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Mendelian randomization impacts public health policy on alcohol use

Drinking alcohol in moderation was widely considered to protect against cardiovascular disease and not be harmful in pregnancy. However, there were concerns that the evidence informing this guidance was flawed and people were being given the wrong advice.

What translational research was done?

We wanted to establish whether drinking alcohol during pregnancy harms children's health and development. We also wanted to address the question of whether alcohol does actually protect against heart disease.

This research used Mendelian randomization, a method pioneered in Bristol. Mendelian randomization uses natural variation in our genes to test the effects of risk factors like drinking alcohol[1]. We used it to estimate the effects of drinking alcohol during pregnancy on childhood health, and of moderate drinking on cardiovascular disease.

It wouldn't be ethical to run randomized trials of alcohol use during pregnancy. Previously, research on this topic has been through 'observational' studies, where participants are already exposed to a risk factor and researchers don't try to change who is or isn't exposed. However, there are limitations with this type of study: it can be impossible to unpick what is caused by alcohol use, and what is caused by other factors.

We used Mendelian randomization to estimate the effect of alcohol use in pregnancy by using a variant of a gene associated with reduced alcohol consumption that isn't linked to other risk factors. This demonstrated that moderate alcohol consumption in pregnancy may adversely affect children's IQ and exam results[2].

Our analysis of drinking alcohol on heart disease in adults demonstrated that even low to moderate levels of alcohol consumption may increase risk of cardiovascular disease, contrary to popular opinion[3].

Translation into later phase research and clinical practice

Our studies suggesting that drinking alcohol in pregnancy may affect children's IQ and school results informed changes to the UK Chief Medical Officers' guidelines on drinking in pregnancy. They were revised to:

"no alcohol is safe in pregnancy"

Our heart disease findings were included in the US Department of Agriculture Scientific Report of the 2020 Dietary Guidelines Advisory Committee, which now recommends that:

"men and women who drink limit themselves to a single serving of wine, beer or liquor per day"

References

1. Davey Smith and Ebrahim, International Journal of Epidemiology, 2003;DOI:10.1093/ije/dyg070
2. Zuccolo et al, International Journal of Epidemiology, 2013;DOI:10.1093/ije/dyt172
3. Holmes et al, BMJ, 2014;DOI:10.1136/bmj.g4164