THE STATE OF MALNUTRITION IN THE PEDIATRIC ICU

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Laura Plante: Hello listeners. I'm Laura Plante, podcasting for Abbott Nutrition Health Institute. And I'm here today with Dr. Julie Khlevner, a pediatric gastroenterologist who shares her time working in research, and also as a clinician and educator to medical students at the New York Presbyterian Morgan Stanley Children's Hospital. We've invited Dr. Khlevner to share her experience on implementing a malnutrition screening protocol within a pediatric hospital. She'll also share the results of a health economics outcome research that highlighted the burden of unrecognized and untreated malnutrition in the pediatric intensive care unit. Dr. Khlevner, thank you for being here today.

Dr. Khlevner: Thank you, Laura, for that kind introduction. It really is my pleasure to be here with you and to discuss one of my favorite and most passionate aspects of GI care: malnutrition.

Laura Plante: So before we begin, Dr. Khlevner, I'd like to give you the chance to tell our listeners about how you got interested in the topic of pediatric malnutrition.

Dr. Khlevner: Thank you. So, pediatric malnutrition is quite near and dear to my heart. Taking care of a lot of complex patients at Morgan Stanley Children's Hospital afforded me the opportunity to really recognize that malnutrition doesn't just exist in acute settings, but happens throughout all our clinics, outpatient, and even regular floor patients. And what's interesting is that it is often unrecognized and so getting involved with my dietitian…so I actually have the honor of supervising nutrition clinic once a week, in addition to my other responsibilities. And I work with three amazing dietitians who have so much knowledge and so much to offer in the realm of malnutrition. And so, having learned from them so much and then implementing these sorts of techniques from them, I brought that back to the inpatient side to really understand why we're so hesitant to diagnose patients with malnutrition and how do we improve that hesitancy? How do we make it better? Easier? Because malnutrition is a significant issue, and it definitely impacts patients in a negative way.

Laura Plante: Thank you so much for sharing that background. Now let's dive into discussing pediatric malnutrition. Here in Canada, a recent study showed that up to one in three children admitted to a tertiary hospital was malnourished. This is concerning because we also know that children's nutritional status is at risk of worsening during their hospital stay. A good place to start this discussion is why is it important to identify children who are at risk of or who have malnutrition?

Dr. Khlevner: So in 2013, ASPEN, for the first time, put out a consensus statement for diagnosing malnutrition. And despite this, malnutrition remains under-recognized and more frequently observed in hospitalized, acute, and chronically ill children, but can happen anywhere in our clinics. The exact prevalence of malnutrition in the United States is actually unknown, and I'm glad to know that there is a little bit more data that one in three children in Canada is malnourished. That's significant and astounding. And what is well known is that malnutrition is prevalent even in developed countries, as we just talked about, and carries a significant risk of morbidity and mortality in addition to the exuberant health care costs. Children are at a particular risk. Adequate nutrition is essential in early childhood to ensure normal growth, neurological and cognitive development, and healthy life. And it's really no secret that early identification and diagnosing of malnutrition is a key to facilitate timely nutrition interventions and prevent malnutrition related adverse outcomes. And so, it's of utmost importance to implement screening protocols on outcome research endeavours and the most effective way to address malnutrition.

Laura Plante: So, tell us a little bit about that. What tools do you use, or should we be using to diagnose pediatric malnutrition?

Dr. Khlevner: So really gone are the days when we diagnose malnutrition based on assumption or subjective findings. In an effort to really address the multifaceted nature of malnutrition, the current criteria relies on five domains. So, we have anthropometric variables growth, growth velocities, and Z scores, chronicity, whether someone malnutrition has been less than three months or more than three months to signify chronic. What is the ideology of malnutrition and what is the functional status of the patient? And this is where some of the physical assessment skills come to play. We have indicators for single and two or more data points, and that allows us for identifications of types of malnutrition, ranging from mild to severe. In addition, we have excellent screening tools like PD Smart, PNST, and Strong Kids to help us screen for malnutrition in acute settings and working on developing some screening tools that allow us to screen patients in an outpatient world as well. And then mid upper arm circumference is also

an integral screening tool that we utilize both inpatient and outpatient settings, and it allows us to have objective data of how we follow patients and how that score changes over time.

Laura Plante: You mentioned mid upper arm circumference. Did clinicians at your institution undergo any training on how to use this tool? And also, did you see a difference once you've implemented a standardized screening tool in terms of malnutrition diagnosis in your hospital?

Dr. Khlevner: Yeah, it's a great question, Laura. So we actually had our education module through UNICEF. It's an online module that is easily accessible and you can get trained in that way. And I'll present the data a little bit about what the significance of implementing MUAC in our patient population was as we talk more about the research study that we performed.

Laura Plante: So let's dive into that retrospective research that was done at your hospital. This research looked into malnutrition diagnosis rates, and its consequences on both patients and hospital resources. So, what spurred this health economic outcome research, or HEOR, analysis? And what did you learn from it?

Dr. Khlevner: So I'm going to brag a little bit about my institution. So, I work at New York Presbyterian Morgan Stanley Children's Hospital, and it's really one of the largest tertiary care providers of children's health services in the tri-state area, with a long-standing commitment to its community and patients. There are over 200 pediatric beds and 60 pediatric ICU beds, excluding neonatal ICU. So, it's a lot of patients that we see. Our institution implemented malnutrition screening guidelines between 2013 and 2014, shortly after the ASPEN published the guidelines. And we looked at our cohort from 2011 to 2019 and looking at the rate of malnutrition diagnosis and its impact on length of stay, comorbidities, pre- and post-implementation of malnutrition screening protocols.

Laura Plante: And did the HEOR data spark any change in terms of your nutrition care practice, or did it reinforce what you were already doing?

Dr. Khlevner: So, let me just tell you a little bit about what we found and how that's changing what we're doing right now. So, what we found is that approximately 19% of our PICU patients were diagnosed with malnutrition between 2011 and 2019. So that's one in five patients. Those patients who were diagnosed with malnutrition were more critically ill and had a higher Elixhauser mortality and readmission scores, as

compared to those who were not diagnosed with malnutrition. In addition, patients with malnutrition had a significantly longer length of stay and higher 30-day readmission rates leading to higher health care costs. Although we didn't find a statistically significant difference in length of stay and 30-day readmission between patients pre- and post-implementation of malnutrition protocol, we found that the overall length of stay was shorter for patients admitted in 2014 or after the time when malnutrition protocols were implemented. This speaks overall to the importance of implementing malnutrition screening protocols. As a result, the hospital got super excited about the prospect of saving money for the hospital stay, in addition to families who are actually paying significant amount out of pocket because their health insurance may not cost the full admission. We're looking to see whether implementing malnutrition protocols actually allows patients to be diagnosed earlier with malnutrition; therefore, implementing nutritional strategies that will improve their overall nutritional outcomes. That data is sort of part two of what we're going to be looking at. Of course, we are limited by the retrospective nature of this project, but despite that, it's really exciting to understand malnutrition implementation a little bit more and understand how we really can advance the care of our patients in the ICU setting.

Laura Plante: Very interesting. I'm looking forward to hearing about part two of that retrospective data that you guys will pull. So out of curiosity, walk us through what nutrition care actually looks like then, for a patient admitted to your pediatric ICU.

Dr. Khlevner: So we have a robust nutritional program at New York Presbyterian, and all patients admitted to the ICU are screened for malnutrition within 24 hours of admission and are rescreened throughout their stay. So, if diagnosed, malnutrition is subtyped into mild to moderate and severe and entered into the medical chart, alerting the full care team. Highlighting malnutrition on a patient's chart really allows for the team to be more vigilant and intervene quicker to implement a nutritional plan. So, we found this to be the most useful implementation so that the whole care team is on board to move quicker and implement enteral, parental, whatever type of nutrition indicated for that patient.

Laura Plante: And when a child is diagnosed with malnutrition, how do you involve the patient and their families? Are they aware of the nutrition care plan?

Dr. Khlevner: Absolutely. So, we are all about patient-centered rounds and families are really at the forefront in all aspects of care and play an integral role in advocating nutrition interventions for their children. It's fascinating how many of our families will demand nutritional interventions as soon as they

get admitted to the ICU setting, which really alerts the full team to understand that families are now part of the decision makers for our patients and that they're the best advocate. And we really listen to them. It's a really nice relationship that we develop with our families, and it's a trustworthy relationship that allows malnutrition to really improve throughout the hospitalization.

Laura Plante: That's great. I think that's a novel approach as well, to include the patient and the caregivers within their own care. So how do you make sure once the patient is discharged that they're getting the proper follow-up in the community with regards to their malnutrition?

Dr. Khlevner: So treating malnutrition requires a long-term approach. It's not fixed in a minute or even during the hospital stay. So, our PICU teams really involve key providers early on and ensure appropriate follow-up upon ICU discharge. Whether it be the pediatrician or a gastroenterologist or whatever other subspecialty, everyone is on top and are alerted to the malnutrition diagnosis and really continue to utilize the criteria and markers that were initially utilized for that patient's diagnosis throughout their hospital and as outpatient to understand the progress of the patient's nutritional status.

Laura Plante: Thank you for sharing that and pulling from your own experience, Dr. Khlevner, why is it so hard to incite change in the acute care setting?

Dr. Khlevner: So the secret really is to get the buy-in from those key stakeholders. Reviewing and presenting evidence-based data can be very helpful, and that's something that we've done for our institution. Whether it's outcome data, health economics, whatever data you could find, it is important to understand what the evidence behind an implementation is. And of course, each health care system has its own drivers. Key in. And so, you really need to key in on the drivers that pertain to your health care model. Improved patient outcomes, equitable care, and reimbursement incurred costs were the key drivers for implementing malnutrition screening protocols at our center.

Laura Plante: And on the other hand, what are keys to success when implementing practice changes?

Dr. Khlevner: So implementing, for example, malnutrition screening protocols across pediatric centers is really the next step to improve recognition and develop effective ways to prevent and treat pediatric malnutrition. The keys to success is degree of ownership and commitment to a change across all levels of the institution. It's really important to empower every provider taking care of pediatric patients to use the

recommended diagnostic indicators to identify and document malnutrition and participate in treatment plan, in order for this to be successful practice.

Laura Plante: Dr. Khlevner, in closing, what advice would you share with our listeners on small steps they can take to start implementing nutrition care practices?

Dr. Khlevner: Laura, I think you really hit it on the nail. Start out small, involve students as part of Q&A, or quality assurance projects, and use the collected data to implement practice changes on a larger scale. So start small, collect data, and then move to a larger scale, and then share that data with other centers across the globe. Hopefully this will sort of be a viral process and get other centers interested and implement similar changes.

Laura Plante: Dr. Khlevner, thank you so much for your time and for sharing your expertise on tackling pediatric malnutrition at your hospital. We really appreciate you helping us raise awareness on this important topic.

Dr. Khlevner: Thank you, Laura, for your time and for really making malnutrition a notable disease process that needs to be identified and treated.

Laura Plante: Listeners, we encourage you to follow the link on our podcast page to view a complete recording of Dr. Khlevner's session at the Canadian Nutrition Society's annual conference entitled The State of Malnutrition in the Pediatric ICU. You can also find more information on the mid upper arm circumference tape, including a demonstration video on ANHI. We hope you enjoyed this podcast and that the information provided will help you improve nutrition care in your hospitals. Thank you, everyone.

Visit anhi.org/ca/en today to listen to this recording .