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Childhood obesity may affect timing of puberty, create problems with reproduction

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(Medical Xpress) -- A dramatic increase in childhood obesity in recent decades may have impacts that go beyond the usual health concerns – it could be disrupting the timing of puberty and ultimately lead to a diminished ability to reproduce, especially in females.

A body of research suggests that obesity could be related to growing problems with infertility, scientists said in a recent review, in addition to a host of other physical and psycho-social concerns. The analysis was published in *Frontiers in Endocrinology*.

Human bodies may be scrambling to adjust to a problem that is fairly new. For thousands of years of evolution, poor nutrition or starvation were a greater concern, rather than an overabundance of food.

"The issue of so many humans being obese is very recent in evolutionary terms, and since nutritional status is important to reproduction, metabolic syndromes caused by obesity may profoundly affect reproductive capacity," said Patrick Chappell, an assistant professor of veterinary medicine at Oregon State University and an author of the recent report.

"Either extreme of the spectrum, anorexia or obesity, can be associated with reproduction problems," he said.

Researchers are still learning more about the overall impact of obesity on the beginning of puberty and effects on the liver, pancreas and other

endocrine glands, Chappell said. While humans show natural variations in pubertal progression, the signals that control this timing are unclear.

But in general, puberty appears to be starting earlier in girls. It is being accelerated.

This may have several effects, scientists have found. One theory is an impact on kisspeptin, a recently characterized neurohormone necessary for reproduction. Normal secretions of this hormone may be disrupted by endocrine signals from fat that serve to communicate to the brain.

Another possible affect on pubertal timing, and reproduction in general, is disruption of circadian clocks, which reflect the natural rhythms of night and day. Disrupted sleep-wake cycles can affect the secretion of hormones such as cortisol, testosterone, and insulin, researchers have found.

"Any disruption of circadian clocks throughout the body can cause a number of problems, and major changes in diet and metabolism can affect these cellular clocks," Chappell said. "Disruption of the clock through diet can even feed into a further disruption of normal metabolism, making the damage worse, as well as affecting sleep and reproduction."

Molecular mechanisms have only started to be uncovered in the past decade, the report said, and the triggers that control pubertal development are still widely debated. For millennia, many mammals made adjustments to reduce fertility during periods of famine. But it now appears that an excess of fat can also be contributing to infertility rates and reproductive diseases.

Some studies in humans have found correlations between early puberty and the risk of reproductive cancers, adult-onset diabetes, and metabolic

syndrome. Early onset puberty has also been associated with increased rates of depression and anxiety in girls, studies have found, as well as increased delinquent behavior, smoking and early sexual experiences in both girls and boys.

Other research has suggested that such problems can persist into adulthood, along with lower quality of life, higher rates of eating disorders, lower academic achievement and higher rates of substance abuse.

Additional research is needed to better understand the effect of these processes on metabolism, hormones and other development processes, the survey concluded.

Provided by Oregon State University