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Video: Physical Development in Infancy and Childhood offers a quick review of the physical changes that occur in a child's first two years.

norm

An average, or standard, calculated from many individuals within a specific group or population.

percentile

A point on a ranking scale of 0 to 100. The 50th percentile is the midpoint; half the people in the population being studied rank higher and half rank lower.

Growth in Infancy

In infancy, growth is so rapid and the consequences of neglect are so severe that gain are closely monitored. Length, weight, and head circumference should be measured monthly at first, and every organ should be checked to make sure it functions well.

Body Size

Weight gain is dramatic. Newborns lose weight in the first three days and then gain an ounce a day for several months. Birthweight typically doubles by 4 months and triples by a year. An average 7-pound newborn will be 21 pounds at 12 months (9,525 grams, up from 3,175 grams at birth).

Physical growth in the second year is slower but still rapid. By 24 months, most children weigh almost 28 pounds (13 kilograms). They have added more than a foot in height—from about 20 inches at birth to about 34 inches at age 2 (from 51 to 86 centimeters). This makes 2-year-olds about half their adult height and about one-fifth their adult weight, four times heavier than they were at birth (see Figure 3.1).

Each of these numbers is a **norm**, which is a standard, for a particular population. The “particular population” for the norms just cited is North American infants. Remember, however, that genetic diversity means that some perfectly healthy newborns from every continent are smaller or larger than these norms.

At each well-baby checkup, the baby's growth is compared to that baby's previous numbers. Often measurements are expressed as a **percentile**, from 0 to 100, comparing each baby to others the same age. For example, weight at the 30th percentile means that 30 percent of all babies weigh less, and 70 percent weigh more.

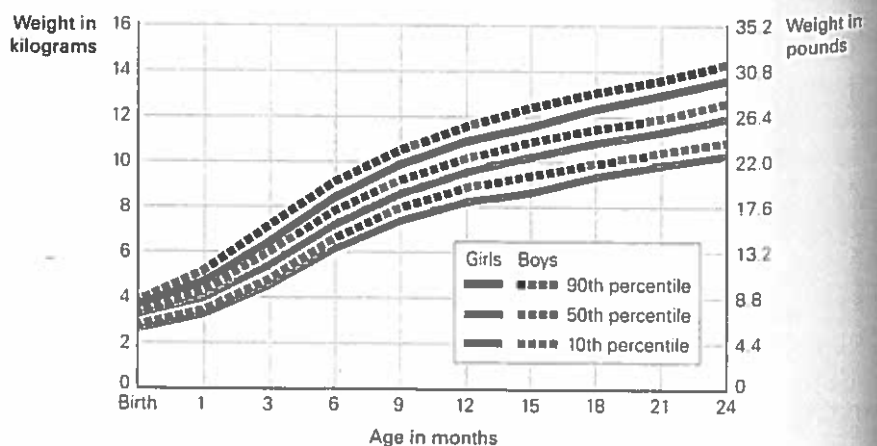
For any baby, an early sign of trouble occurs when percentile changes markedly, either up or down. If an average baby moves from, say, the 50th to the 20th percentile, that could be the first sign of *failure to thrive*, which could be caused by dozens of medical conditions. Pediatricians consider it “outmoded” to blame parents for failure to thrive, but in any case the cause should be discovered, and remedied (Jaffe, 2011, p. 100).

Sleep

Throughout life, health and growth correlate with regular and ample sleep (Maski & Kothare, 2013). As with many health habits, sleep patterns begin in the first year.

FIGURE 3.1 Averages and Individuals Norms and percentiles are useful—most 1-month-old girls who weigh 10 pounds should be at least 25 pounds by age 2. But although females weigh less than males on average, lifelong, it is obvious that individuals do not always follow the norms. Do you know a 200-pound woman married to a 150-pound man?

Weight of Girls and Boys, Birth to 24 Months





Same Boy, Much Changed

All three photos show Conor: first at 3 months, then at 12 months, and finally at 24 months. Note the rapid growth in the first two years, especially apparent in the changing proportions of the chin, head, and arms.

Newborns sleep about 15 to 17 hours a day. Every week brings a few more waking minutes. For the first two months the norm for total time asleep is $14\frac{1}{4}$ hours; for the next 3 months, $13\frac{1}{4}$ hours; for the next 12 months, $12\frac{1}{4}$ hours. Remember that norms are averages; individuals vary. Parents report that, among every 20 infants in the United States, one sleeps nine hours or fewer per day and one sleeps 19 hours or more (Sadeh et al., 2009).

National averages vary as well. By age 2, the typical New Zealand toddler sleeps 15 percent more than the typical Japanese one ($13\frac{1}{3}$ hours compared to $11\frac{2}{3}$) (Sadeh et al., 2010).

Infants also vary in how long they sleep at a stretch. Preterm and breast-fed babies wake up often. Part of this depends on an adult's perspective. If a night is thought to be from midnight to 5 A.M., many babies occasionally sleep "through the night" at 3 months. But if night is 10 P.M. to 6 A.M., many 1-year-olds don't sleep all night (C. Russell et al., 2013).

Over the first months, the time spent in each type or stage of sleep changes. Babies born preterm may always seem to be dozing. About half the sleep of full-term newborns is **REM (rapid eye movement) sleep**, with flickering eyelids and rapid brain waves. That indicates dreaming. REM sleep declines over the early weeks, as does "transitional sleep," the half-awake stage. At 3 or 4 months, quiet sleep (also called *slow-wave sleep*) increases markedly.

Sleep varies not only because of biology (age and genes) but also because of culture and caregivers. Babies who are fed formula and cereal sleep longer and more soundly—easier for parents but not necessarily good for the baby. Where babies sleep depends primarily on the baby's age and the culture, with bed-sharing (in the parents' bed) and co-sleeping (in the parents' room) the norm in some cultures, but unusual in others (Esposito et al., 2015).

Parents are soon frustrated if they think their babies will adjust to adult sleep-wake schedules. Infant brain patterns and hunger needs do not allow them to sleep quietly for long stretches. This can create a problem for the entire family: Maternal depression and family dysfunction are more common when infants wake up often at night (Piteo et al., 2013).

Overall, 25 percent of children under age 3 have sleeping problems, according to parents surveyed in an Internet study of more than 5,000 North Americans

REM (rapid eye movement) sleep

A stage of sleep characterized by flickering eyes behind closed lids. REM indicates dreaming.

(Sadeh et al., 2009). Problems are especially common when the baby is the parents' first child.

New parents "are rarely well-prepared for the degree of sleep disruption a newborn infant engenders." As a result many become "desperate" and institute patterns that they may later regret (C. Russell et al., 2013, p. 68). But what patterns should they follow? Experts, strangers, and close relatives give conflicting advice. Co-sleeping is one example.

OPPOSING PERSPECTIVES

Where Should Babies Sleep?

Traditionally, most middle-class U.S. infants slept in cribs in their own rooms; psychiatrists feared that babies would be traumatized if their parents had sex, and many non-professionals thought children would be spoiled if they depended too much on their mothers at night.

By contrast, most infants in Asia, Africa, and Latin America slept near their mothers, a practice called **co-sleeping**, and sometimes in their parents' bed, called **bed-sharing**. In those cultures, nighttime parent-child separation was considered cruel.

Sleeping alone may encourage independence for both child and adult—a quality valued in some cultures, abhorred in others. Since 2000, co-sleeping has been recommended by North Americans who advocate *attachment parenting* (Sears & Sears, 2001). They want babies always near their mothers so that every cry meets a comfort, often with breast milk.

Many companies now sell "co-sleepers" that allow babies to sleep beside their mothers without being on a soft mattress or risking blankets on the face. But bed-sharing itself (not just co-sleeping) is becoming more popular: The rates doubled from 6.5 percent in 1993 to 13.5 percent in 2010 in the United States (Colson et al., 2013).

A 19-nation study found that Asian and African mothers still worry about separation, whereas mothers with European roots worry more about privacy. In the extremes of that study, 82 percent of Vietnamese babies slept with their mothers, as did 6 percent in New Zealand (Mindell et al., 2010) (see Figure 3.2).

North Americans may attribute this international difference to poverty, since few families in poor nations have an extra room. Everywhere, mothers with higher SES are less likely to co-sleep (Colson et al., 2013). But culture trumps SES (Ball & Volpe, 2013), as evident in many wealthy,

co-sleeping

A custom in which parents and their children (usually infants) sleep together in the same room

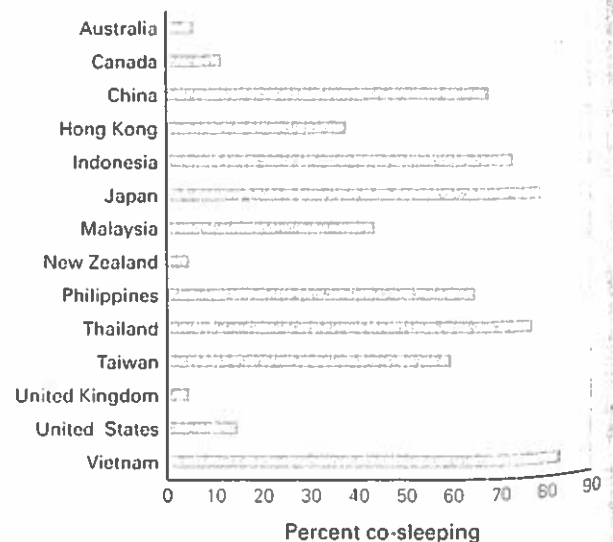
bed-sharing

When two or more people sleep in the same bed

educated, Asian mothers who co-sleep, and many poor U.S. couples who sleep apart from their children.

In the United States the age of the baby is crucial. One study found that even infants in middle-class and upper-class families usually slept in the same room as their parents at 1 month (60 percent, 11 percent of them bed-sharing), but most of them slept in a separate room by 6 months. In that study, mothers who were depressed, and who were unhappy with the father's involvement, were less likely to move the baby out of the parents' room (Feti et al., 2015).

The authors of that study suggest that the correlation between maternal depression and co-sleeping may not be



Data from Mindell et al., 2010

FIGURE 3.2 Awake at Night Why the disparity between Asian and non-Asian rates of co-sleeping? It may be that Western parents use a variety of gadgets and objects—monitors, night lights, pacifiers, cuddle cloths, sound machines—to accomplish the same things Asian parents do by having their infant next to them.