

Obesity associated with hearing loss in adolescents

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Obese adolescents are more likely than their normal-weight counterparts to have hearing loss, according to results of a new study. Findings showed that obese adolescents had increased hearing loss across all frequencies and were almost twice as likely to have unilateral (one-sided) low-frequency hearing loss. The study was recently e-published by *The Laryngoscope*, a journal published by the American Laryngological, Rhinological and Otological Society.

"This is the first paper to show that [obesity](#) is associated with hearing loss in adolescents," said study first author Anil K. Lalwani, MD, professor and vice chair for research, Department of Otolaryngology/Head & Neck Surgery, Columbia University Medical Center.

The study found that obesity in adolescents is associated with sensorineural hearing loss across all frequencies (the frequency range that can be heard by humans); sensorineural hearing loss is caused by damage to the inner-ear hair cells. The highest rates were for low-frequency hearing loss—15.16 percent of obese adolescents compared with 7.89 percent of non-obese adolescents. People with low-frequency hearing loss cannot hear sounds in frequencies 2,000 Hz and below; they may still hear sounds in the higher frequencies (normal hearing range is from 20 Hz to 20,000 Hz). Often they can still understand human speech well, but may have difficulty hearing in groups or in noisy places.

"These results have several important public health implications," said

Dr. Lalwani, who is also an otolaryngologist at New York-Presbyterian Hospital/Columbia University Medical Center. "Because previous research found that 80 percent of adolescents with hearing loss were unaware of having hearing difficulty, adolescents with obesity should receive regular hearing screening so they can be treated appropriately to avoid cognitive and behavioral issues."

Although the overall hearing loss among obese adolescents was relatively mild, the almost 2-fold increase in the odds of unilateral low-frequency hearing loss is particularly worrisome. It suggests early, and possibly ongoing, injury to the inner ear that could progress as the obese adolescent becomes an obese adult. Future research is needed on the adverse consequences of this early hearing loss on social development, academic performance, and behavioral and cognitive function.

"Furthermore, hearing loss should be added to the growing list of the negative health consequences of obesity that affect both children and adults—adding to the impetus to reduce obesity among people of all ages," said Dr. Lalwani.

In the United States, nearly 17 percent of children are obese, defined as having a body mass index (BMI) of ≥ 95 percentile. (BMI in children is expressed as a percentile; adult BMI is expressed as a number based on weight and height.) Obesity and its associated morbidities have been identified as a risk factor for hearing loss in adults.

The study analyzed data from nearly 1,500 adolescents from the National Health and Nutrition Examination Survey—a large, nationally representative sample of [adolescents](#) between the ages of 12 and 19, conducted from 2005 to 2006 by the National Center for Health Statistics of the Centers for Disease Control and Prevention. Participants were interviewed at home, taking into account family medical history, current medical conditions, medication use, household smokers,

socioeconomic and demographic factors, and noise-exposure history.

Dr. Lalwani and his colleagues speculate that obesity may directly or indirectly lead to hearing loss. Although additional research is needed to determine the mechanisms involved, they theorize that obesity-induced inflammation may contribute to hearing loss. Low plasma levels of the anti-inflammatory protein adiponectin, which is secreted from adipose tissue, have been found in obese children, and low levels in obese adults have been associated with high-frequency hearing loss (which affects a person's ability to understand speech). Obesity also may contribute indirectly to [hearing loss](#) as a result of its comorbidities, including type 2 diabetes, cardiovascular disease, and high cholesterol—all of which have been reported to be associated with loss of peripheral hearing (relating to the outer, middle, and inner ear).

Provided by Columbia University Medical Center

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