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This document is part of a collection that serves two purposes. First, it is a digital archive for a sampling of unpublished documents, presentations, questionnaires and limited publications resulting from over forty years of research. Second, it is a public archive for data on college student drinking patterns on the national and international level collected for over 20 years. Research topics by Dr. Engs have included the exploration of hypotheses concerning the determinants of behaviors such as student drinking patterns; models that have examine the etiology of cycles of prohibition and temperance movements, origins of western European drinking cultures (attitudes and behaviors concerning alcohol) from antiquity, eugenics, Progressive Era, and other social reform movements with moral overtones-Clean Living Movements; biographies of health and social reformers including Upton Sinclair; and oral histories of elderly monks.

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Women, alcohol, and health: a drink a day keeps the heart attack away?

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Abstract

This review examines the effects of alcohol on women's health. It discusses studies examining the association of lower mortality with moderate drinking, explores reports relating alcohol consumption to health problems among women, and alludes to the ancient Mediterranean moderate drinking norm in light of this current research.

Introduction

Until the past few years, most research examining the health effects of alcohol consumption used men. However, it is not always possible to extrapolate information concerning women from these data as women have different biological functions. A few recent studies have included or focused on the effect of alcohol on women in terms of health and illness other than fetal alcohol research. Most studies appear to show that moderate alcohol consumption, in particular of wine, is associated with lowered mortality among women. Southern European drinking patterns have their origins in antiquity; could moderate drinking have been associated with health and longevity by the populace, thus reinforcing this pattern as a cultural norm?

The health implications of moderate alcohol consumption by men and women

Over the past decade, most studies that focused on alcohol consumption among women investigated fetal alcohol syndrome. Several reports discussing this subject were found during the past year [1-3]. However, few studies in the past examined other health aspects of alcohol consumption. Therefore, this review will explore health issues of women and alcohol other than the fetal alcohol syndrome.

Prospective cohort studies, conducted primarily with men, have found that light to moderate drinkers, one or two drinks each day, have lower mortality rates compared with either nondrinkers or heavier drinkers. This U or J-shaped curve in mortality is largely a result of a decreased risk of coronary heart disease and, to a smaller extent, ischemic stroke [4,5,6,7].

Besides decreased mortality, there appear to be other health implications related to moderate drinking in studies that examined both women and men. Among Italians, La Vecchia et al. [8] found that individuals who consumed any alcohol were at less risk for gallbladder disease compared with those who abstained from alcohol. Randin et al. [9], in a Swiss study, suggested that low levels of alcohol act to dilate blood vessels, thus reducing blood pressure. On the other hand, above two to three drinks each day increased blood pressure. Istvan et al. [10] at the US National Heart, Lung, and Blood Institute, showed an association with lower body weight and alcohol consumption among nonsmokers. Women who consumed under two drinks each week had the lowest body mass index. This could have implications for a lowered risk of heart disease.

Studies examining the effect of drinking on general health among college students and on bone density in older individuals were published. Among a sample of US university students, Engs and Aldo-Benson [11] found no difference between nondrinkers and those who consumed up to 21 drinks each week in the incidence of upper respiratory infections and other acute health problems for both women and men. Above this level there was increased illness. Among elderly women, age-related loss of bone mineral density is a chief factor in osteoporosis, a leading cause of death and disability. A report from the Framingham cohort study [12] found that consuming alcohol was associated with a high bone density in postmenopausal women and also in elderly men. These researchers, who studied both women and men, appear to suggest that more than two or three drinks each day are associated with health problems.

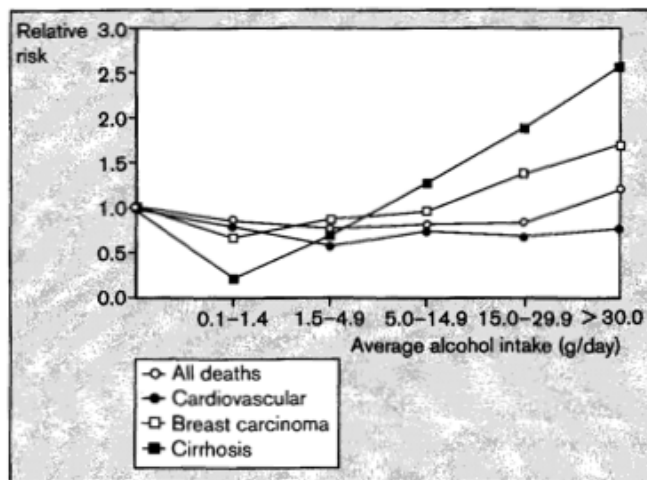
The health implications of moderate alcohol consumption by women only

In the early 1990s, a few publications began to focus exclusively on women and alcohol [13]. As a whole, women in the USA and other cultures are more likely to abstain, drink less, and drink less frequently compared with men [14]. Only a few studies, over the time period for this review, found a positive association with moderate alcohol consumption and health. Fuchs et al. [15] reported on 86000 US women from the prospective Nurses Health Study. Over a 12-year period, the authors found the relative risks of death in drinkers compared with non-drinkers were 0.83 for women who consumed from one to three drinks each week. Light to moderate drinking (1.5-29.9g each day) was associated with a decreased risk of death from cardiovascular disease. Risks for breast cancer and hepatic cirrhosis increased at three drinks a day (:2: 30 g each day) or more (Fig. 1).

The authors concluded that the benefits were greatest for women over 50 years of age and for those reporting one or more risk factors for coronary heart disease, which accounted for almost

75% of the study population. The results of this study are similar to other reports that suggest that small amounts of alcohol decrease the risk of heart disease in women.

Figure 1. Relative risk according to cause and alcohol intake in grams/day



Adapted from Fuch *et al.* 1995 [15].

A few groups suggested a lack of association between moderate alcohol consumption and breast cancer. Freudenheim *et al.* [16], in a case-control study of pre and postmenopausal women in western New York, USA, found little evidence of increased risk of breast cancer for lifetime low levels of alcohol consumption. The relative risk of about two drinks each day was 0.86.

The Netherlands cohort study [17] on diet and cancer found moderate consumption led to an insignificant risk for breast cancer. However, an increased risk, particularly among postmenopausal

women, who consumed 30 g (three or more drinks) or more of wine and spirits, was found. The relative risk of drinkers compared with non-drinkers was 1.31.

In one gynecological study, no significant physiological change in the responsiveness of women to alcohol during the menstrual cycle as a result of changes in levels of sex steroid hormones was found [18]. Among Italian women, no significant difference for spontaneous abortion rates between those who abstained and those who consumed different levels of alcohol was ascertained [19]. The results of these reports appear to support a lack of association of health problems with moderate consumption among women.

The health consequences of alcohol consumption by women

In contrast to these results, several reports suggested increased cancer risks for women that are associated with alcohol consumption. Parazzini *et al.* [20] in a study of Italian women, found an increase in endometrial cancer associated with increased alcohol consumption. The relative risk for women who drank alcohol compared with those who abstained was 1.3. The estimated risk was 1.3, 1.1, 1.4, and 1.6 for women abstaining, drinking under one, from one to two, and over two drinks each day, respectively.

Longnecker *et al.* [21] studied women from the North Eastern and North Central sections of the USA. The authors of this case-control study found the risk for breast cancer increased with increasing doses of alcohol. Women whose lifetime average daily alcohol consumption was greater than or equal to 33 g each day (about three drinks or more) experienced a relative risk of 2.3 compared with that of 1.0 for women with a lifelong abstention from alcohol. However, the

authors found that alcohol consumption before the age of 30 years or by postmenopausal women receiving estrogen replacement therapy did not increase the risk of breast cancer.

Very heavy drinking has been found to be associated with cardiac damage. In a study among Spanish alcoholic patients [22], despite the fact that the mean lifetime dose of alcohol among the women was only 60% that of the men, the prevalence of cardiomyopathy was the same. The authors concluded that women were at greater risk for alcohol-induced cardiac damage compared with men. In a sample of US alcoholic women, Smith et al. [23] found an association of higher mortality with 'bender' drinking among the older women. The authors suggested that women may be more sensitive to short periods of high concentrations of alcohol compared with men. One group suggested that small amounts of alcohol could cause potential cardiac problems. Wang et al. [24], with a sample of US women, reported that even one drink increased blood pressure and heart rate in an exercise situation. Most but not all of the studies showing an association of alcohol with health problems suggested the relationship occurred with heavier drinking.

Wine, health, and the origins of drinking cultures

Some studies have implied that moderate wine consumption is more associated with longevity compared with moderate drinking of spirits [25]. Gronbaek et al. [26] over a 12-year study period in Copenhagen, Denmark, found that the risk of dying steadily decreased with an increasing intake of wine for both women and men for all causes of mortality. The relative risk was 1.00 for the individuals who never drank wine compared with 0.5 for those who drank three to five glasses each day. Intake of neither beer nor spirits, however, was associated with reduced risk.

Longnecker et al. [27] found that moderate wine consumption did not increase the risk of breast cancer in women. The authors suggested the reason for these results could be that some wine contains phenolic compounds which have antioxidant activity, whereas beer and spirits may contain substances that have estrogenic activity.

In view of these reports, it is interesting to note that the mortality rate for women from cardiovascular disease is 256 out of 100000 in Glasgow, Scotland, compared with 30 out of 100000 in Catalonia, Spain, where wine is the most commonly consumed beverage among older women compared with beer and spirits in Scotland [27-29]. Rimm and Ellison [30] suggested that a Mediterranean diet high in fruits, vegetables, and grains along with wine may be an important factor in preventing heart disease and ischemic stroke for both women and men. La Vecchia [31] also discusses the same subject. In addition, La Vecchia et al. [32] found that Italians who abstained from alcohol (primarily wine) were at increased risk of diabetes, hypertension, heart attacks, ulcers, and other health problems. The authors concluded that one to two drinks a day is an important component of a healthy lifestyle and is conducive to good health and longevity.

These studies suggest that moderate drinking, in particular of wine, is associated with longevity and better health among women and men. Alcohol-based beverages have been drunk in moderation with meals by Italian and other Southern Europeans for centuries. Folk wisdom, through proverbs, has suggested that 'wine builds the blood' and 'wine is the milk of the elderly' [33].

The observation that a small amount of alcohol had beneficial but large amounts had harmful health effects may have been a factor in shaping cultural norms. It has been suggested that in antiquity, divergent climates, political processes, and agricultural ecosystems led to different drinking norms and beverage preferences in the Northern and in the Southern regions of Western Europe [34]. The Mediterranean regions, well suited to viticulture, developed a drinking pattern of consuming small amounts of wine with meals. Alcohol was widely acceptable and available to most members of the culture, however, intoxication was frowned on. In contrast, episodic 'feast drinking' to intoxication developed among the Northern tribes because of the scarcity of alcohol. Their grain-based beverages without preservatives led people to consume it immediately. The resulting health and social problems from this pattern led to ambivalence about alcohol.

It is interesting to speculate if these drinking styles and their relationship to health were a reinforcing factor to the shaping of cultural norms. Could women and men who drank small amounts of alcohol with meals have been seen by the populace to live longer and have better health than those who abstained or drank to intoxication? Some of the data-based research discussed in this review, which appears to imply health benefits from small amounts of alcohol, may, in fact, support ancient folk wisdom.

Conclusion

In conclusion, with a few exceptions, moderate alcohol intake among women (one to two drinks each day) is associated with a reduction in overall mortality. This reduction is primarily as a result of a reduced risk of coronary heart disease. Increased alcohol consumption may increase the risk of breast and endometrial cancer. However, wine consumption may not be related to the risk of breast cancer. The norm of moderate drinking with meals in Southern Europe may have partially developed in antiquity, based on 'folk' observations that this moderate drinking was associated with longevity and health among women and men.

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