at 16% (Krom et al, 2019).

### Good To Remember

- Formula feeding is preferred over grinded food to avoid higher water and oil consumption to meet a balanced diet (Rahnemaiazar et al, 2014).
- The feeding formula should be store in a dry place at normal room temperature while administered and always starting with low volume to the patient's tolerance. If handled aseptically, the preparation can be kept open and connected to the feeding device at room temperature for a maximum of 24 hours, otherwise a maximum of 8 hours (Rahnemaiazar et al, 2014).

- The unused product or opened package should be closed and stored in a refrigerator at a room temperature for 24 hours (Rahnemaiazar et al., 2014).
- The nurses should maintain the position of the patients before tube feeding. The recommended tube feeding position is 30 to 40 degrees in the sitting position to reduce the reflux (Rahnemaiazar et al., 2014).
- Using a syringe to deliver large volumes of feed (bolus) at agreed time slots 6–8 times a day (Brady, McCann & McCane 2014).
- Inspect the patient's tube areas for any redness dislodgement (Website of Western Australia Government 2019).
- After finishing feeding, flush with lukewarm water i.e., 30 ml of water (Website of Western Australia Government 2019).
- Ensure upright position of patient where possible after feeding for at least 30 minutes to avoid aspiration (Website of Western Australia Government 2019).

# Administration of nutrition through PEG tubes in hospital setting



Image: Anjana Bhandari 2023

## METHODS OF DELIVERY

- continuously through a pump (pump providing a set rate of feed over a specified number of hours)
- Intermittent infusion (With or without pump) and
- Using a syringe to deliver large volumes of feed (bolus) at agreed time slots 6–8 times a day (Brady, McCann & McCane 2014, 55–56).

## NURSING CONSIDERATIONS (Website of Western Australia Government 2019).

- Explain the procedure to the patients.
- Washing hands before starting the procedure is important.
- Always remember formulas should be prepared as per the doctor's order.
- Enteral feed is stored and should be administered at room temperature to prevent any gastric discomfort associated with the administration of cold feed.
- Correct placement of the PEG TUBE should be ensured prior of medication.

## **POSITIONS**

- The position of the patients should be supine with the head of the bed raised to 30 to 40 degree to reduce aspiration (Website of Western Australia Government 2019).

## **PROCEDURES**

- Inspect the patient's tube areas for any redness dislodgement (Website of Western Australia Government 2019).
- A big catheter syringe's plunger should be removed, and the tip should go into the connecting tube (Website of Western Australia Government 2019).
- Flushing the tube with water (room temperature water) and monitoring the patient's tolerance level for tube feeding like abdominal pain, cramps, increased bowel sounds, diarrhea, vomiting, and so on (Website of Western Australia Government 2019).
- Fill the syringe with the formula. To make the formula go in more quickly, raise the syringe. To proceed more slowly, lower the syringe (Website of Western Australia Government 2019).
- After finishing feeding, flush with lukewarm water i.e., 30 ml of water (Website of Western Australia Government 2019).
- Ensure upright position of patient where possible after feeding for at least 30 minutes to avoid aspiration. (Website of Western Australia Government 2019).
- Proper documentation is needed after the procedure. (Website of Western Australia Government 2019).

# MEDICATION ADMINISTRATION THROUGH PEG TUBE

## Concepts

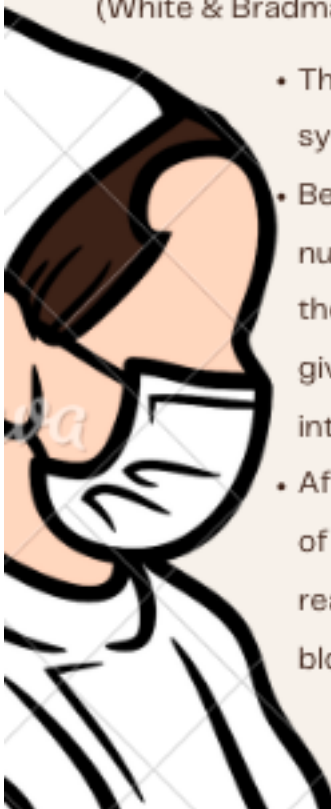
Administration of medication through a PEG tube is important for long-term illness patients and its primary goal is to optimize the drug's therapeutic actions without interfering with enteral nutrition. (White and Bradham, 2015).

## CONSIDERATION BEFORE ADMINISTRATION OF MEDICATION THROUGH PEG (FRIGAL-RUIZ & LUCENDO 2015).

- Chewable, cytotoxic preparations or sublingual tablets should not be crushed, nor should enteric-coated or sustained-release pills
- Tablets that form large masses, like Metamucil® are not allowed.
- Drugs that are hypertonic and concentrated can be applied after being diluted in water.
- Warfarin® is not recommended to provide phenytoin, morphine sulfate, and aluminum-containing antacids together.
- Liquid drugs are preferable compared to solid versions to prevent the occlusion of silicone PEG tubes
- Medicine like ciprofloxacin and clarithromycin caution should be exercised to avoid changing absorption characteristics.

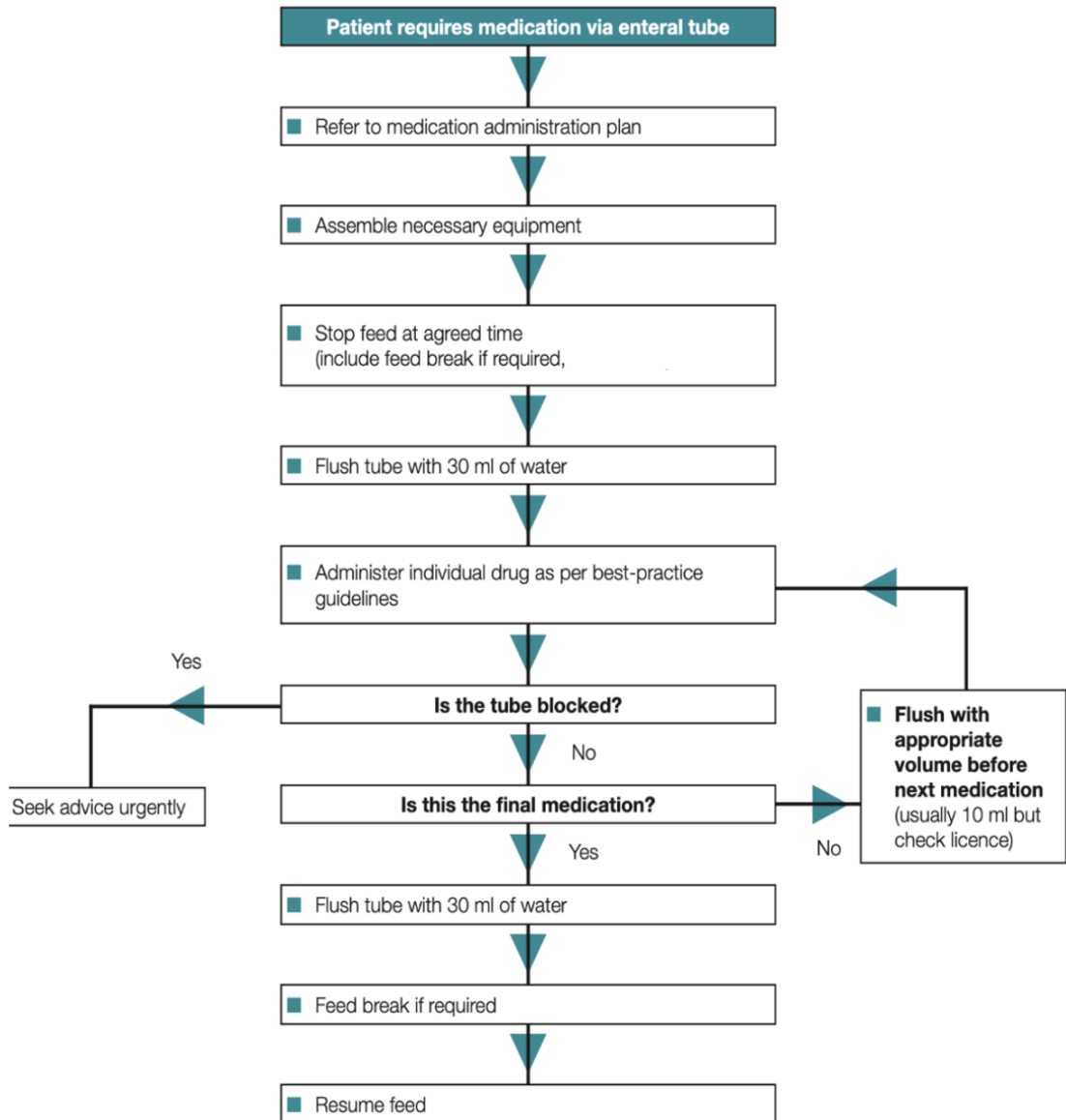
## Preparation of Medication

- Verify the patient's identity and current prescription prior to administering a medication (White & Bradman 2015, 7–20).
- The nurse administering the medication ensures that the medication is suitable to be crushed and slurried. Medicines are diluted for example with 15 ml of freshwater water. Every drugs is slurried separately (White & Bradman 2015, 7–20).
- The medicine and the tube must be handled with clean protective gloves (White & Bradman 2015, 7–20).
- The feeding tube is flushed with 40–50 ml of fresh water before administering the medicine. For rinsing, saline solution is not recommended as it can crystallise inside the tube and block it. (White & Bradman 2015, 7–20).



- The diluted drug is drawn into the drug administration syringe (White & Bradman 2015, 7–20).
- Before drawing the medicine into the syringe, the nurse checks that the connection is compatible with the feeding tube. And make sure that the medicine is given through the feeding tube not through the intravenous line (White & Bradman 2015, 7–20).
- After the last medicine, the hose is rinsed with 30 ml of freshwater. This ensures that the medicines reaches its destination and prevents the tube from blockage (White & Bradman 2015, 7–20).

## FLOWCHART OF ADMINISTRATION OF MEDICATION THROUGH PEG TUBE



Source: (Wright et al. 2019, 12).

# Management of PEG Tube



Image: Adobe stock

Nutrition support through PEG tube is considered as a minor surgical procedure and less complicated procedure to other enteral feeding. However, it is associated with various complications (Mahmodabadi 2020).

Nurses play meaningful role in prevention and identification of PEG tube complications by proper accessing the stoma site, stoma care, proper position and location of PEG tube, pain management, cleaning around the stoma skin, flushing the tube, using proper technique to feed, aseptic technique, rotating tube, documentation and notifying doctors if any problem notices. (Anne 2020).

Infection and complication can be observed through drainage, wound secretion, odour, pain tube blockage, necrotic discoloration, leakage, malposition (Cyrany, Rejchrt et al. 2016).

## STOMA CARE

- Stoma care is a fundamental part of nursing care in PEG tube patients (Friginal-Ruiz & Lucendo 2015.)
- During the two weeks post insertion, the peri-stoma skin should be cleaned daily using soft soap and water, inside out technique, letting it completely dry(Friginal-Ruiz & Lucendo 2015.)
- Observation of dressing site, any kind of abnormalities, colour, order, smell or small liquid secretion from wound site during first week is expected. (Friginal-Ruiz & Lucendo 2015.)

## ORAL CARE

- When the patient does not receive nutrition orally, the importance of oral care is emphasized (Wang et al. 2021.)
- Inability to chew, swallow food, or use of enteral feeding methods contributes to dental disease. So, Peg tube patients requires extra care when it comes to oral hygiene and teeth cleaning because they frequently accumulate a lot of calculus and have inadequate salivation, which can exrabate dental erosion like oral infections, tooth decay or oral cancer (Wang et al. 2021.)
- Therefore, regular inspection of mouth cavity and taking proper care of mouth plays a crucial role in preventing oral illnesses (Wang et al. 2021.)

## Patient guidance



Image: Adobe stock

Patient guidance is the core of nursing care. "The patient must be given information about their state of health, the significance of the treatment, alternative forms of treatment and their effects, as well as other matters relating to the treatment that are significant in terms of treatment decisions" (Act on the Status and Rights of Patients 785/1992).

In guiding the patients, it is important to consider not only the patients but also their family and loved ones. It is important for all of them to get information about the procedure, and its pros and cons, the use of a PEG tube, and its care. So, patients and family members need special education that help to familiarize themselves with devices and methods of feeding. (Heuschkel, Gottrand 2015).

## REFERENCES

Website of Adobe stock. Referred 15.02.2023 <https://stock.adobe.com/fi/>

Cyrany, J., Rejchrt, S. et al. 2016. Buried Bumper Syndrome: A Complication of Percutaneous Endoscopic Gastrostomy Tube. Referred 18.10.2022  
<https://pubmed.ncbi.nlm.nih.gov/26811611/>

Friginal-Ruiza, A.B., & Lucendo, A. J. 2015. Percutaneous Endoscopic Gastrostomy. Society of Gastroenterology Nursing and Associates. Referred 18.10.2022  
<https://uat-nursing.ceconnection.com/ovidfiles/00001610-201509000-00005.pdf>

Wei, M., Ho, E., & Hegde, P. An Overview of Percutaneous Endoscopic Gastrostomy Tube Placement in Intensive Care Unit. 2021. Journal of Thoracic Diseases 13(8). Referred 19.10.2022  
<https://jtd.amegroups.com/article/view/40228/html>

White, R., & Bradnam, V. (2015). The British Pharmaceutical Nutrition Group. Handbook of drug administration via enteral feeding tubes (3rd ed., p. 7-20).  
<https://books.google.fi/books?id=yyikBwAAQBAJ&printsec=frontcover&d#v=onepage&q&f=false>

Mahmodabadi, Z. A., Zakerimoghadam, A. et al. Nursing empowerment by simulation in percutaneous endoscopic gastrostomy short-time complication: Protocol study. J Educ Health Promote. 2020. Referred 15.10.2022  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7652070/>

Ministry of social affairs and health. Acts on the status and rights of the patients. Issued 1992. Referred 16.10.2022  
<https://www.finlex.fi/en/laki/kaannokset/1992/en19920785.pdf>

Vudayagiri, L., Hoilat, G. J. & Gemma, R. (2022). Percutaneous Endoscopic Gastrostomy Tube. Referred 18.10.2022.  
<https://europepmc.org/article/med/30570992#free-full-text>

Rahnemai-Azar, A. A., Rahnemai-azar, A. A., Naghshizadian, R., Kurtz, A., & Farkas D.T. World Journal of Gastroenterology. 2014. Percutaneous endoscopic gastrostomy: Indications, technique, complications. Referred 18.10.2022.  
[https://www.cghjournal.org/article/S1542-3565\(18\)30803-6/fulltext](https://www.cghjournal.org/article/S1542-3565(18)30803-6/fulltext)

Rai, Lalita. 2019. Nursing Concepts Theories and Principles. Fourth edition. Chhetrapati, Kathmandu: Akshav Publication. Referred 01.04.2023

Sealock, R.J. & Munot, K. 2018. Common Gastrostomy Feeding Tube Complications and Troubleshooting. Referred 13.03.2023. [https://www.cghjournal.org/article/S1542-3565\(18\)30803-6/fulltext](https://www.cghjournal.org/article/S1542-3565(18)30803-6/fulltext)

Wright, D., Griffith, R., Merriman, H., Smithard, D., Smyth, J & Welsh, N. 2019. Medication management of patients with nasogastric (NG), percutaneous gastrostomy (PEG), or other enteral feeding tubes. Referred 02.04.2023

## APPENDIX 3



### Tilaaajan palaute Satakunnan ammattikorkeakoulun hoitotyön koulutuksen opinnäytetyöstä:

Hyvä opinnäytetyön tilaaja/yhteistyökumppani

Opiskelijan opinnäytetyö on valmistunut ja pyydämme palautetta tilaamastanne opinnäytetyöstä. Palautteenne otetaan huomioon opinnäytetyön arviointilausunnossa ja arvioinnissa.

Opiskelijan nimi (opiskelija täyttää): Anjana Bhandari

Opinnäytetyön nimi (opiskelija täyttää):

### Enteral Feeding and Medication Administration via Percutaneous Endoscopic Gastrostomy Tube: Educational Digital Book for Nursing Students

Valitkaa seuraavista vaihtoehtoista sopiva laittamalla rasti ko. kohtaan.

	täysin samaa mieltä	jokseenkin samaa mieltä	jokseenkin eri mieltä	täysin eri mieltä
Opinnäytetyö vastasi tarpeitamme.	x			
Opinnäytetyötä/ opinnäytetyön tuloksia voidaan hyödyntää työelämässä.		x		
Opinnäytetyö osoittaa kykyä luoviin ratkaisuihin.		x		
Opinnäytetyö osoittaa kykyä työelämän näkökulmasta uskottaviin ratkaisuihin.		x		
Opiskelija kykeni itsenäiseen ja itseohjautuvaan työskentelyyn opinnäytetyöprosessissaan.		x		
Ohjasimme opiskelijaa omalta osaltamme opinnäytetyön etenemisessä.	x			

Vapaamuotoinen palaute:

Opas sisältää hyviä lähteitä, mutta ne ovat osin vanhoja. Oppaan layout vaihtuu usein ja antaa osin sekavan kuvan lukijalle. Oppaan kappaleet ovat selkeitä ja sopivan lyhyitä oppaaseen. Lukija saa tarvittavan tiedon PEG-letkuun liittyen.

Paikka ja aika

Pori 22.4. 2023