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Revista de cercetare și intervenție socială

ISSN: 1583-3410 (print), ISSN: 1584-5397 (electronic)

Selected by coverage in Social Sciences Citation Index, ISI databases

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Revista de cercetare și intervenție socială, 2013, vol. 40, pp. 180-187

The online version of this article can be found at:

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Published by:

Expert Projects Publishing House



On behalf of:

„Alexandru Ioan Cuza” University,

Department of Sociology and Social Work

and

Holt Romania Foundation

REVISTA DE CERCETARE SI INTERVENTIE SOCIALA

is indexed by ISI Thomson Reuters - Social Sciences Citation Index

(Sociology and Social Work Domains)



Alcohol and cardiovascular disease - a social impact analysis

Florin MITU¹, Elena STEFANACHI², Maria Magdalena LEON²

Abstract

Alcohol has been considered a risk factor for over a century, but the pathogenesis and natural history of alcohol-related heart disease remains obscure. Numerous researches have demonstrated the beneficial effects of alcohol consumption as long as it is consumed in moderation. Advances have been made in our understanding of the effects of acute and chronic alcohol administration both at hemodynamic and cellular level, and recent studies have indicated that changes in heart dimensions and function are common in alcoholics. Depending on the amount consumed, alcohol increases blood pressure, which increases the risk of hypertension, cardiomyopathy, heart failure, myocardial infarction, arrhythmias etc. In terms of overall mortality, epidemiological investigations have shown that in case of young people, drinking any amount of alcohol increases the overall risk of death, the risk being greater as the amount of alcohol consumed increases. The success of the joint efforts of researchers, clinicians, psychologists and of all those whose activity is related to alcoholology lies in the ability to convince the society of the importance of this health issue, and that the dependency syndrome that it creates attracts many biological, psychological, social problems.

Keywords: Alcohol abuse; cardiovascular disease; alcohol consumption.

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Introduction

Alcohol is the leading risk factor for disease burden in the Western Pacific and the Americas, and the second largest in Europe. All over the world, the alcohol is responsible for approximately 2.5 million deaths annually and the cost for treatment all the complications of alcohol intake are inestimable. Throughout history, alcohol has been shown to have an important contribution in making important decisions at the level of the individual and of the society. Scientific research related to alcohol focuses on the behavior towards this compound, the factors that predispose to alcoholism or organism reaction to alcohol toxicity, their ultimate goal being the change of mentalities regarding the alcohol use and abuse (Bogg, Finn and Monsey, 2012). But the effects in social area are more important, for instance, greater alcohol outlet density has been linked to higher rates of violence, violent crime, assaults child maltreatment and physical abuse and homicides. It is very important to note the relationship between outlet density and other traffic-related consequences, including drinking and driving, and riding with intoxicated drivers, alcohol-involved pedestrian collisions, traffic injury rates requiring hospitalization and alcohol-related crash fatalities (Pereira, Wood, Foster and Haggar, 2013).

Numerous studies have contributed to the appearance of the *alcoholology* – the science that includes all the knowledge related to the individual and social consequences of alcohol consumption. The first information about this term appeared in 1967 in an article by Pierre Fouchet, alcoholology development as a science being performed at a fast pace after 1960-1970 along with the development of other scientific fields. What characterizes alcoholology is the multidisciplinary, as it is a science that is of interest for medicine, social sciences, as well as for public health.

Alcohol and mental health

The potential impact of excessive alcohol consumption on mental health is widely accepted, with the majority of alcohol-related disease burden due to neuropsychiatric disorders, which include alcohol use disorders and depression. More over, the relationship between alcohol and mental health is also bi-directional, with evidence suggesting that among individuals more predisposed to harmful alcohol consumption are those prone to episodes of depression, anxiety and stress (Pereira, Wood, Foster and Haggar, 2013). The risk factors, like body mass index, total cholesterol, hypertension, status of smoker, alcohol consumption and diabetes mellitus are involved in the appearance of Alzheimer's disease and mild cognitive impairment (Ciobica, Padurariu, Bild and Stefanescu, 2011). Another study suggests that moderate alcohol consumption, especially in earlier adult

life, is associated with a reduced risk of dementia (Ruitenberg, 2002; Peters, Peters, Warner, Beckett and Bulpitt, 2008). Additionally, some very interesting studies have discussed the joint effects of nicotine from cigarettes and alcohol consumption on risk of Alzheimer's disease, stating a protective effect of alcohol consumption, which is better expressed in non-smokers individuals (García, Ramón-Bou and Porta, 2010).

The researchers from Slovenia show that low physical quality of life is strongly predictive of higher frequent attendance and the presence of depression, panic syndrome, other anxiety syndrome, alcohol misuse and similar finding was observed for people with lower educational level (Rifel et al, 2013).

Alcohol and cardiovascular system

Data from the HAPIEE (Health, Alcohol and Psychosocial Factors in Eastern Europe) study, made in Lithuania, on men and women, aged 45–72 years, show there is an association between cardiovascular disease, alcohol intake, older age, lower education level and poorer cognitive performance (Tamosiunas et al., 2012).

The presence of cardiovascular risk factors such as cholesterol, hypertension, diabetes mellitus, fibrinogen levels, homocysteine, C-reactive protein and the middle or elderly men and women are the principal factors for the appearance of cardiovascular diseases and psychic problems. The quality of life and self-rated health has a big importance on cognitive function in both sexes. The studies show that alcohol intake was lower in impaired cognitive function for women, but not for men (Tamosiunas et al., 2012).

We know that moderate alcohol consumption has been found to be associated with a reduced risk of cardiovascular-related outcomes, like coronary heart disease, stroke, congestive heart failure, including death but this is not available for atrial fibrillation. In healthy people, the alcohol decrease heart rate variability because of diminished vagal modulation (Koskinen, Virolainen and Kupari, 1994).

The benefic effects of moderate amount of alcohol, seen in observational studies, continue to be hardly debated in the medical literature and popular media. The review of 84 studies of alcohol consumption and cardiovascular disease, show that moderate amount of alcohol is consistently associated with a 14–25% reduction in the risk of all outcomes assessed compared with abstaining from alcohol, but consumption of larger amounts of alcohol is associated with higher risks for stroke incidence and mortality. Another meta-analysis supports the latter association for coronary heart disease, with a 25–35% risk reduction for light to moderate drinking, present at heavier drinking (Ronksley, Brien, Turner, Mukamal and Ghali, 2011). Short term effects of alcohol may be related to the inability to coordinate movements, temporary impairment of memory or mood; in large

quantities it can cause depression, or conversely, consumed moderately, it may be a perfect relaxing factor. As the blood alcohol concentration increases, the central nervous system activity slows down. A blood alcohol concentration of 50mg/dL can be correlated with a state of mild intoxication; at a concentration of 350mg/dL coma and at 500mg/dL even death will appear. The beneficial effects of alcohol consumption as long as it is consumed in moderation have been demonstrated. The increase of HDL cholesterol level, the decrease of blood pressure, the prevention of arterial atherosclerotic lesions appearance or thrombus formation in the coronary arteries, the decrease of the risk of a sudden heart attack, the increase of the DHEA hormone level (dehydroepiandrosterone), with a positive effect on the cardiovascular system are just a few examples.

At the same time many of us sadly fail to stick to an optimal amount of alcohol and therefore they put their health at risk, the effects being extremely severe, and sometimes irreversible, all the more so as family medical history includes certain cases of alcoholism: central nervous system damage, liver, pancreas, myocardial muscle damage; hypertension (Taylor et al., 2009), alcoholic cardiomyopathy, manifested by excessive enlargement of the heart, which considerably reduces the contractile capacity and blood pumping into the body; heart rhythm disorders.

More over, acutely ingesting excessive amounts of alcohol “binge drinking” has been related to increased risks of myocardial infarction, stroke, hypertension, type 2 diabetes mellitus and atrial fibrillation (Liang et al, 2012). Depending on the amount consumed, alcohol increases blood pressure, which increases the risk of hypertension (Higashiyama et al., 2013). There is therefore clear evidence that alcohol abuse increases the risk of hypertension in the two sexes, while the effects of low or moderate consumption are still controversial (Sesso, Cook, Buring, Manson and Gaziano, 2008). Regarding the link between alcohol and the risk of ischemic infarction it has been found that there is a directly proportional relationship: a low consumption reduces the risk of infarction, while increased abusive consumption increases it. Even an occasional abusive consumption is an important risk factor for the appearance of an ischemic or hemorrhagic infarction. For this reason it should be considered as an important cause of myocardial infarction in adolescents and young adults. Also, occasionally abusive consumption increases the risk of arrhythmias and sudden death, even in people with no history or previous signs of heart disease (Gao et al., 2012).

Excessive alcohol consumption, on a more regular basis, increases risk of developing alcoholic cardiomyopathy (directly proportional to the doses consumed) (Beulens et al., 2007) and congestive heart failure on both sexes (Conen et al., 2008). Dilated cardiomyopathy from alcoholic cause appears after a long-term history of heavy alcohol consumption (5-15 years) and it is echographic characterized by left ventricular dilation, increased left ventricular mass, reduced or normal left ventricular wall thickness and depressed myocardial contractility. It is very important to diagnose heart failure because it is a major cause of morbidity

and mortality all over the world. Myocardial infarction, hypertension and type 2 diabetes mellitus are predictors for heart failure. It is interesting to know that excessive consumption of alcohol (heavy drinking) increases the risk of heart failure, whereas light-to-moderate drinking has been associated with a lower risk of heart failure (Djoussé and Gaziano, 2008).

The Framingham Heart Study reported a 59% lower risk of heart failure to the men with moderate consumption of alcohol versus abstainers, but the results are not present at women. Another study, SOLVD (Study Of Left Ventricular Dysfunction) did not show an association between alcohol consumption and heart failure among patients with ischemic cardiomyopathy. The same result was observed in SAVE study (Survival And Ventricular Enlargement), when moderate drinking was not associated with hospitalization for heart failure in patients with myocardial infarction (Djoussé and Gaziano, 2008; Mitu, Turiceanu & Gaitan, 2011).

A meta-analysis shows a linear relation between alcohol consumption and risk of atrial fibrillation among men, but not among women. The explanation for this relation is that alcohol shorts the effective refractory period of the right atrium, promotes propagation of a critically timed premature atrial complex, increases thickening and scarring of cardiac connective tissue, alters oxidative stress, induces electrolyte imbalance and negative inotropic effect through calcium-channel inhibition in ventricular cells. If the patient has diabetes, cardiovascular disease, etc. the incidence rates of atrial fibrillation is several times higher than the general population (Liang et al., 2012). However, the researchers from the Cardiovascular Health Study did not find a relationship between different levels of alcohol consumption and atrial fibrillation in elderly individuals, although gender-specific informations were not provided. There are no effects on atrial fibrillation at women when they consume moderate amounts of alcohol, but excessive amounts of alcohol can increase the risk of atrial fibrillation (Mukamal, Psaty and Rautaharju, 2007).

Alcohol and liver function

What is important to realize is that the heart is not the only organ affected by alcohol abuse. The biggest amount of the alcohol is metabolized in the liver, but over time this can lead to accumulation of toxins, which will result in irreversible damage at the level of this organ (Zatonski et al., 2012). European Registry on liver transplant demonstrates that alcohol produces 1/3 of liver cirrhosis requiring liver transplant, while the number of patients with alcoholic liver disease who require transplant is increasing (Burra et al., 2010). Numerous data also indicate an increase of mortality due to liver cirrhosis in Eastern European countries, the UK and Finland (Makela and Osterberg, 2004).

The effects of alcohol on other systems of the body

A study made in USA in 2011, among women and girls, show that “binge drinking” was responsible for more than half of those deaths and years of potential life lost. Excessive amount of alcohol is a risk factor for many health and social problems including unintentional injuries, violence, liver disease, hypertension, heart disease, stroke, breast and other cancers, reduced cognitive function, and alcohol dependence. The alcohol can affect the normal functioning of the immune system, causing an increase in certain infectious diseases, including pneumonia, tuberculosis or HIV. Alcohol-dependent patients are subject to a risk two to four times higher regarding the appearance of acute respiratory distress syndrome, under conditions of sepsis or trauma (Crews, 2012). In patients with various surgical interventions, alcohol increases the risk of postoperative complications and of the need for intensive care measures directly proportional to the amount consumed. Epidemiological studies show that there is a direct relationship between alcohol consumption and the risk of fractures in both men and women, depending on the amount consumed. However, the risk of fracture is higher in men (Harris AH et al., 2012). Reproductive disorders in case of alcohol consumption are not negligible, affecting both sexes (Gude, 2012). In terms of overall mortality, epidemiological investigations have shown - at least in the UK - that in case of young people (women under 45 and men under 35), drinking any amount of alcohol increases the overall risk of death, the risk being greater as the amount of alcohol consumed increases. It is noteworthy that alcohol interacts with certain medications such as antidepressants, antibiotics and painkillers, with very serious effects on the human body.

Conclusions

The success of the joint efforts of researchers, clinicians, psychologists and of all those whose activity is related to alcoholology lies in the ability to convince the society of the importance of this health issue, and that the dependency syndrome that it creates attracts many biological, psychological, social problems. The goal of alcohol addiction treatment remains the improvement of physical and mental health, as well as the relational and social status of the patient, the debate between adherents of abstinence and those of moderate alcohol consumption remaining still open.

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