

The Interplay Among Sleep, Nutrition & Childhood Growth

Speakers: Dr Nylong Vyas, MD, MPH

Maura Bowen: From day one, my younger son was a troubled sleeper, and it was just like clockwork. His sweet little baby face would peer up at me through tears every 90 minutes or so each night, wanting to eat, wanting to be held, wanting to play. Now, I received a lot of advice from our pediatrician and the other mothers around me, so believe me when I say I tried everything – adjusting bedtimes, letting him cry it out, maintaining a soothing bedtime routine, filling his room with white noise and calming night lights – and it didn't matter. For that first full year, he really just wasn't a sleeper. But he also wasn't a sleeper at two, when I would catch him flipping happily through his baby books. Nor was he a sleeper at three, or four, or five.

And, in fact, I don't think he slept through an entire night until he was about eight years old. Now, he did great in school. He was full of energy. He played sports, had lots of friends, behaved really well, but, for years, he was a little smaller than the other kids and he was a picky, and very undetermined eater. And I think it must just be how he's wired. Maybe some kids just don't need to catch those Zs.

But, anyway, he's 17 now. His growth caught up eventually, right around the time he started strength training and putting a laser focus on nutrition, and these days, he'd sleep for 14 hours straight if he could. But here's the thing – never once did I suspect nutrition might play a role in any of this. None of the experts suggested it either, so I guess this is one of those moments I get to look back on – guilty in my own ignorance to ask, what should I have done differently. It's one of the most common mom questions there is, am I right?

I'm Maura Bowen with Abbott Nutrition Health Institute's Power of Nutrition Podcast, and I'm happy to report that our guest today can answer that question. Nilong Vyas is a board-certified pediatrician and founder of Sleepless in NOLA, a sleep coaching and consulting firm based in New Orleans, Louisiana, here in the United States. Dr. Vyas and I are in different studios today, so we can't see each other, but I will bet she's wide awake and looking very well rested. Dr. Vyas, thank you for joining us.

Dr Nilong Vyas: Thank you so much for having me. I do love my sleep, and I'm crazy about it in my household, to the disappointment of my teenage children, who wish they could stay up later, but are grateful the next morning when they wake up feeling rested and refreshed. I am passionate about sleep and educating as many people as possible on its benefits, and how to get the most of it. I look forward to speaking with you today about the link between nutrition and sleep.

Maura: Well, great. I'm looking forward to it too. And, before we get started, I'm hoping you can tell our listeners a little bit about your background and how you came to be interested in the link between nutrition, quality sleep, and pediatric growth.

Dr Vyas: Sure, I am a board-certified pediatrician, and nutrition and growth are the foundations of any pediatric practice. So, when I ventured out on my own over ten years ago to create Sleepless in NOLA Sleep Consultancy firm, I wanted parents to understand the importance of nutrition in laying the foundation for optimal sleep, and ultimately promoting growth and development. I developed a protocol using an evidence based, comprehensive behavioral approach to address the nuanced nutritional requirements of children, with a particular emphasis on sleep enhancement. And, of course, all of this started because, when I had children, they weren't great sleepers to begin with, but they are great sleepers now.

Maura: That makes me feel better to hear that. Okay, let's talk a bit about good sleep quality. What does a good night's sleep look like for each age group, and I don't just mean how much sleep a newborn might need, for example, but also, how do you know for sure your baby is sleeping well, and what about your toddler, your younger kiddos, your pre-teens, and even your teenagers?

Dr Vyas: Yeah, and this answer applies to any age group, including adults. You know one has slept adequately based on their developmentally specific needs by how they feel upon waking, and if they can function with their day-to-day activities and stay alert through their period of wakefulness.

For example, an infant should be able to stay alert for about 90 minutes after waking. If, however, they're fussy the whole time or fall asleep before the next nap while in a stroller, or during a feed, then they're likely in an overtired state or a state of sleep debt.

Toddlers and school age children who are overtired may become irritable with simple tasks that are asked of them, such as getting into a car seat, or getting into the bath.

And a teenager may seem characteristically grumpy and distractible, but those mood responses could be due to poor sleep quality.

A good night's sleep for each age group is one where the individual sleeps the recommended amount, wakes feeling happy and refreshed, and is capable of staying alert for their developmentally appropriate wake window, without becoming sleepy or needing stimulants to stay awake.

Maura: Okay, so then taking it a step further, what's the link between sleep and how it impacts child growth?

Dr Vyas: So, the link between sleep and child growth is really important, and during sleep, it's when children's bodies release growth hormones, which contribute to their physical development. Additionally, sleep plays a crucial role in cognitive and brain development in children by consolidating learning and memory, enhancing attention span, and supporting overall cognitive function. This ensures that children get enough quality sleep, making that essential for their growth and development.

Maura: Okay. That makes perfect sense. So, let's get clinical. If a child isn't sleeping well, in what ways might their body function differently than if they were having like a lovely, healthy, quality sleep? How might that impact their growth?

Dr Vyas: Yeah, so genetic potential is what determines the growth of a person; for example, how tall they'll become. However, if they're not meeting their daily nutritional needs, it's possible they won't hit their genetic growth potential.

Equally, suppose that a child's not meeting their sleep requirements. In that case, there are implications in the long run that may cause many adverse consequences, including obesity, memory and attention deficiencies, poor academic performance, emotional and behavioral disorders, and most importantly, achieving that optimal growth potential.

So, I always tell parents just because their child does not eat or sleep well, it does not mean they will not learn to read, write, walk, talk, or grow. They will. But they may not do it to their genetic potential without adequate nutrition and sleep.

Maura: Okay, so, let's say a child doesn't seem to be sleeping as well as you just described. Why do you think that might be? For instance, what are some of the factors, especially as they relate to nutrition, that come in to play that could have a positive or a negative impact on sleep quality?

Dr Vyas: Yeah, that's a great question. So, most children, by four to eight months of age, should be capable of sleeping all the way through the night without waking for a feed. If, however, this child's not receiving adequate nutritional calories during the day, they will wake for overnight feeds, and parents will think that their child's not capable of sleeping through the night when, in fact, they're not receiving enough nutrition during the day to meet this overnight milestone. So, feeding overnight creates a disruption to the sleep cycles which can impact their growth potential and, ultimately, their nutritional intake during a day, creating a vicious cycle of improper nutrition and poor sleep.

In addition, many infants have a feed to sleep association in which they fall asleep while feeding. Many times, while feeding, the infants see pressure, like the likelihood of them wanting to go to sleep, will overwhelm the child's hunger drive, and the infant will tend to fall asleep without finishing the entire meal. In that situation, the child will wake overnight secondary to hunger, which then disrupts their sleep-wake cycle and their normal pulsatile secretions of growth hormone. So, this is mostly relevant in those children who can, and are capable of, sleeping through the night without the need to wake for a feed, so those after the age of four to eight months.

Maura: Okay, that makes sense. So, let's get into some data to ground us a little. Is struggling to sleep well a rare thing among children, or is it fairly common?

Dr Vyas: Well, I wouldn't be in business if inadequate sleep in the pediatric population wasn't a common occurrence, but, seriously, more families need my help than they realize, because the ramifications of poor sleep on health aren't always acutely visualized, but, rather, seen years later. Statistically speaking, though, sleep problems affect about 25 to 50 percent of children, which is a significant enough number that I'm glad we're talking about it now to bring awareness, not only to parents, but health care workers on the importance of sleep and nutrition in the pediatric population.

Maura: Yeah, I'm glad about that, too. So, what nutrition-related challenges do you tend to see then?

Dr Vyas: So, the predominant challenges that I see in my day-to-day sleep practice are infants who get an inadequate number of calories during the day, and tend to wake to eat overnight; children who wake too early or prematurely secondary to hunger; and, toddlers who have poor intake, which leads to an inability to fall asleep or delayed sleep onset. More specifically, a lot of children are dependent on milk to fall asleep, which gives them the false sense that, when they wake overnight, they are, in fact, hungry.

In addition, I see children classified as picky eaters, like you were talking about with your son, whose daily food intake may be nutritionally deficient. For example, if they have a diet that's high in saturated fat and inadequate fiber content, those children can have a shorter sleep cycle with premature weight gain and a shorter total sleep duration.

Finally, there's a subset of children that I see who can't fall asleep independently, so when they do wake overnight at the end of a sleep cycle, they wake up in this panicked state, looking for their caregiver. Some children can be soothed back to sleep without a feeding, but parents often resort to feeding to see if it will help the child return to sleep. In this situation, children are ingesting calories that they may not need, which impacts how much they can consume during the next day.

Maura: Okay, so, as I noted in my introduction, I didn't know when my sons were little that there was such a strong tie between nutrition and sleep quality, so I'm wondering if you can describe how diet composition may impact sleep quality for kids.

Dr Vyas: Sure. So, more recently, scientific studies have investigated the association between sleep duration and childhood obesity, since it's been reported that sleep deprivation causes a related increase in calorie intake. So, even though the mechanisms of how this occurs are still under study and not completely understood, we do know that the effects of dietary habits, nutrient intake, and diet composition on sleep quality has been reported in the pediatric population.

A recent study published in the *Nutrients Journal* last year reports a high correlation between specific diet patterns and sleep disturbances in children of all ages. More specifically, they discuss that diets rich in fiber, fruit, vegetables, anti-inflammatory nutrients, and low in saturated fats seem to promote better sleep quality.

So, while we wait for more evidence on how diet composition relates to sleep quality, health care providers should continue encouraging healthy dietary habits in the pediatric population.

Maura: Okay. So, I think that you've hinted at this a little bit already, but it sounds like there's a connection between the lack of quality sleep and obesity.

Dr Vyas: Absolutely. We've seen that sleep is an important modulator of neuro-endocrine function and glucose metabolism, and sleep loss has been shown to result in metabolic and endocrine alterations, including decreased glucose tolerance, decreased insulin sensitivity, increased evening concentrations of cortisol, increased levels of ghrelin, which is the hunger hormone, and decreased levels of leptin, the fullness hormone. And all of these components, these hormonal alterations, increase the likelihood of obesity long term. And obesity in the U.S. has reached epidemic proportions, especially among children.

Dr Vyas: And the CARDIA Study, which is the Coronary Artery Risk Development in Young Adults Study, showed that sleep fragmentation was strongly associated with increases in BMI Z-Score, being overweight, and having a high waist circumference percentile.

In essence, as we said before, the thought is that sleep deprivation causes an increased desire for more nutritionally deficient foods, which can lead to obesity, so it's all interconnected and definitely we're seeing in the research a correlation between sleep quality and obesity.

Maura: So, can you describe the few effective clinical approaches to help children get the right nutrition to improve their sleep quality?

Dr Vyas: Of course. So, first of all, it's important for the health care professional to carefully evaluate the child's diet, ensuring no underlying chronic conditions exist.

Next, it's vital to optimize caloric intake by counseling parents to offer meals in accordance with the child's age and stage, while simultaneously decreasing overnight feeds when they are developmentally ready to do so. This may mean offering three meals and two snacks to children over a year of age, and finally, limiting the quantity and improving the quality of snacks during the day for older children and teens.

In my practice, I counsel parents to optimize infants' daytime milk intake first, and then offer children a wide variety of foods by six months of age to help develop their palate and interest in food. I encourage them not to shy away from offering flavor and texture, and to let children experiment with their food, especially from a young age.

Force feeding and offering treats as a reward for healthy eating are not recommended, and for toddlers, restricting milk intake throughout the day to 12 to 20 ounces in a 12-hour period so there's availability for that solid food intake.

Encourage toddlers towards self-feeding and playfulness at meal times, and introduce various healthy foods, including macro-nutrients, fiber, and protein, especially at dinner time.

Also, we want to restrict the use of electronic devices during meal time for all age groups, including adults.

And lastly, establish a consistent bed time and wake routine, while also limiting high doses of caffeine too close to bedtime.

Maura: Now, I'm curious. Is there any sort of link between when a child eats and their quality of sleep?

Dr Vyas: Yeah, so a lot of studies conducted on shift workers, who tend to consume the majority of their calories at night, and that showed that significant changes in the composition of their gut microbiome were linked to misalignment of the circadian rhythm, leading to poor sleep. This led to studies conducted in animal models that showed the impact of food intake on health, and how the timing of eating affected the body clock and sleep-wake correlation.

Dr Vyas: These types of studies in the pediatric population are lacking, but we do know that if a child is ingesting food overnight and can sleep through the night without feeding, their body must work to digest that food, rather than rest and regenerate for daytime activities. So, it's crucial to work towards minimizing and eventually eliminating overnight feeds for children who are developmentally capable of doing so, and, like we said before, some as early as four to six months of age.

Maura: Where does napping fit into this picture, if it does?

Dr Vyas: So, napping is crucial for newborns all the way to school age children, typically up to age five. And, some kids will drop their naps sooner than five, but generally, you'll start to notice increased fussiness around meal time and poor meal intake, which indicate a need for sleep, based upon their mood and behavioral responses. So, often, I see parents drop their kids' naps way too soon, which creates difficulty with sleep initiation at bedtime, because then children are in this overtired state. So, napping is important and making sure not to drop the nap too soon.

Maura: So, with all of this in mind, how would you describe the ideal role a health care professional should play to optimize sleep through nutrition?

Dr Vyas: So, they're sort of the first step – the gate keeper. So, as a health care provider, it's important for them to inquire about sleep and nutrition at every patient interaction. Sometimes, sleep isn't brought up until the well visit, which may be just yearly, so bring up that interaction, even at sick visits, asking about nutrition and sleep, because many families don't even realize that there's an issue and don't even present the question at their pediatric appointments.

Also, what health care providers should do is to counsel parents to eliminate screens from the bedroom, improve food intake, and be mindful of meal timings. Maintain a consistent sleep and wake time, and guarantee a comfortable sleep environment for their children, which includes appropriate temperature, bedding and lighting, because, of course, as we know, happily rested children create happily rested parents.

Maura: This is all so helpful to know, and I really wish we had chatted years ago. Any other parting pieces of advice as we wrap up this episode?

Dr Vyas: Sure. I hear that all of the time, but it's never too late to have this information. My parting advice would be to prioritize sleep. Of course, that's easier said than done, I know, especially with the many devices and activities demanding our time these days. However, it may be easier to prioritize sleep now that the listeners have gained more knowledge about the importance of sleep and its interplay with nutrition. And, they don't have to go at it alone. If they're struggling, there's definitely help out there.

Maura: Excellent. That's great to hear. And Dr. Vyas, thank you so much for joining me today, and for sharing your expertise. This has been a really fun conversation, and it's been very helpful. So, thank you again.

Dr Vyas: Of course. Thanks for having me, and hopefully, now your listeners have learned something that will prompt a change in their lives regarding sleep and nutrition.

Maura: Definitely. And listeners, if you'd like to learn more about the link between sleep, nutrition, and pediatric growth, visit Dr. Vyas' website at www.sleeplessinnola.com, and you can make a free consultation appointment to see if you're a good fit and would benefit from her program.

And also, if you're looking for nutrition podcasts, at ANHI, we have dozens and dozens of episodes across a variety of nutrition science topics, and you can find them on ANHI.org by clicking Resources at the top of the page, then podcasts. And, of course, we're also on Spotify and Apple podcasts, so be sure to subscribe to ANHI's Power of Nutrition Podcast series to hear the latest nutrition science news, and, of course, share it with your colleagues.

Thank you everyone.