

**Learning Outcome 2:** Comprehend the interrelationship among macro- and micronutrient intakes as the impact human health in normal and disease states.

**NUTR 7104:** Reproductive and Pediatric Nutrition

**Artifacts:** Pediatric Nutrition Case Study #5: Cystic Fibrosis

**NUTR:** Supervised Practice

**Artifacts:** Preceptor Evaluation-Northeast Georgia Medical System Clinical Enrichment Rotation

Throughout my undergraduate and graduate coursework at Tennessee Technological University (TTU) and Georgia State University (GSU), respectively, the various metabolic pathways and their regulatory role on human health in normal and disease states have been a major emphasis in many of my classes. Because of this, it is clear to me that understanding the relationship between macronutrients (carbohydrates, fats, and protein) and micronutrients (vitamins and minerals) is essential to becoming a successful registered dietitian (RD). I completed NUTR 6014: Macronutrients fall semester 2014 and NUTR 6106: Micronutrients spring semester 2015 as part of GSU's curriculum. These two courses came as a much-needed refresher on my biochemistry and the various metabolic pathways as I had not taken biochemistry or medical nutrition therapy (MNT) since fall semester 2012 at TTU and I felt rusty.

As part of GSU's coordinated program (CP), I was required to take two elective courses. The first elective I chose was NUTR 7104: Pediatric Nutrition and I completed the course the same semester as my micronutrients course. Taking macronutrients the semester prior gave me a strong foundation, while taking micronutrients and pediatric nutrition tied everything together. Over the course of the semester, our pediatric nutrition professor gave us various assignments and quizzes to assess how well we understood the relationships between micro- and macronutrients, nutrition, and disease.

Pediatric nutrition covered topics ranging from nutrition during pregnancy through adolescence, enteral and parenteral nutrition in pediatric populations, and different nutrition related disease states. Our assignments included four pop-quizzes, two calculation assignments, and eight case studies. Each case study focused on a patient suffering from a specific condition such as diabetes, phenylketonuria, cystic fibrosis (CF), and short bowel syndrome. The questions on the case studies required you to use critical thinking skills and relate back to the nutrition care process, micro- and macronutrients, and medical nutrition therapy. I personally enjoyed working on the case studies, but case study #5 on CF gave me the most trouble. This case study required you to discuss the goals of nutritional care for a child with CF, state her nutritional requirements including macronutrients and pertinent micronutrients, draft specific diet recommendations for the child as well as what her vitamin therapy regimen should include, and decide what type of pancreatic enzyme preparation you recommend she consume. Patients with CF are more susceptible to malnutrition; therefore it is essential to provide the patient with adequate calories while replacing pancreatic enzymes with each meal and snack. Unlike the majority of other patients I would counsel, a patient with CF should not have a fat restricted diet. I outlined the patient's energy, fat, and protein needs, as well as her increased fat-soluble vitamin needs. The last two questions of the case study focused on treating distal intestinal obstruction syndrome, a

complication of CF, and what nutrition recommendations I would give the patient and her family if she were diagnosed with CF-related diabetes. I received a 28.5/30 possible points on this case study and ended the semester with an A in the course. Working on the various case studies gave me more opportunities to broaden my understanding of the roles of micro- and macronutrients on human health in normal and disease states.

As part of the coordinated program (CP) we are allotted a minimum of 120 hours of enrichment hours as part of our 1,200 hours of supervised practice. These 120 hours can be split up and completed in any area you want to gain more experience or learn more about. When brainstorming what area I wanted to focus on and where I felt I would gain the most experience for my enrichment rotations I immediately thought about the clinical setting. I loved my experiences at Grady Memorial Hospital as well as my renal rotation at Fresenius Medical Care, but I wanted to try clinical in a new environment in order to meet and network with more RD's and gain new experiences. For 80 hours of my enrichment I chose to work with the RD's at Northeast Georgia Medical Center (NGMC) in Gainesville, GA. Having already completed my other clinical rotations, my preceptor at NGMC allowed me to work alongside some of the RD's on staff for my first few days, progressing to covering a floor of patients, to essentially filling in for whichever RD was scheduled off that day and covering their floors. This allowed me to become a part of the nutrition team and help wherever I was needed while maintaining independence and managing up to three floors of patients at a time.

Being able to work in each area of the hospital at NGMC was a unique experience. Unlike my acute care or critical care rotations, I was able to go to a new area almost every day and see subspecialty areas such as cardiovascular, oncology, and behavioral health patients, in addition to the intensive care units and medical surgical floors. I also gained invaluable experience working with my preceptor and the nutrition support pharmacy team at the hospital in calculating total parenteral nutrition (TPN) orders. If a patient is on TPN, the RD must follow-up with them daily in order to create accurate TPN orders or changes in the patient's plan of care. At NGMC the RD's and I would calculate energy and macronutrient needs for each patient including percent dextrose, percent amino acids, and any addition of lipids. When calculating macronutrient needs it is vital to take the patient's disease state into consideration to make appropriate recommendations. For example, a patient with renal disease not on dialysis would need decreased percent protein content of TPN. After calculating energy and macronutrient needs, we would when increasing percent dextrose in TPN it is important to monitor plasma glucose often to avoid hyperglycemia, and adjust the insulin dose as needed. Hypoglycemia may be precipitated if concentrated dextrose infusions are suddenly stopped. Lipids are not added to TPN every day, but at minimum once a week to ensure an essential fatty acid deficiency does not occur. We would then determine the rate per hour of TPN required to meet the patient's nutritional needs.

Before charting, the RD would meet with pharmacy to compare micronutrient additions to TPN and discuss what the final order would be. The micronutrient additions range from phosphate, potassium, calcium, chloride, sodium, magnesium, trace elements such as zinc, selenium, and copper, and the fat-soluble and water-soluble vitamins. Any changes made in micronutrients day-to-day were based on the patients morning lab work and disease state in order to keep lab values in a normal range and avoid complications of TPN. For example, zinc would

always be added, as it is an essential trace element but patients that had fistulas, diarrhea, or intestinal drainage would require additional zinc. Potassium would always be monitored closely to ensure the patient had normal lab values because of the severity of high levels of potassium in the blood. From simply observing this process in the beginning of my rotation to calculating the TPN formulas with my preceptor and the pharmacist at the end of the rotation, improved my skills of calculating TPN orders and making macronutrient and micronutrient adjustments based on individual patient's needs.

Taking pediatric nutrition as an elective at GSU followed by completing the majority of my enrichment hours in the clinical setting at NGMC solidified my desire to work in the clinical setting upon completion of the CP. My preceptor at NGMC even discussed the possibility of me taking a part-time position that is about to open up once I graduate and become eligible for the RD exam. I am confident that by learning and understanding the interrelationship between micronutrients and macronutrients and their impact human health, I have strengthened my foundation of knowledge needed in order to become a successful RD.