Are infant growth charts misleading?

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Pre-term infants who are born either smaller or larger than expected for their gestational age face an increased risk of poor growth and development. Smaller babies are in greater danger of experiencing neurodevelopmental delays, says Irene Olsen, an adjunct assistant professor in Penn Nursing, while larger newborns have higher rates of hypoglycemia, obesity and obesity-related diseases.

Because growing is one of the most important things pre-term babies (born earlier than 37 weeks) must do in their initial months of life, charting their progress is vital, Olsen says. Unfortunately, many of the growth charts commonly used in Neonatal Intensive Care Units (NICUs) are limited in a number of ways, often utilizing outdated, incomplete or faulty information.

Olsen says she first noticed the problem while working as a dietician.

One of her responsibilities was measuring infants for growth, and when she looked into available measuring tools, her options were scarce.

The Lubchenco growth chart, the most commonly used in NICUs, is based on data collected between the 1940s and 1960s on 5,000 primarily white infants from one Denver NICU, Olsen says. Other charts assess for weight only and not weight, length and head circumference, the three most essential elements for monitoring the growth of pre-term infants. A newer set of curves published in the early 2000s is based on non-U.S. data.

"Ideally, you would want a growth curve that best represents the infants that you're plotting," Olsen says.

Medical professionals are aware of the inadequacies of the curves used today, but Olsen says they lack a more efficient measuring tool.

To produce more accurate measurements, Olsen has developed a new set of gender-specific growth curves for weight, length and head circumference, using a large, more contemporary and racially diverse U.S. sample that better reflects U.S. birth data.

Using information provided by the Pediatrix Medical Group, Olsen and collaborators created a growth chart based on more than 257,000 infants nationwide, ages 23 to 41 weeks. The study was published in the February issue of *Pediatrics*.

One of the limitations of Lubchenco curves is that they are not male- and female-specific. Olsen says her data shows that there was a big enough difference between girls and boys that there should be separate growth curves for each gender.

Her growth tool includes six different curves: weight, length and head

circumference for both males and females. Her study compares her newly created curves with the curves currently in use.

Olsen discovered that, on average, 42 percent of the infants considered to be of small weight for their age based on her findings were actually considered appropriately sized by the Lubchenco curves, and 27 percent of the infants considered large for their age based on her findings were considered appropriate weight for their age by Lubchenco.

"That's concerning because these kids aren't being identified as high-risk, therefore they're not getting the extra attention in the NICU," she says. "If I think that [infants] are appropriately sized, which according to the Lubchenco curve they are, then I might not be paying as close attention to their nutrition as I should be."

Olsen says she hopes that her growth curves become the new hospital standard. Although not perfect, she says her chart is an improvement to what is presently available.

"We do hope that people will look at our studies, read the studies closely and consider using them in their NICUs, because we feel that they're a better representation of NICU infants today," she says.

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