

Research Article

The Effect of Drugs of Abuse and Alcohol Can Lead to Ocular Disorders: A Systematic Meta-Analysis

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Abstract

Background & Aim: The effect of those drug and alcohol on the ocular can range from mild to severe that can cause visual loss or even blindness. The effects of drug and alcohol abuse remain unclear and were studied in this meta- analysis.

Methods: Prospective studies that randomised heavier alcohol consumption to either were included. The primary outcome was odds ratio (OR) with a 95% confidence level risk of early AMD. Methodological quantitative was assessed using STATA software.

Results: Patients with more than three drinks per day were classified in the highest category in all studies. The six studies reported an increased risk of early AMD in relation to heavy alcohol consumption, but only in one study found it to be statistically significant. There was a borderline heterogeneity between studies (p 0.698; <50%); therefore the results are presented in the form of a fixed effect.

Conclusion: Heavy alcohol consumption more than three times the standard drink per day is associated with an increased risk of early Age-related macular degeneration (AMD). Although this relationship appears to be independent and is thought to be related to smoking as a confounding effect in this meta-analysis.

Keywords

Heavy alcohol consumption, AMD, Drug and alcohol abuse

1. Introduction

Drug abuse is rife in our society. Many cases in which people fall to death due to use drugs a lot without awareness of its hidden danger. Drug abuse or better known as drug abuse is use of a drug in amounts or by different methods for any purpose which are harmful to the individual or others. The effect of drug and alcohol abuse may lead to ocular and non-ocular manifestation.

The effect of those drugs on the ocular can range from mild to severe that can cause visual loss or even blindness. It depend on the dose, routes of administration such as enteral or oral ingestion, and parenteral such as nasal inhalation, intravenous injection, or topical application. Injection drug use can result in a variety of severe ocular conditions. Hematogenous dissemination of various fungi and bacteria may produce endophthalmitis with resultant severe visual loss [1–3]. Some study related the alcohol consumption to ocular manifestation. Decreased tear production, tear film instability may trigger the signs and symptoms of dry eye syndrome were describe following ethanol ingestion.⁴ Early cataract formation, significant degeneration of the ocular surface epithelium, glaucoma, age-related macular degeneration, open globe injury, etc may also happened due to heavy consumers of alcohol [4–7].

Thiamin deficiency due to severe malnutrition seen in chronic alcoholics patients and caused Wernicke's encephalopathy. The classic clinical triad of Wernicke's encephalopathy is ophthalmoplegia, ataxia, and confusion. Nystagmus is one of the extra ocular motility disturbances [8].

Other drugs abuse most often associated with ocular manifestation are amphetamines, barbiturates, benzodiazepines, cannabis, cocain, hallucinogens, methaqualone and opioids. Corneal damage and pupillary

mydriasis, retinal vascular diseases were reported as ocular side effect of the use of topical anesthetics, cocaine and methamphetamine [9–11].

Hallucinations are often a favourable effect of various drugs of abuse. Sympathomimetics effect causing not only vascular occlusive and hemorrhagic disease within the eye, but also ischemic stroke and intracerebral and subarachnoid haemorrhage. Those affect sre mostly occur in the use of cocaine and methamphetamine [12].

2. Methods

The meta-analysis randomized controlled trials (RCTs) was performed according to the reporting guidelines implied by the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) and Meta-analysis of Observational Studies in Epidemiology (MOOSE).

2.1. Search strategy and study eligibility

We conducted a PubMed, google scholar, sciencedirect database search for articles published between January 2000 to May 2020. The search term used in PubMed, google scholar and sciencedirect included ("drug abuse (All Fields) and ocular (All Fields)"). The included entries have an abstract available, which has to be either in English. Furthermore, investigations had to be performed in humans (or human tissue) and not in animals. Titles and abstracts were scanned to select eligible articles in which the relationship between drug abuse and ocular disorders was studied without any restricting selection criteria. A search was also carried out on the *ClinicalTrials.gov* website to identify completed but unpublished studies. All searches are carried out independently and completed with discussion.

2.2. Data extraction and quality assessment

The data entered consists of: (1) Country; (2) Patient characteristics (3) Type of research carried out; (4) Treatment protocol (intervention and comparison, sample size); (5) Measured results and effects. If there is insufficient data in the article, we contact the first author or the author in accordance with the information needed, but if the article's author does not respond within 4 weeks an in-depth search of the available information data will be carried out.

2.3. Data synthesis and analysis

The results of the research shown are presented as a odds ratio (OR) with a 95% confidence level. Meta-analyzes were carried out to calculate the estimated effect of the relationship between drug abuse and ocular disorder. The heterogeneity of the meta-analysis is measured by calculating I^2 . Fixed effect models are used when studies are conducted homogeneous meta-analyzes or with low heterogeneity. For studies with low heterogeneity, a fixed effect models was used.

3. Result

A total of 221 studies were published between 2010-2020 with keyword search, 3 journal in not english form, 212 articles relevant to keyword search, but only 6 articles

randomized controlled trials that fit the inclusion and exclusion criteria (Figure 1).

Inclusion and exclusion criteria were defined in all research studies included in this meta-analysis study. Point estimates for alcohol consumption in six studies [13–18], comparing the highest versus lowest consumption categories for early AMD, were collected and presented graphically (Figure 2). Patients with more than three drinks per day were classified in the highest category in all studies. The six studies reported an increased risk of early AMD in relation to heavy alcohol consumption, but only in one study found it to be statistically significant. There was a borderline heterogeneity between studies (p 0.698; <50%); therefore the results are presented in the form of a fixed effect.

4. Discussion

Alcohol, generally in the form of ethyl alcohol or ethanol, has an important role in human civilization for at least 8000 years. In western culture, beer and wine were the main drinks in everyday life until the 19th century [6]. In some countries, alcohol is an easy drink to get so it tends to be misused [7]. Alcohol interferes with the regulation of excitation or inhibition in the brain, so consuming alcohol can resulting in disinhibition, ataxia and sedation [4–6]. Pharmacological effects of ethanol include its effects on the onset of disease, prenatal development, gastrointestinal, cardiovascular and central nervous system. Ethanol upsets the balance of excitation and inhibition of electrical transmission in the brain, which causes disinhibition, ataxia and sedation. Tolerance to ethanol begins after chronic use which is indicated, among others, by psychological disorders and activity when alcohol consumption is stopped suddenly [8].

The increased risk of AMD is associated with heavier alcohol consumption. Our systematic review cannot investigate the J-shaped relationship. However, we show that heavy alcohol consumption is associated with an increased risk of early AMD (OR, 1,47; 95% CI, 1,10-1,95) [19].

The results of all studies in this meta-analysis agree with the negative pathophysiological effects of heavy alcohol consumption. Photooxidative damage from blue light in the oxygen-filled environment of the retina, rich in polyunsaturated fatty acids, which are very susceptible to oxidation, which is thought to play a role as a pathogenesis of AMD. Alcohol has also been shown to increase oxidative stress or modify mechanisms that protect against oxidative stress, 10,11 which can lead to AMD. In addition, because antioxidants can prevent the occurrence of AMD and it has been proven in several studies that patients with intermediate AMD treated with high-dose antioxidant supplements (vitamins C and E, zinc, and carotene) have a 28% reduction in the risk of developing advanced AMD compared to placebo (OR, 0,72; 99% CI, 0,52-0,98) and heavy drinkers have lower serum antioxidant levels.

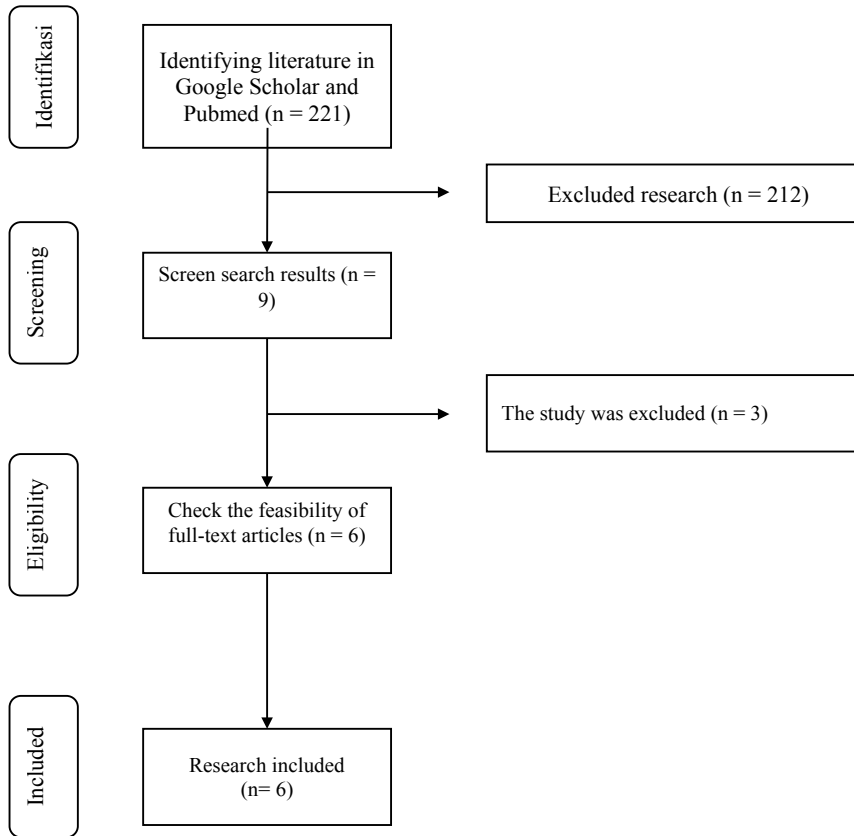


Figure 1: PRISMA diagram.

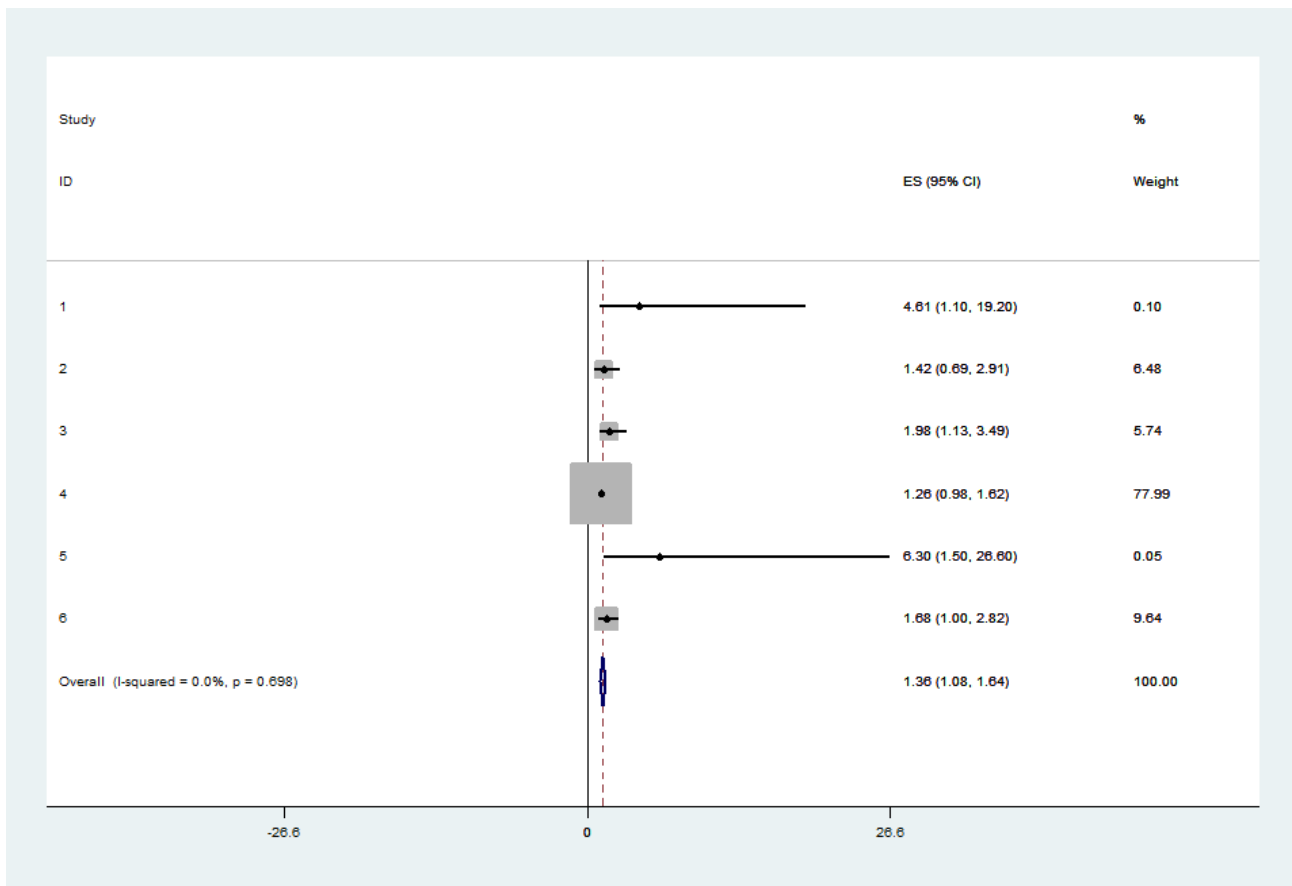


Figure 2: Graph showing for rest plot odds ratio (OR) in age-related macular degeneration (AMD) with alcohol consumption category.

Although people often regard alcoholic drinks as stimulants, ethanol is basically a depressant of the central nervous system. As with other depressants such as barbiturates and benzodiazepines, consumption of moderate amounts of alcoholic beverages can cause anti-anxiety effects and cause loss of behavioral inhibition over a wide range of doses. Signs of intoxication in each individual varies, ranging from the effects of excitation and overflowing to uncontrolled mood changes and emotional turmoil that can be accompanied by violence. The peak concentration of ethanol in the blood can be reached within 30 minutes after ethanol ingestion in an empty stomach. The volume of distribution for ethanol is close to the total water in the body (0.5-0.7 l/kg). With an equivalent dose of alcohol orally, women have a higher peak concentration than men. This is because women have more total body water content [21].

5. Conclusion

Heavy alcohol consumption more than three times the standard drink per day is associated with an increased risk of early AMD. Although this relationship appears to be independent and is thought to be related to smoking as a confounding effect in this meta-analysis.

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