

Adolescent alcohol dependence may damage brain function

A study in the February 2000 *Alcoholism: Clinical and Experimental Research* (Volume 24, Number 2) presents the first concrete evidence that prolonged, heavy alcohol use can impair brain function in adolescents.

It is not clear whether the damage is reversible.

Supported by the National Institute on Alcohol Abuse and Alcoholism, a research team led by Sandra A. Brown, Ph.D., chief of psychology at the VA San Diego Healthcare System and professor of psychology and psychiatry at the University of California, San Diego, assessed neuropsychological function in 33 teens, age 15 and 16, with more than 100 lifetime alcohol use episodes and without dependence on other drugs. The alcohol dependent teens were recruited from inpatient treatment programs and compared after a minimum of three weeks of abstinence with 24 age, gender, socioeconomic status, and education-matched adolescents with no history of alcohol or other drug problems. Through structured clinical interviews corroborated by parent reports, the researchers assessed both groups for recent and lifetime involvement with alcohol and other drugs, alcohol or other drug disorders, and alcohol or other drug withdrawal symptoms. Both groups then participated in psychological tests of learning, memory, visuospatial functioning, language skills, problem solving, and attention.

"Significant brain development continues through adolescence," said Dr. Brown. "For example, certain brain nerve cell connections disappear up until about age 16 as a function of environmental stimulation and redundancy, and cerebral metabolic rates increase in childhood, then taper toward adult levels by about age 20. Thus alcohol may have quite different toxic effects on adolescent brains than on

those of adults."

But, while adolescent neurological and cognitive development may be disrupted, altered or impeded by exposure to alcohol, young brains have more resilience and more opportunities for compensatory development, Dr. Brown added.

Dr. Brown and her colleagues found several differences in memory function between the alcohol dependent and the control adolescents. Adolescents who had drunk heavily over time scored lower on verbal and non-verbal retention in the contexts of intact learning and recognition discriminability. Recent alcohol withdrawal was associated with poor visuospatial functioning, while lifetime alcohol withdrawal was associated with poorer retrieval of verbal and nonverbal information.

The study has several limitations, the authors point out: An example is that longitudinal studies will be required to determine the direction of the alcohol and neurocognitive relationship.

"While protracted alcohol involvement may cause neuropsychological impairment, it also is probable that cognitive deficits are a risk factor for alcohol disorders," said Dr. Brown. In addition, the use of other drugs may have affected cognitive performance. "None of our

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NIAAA Director

heavy drinking adolescents was dependent on other drugs, although all reported some exposure, especially to marijuana and stimulants. On the basis of animal research by others, we would expect that heavy alcohol use alone can produce behavioral abnormalities in humans."

"This work is an important step toward confirming what many scientists have suspected for some time," said NIAAA Director Enoch Gordis, M.D. "Certainly, it raises important questions for researchers and, if borne out by additional studies, for young people, parents, educators, and policy makers."

"Of course, other consequences associated with underage drinking - interference with learning, social, other competencies, fatal traffic crashes, unintentional injuries, homicide, suicide, and early, more frequent, and less safe sexual activity - are also well known. Initiatives to keep youth alcohol free and define

research-based interventions for college drinking are current NIAAA priorities."

"Our youth are an especially vulnerable part of America's alcohol problem," said Dr. Gordis. "It is time that we face underage drinking head on."

Cosponsors of the study are Susan F. Tapert, Ph.D., Eric Granholm, Ph.D., and Dean C. Delis, Ph.D., Psychology Service, VA San Diego Healthcare System and Department of Psychiatry, University of California, San Diego. The Veterans Medical Research Service and the National Institute of Mental Health contributed additional support for the study.

For additional alcohol research information and publications, visit <http://www.niaaa.nih.gov>.

The National Institute on Alcohol Abuse and Alcoholism is a component of the National Institutes of Health, U.S. Department of Health and Human Services.

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Underage persons who reported binge drinking were almost nine times more likely to have used marijuana/hashish and six times more likely to have used any illicit drug other than marijuana during the past month compared with underage persons who did not binge drink.

Underage binge drinkers were 11 times more likely to have used hallucinogens and six times more likely to have used psychotherapeutic drugs during the past month nonmedically than underage persons who did not binge drink.

Parents' naiveté about their children's drinking habits isn't the only factor that makes them enablers. Many parents believe that drinking in a controlled situation, or drinking "just beer," is okay, said Logan.

"Parents who have graduation parties with only beer often find vodka bottles or noxious oxide bottles the next morning."

Parental influence

Dr. Michael Brooks, medical director, Brighton Hospital, spurs no sentiment when drawing a connection between parental attitudes and children's behavior: "If you want to see what's wrong with a kid, look at



Advocate for teens: Holly Bair, trauma nurse coordinator at Beaumont Hospital, often speaks about the dangers of alcohol to students at area hospitals.

his parents."

Simply put, parents are children's primary influence. If parents view alcohol abuse as socially unacceptable, "it significantly decreases the likelihood that alcohol will be a problem" for their children, said Brooks. "Good parents can be involved with their kids, and still have struggling kids. But for the most part, parents are the biggest influence of a child's attitudes."

Genetics also plays a role. Alcoholism is a "polygenic" disease, meaning there is not one gene that can be isolated and indicted as the cause, said Brooks. "There are no tests, nothing as simple as a blood test, that says this person will be an alcoholic. The only thing that prevents a genetically disposed person to use alcohol is not to use alcohol."



Addiction specialist: Dr. Michael Brooks, medical director, Brighton Hospital, said there are few obstacles in society to preventing teens from experimenting with alcohol.

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Brooks warns that smoking is a gateway drug. "Especially at an early age. Probably the next thing they will do is smoke marijuana and drink alcohol."

Both Logan and Brooks indict insurance companies for the loss of in-house treatment beds in hospitals and treatment centers. "Insurance companies believe alcohol-related problems in teens can easily be treated on an outpatient basis," said Logan. "Inpatient is just no longer available unless you are extraordinarily sick."

Brighton Hospital is an addiction hospital with 63 inpatient beds located in Brighton. It recently closed its inpatient adolescent treatment ward. "We were the last bastion in the area. Now it's more of a challenge to garner resources and get treatment," said Brooks.

Lack of treatment centers for teens with serious alcohol problems, peer pressures to "fit in," and a society that accepts teen drinking as a rite of passage is all the more reason for parents to monitor their own behavior as well as their children's.

"That's where it all starts," said Brooks.

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