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Effectiveness of Nutrition Diagnosis and Intervention

An Honors Program Project Presented to
the Faculty of the Undergraduate
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by Olivia Rose Massa

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Abstract

This study is designed to investigate whether the current system of administering fluid to enteral nutrition patients in a mid-sized community hospital is effective based on the enteral feeding order, outcomes recorded by the dietitian in the medical record, or comparison to widely-accepted standards for estimating fluid needs. Data of this retrospective chart review came from 566 medical records that were pulled based on admission date within a one year time span and an order for enteral nutrition (EN) during the patient's stay. Out of these, 107 records were used due to incomplete chart documentation and inaccessibility of medical records. Results were analyzed using SPSS to compare the amount of EN ordered and the amount given; the amount of EN given and the total fluid intake of the patient; and a comparison of serum electrolyte values as compared to normal standards for the respective hydration levels. The findings show that EN orders are not consistently being followed, and patients tend to be overfed, though their laboratory values do not confirm that they are being overhydrated.

Introduction

Dietetics is defined as the “integration, application and communication of principles derived from food, nutrition, social, business, and basic sciences to achieve and maintain optimal nutrition status of individuals through the development, provision and management of effective food and nutrition services in a variety of settings,” according to the Academy of Nutrition and Dietetics. (“Definition of Terms List”, 2014) With current trends in health throughout the world, there is definitely a call for a focus in nutrition and dietetics. Dietitians are those dedicated to this profession and helping people to improve their lives and treat diseases by making changes in nutrition.

The Academy for Nutrition and Dietetics has established the Scope of Practice Framework that “defines the roles, functions, responsibilities, and activities that dietary practitioners are educated and authorized/proficient to perform within the boundaries of federal, state, and facility regulations.” (Nelms, Sucher, Lacey, & Roth, 2007, p. 3) This framework is divided into three portions, the foundation of knowledge, evaluation of resources, and evaluating materials. All dietitians are expected to follow the pathway of this framework in preparing and practicing as a dietitian in order to deliver proper nutrition therapy.

Since dietitians are expected to treat patient’s nutrition problems, there was a position paper published from the Academy of Nutrition and Dietetics on “The Role of Nutrition in Health Promotion and Chronic Disease Prevention.” This study looked at the ways that dietitians were making decisions and if the actual practices were compliant with the guideline recommendations. It was found that the guidelines were not being followed as closely as they should be. The study then looked at ways that the guidelines could be followed to “optimize nutritional outcomes.” (Cahill & Heyland, 2010) After determining ways that could help make

the nutrition process more effective, these practices were put into place but did not result in the ideal outcomes. It was found that more guidelines for implementation strategies may be the best way to go about the situation in making the guideline-practice gap smaller.

The practice of following the guidelines sometimes gets muddled, especially regarding fluid, when treating critical care patients. When patients are having trouble eating and ingesting fluid, they must be fed by alternative ways. Fluid plays an integral part of this process. Dietitians must pay close attention to the administration of fluids during tube feedings. It is important to maintain a balance for the body to regulate; however, dehydration and over hydration need to be taken into consideration.

There was a study done entitled “Improving the provision of enteral nutrition in the intensive care unit: a description of a multifaceted intervention tailored to overcome local barriers” which was conducted among five hospitals and worked to create a way to identify barriers and therefore improve practice as it would aim to better implement the guidelines. The process followed was recognizing the barriers, prioritizing the barriers, working to alleviate the barriers, conducting a twelve month intervention plan and evaluating the outcomes. In conclusion, the study found that as the hospitals began to follow this implementation plan, they could work to improve the overall nutrition practice to improve the treatment of the patients. (Cahill, Murch, Cook, Heyland, 2014, p. 110-7)

Part of managing enteral feeding is a focus on fluid. Though the dietitian’s main role is to recognize and calculate the amount of kilocalories the patient needs when calculating the tube feeding order, water must be included in these calculations. Water plays a major role in the

human body taking up 45-60% of body weight (Best & Lecko, 2013, p. 16). This makes fluids an integral part of the tube feeding and should be accounted for in the tube feeding order.

There are no recommended guidelines for the amount of water that a healthy person should consume per day. The US Dietary Recommendations suggest that the adequate intake (AI) for water is 2.7 L per day for females and 3.7 L per day for males. These recommendations are based on median water intakes and there is lack of data to determine a Recommended Dietary Allowance (RDA). (“Dietary Reference Intakes: Water, Sodium, Potassium, Chloride and Sulfate”, 2004) According to existing standards presented by the Omnibus Reconciliation Act Minimum Data Set for nursing home residents, which can account for patients in a hospital as well, the minimum amount of fluid to be given to a patient is 1500 mL. As to not overload the patient with fluid and to account for differences between genders, a normal range of fluid intake can be classified as being between 1500-3000 mL. Above average can be classified as greater than 3000 mL. (Chidester & Spangler, 1997)

For the body to respond appropriately to the fluids, there needs to be a balance; however, guidelines for the appropriate amount of fluids that the enteral nutrition patient needs are not universally agreed upon. A study presents a survey that was conducted in Britain regarding how practitioners were calculating and utilizing fluids for enteral nutrition patients. It was found that less than one-third had set guidelines for fluid intake during tube feedings. If there were guidelines established, they were not daily fluid recommendations. The most common recommendation for estimating fluid requirements was 30-35 ml fluid/kg body weight per day; however, the survey concluded that the correct amounts of fluid must not have been given to patients which could have been because the estimation formulas used to calculate the fluid needs were not yielding the amounts required by the patients and as a result, led to the common

symptoms present of dehydration in a clinical setting. This study shows that further investigation must be provide in this area to determine if guidelines are being followed and if they are being appropriately administered in order to have the greatest benefit for the patient.

This study is designed to investigate whether the current system of administering fluid to enteral nutrition patients in a small community hospital is effective based on the tube feeding order, outcomes recorded by the dietitian in the medical record, or other improvements in the patients' nutritional statuses.

Hypothesis: It is hypothesized that the fluid intake for tube fed patients is appropriate for their needs.

Methods

The clinical nutrition manager at a local hospital served as a liaison between the researchers and the hospital. This individual facilitated access to medical records for the purpose of a retrospective chart review. The data that was extracted from the medical records is as follows: amount of tube feeding (ml or cc), total fluid intake, total fluid output, IV fluids, lab values (specifically electrolytes including sodium, potassium, chloride and BUN), and the tube feeding order to find the goal amount to be provided to the patient. No identifying information or specific medical information was recorded, only nutrition information. The data was analyzed as descriptive statistics or as percentages. The study was approved by the Institutional Review Board for Research Involving Human Subjects at James Madison University as well as the IRB at the hospital.

Electronic medical records for one year were collected for patients who were admitted at RMH and during their admission were ordered enteral nutrition (EN). There was no recording of their reasoning for being admitted. The data was collected per admission if the patient was admitted multiple times and if enteral nutrition was ordered for each admission. A total of 566 records were identified by the code for enteral nutrition that fulfilled the time frame. Attempts to access all records were made; however, the system did not allow the researcher to access the data needed for the study for some cases. There were also multiple records per admission per patient because of multiple orders for enteral nutrition. These orders were listed separately among the total amount of records collected. Data was collected from 107 records. Due to incomplete chart documentation, only 100 records were used to analyze the data. For this study, the initial rate ordered and once the patient reached that goal rate was recorded per admission. The laboratory values were also collected for the day that the patient's first goal amount was reached.

Results

The amount of total fluid intake was recorded and the data is presented in Table 1 as different levels of intake. According to these standards, 44% of the patients were receiving potentially excessive fluid.

Table 1: Number of patients that fall within the specific intake level ranges, measured in milliliters, as recorded on their medical health records.

Amount of Intake (mL)	Number of Patients within Range of Intake
<1500	18
1500-2000	15
2000-3000	23
>3000	44

Certain laboratory values were collected because of their importance in determining hydration status in a patient. The ranges were determined using the guidelines that the hospital follows. These included sodium (Table 2), potassium (Table 3), chloride (Table 4) and BUN (Table 5). Sixteen percent of patients receiving over 3000 ml fluid per day had levels of serum sodium above the normal range, 41% had high serum chloride, and 43% had elevated serum BUN. Conversely, 25% of those receiving less than 1500 ml fluid per day had serum sodium levels below the normal range, while 19% had low serum potassium, and 19% had low serum Cl.

For serum potassium, though the patient was receiving what was deemed the normal amount of mL of intake (1500-2000mL), 50% were below the recommended potassium levels. For serum chloride, 8 out of the 15 patients with normal fluid intake levels had high chloride levels.

Table 2: Number of patients within each intake level that fall below the normal range of serum sodium levels (<137 mEq/L), above the normal range (>145 mEq/L) and within the normal range for serum sodium (137-145 mEq/L).

Intake Level (mL)	<137	137-145	>145
<1500	4	11	1
1500-2000	1	8	5
2000-3000	2	17	4
>3000	8	29	7

Table 3: Number of patients within each intake that fall below the normal range of serum potassium levels (<3.5 mEq/L), above the normal range (>5.1 mEq/L) and within the normal range for serum potassium (3.5-5.1 mEq/L)

Intake Level (mL)	<3.5	3.5-5.1	>5.1
<1500	3	13	0
1500-2000	5	10	0
2000-3000	5	18	0
>3000	9	35	0

Table 4: Number of patients within each intake level that fall below the normal range of serum chloride levels (<98 mEq/L), above the normal range (>107 mEq/L) and within the normal range for serum chloride (98-107 mEq/L).

Intake Level (mL)	<98	98-107	>107
<1500	3	10	3
1500-2000	1	6	8
2000-3000	1	13	9
>3000	2	24	18

Table 5: Number of patients within each intake level that fall below the normal range of BUN levels (<7 mg/dL), above the normal range (>18 mg/dL) and within the normal range for BUN (7-18 mg/dL).

Intake Level (mL)	<7	7-18	>18
<1500	1	3	11
1500-2000	2	3	9
2000-3000	2	8	13
>3000	2	23	19

The amount of EN that was ordered compared to the amount that was documented to be provided to the patient was collected and plotted in a scatter plot (Figure 1). The R^2 value is 0.078. This means that only 7.8% of the variation in EN delivered is accounted for by the amount ordered. At least 20% of the charts reviewed had record of more tube feeding being administered than was ordered.

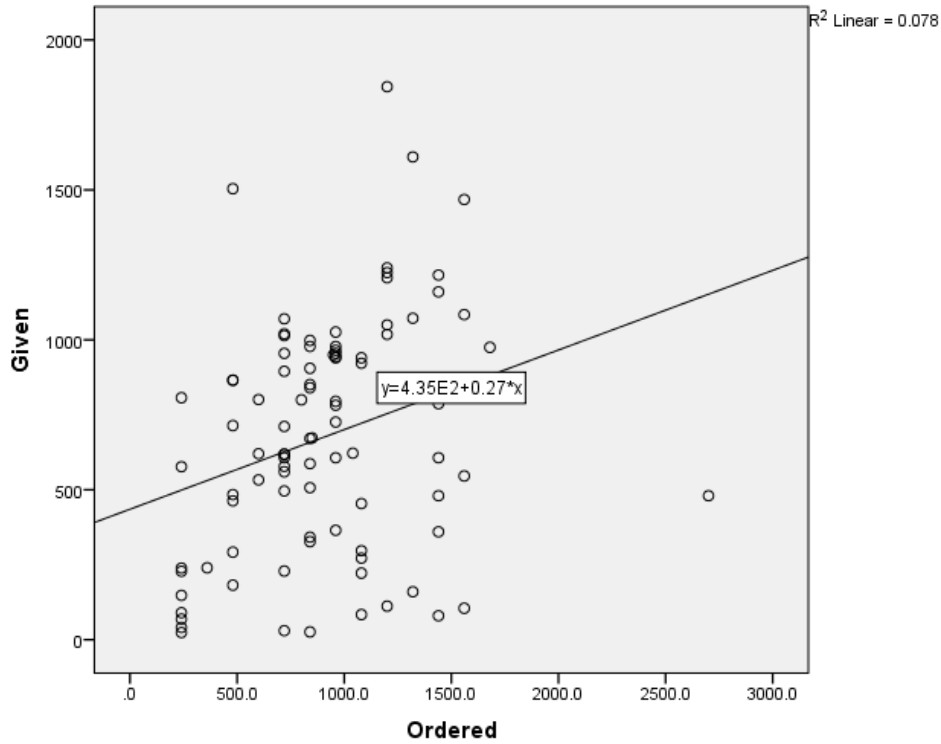


Figure 1: Correlation of the amount of EN ordered (mL) and the amount of EN that the patient received (mL).

According to Figure 2, there was a small, but significant correlation between the amount of tube feeding given and total fluid intake ($R^2 = 0.089$, $p = 0.003$). Less than 10% of the variation in total fluid intake can be accounted for by EN administered.

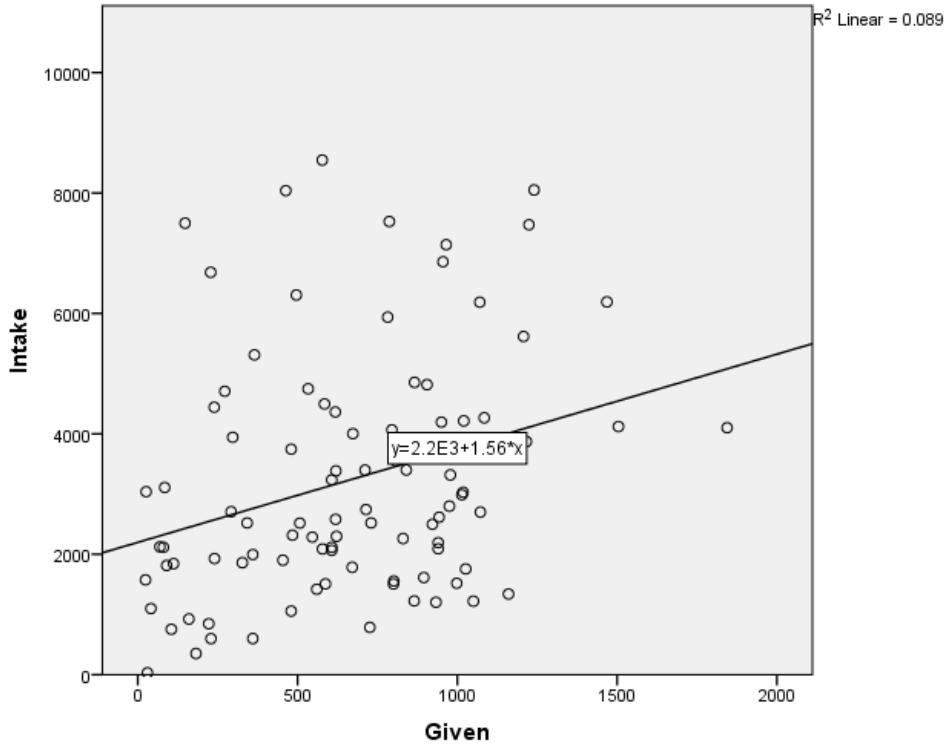


Figure 2. Correlation between the amount of EN given and total fluid intake.

Discussion

As previous studies have shown, there are discrepancies in the amount of fluid a patient should receive while getting EN. This study presents the EN orders within a year's time span and the amount of EN the patient was receiving. When looking at total fluid, included in this total is not only the EN feeding but also additional IV fluids, any other fluids given with medication, and any oral fluids if the patient can tolerate them. Hydration levels were organized according to the Omnibus Reconciliation Act Minimum Data Set for nursing home residents and the adequate intake amounts for healthy individuals. Hydration was analyzed using levels of serum electrolyte values that were referenced according to the hospital's guidelines and by the amount that the patient was receiving.

When organizing the data into the respective intake levels, it was alarming how many of the patients were being given excessive fluid amounts. There are not clear guidelines for providing fluid during EN or even the amount of fluid that a healthy individual should be receiving, though about 2000 mL has been identified and is normally recommended. The number of patients receiving such increased amounts of fluid (>3000 mL) was higher than the patients receiving normal amounts. This confirms findings in previous studies that state there is some discrepancy when giving fluids to the patients both in giving too much or too little fluid, especially with EN. Fluid, although not the main source of concern for a dietitian, does play a vital role in the body to maintain homeostasis. As the data represents, the amounts being provided suggest a need for more regulation regarding fluid control in patients.

Also consistent with previous studies is that the amount of EN that is being ordered is not always the amount that is being provided to the patient. It is clear from Figure 1 that EN orders are not consistently followed. It is anticipated that the hospital routine might interfere with the

infusion of the full amount of tube feed recommended, so amounts given that are slightly lower than ordered would be expected. However, there were multiple recorded incidents of patients being administered higher amounts of feeding than were ordered. Dietitians are careful when recommending EN orders and specify administration rates to increase tolerance. If these orders are not being followed, less than optimum patient outcomes can result.

Certain lab values can be helpful when analyzing hydration. It was anticipated that fluid intake levels would directly affect serum electrolyte levels with those patients having low fluid intake displaying higher than normal electrolytes and patients receiving excessive amounts of fluid having low serum electrolytes. This was not consistently true. It was interesting to see that the patient receiving fluid within the normal range of recommended intake (1500-2000 mL) had more abnormal laboratory values than within the other intake levels. A high serum sodium, potassium and BUN are usually considered signs of dehydration, whereas the data showed that many of those who were being administered excess fluid had these increased levels. Low levels of serum sodium, potassium and chloride are usually consistent with over-hydration, though according to the data, it is probably not likely that these patients were overhydrated because the data represented values for patients who had low total fluid intake. BUN levels were also interesting to analyze because in the less than normal (<1500mL) and normal (1500-3000mL) levels of intake, more patients had increased BUN levels than normal BUN levels. These elevated BUN levels could potentially be from medical reasons other than hydration. Since diagnosis was not gathered as part of the study, this cannot be verified.

In conclusion, the data analyzed from this study suggests that the total fluid given to the patients is not meeting their needs. Discrepancies exist within the amount being ordered and the amount being administered to the patients, and a high number of patients are administered above

average amounts of fluid. It is apparent that more care can be given regarding EN and fluid intake while in the hospital. This may indicate a need for fluid policy.

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