

Alcohol-Related Cognitive Deficits : A Meta-Analysis

The cognitive repercussions of alcohol dependence are well documented. However, there remains some ambiguity regarding which cognitive functions are most affected by alcohol, and the degree to which abstinence duration influences cognitive recovery. This is one of the first meta-analyses to examine the various cognitive functions affected by alcohol abuse and the duration of abstinence necessary to achieve cognitive recovery.

Stavro, K., Pelletier, J., & Potvin, S. (2012). Widespread and sustained cognitive deficits in alcoholism: a meta-analysis. *Addiction Biology*, 18, 203-2013.

Issue and Objectives

Alcohol abuse is associated with multiple cognitive deficits. There is general agreement in the literature that attention, memory, visuospatial abilities, executive functions, impulsivity, learning, verbal fluency and speed of processing are a few of the cognitive deficits linked to alcoholism. However, there is an ongoing debate regarding which cognitive functions are most severely affected by alcoholism, as well as on the rate of cognitive recovery in alcoholism. Some research results support the hypothesis that alcohol damages cognitive functions associated with specific regions of the brain (e.g. frontal lobe) whereas others put forward the diffuse brain deficit hypothesis. These contradictory findings prompted the authors to perform a quantitative synthesis of the literature to identify which cognitive functions are most disturbed in alcoholics by examining functions that span multiple brain regions, and to examine how duration of abstinence influences cognitive recovery.

Methodology

The authors conducted a meta-analysis, allowing them to combine the results of a series of independent studies on this topic and thus increase the number of subjects studied to arrive at an overall conclusion. A literature search identified 62 studies that assessed cognitive function among individuals with an alcohol use disorder. The following 12 cognitive domains were examined: intelligence quotient, verbal fluency/language, speed of processing, working memory, attention, problem solving/executive functions, inhibition/impulsivity, verbal learning, verbal memory, visual learning, visual memory, and visuospatial abilities. The influence of alcohol abuse on these cognitive domains was assessed according to abstinence duration: short- (<1 month), intermediate- (2 to 12 months) and long- (>1 year) term abstinence.

Highlights

- Cognitive impairment linked to alcohol use remains relatively stable during the first year of abstinence. Alcoholics with short-term abstinence presented moderate impairment across 11 cognitive domains, while individuals with intermediate-term abstinence showed moderate impairment in 10 cognitive domains.
- Cognitive impairment declines appreciably after a prolonged period of abstinence (more than a year). Individuals who are abstinent for over a year present minimal cognitive impairment.
- Many cognitive functions linked to several brain regions are damaged as a result of alcohol abuse. This finding supports the hypothesis of diffuse cognitive deficit associated with alcoholism.

Conclusion

Our study shows that alcohol is a substance capable of damaging an array of cognitive functions, particularly when chronically consumed over an extended period of time. Alcoholics present significant cognitive deficits even after many weeks or months of abstinence. However, following one year of abstinence, their cognitive performance is similar to that of «normal» individuals.

Findings from this meta-analysis also have important clinical implications for treatment of alcoholism and relapse prevention. Various treatment and prevention strategies are typically provided to alcoholics during the first month of abstinence. Yet, to learn, retain and apply the strategies provided during therapy, people usually need many cognitive functions that are significantly deficient during the first year



of abstinence. Deteriorating cognitive functions during the first year of abstinence is one of several factors that could explain lower short-term remission rates among alcoholics who have been in treatment programs. This study suggests that cognitive deficits should be considered and integrated into treatment of alcohol abuse.

More information

Moos, R.H., Moos, B.S. (2006). Rates and predictors of relapse after natural and treated remission from alcohol use disorders. *Addiction*, 101, 212-222.

Sullivan, E.V., Pfefferbaum, A. (2005). Neurocircuitry in alcoholism: a substrate of disruption and repair. *Psychopharmacology*, 180(4), 583-594.

Oscar-Berman M., Marinkovic, K. (2007). Alcohol: effects on neurobehavioral functions and the brain. *Neuropsychology Review*, 17, 239-257.

Parsons, O. (1998). Neurocognitive deficits in alcoholics and social drinkers: a continuum ? *Alcoholism: Clinical and Experimental Research*, 22, 954-961.

Keywords

- / Alcoholism;
- / Attention;
- / Executive functions;
- / Memory;
- / Meta-analysis;
- / Visuospatial abilities

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