How stimulant treatment prevents serious outcomes of ADHD

July 23 2019

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An analysis of three previous studies of children and young adults with attention-deficit hyperactivity disorder (ADHD) quantifies for the first time the extent to which stimulant treatment reduces the development of mood disorders, school problems, conduct disorders, substance use disorders and other problems. The study led by Massachusetts General

Hospital investigators is being published online in the *Journal of Adolescent Health*.

"Our study documents that early treatment with stimulant medication has very strong protective effects against the development of serious, ADHD-associated functional complications like mood and anxiety disorders, conduct and oppositional defiant disorder, addictions, driving impairments and academic failure," says Joseph Biederman, MD, chief of the Pediatric Psychopharmacology and Adult ADHD Program at MGH and MassGeneral Hospital for Children. "In quantifying the improvement seen with stimulant treatment, it measures its potency in mitigating specific functional outcomes."

Previous studies of stimulant treatment for ADHD have had limitations, such as only investigating outcomes in boys or not calculating the magnitude of the protective effects of treatment. The current study determined the number needed to treat (NNT) statistic, often used to show the effectiveness of an intervention. As the title indicates, NNT reflects the number of individuals receiving a medication or other treatment needed to prevent a specific unwanted outcome—the lower the NNT, the more effective the treatment.

The investigators analyzed data from three separate studies they had previously published to calculate the NNT needed to prevent specific outcomes. Two of these were long-term, prospective studies of children with and without ADHD—one of boys, one of girls—some of those diagnosed with ADHD were treated with stimulants, some were not. The third study was a randomized, double blind study of young adults with ADHD that compared their performance on a driving simulation upon entering the study with their performance after six weeks of treatment with either a stimulant medication or a placebo. Participants in the long-term studies averaged age 11 upon study entry and 20 at follow-up, and the current investigation focused only on those with ADHD. Participants

in the driving study were ages 18 to 26.

The NNTs for the outcomes of interest were found to be quite low:

- three participants with ADHD needed to be treated to prevent one from repeating a grade or developing conduct disorder, anxiety disorders or oppositional-defiant disorder.
- four participants with ADHD needed to be treated to prevent one from developing major depression or experiencing an accident during the driving simulation.
- five participants with ADHD needed to be treated to prevent one from developing bipolar disorder, six to prevent one from smoking cigarettes, and ten to prevent one from developing a substance use disorder.

Adjustments for the sex of participants and several other factors did not change the impact of treatment on those outcomes, except that the protection against substance use disorders was stronger in younger participants.

"Now we have the evidence allowing us to say that stimulant treatment of ADHD prevents the development of several very serious functional outcomes," says Biederman, a professor of Psychiatry at Harvard Medical School. "However, the impact on other serious outcomes—such as post-traumatic stress disorder, traumatic brain injury, suicide risk and employment success—still needs to be investigated." (is your team planning any such studies?)

More information: Joseph Biederman et al, Quantifying the Protective Effects of Stimulants on Functional Outcomes in Attention-Deficit/Hyperactivity Disorder: A Focus on Number Needed to Treat Statistic and Sex Effects, *Journal of Adolescent Health* (2019). DOI: 10.1016/j.jadohealth.2019.05.015

Provided by Massachusetts General Hospital