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Nutrition of Patients on a Surgical Ward

Observation Study

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The purpose of this final project was to describe the nutrition of surgical patients on a surgical ward. This was accomplished by observing the proportions of macronutrients consumed by patients at lunchtime.

The data collection method applied in this project was structured observation using digital photograph analysis. The observations took place over a 10 day period on a surgical ward. An observation tool was developed and pilot-tested prior to data collection. The observation sample comprised of 80 trays, consisting of 80 meals and 89 drinks that were served to the adult surgical patients during lunchtime. The meal trays were photographed prior to and following meal consumption and the proportion of nutritional categories consumed was analyzed. Only oral enteral nutrition was considered.

The results suggested, that less than 50% of patients ate the meals served to them in their entirety. Protein consumption was highest among the macronutrient (food) categories included in the main meal while the beverage category displayed the highest rate of consumption overall. The expenditure of fats (butter and margarine) showed the lowest consumption trends.

Nurses are in a key position to influence the nutritional status of patients. There are numerous variables that must be considered together to provide a holistic approach to care that will improve the nutritional standards of care in the surgical patient group. Uncovering possible reasons for the suboptimal consumption of meals warrants further attention and investigation.

Keywords	nursing, nutrition, nutritional intake, surgical patient, observation

Tekijä(t) Otsikko Sivumäärä Aika	Anna Jokivirta, Sandhja Kuivalainen Potilaiden ravinto kirurgisella vuodeosastolla 24 sivua + 1 liite Marraskuu 2014
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Tämän opinnäytetyön aiheena oli kuvailla kirurgisten potilaiden ravitsemusta kirurgisella vuodeosastolla. Opinnäytetyön tavoitteena on parantaa kirurgisten potilaiden ravitsemushoitoa. Opinnäytetyön tutkimuskysymys oli: Missä määrin kirurgiset potilaat nauttivat makroravinteita kirurgisella osastolla?

Opinnäytetyössä käytettiin tiedonkeruumenetelmänä systemoitua havainnointia valokuvien perusteella. Havainnointeja tehtiin kirurgisella vuodeosastolla 10 päivän ajan. Havainnointilomake kehitettiin ja pilotoitiin ennen tiedonkeruuta. Havainnoinnin kohteena olivat kirurgisten potilaiden lounastarjottimet, joita oli yhteensä 80 ja ne sisälsivät 80 ateriaa ja 89 ruokajuomaa. Tarjottimet kuvattiin ennen niiden viemistä potilaalle ja uudestaan niiden palautettua potilaalta. Kuvien perusteella analysoitiin makroravinteiden kulutuksen määrää. Vain enteraalinen ravinto otettiin huomioon.

Tulokset mukaan vähemmän kuin 50% potilaista söi ateriansa kokonaan. Proteiinin kulutuksen määrä oli korkein pääruoan makroravinteista, kun taas ruokajuomilla oli korkein kokonaiskulutus. Levitteiden (margariini ja voi) kulutus oli vähäisintä.

Sairaanhoitajat ovat avainasemassa vaikuttamassa potilaiden ravitsemustilaan. On olemassa lukuisia muuttujia, jotka on otettava huomioon potilaiden kokonaisvaltaisessa hoidossa, jotta pystytään parantamaan kirurgisten potilaiden ravitsemuksellisen hoidon vaatimustasoa.

Avainsanat	hoitotyö, ravinto, ravinnon saanti, kirurginen potilas, havainnointi

Contents

1 Introduction

Health and wellness are founded upon a good, stable nutritional status (Valtion Ravitsemusneuvottelukunta 2010:46). Following surgery, the body is particularly vulnerable and has unique nutritional demands, making individualized, optimal nutritional planning an especially important component of patient care (Weimann et al. 2006:228; Bloomfield & Pegram 2012:52). As the body attempts to recover from the injury and stress of surgery, appetite is often poor and nutritional intake decreases, placing the patient at risk of complications and adverse clinical outcomes, such as impaired wound healing and increased length of hospital stay (Fry et al. 2010:149; Weimann et al. 2006:228; Barker et al. 2011:520). It is every nurse's duty to ensure that patients receive access to safe, appropriate and adequate nutrition and fluids (New South Wales Agency for Clinical Innovation [ACI] 2011:4; Barker et al. 2011:515).

As nurses interact with patients on a continual basis, they are in a position to greatly impact the nutritional status of those in their care. Nursing interventions such as positioning patients, assisting with feeding at mealtimes and creating an atmosphere conducive to eating are among the actions that promote nutritional intake in clinical settings (Jefferies et al. 2011:323; Kondrup 2001:153; Bjerrum et al. 2011:85). Unfortunately, the nurse's role in nutritional care is often poorly defined and commonly neglected in lieu of other more concrete nursing duties, such as medication rounds and hygiene (Xia & McCutcheon 2006:1226; Beck et al. 2002:353-354; Bjerrum et al. 2011:87). Furthermore, nurses employed in hospital settings commonly possess a poor understanding about nutrition (National Institute for Health and Clinical Excellence [NICE] 2006:41; Fulham 2004:702). The identification of clear practices founded upon best-practice guidelines that specify the nurse's role in nutritional care will aid in improving the nutritional status of patients and improve clinical outcomes (Jefferies et al. 2011:318; Jordan et al. 2003:21; Tappenden et al. 2013:151).

While the scope of perioperative nutrition also encompasses enteral tube feeding: the delivery of nutrition directly into the intestine via a tube and parenteral nutrition: the delivery of nutrition intravenously, only oral enteral nutrition will be considered for the purposes of this work (NICE 2006:4). This final project is a part of a larger nutritional study conducted in partnership with Helsinki University Hospital, HUS and Metropolia Universitý of Applied Sciences. The focus of this work was to describe the nutrition of surgical patients on a surgical ward.

2 Background

2.1 Nutritional requirements of surgical patients

In order to provide quality nutritional care to patients undergoing surgical procedures, it is important to first comprehend the metabolic demands that accompany surgery. Surgical patients face numerous physiological and metabolic difficulties that may adversely impact their nutritional status. Even minor surgeries may provoke postoperative nausea, vomiting, pain and anorexia, while major surgeries can result in infection, impaired wound healing and muscle wasting. Delayed wound healing slows postsurgical return of patient mobility, which in turn hastens recovery. (Huckleberry 2004:671.)

Following the physiological injury sustained from surgery, the body releases stress hormones and inflammatory mediators into the circulation, prompting catabolism, or the breakdown of more complex molecules (such as fat and protein stores) into smaller substrates, as a source of available energy. The purpose of the catabolic state is to allow the body to access energy that can be directed to immune response and healing. For healing and recovery to ensue optimally, the body should be in a state of anabolism, where complex molecules, such as new tissue required for wound healing, are synthesized from simpler precursor forms by the consumption of energy. (Weimman et al. 2006:227-228; Fulham 2004:704.)

Whenever feasible, patients' nutritional demands should be received from food and drink ingested orally and oral nutritional supplements (ONS) should only be provided where clinically indicated (ACI 2011:5; Ord 2007:1350). Each patient's nutritional care plan should be individually tailored and deliver optimal nutrition to meet particular needs and preferences (Jefferies et al. 2011:322).

When calculating the caloric requirements of patients, factors such as height, weight, age and gender should be considered. Additionally, large bone fractures and major burns, for example can significantly raise caloric demands, whereas chronic conditions and resulting undernutrition may slow metabolism and thus reduce metabolic requirements. Major surgeries can induce states of hypermetabolism, thus escalating caloric requirements. These additional variables can be entered into predictive equations used to calculate the energy requirements of hospitalized patients. (Huckleberry 2004:676.)

The average adult hospitalized patient with a normal body mass index requires approximately 30 kcal/kg/day. Due to increased metabolic demands, surgical patients may require their daily caloric content to be increased by a further 10-30%. (Valtion Ravitsemusneuvottelukunta 2010:33; NICE 2006:15.) A study conducted by Fry et al. (2010:149) found that malnourished patients were 2-3 times more likely to be infected with *Clostridium difficile,* enterocolitis, wound infections or postoperative pneumonia and 5 times more inclined to develop a catheter related urinary tract infection. The term malnourished may be applied to surgical patients with a deficiency in nutrients including energy, protein, vitamins and minerals that have calculable negative effects on body constitution, function or clinical results (NICE 2006:4). Various nutrition-assessment tools and tests are currently in use to gauge patients nutritional status, but their applicability is beyond the scope of this project and will not be considered here.

To support recovery by minimizing catabolism and encouraging anabolism throughout the various phases of surgery, patients' fluid balance and pre- and postoperative nutrition must be carefully considered and planned (Weimman et al. 2006:228). There is a strong correlation between poor nutrition and impaired wound healing in surgical patients (Tappenden et al. 2013:149; Huckleberry 2004:671). Surgical patients are at particular risk of acquiring poor nutritional status as they are commonly tired, without energy and have little or no appetite. Additional factors contributing to poor nutritional status in hospitals include: postoperative nausea and vomiting, pain, lack of mobility and physical activity, unfamiliar foods or dietary restrictions, constipation, diarrhea and unpleasant mealtime atmosphere (Valtion Ravitsemusneuvottelukunta 2012:24-25). In hospitals across Europe, it is not uncommon for patients not to eat for several days at a time (Ng & Neill 2006:697; Beck et al. 2002:354). However, long periods of pre- and/or postoperative fasting have been shown to impede recovery times, even after uncomplicated surgery and is unnecessary for most patients (Jefferies et al. 2011:323; Ng & Neill 2006:704; Weimann et al. 2006:228).

Even when surgeons give instructions regarding the resumption of oral intake, decisions regarding patient feeding are ultimately nursing responsibilities. Resuming early feeding postoperatively has been found to be safe and well tolerated by the majority of patients. Traditionally, nurses have feared that initiating early feeding may lead to postsurgical complications, especially within the gastrointestinal patient group but this fear is unfounded and not supported by evidence. (Ng & Neill 2006:700.) To reduce the duration of fasting following surgery, it is suggested that oral feeding should be re-established as

promptly as possible, according to individual tolerance (Jefferies at al. 2011:323-324; Weimann et al. 2006:226).

2.2 The role of nutrients in recovery

Carbohydrates and fats should comprise the primary source of energy for surgical patients. In fact, carbohydrates should typically constitute roughly 70-80% of non-protein calories and lipids or fats 15-30%. Their consumption should be sufficient enough to restore the patient's weight and meet the demands for increased metabolic functions following the cellular injury sustained from surgery. (Huckleberry 2004:677.) For patients with poor appetites, food choices with sufficient energy densities should be available to ensure the recommended daily caloric intake (ACI 2011:8). If the intake of fats and carbohydrates is insufficient to meet the energy demands of the patient, the body begins to use protein as an energy source, initiating a catabolic state that may quickly lead to malnutrtition, complications and impaired healing (Dudek 2006, cited in Smeltzer et al. 2010:431).

There are several nutrients that are particularly important for wound healing and recovery following surgery. Protein is a macronutrient required for collagen deposition, which acts to strengthen the skin in and around the wound. On average, surgery increases protein requirements by 15-20%, to approximately 1.2-2 g/kg post-surgically. Protein is a building block used for cell and tissue regeneration and is necessary for the functioning of enzymes and hormones. Additionally, it is required to maintain fluid and acid-base balance, immunity and the transport of nutrients within the body. When caloric intake is inadequate to meet patients energy needs, protein may also be used as a source of energy by the body. Although increasing the intake of dietary protein cannot prevent catabolism entirely, it can significantly reduce it. (Valtion Ravitsemusneuvvotelukunta 2010:33-34; Huckleberry 2004:677; ACI 2011:8). Furthermore, insufficient protein consumption increases morbidity and mortality in the surgical patient group (MacKay & Miller 2003:368).

The amino acid arganine is a precursor required in collagen production. Patients deficient in arganine (and therefore collagen) have decreased wound strength, impaired wound healing and suffer more infections and postoperative complications. Additionally, many micronutrients, such as vitamins C, B complex, A and K, as well as magnesium, copper

and zinc each have notable roles in facilitating wound healing and immune response. (Dudek 2006, cited in Smeltzer et al. 2010:431; Ord 2007:1348-1350.)

Water is also considered to be an essential nutrient (Bloomfield & Pegram 2012:55). Perioperative water consumption must replace the fluids lost through possible bleeding or vomiting, fever, drainage or diuresis. Water is also essential in maintaining physiological homeostasis and the body's electrolyte balance, whose status may be compromised post-surgery. Although individual requirements vary, general guidelines suggest that surgical patients should consume between 2.0-2.5 L of water daily (Valtion Ravitsemusneuvottelukunta 2012:34; ACI 2011:9; Ord 2007:1351). Common complications that may ensue from dehydration include increased duration of hospital stay, low blood pressure, increased electrolyte disturbances, greater incidence of pressure ulcers, urinary tract infections and constipation (Bloomfield & Pegram 2012:55).

2.3 Nursing interventions at mealtimes

Nursing care is imperative to warranting that patients receive the assistance and attention necessary to maintain their nutritional status. In addition to facilitating health and recovery, eating provides comfort for patients during hospitalization (O'Regan 2008:35). There is a broad range of nursing roles and responsibilities relating to patients oral nutrition. Upon admission to a hospital ward, nurses should assess each patient's ability to eat and determine whether their ability is hindered by factors such as mental state (depression leads to reduced appetite), cognitive impairment, or equipment or conditions limiting mobility (IV lines, casts, rheumatoid arthritis). Such impediments must be documented and measures taken to overcome the barrier(s), including correct positioning of patients prior to meals, assisting with eating and opening packages or cutting food to a consistency that is manageable for the patient. (Jefferies et al. 2011:318,322; Kondrup 2001:160.) To prevent dehydration, nurses must arrange that fresh water is available and easily accessible to patients and fluids must be offered and their intake encouraged during mealtimes. To manage chewing, good oral hygiene and well-fitting dentures are important. It is the nurses' responsibility to assist patients who require help with their oral hygiene so that eating is safe and enjoyable. (Bloomfield & Pegram 2012: 55-56; Huckleberry 2004:674.)

Providing a high standard of nutritional care requires the provision of adequate staffing and resources as well as clear roles and responsibilities for hospital staff involved in patients' nutritional care. It also requires professionals to possess nutritional knowledge and the ability to apply that knowledge into practice. (Valtion Ravitsemusneuvottelukunta 2012:17.) It is a low-risk and low-cost method of improving the quality of care in acute settings (Tappenden et al. 2013:148). Nutrition should not be viewed in isolation but rather as a component in the overall holistic approach to patient care (Ord 2007:1352; Weimann et al. 2006:228).

The delivery and collection of meal trays should be undertaken or overseen by nursing staff. Although traditionally a nursing duty, this task has largely been delegated to catering or adjuvant staff. (Xia & McCutcheon 2006:1222; Fulham 2004:704.) In a study conducted by Xia and McCutcheon (2006:1225), 73% of all patient meal trays were collected by catering personnel. Meal delivery and collection provides nurses with the opportunity to interact and assess their patients. Unfortunately, such encounters do not occur when catering staff are delegated this function. Following patients' nutritional consumption and documenting it accurately is imperative in the care of surgical patients and often accomplishing this responsibility requires direct observation (Schenker 2003, cited in Xia & McCutcheon 2006:1222; Kondrup 2001:153). Regretfully, patient mealtimes are not commonly perceived by nurses as an aspect of clinical care that warrants adequate attention (Fulham 2004:708). Xia and McCutcheon (2006:1226) contend that the importance of nutrition on patient health is undermined by nurses and that a dramatic change in attitudes and perception is required to improve the quality of nutritional care.

Describing the meal, taking into consideration individual food preferences, ordering individual or specialized meals, providing encouragement and soliciting patient feedback are methods by which nurses can increase the nutritional intake of their patients (Bjerrum et al. 2011:87, Valtion Ravitsemusneuvottelukunta 2012:18). Frequent, small snacks served in-between meals can also bolster nutritional consumption and should be offered to patients with poor nutritional intake every 2-3 hours (Fulham 2004:706; Valtion Ravitsemusneuvottelukunta 2012:37). Mealtime assistance should be provided in a timely manner, as patients should not be left to await help while their meal becomes cold (Xia & McCutcheon 2006:1225-1227; O'Regan 2009:39). Patient feedback can be utilized to measure quality and satisfaction and thus improve mealtimes within a ward, particular patient group or for an individual patient (Valtion Ravitsemusneuvottelukunta 2012:21). Simply taking a moment of time to explain to the patient how eating well will contribute

to recovery may also motivate the patient with a poor appetite to eat (Ord 2007:1348; Hiesmayr et al. 2009:489). However, a study conducted by Bjerrum et al. (2011:87) found that heavy workload was cited as a reason for nurses to neglect going to patients, as they were busy with other tasks and lacked time for patient questions or discussions during mealtimes.

The results of many studies promote devoting a specific duration of time on patient mealtimes, commonly termed “focus on patient mealtime” or “protected mealtimes” (Jefferies et al. 2011:322; Young et al. 2012:544). The purpose is to prioritize mealtimes and avoid “unnecessary and avoidable interruptions, providing an environment conductive to eating” (Das et al. 2006, cited in Young et al. 2012:544). Nurses should take into account the patient and the room environment itself to create a pleasant atmosphere. Considerations may include ensuring that the patient is comfortable (positioning, washing hands), that the meal tray and utensils are within reach and food is accessible (opening packages, cutting up food), and that the environment is facilitative to eating (airing the room to dispel unpleasant smells, clearing and tidying the bed and immediate vicinity) (Jefferies et al. 2011:323; Kondrup 2001:153; Bjerrum et al. 2011:85). All nonessential clinical interventions, such as documentation or dressing changes should be ceased during mealtimes and nurses should delegate their attention to patients nutritional needs (Xia & McCutcheon 2006:1227). In a study by Xia and McCutcheon (2006:1224), 51% of patients experienced an interruption by other people during the course of their meal, with the most common interruption arising from nurses (92%). It is the nurse’s duty to establish a pleasant mealtime environment that promotes eating (Jefferies et al. 2011:323; O’Regan 2009:38).

Healthcare professionals working in acute and long-term settings generally have an inadequate knowledge regarding nutrition, partially due to minimal or no nutrition education during their undergraduate studies (NICE 2006:41). While there have been impressive advances in clinical care and practice, regrettably patients nutritional status is frequently neglected by nurses and other healthcare professionals, impeding not merely surgical recovery, but overall health as well (Barker et al. 2011:522; Tappenden et al. 2013:147).

2.4 Nutritional intake in hospitalised patients

A study by Xia and McCutcheon (2006:1225) found that 31% of hospitalized patients left more than two-thirds of their meal uneaten and 19% left one-third to two-thirds of their meals. Additionally, the majority of documentation by nurses regarding intake at mealtimes were about the fluids ingested rather than the quantity or portion of the meal that the patient had consumed. While the patients in this study expressed that the food was “not bad overall”, they cited lack of variety, difficulties in managing certain foods and large portion sizes being off putting due to reduced appetites as reasons for not finishing meals. Serving smaller portions of food more frequently may be more appropriate and aid in increasing nutritional intake.

Similarly, Hiesmayr et al. (2009:486) found that the percentage of hospitalised patients in Europe finishing their meals was less than 50%. The most common reason cited for unfinished meals was “not being hungry” followed by “normally eating less”, “don’t like the taste”, “don’t want to eat” and “having nausea”. Hiesmayr et al. (2009:487) further found that the incidence of dying within a 30 day timespan while in hospital rose steadily as nutritional intake decreased.

3 Purpose and Aim

The purpose of this final project was to describe the nutrition of surgical patients on a surgical ward.

The aim of this project is to improve the nutritional care of surgical patients.

Study question: What proportions of macronutrients served during lunchtime are consumed by patients on a surgical ward?

4 Methods

Structured observation in health care settings involves the monitoring of specific health care domains to collect data on errors, adverse events, near misses, team performance, and organizational culture (Carthey 2013:13). Structured observational research looks selectively at social phenomena and it follows the principles and assumptions of quantitative research: the focus of the observation is fragmented into pre-defined, more manageable pieces of data that can be grouped into variables (Bottorf 2004:752; Duxbury et al. 2010:2483).

Furthermore, structured observation is applicable for testing hypothesis and it is used when behaviors or phenomena of interest are known (Bottorf 2004:752). The development of assessment instruments have aided in making observational data collection standardized and systematic, hence increasing its reliability in quantitative research (Carthey 2013:15). Observation produces either written or recorded data (Metsämuuronen 2006:118).

An advantage of the observational method in nursing research includes the retrieval of immediate and actual information, as it happens in the clinical setting. A disadvantage is the significant amount of time required for observation and the ability of the observer(s) to correctly record and recall all necessary variables being measured (Kankkunen & Vehviläinen-Julkunen 2009:95). In this project, these disadvantages were markedly reduced due to the application of digital photography, which greatly decreased the time required for observation as well as allowed for the data to be stored, retrieved and analyzed at a later time. To further ensure the validity of the findings, hospital staff and patients were not informed about the specific content of the observation form, merely the general purpose of the study. Structured observation using digital photograph analysis was employed in this final project.

4.1 Design of tool

A data base search was conducted for primary research articles available from online databases CINAHL and MEDLINE, published in English, between 2000-2013. Search

terms used included combinations of: “nursing”, “nutrition”, “nutritional intake”, “malnutrition”, “meal”, “surg*” and “surgical patient”. Additionally, a manual search of the reference lists of relevant articles was conducted.

As no pre-existing tool measuring the relevant variables of nutritional consumption on a surgical ward was available, a suitable tool was first developed. The tool was developed for the purposes of this final project by both authors and their supervisor, using previous research and relevant nutritional guidelines and current hospital mealtime protocols (see Appendix 1). The observational instrument was then applied to observing mealtimes on a surgical ward, with a focus on answering the following: what proportions of macronutrients served during lunchtime are consumed by patients on a surgical ward?

The components of the meal that were observed for consumption were: the main meal, consisting of a protein portion (meat, chicken, fish or vegetarian option), starches (rice, potato, pasta or other grain) and vegetables. Also, a side salad portion, bread plus accompanying spread (butter or margarine) and drink(s) (milk, water and/or juice) were also measured for consumption.

4.2 Sample

The observations took place on a surgical ward, specialized in hernia, gallbladder and bowel surgeries. The observation sample was comprised of the meals that were served to the adult surgical patients at lunchtime, between the hours of 11.00-12.00. Only the trays of patients who were able to consume nutrition orally were considered.

Meal trays were numbered using a small piece of masking tape or paper attached to the top left corner of every tray. Digital cameras were used to take photographs of the meal trays using either a Canon PowerShot SX260 HS (observer 1: Canon Corporation, Japan) or Canon EOS 1100D (observer 2: Canon Corporation, Japan).

4.3 Data collection and pilot testing

Prior to the commencement of data collection, ethical approval for the project was granted by the hospital. Information regarding the project was distributed to the staff and administration of the ward, as well as to the catering staff distributing meals on the ward.

Observations were conducted by two, third-year nursing students, during the period from 22.03.-31.03.2014. Observations were conducted for a total of 10 days, between 11:00–12:00, for a total of 10 hours. The first visit was used to pilot-test the observation tool. The pilot testing aided in determining the relevance, practicality and applicability of the tool in the clinical setting.

As a result of the testing, modifications to the observation tool were made that increased its accuracy. Examples of such modification were the addition of a “not applicable” category and the deletion of the “dessert” category, as no dessert was served on the ward during lunch. The observations from the pilot testing were not included in the data set.

Each meal tray was numbered and photographed by one of the two researchers once before it was distributed to the patient and again after being collected by hospital staff, once the patient had eaten. The total number of meal trays observed was 80. There were 11 meal trays for patients receiving liquid diets that were excluded from the data set as the individual components of the meal as well as the estimation of the amount of macronutrients consumed was impossible to decipher. Foods or beverages that did not accompany the trays following the meal were marked as “not applicable” as it was uncertain what portion had been consumed by the patient.

4.4 Data analysis

Data recorded in the form of digital photographs was first analyzed individually by each observer, using the observation tool. This was accomplished by placing the uneaten photo of each meal tray side by side with the eaten image on a computer screen and estimating the portion of each meal category that was consumed according to the options: “none”, “less than half”, “half”, “more than half”, “all” or “not applicable”. Each observation day was recorded on a separate sheet and each recording on the data sheet was identified by the individual tray number. This process was repeated for each meal tray that was photographed. Neither observer had access to the record sheet of the

other observer during this phase. After both observers had accomplished their recordings individually, the results were cross-checked to ensure inter-rater reliability.

The results of quantitative research data are most commonly presented as percentages and frequencies (Kankkunen & Vehviläinen-Julkunen 2009:103). The data was first pooled and the quantities and percentages were calculated using Microsoft Excel. Calculations were performed individually by both observers and then cross-checked for accuracy.

5 Results

80 trays, consisting of 80 meals and 89 drinks were observed. Each meal portion contained a protein, starch and vegetable component, as well as a salad serving, bread and a bread spread (butter or margarine). One or two drinks were offered per tray. Patients had a choice of three different drink varieties: a dairy beverage, water or juice.

The analyzed data suggests that patients were most likely to consume either all of their meal or leave it entirely uneaten. Figure 1 represents the quantity of all the macronutrients consumed by the surgical patients.

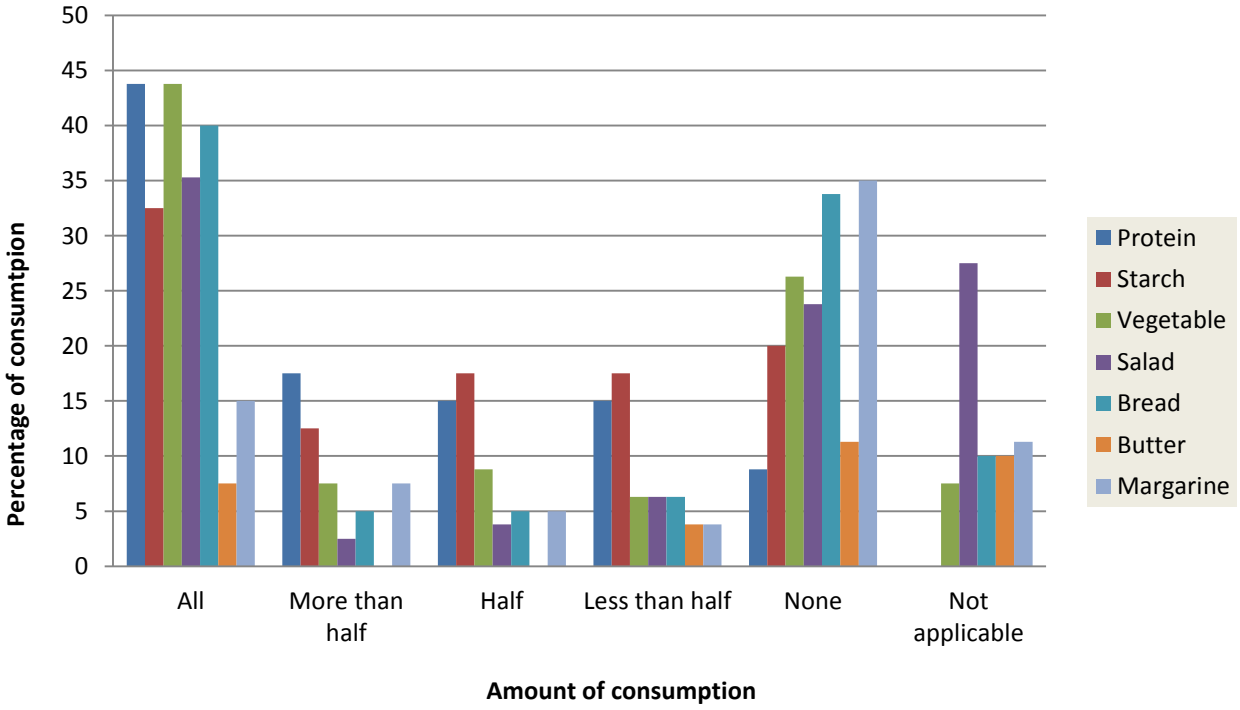

Figure 1. Consumption of all macronutrients served to surgical patients at lunchtime.

5.1 Main meal

For the meal trays observed, the main meal consistently included a protein, starch and vegetable serving, as well as a salad portion served on a separate bowl. Figure 2 displays the results of the consumption of the different food groups comprising the main meal.

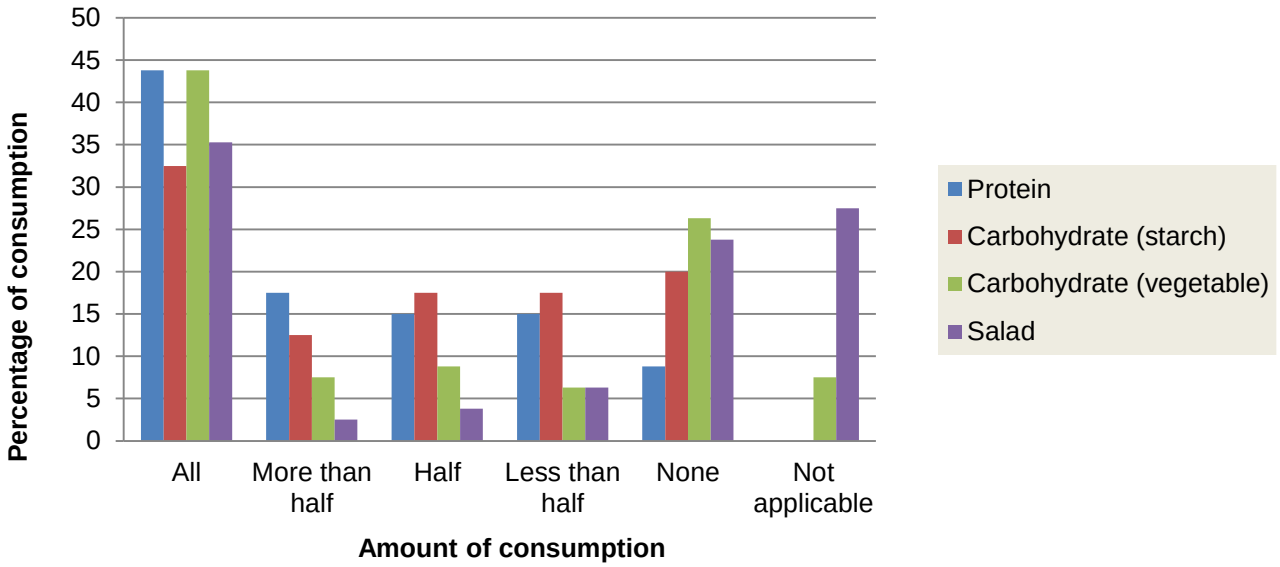

Figure 2. Consumption of proteins, carbohydrates (starches and vegetables) and salad, comprising the main meal served to surgical patients at lunch.

5.1.1 Protein

The consumption of protein was the highest of the observed macronutrient categories in the main meal. 44% of patients ate all of the protein served, 17% ate more than half and 15% ate half. In total, 91% of all patients ate protein to some degree and only 9% of patients did not consume any protein. All of the food portions included a protein serving.

5.1.2 Carbohydrates

Nearly a third of patients (32%) ate all of the starches, 13% ate more than half and 17% ate half. However, 20% left their starches untouched and almost as many (18%) ate less than half. All of the solid food portions included starches.

44% of patients ate all of their vegetables and a smaller portion of patients consumed them to some degree. Approximately a quarter of all patients (26%) did not eat any vegetables. Six vegetable servings (7%) never came back with the meal tray and were thus regarded as not applicable.

5.1.3 Salad

Salad consumption was similar to the consumption of vegetables. 36% of patients ate all of the salad offered while nearly a quarter (24%) did not eat any. 22 trays (28%) did not contain salad or the salad never came back with the tray and was thus regarded as not applicable.

5.2 Bread and spread (fats)

The consumption of bread and the accompanying spreads, butter and margarine were consumed less enthusiastically that the other components of the meal. The consumption of bread exceeded the consumption of margarine and butter. Figure 3 displays the amount of bread, butter and margarine consumed.

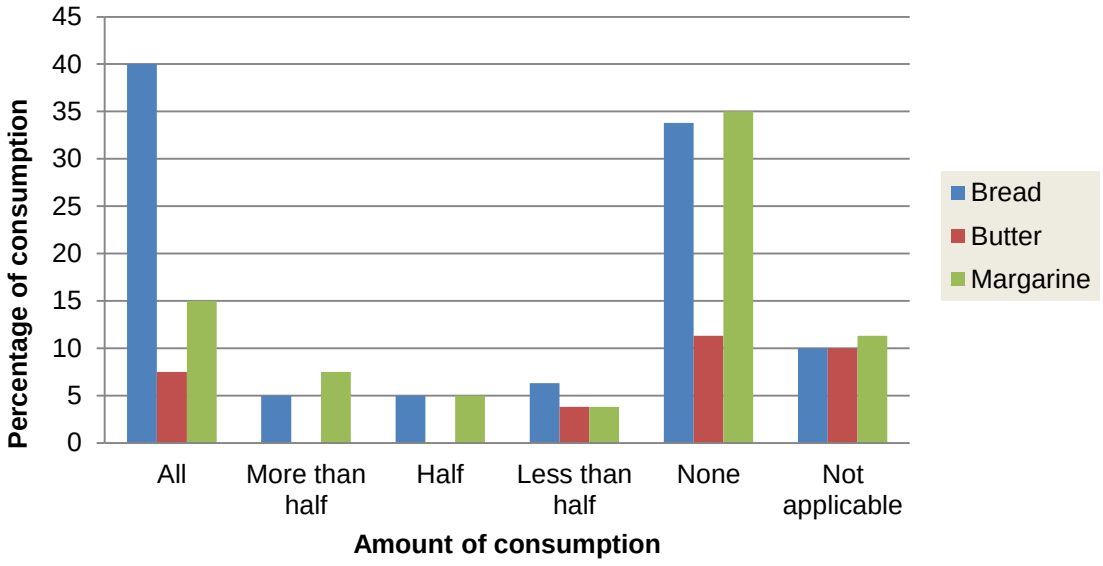

Figure 3. The consumption of bread, butter and margarine.

5.2.1 Bread

40% of patients ate their entire bread serving or a portion of it. Nonetheless, a significant proportion of patients conversely left their bread entirely uneaten (34%). 10% of the bread served never came back with the tray and was thus regarded as not applicable.

5.2.2 Butter and margarine

Butter and margarine displayed the lowest rates of consumption of all the observed categories. The majority of the spreads were left uneaten: approximately a third of the butter (32%) and nearly half of the margarine packages (45%) were left entirely unopened or uneaten. 10% of the butter served and 11% of the margarine was deemed not applicable.

5.3 Drinks

Patients had a choice of three drink varieties: a dairy beverage (milk or sour milk), water and juice. One to two glasses were served per tray. It was more common for patients to drink all of their drink(s) than to not drink anything.

The most common drink served was milk. The consumption of milk was also the highest; 41% of patients drank all of the milk served to them. The percentage of the non-applicable drinks for dairy beverages was a mere 2% and only 3% of the dairy beverages remained untouched by patients.

Water was the second most consumed beverage and juice the least consumed. 24% of all the patients drank all of their water while 6% drank none. 8% of the drinks were classified as non-applicable. Juice was completely drunk by 9% of the patients and 2% drank none of the juice served. Figure 4 represents the consumption of drinks by surgical patients.

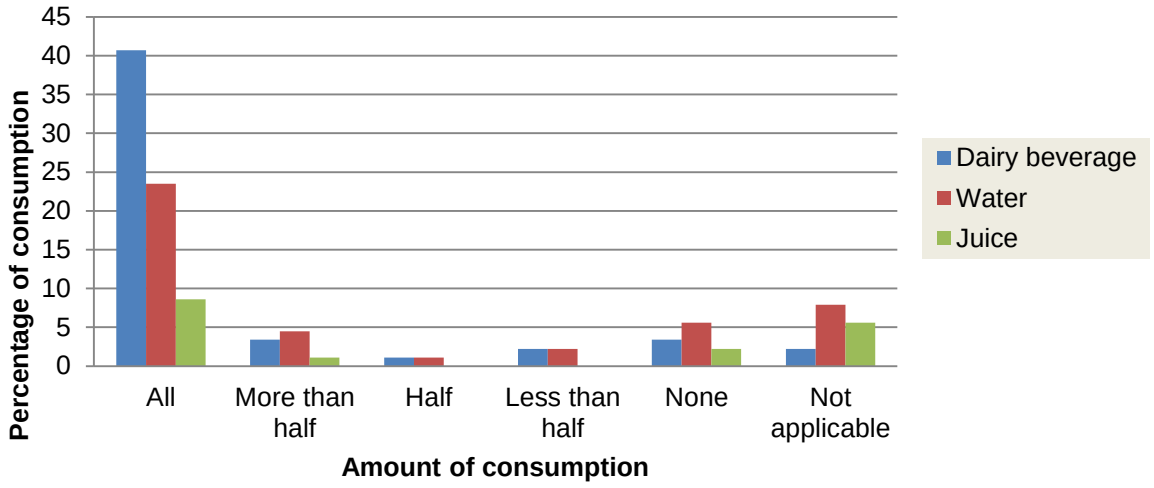

Figure 4. Beverage consumption of surgical patients during lunchtime.

5.4 Typical meal tray

Figures 5 and 6 display a typical meal tray served to surgical patients on the ward, containing the typical nutritional categories. The tray in the figures was photographed on March 28, 2014 during lunchtime. Figure 5 shows the meal prior to delivery to the patient, while Figure 6 shows the same tray following consumption. The corresponding observations for the meal tray are marked in Table 1, on the observation sheet used in the project.

Figure 5. A picture of a tray (number 3) before delivery to the patient.

Figure 6. A picture of tray 3 after consumption.

Table 1. Sample observation sheet containing observations of meal tray 3, following consumption.

		Amount consumed					
Macronutrients		None	<1/2	1/2	> 1/2	All	Not applicable
Main meal	Protein					x	
	Carbohydrates (starch)				x		
	Carbohydrates (vegetables)				x		
	Salad	x					
Bread						x	
Spread (fats)	Butter						
	Margarine	x					
Drink	Dairy beverage						
	Water				x		
	Juice						

6 Discussion

6.1 Ethical Considerations

There are certain ethical dilemmas that observation can present for researchers. However, structured observation is a relatively ethically sound method of research, at least in nutritional studies, as high-quality randomized controlled trials that withhold nutritional care to a selected group of participants raise serious ethical concerns (Barker et al. 2011:521; Jefferies et al. 2011:325).

Before proceeding with data collection, approval from the hospital and ethics committee was acquired. Ward staff was informed about the study's purpose and aim. The main procedures of the project were communicated to the ward staff so that they were able to anticipate what to expect during the duration of the research. The staff had the right to ask questions and obtain a copy of the results. (Creswell 2003:64-65).

6.2 Validity

Observation is deemed to be a credible method to collect data regarding nursing care and it does not appear to modify the subjects' behaviour (De Marinis et al. 2010:1546). However, there are a few factors that may affect the validity of observation studies. In the case of structured observational studies, validity refers to any significant and purposeful interpretations that can be made from scores attained from the observation instrument (Creswell 2003: 157).

6.2.1 Validity of the observation tool

The observation tool was developed by the observers for the purposes of this final project. To ensure the validity of the tool, it was pilot-tested prior to data collection and amended according to the feedback obtained. Pilot-testing is important in establishing the content validity (that the correct phenomena are being measured) and in improving the format and content of the instrument. In simpler terms, pilot-testing is meant to determine whether the tool measures what it was intended to measure. (Creswell 2003: 158.)

6.2.2 Validity of the data collection and analysis

While open observation is considered to be more ethical than concealed observation, it may be subject to the Hawthorne effect, where study subjects wittingly or unwittingly modify their behavior due to the presence of the researcher (Pontin 2000, cited in Duxbury et al. 2010:2488). According to Vilkka (2006:56-57) it is important for researchers to be aware that their presence disrupts the normal behaviors of the study participant(s). It is therefore crucial for the observer to remain as unobtrusive as possible (Angrosino 2004). During the observations, contact with the patients was avoided and details of the study were not revealed to avoid influencing the patients behaviour.

Discrepancies related to inter-rater reliability, or the extent to which observers give consistent estimates of the same phenomenon, had to be minimized to assure the validity of the study. Both observers were clear regarding observation criteria and how variables were defined and recorded. (Carthey 2013:15.) If there were discrepancies between the recordings, both observers reviewed the recording in question a second time, first individually and then together until an agreement about the scoring could be reached. Such discrepancies occurred in 7 instances. In each instance, a consensus was attained.

6.2.3 Validity of photography as a method of visual estimation

The use of photography in analysing nutritional intake is an objective, cost-effective research method. This method has several advantages to the in vivo approach of analyzing nutritional intake in hospitals, including convenience, time and cost. High levels of inter-rater reliability can be attained from this method of visual estimation. (Swanson 2008:432-435.)

A study by Mitchell et al. (2009:51-52) found a high degree of both intra- and inter-rater reliability with the use of photographs to analyze the content of school lunches. Their results indicated that individual auditors made consistent judgements when auditing lunchbox contents in the school setting and when analyzing photographs of school lunches. Similarly, auditors made consistent judgements when classifying the same school lunch photograph. A study by Simmons and Reuben (2000:209) also discovered that the methods of photography and direct observation yielded comparable results of nutritional assessment by the observers.

The application of photography in nutritional assessment studies minimizes disruption to patients and healthcare staff and has the advantage that the photos may be stored and reviewed. With photography, there is a possibility for future large-scale studies, where the reliability of several auditors can be assessed using the same photographs. (Mitchell et al. 2009:52; Swanson 2008:432.) A study by Riley and Manias (2004:402) similarly discovered permanence of the data and not relying on recall as advantages of photography.

6.3 Main findings

The results of the project indicate that the majority of surgical patients did not consume the full meals served to them during lunchtime. However, they were more likely to eat all of their meal than to leave it entirely uneaten. Protein was the most commonly consumed macronutrient category, followed by carbohydrates (starches and vegetables). Most patients ate their bread serving either entirely or not at all, but the trend in butter and margarine consumption was surprisingly low and did not correspond directly with bread consumption as could be expected. More than three-quarters of patients finished all of the drink(s) served to them, making beverages the most consumed category in the observation study.

The findings in this project are similar to the results of other studies measuring nutritional consumption. Studies conducted by Hiesmayr et al. (2009:486) and Xia and McCutcheon (2006:1225) also found that less than 50% of hospitalized patients finished their meals. While Hiesmayr et al. (2009:485) followed a questionnaire design using patients' self-reported accounts of their nutritional intake, the study conducted by Xia and McCutcheon (2006:1222) also applied a design of structured observation to measure food consumption. Both studies measured the quantity of meals consumed but neither work considered differences in the consumption of individual nutritional categories. Additionally, the application of digital photograph analysis in this project makes it unique amongst nutritional observation studies of surgical patients.

Each of the observed meals served to patients on the surgical ward contained all the macronutrient categories (protein, carbohydrates, fat) intended to uphold patients' nutritional status and support recovery. Of the food categories observed, protein was the most enthusiastically consumed, likely contributing to the prevention of postoperative

states of catabolism and muscle-wasting amongst patients. (Valtion Ravitsemusneuvotelukunta 2010:32-34; ACI 2011:8-10.) One can speculate whether the current popularity of protein-rich diets and consumer products and the emphasis on the health promoting effects of protein in the media may have influenced the patients to favour protein consumption over other macronutrient varieties? However, no cause and effect relationships between consumption and preferences was investigated.

Interestingly, the consumption of bread did not correlate with the accompanying use of spread. The bread that was consumed was often eaten plain, without butter or margarine. One possible explanation for this may be attributed the lack of assistance patients received from nurses. As the butter and margarine was served in individual packets, it is possible that elderly patients or those with conditions affecting their manual dexterity may not have been able to access the packages, thus explaining the discrepancy in bread to spread consumption. In previous studies, the lack of assistance patients received at mealtimes, including with the opening of packages, was found to negatively impact nutritional consumption (Jefferies et al. 2011:323; Kondrup 2001:153; Bjerrum et al. 2011:85; Xia & McCutcheon 2006:1223).

There are many additional factors that may have contributed directly to the observed rates of nutritional consumption. Xia and McCutcheon (2006:1225) and Hiesmayr et al. (2009:486) both concluded that the most common reasons cited by patients for failing to finish their meals were poor appetite and portion sizes that were too large. Patients on the ward were served three main meals daily, and perhaps offering smaller portions more frequently, or when the patient feels hungry could prove helpful in bolstering overall nutritional consumption. The impact of additional variables, including the provision of mealtime assistance by nurses, the practice of protected mealtimes and soliciting patient feedback were not assessed in this project.

6.4 Limitations

The results of this project were restricted to a limited number of observations. Only 80 meal trays were observed in total. Time constraints narrowed the observation period to 10 days. All observations were confined to a single hospital and only considered gastrointestinal surgical patients. Future studies considering a broader scope and sample size should be conducted to ascertain credible results that can be generalized. Despite the project's limited capacity, it is worthy to note that the study by Hiesmayr et al. (2009:486)

that considered 16 455 patients from hundreds of different hospital wards found similar trends in meal consumption.

The purpose of this project was to describe the portion of macronutrients consumed by surgical patients but the reasons explaining the observed trends in the data were not investigated. To attain a causal relationship that clarifies the data, a more detailed study design involving observation of nursing behaviours and/or patient questionnaires should be applied.

6.5 Conclusions and implications for clinical practice

There is a wealth of available nutritional information and recommendations to guide hospitals and healthcare professionals regarding the nutritional care of surgical patients. However, even the most considered and tailored meal plans are only beneficial in improving nutritional status if patients actually consume the meals intended for them. The findings of this project suggest that the majority of patients for one reason or another did not or were unable to consume their meals in their entirety. Previous research strongly relates this result with postoperative complications, delayed healing and even increased morbidity and mortality (Hiesmayr et al. 2009:487; Tappenden et al. 2013:149; Weimann et al. 2006:228). Uncovering possible reasons for the suboptimal consumption of meals warrants further attention and investigation. There are a multitude of variables influencing nutritional intake that must be considered together to provide a holistic approach to nutritional care that will ultimately improve the health outcomes of surgical patients.

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Observation tool

Date and time:
Number of trays:

Macronutrients		Amount consumed					
		None	< 1/2	1/2	> 1/2	All	Not applicable
Main meal	Protein						
	Carbohydrates (starch)						
	Carbohydrates (vegetables)						
	Salad						
Bread							
Spread (fats)	Butter						
	Margarine						
Drink	Dairy beverage						
	Water						
	Juice						