

Food buying habits of people who buy wine or beer: cross sectional study

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Abstract

Objective To investigate whether people who buy wine buy healthier food items than those who buy beer.

Design Cross sectional study.

Setting Supermarkets in Denmark.

Data Information on number, type of item, and total charge from 3.5 million transactions over a period of six months.

Results Wine buyers bought more olives, fruit and vegetables, poultry, cooking oil, and low fat cheese, milk, and meat than beer buyers. Beer buyers bought more ready cooked dishes, sugar, cold cuts, chips, pork, butter or margarine, sausages, lamb, and soft drinks than wine buyers.

Conclusions Wine buyers made more purchases of healthy food items than people who buy beer.

Introduction

The differential effects of beer and wine on morbidity and mortality indicate that components other than ethanol may be important.^{1,2} Usually, the relations between drinking beer, wine, and spirits and health outcomes are adjusted for confounding by sex, age, social class, and smoking; however, differences in beverage-specific drinking patterns or other risk factors could also affect the findings.² Some studies have found that wine drinkers have a healthier diet than people who drink beer or spirits, and this may explain why wine has an additional beneficial effect on health.³⁻⁵ However, self reporting may lead to under-reporting or over-reporting of diet and other lifestyle factors.^{6,7}

To study whether people who buy wine also buy healthier food items and therefore have a healthier diet than those who buy beer, we investigated the relation between the purchase of beer and wine and various food items, using data from Danish supermarkets.

Methods

Data were taken from approximately 3.5 million transactions chosen at random from 98 outlets of two large Danish supermarket chains—16 Bilka and 82 Føtex supermarkets—over six months (September 2002 to February 2003). Dansk Supermarked, which collects these data for inventory control, provided us with details of which items were bought, the number and price of the items, and the total charge for each customer's transaction. The data cannot be traced to individual consumers.

Spirits are bought in a separate section of the supermarkets and are not found on receipts for food. We categorised customers as "wine only," "beer only," "mixed," or "non-alcohol" buyers. Food items were divided into 40 categories (see table on bmj.com). All

food items were dichotomised: 1 if a customer bought the item and 0 otherwise.

Statistical analysis

Firstly we used correspondence analysis to investigate correlations between the four categories of alcohol buyers and the 40 food categories. Correspondence analysis is a descriptive technique designed to analyse simple two way tables by measuring the association or correlation between the rows and columns. See bmj.com for details. We then carried out logistic regression analysis to estimate the size of the difference between beer and wine buyers with food categories as the dependent variable and alcohol categories as the independent variable.

Results

Customers who bought wine but not beer comprised 5.8% of the total number of customers, and those who bought beer but not wine constituted 6.6% of the total number; 1.2% of customers bought both wine and beer. In general, customers who bought both beer and wine bought more food items and spent more money than other customers. A smaller proportion of beer buyers purchased fruit or vegetables, bread, poultry, milk, cereals, and sweets than other customers. A higher proportion of wine buyers than beer buyers bought all the food items, except for soft drinks, which were bought by a higher proportion of the beer buyers, probably because people who bought beer also bought fewer items and spent less than wine buyers (see table on bmj.com).

Figure 1 shows the results of the correspondence analysis. Dimension 1 (vertical axis) explains 83% of the χ^2 value and dimension 2 (horizontal axis) explains 17%. Dimension 1 is linked to wine, beer, chips, soft drinks, veal, oil, and olives at one end and milk, cereals, cold cuts, and low fat products at the other end. Dimension 2 is linked to soft drinks, beer, lamb, chips, butter, sausages and pork at one end and olives, oil, veal, wine, and beef at the other end. The correspondence plot shows that beer buyers are more likely to buy chips, soft drinks, and lamb and that wine buyers are more likely to buy oil, olives, veal, and beef. Milk, bread, pasta, and cold cuts, which we interpreted subjectively as "everyday" purchases, were found at the low end of dimension 1, whereas chips, alcohol, veal, spices, and beef, which we interpreted as "weekend" shopping, were at the high end. Similarly, we interpreted dimension 2 as a "Mediterranean" diet (oil, wine, veal, low fat meat, and low fat cheese) at the low end and as a "traditional" diet (beer, butter, sausages, and pork) at the high end.

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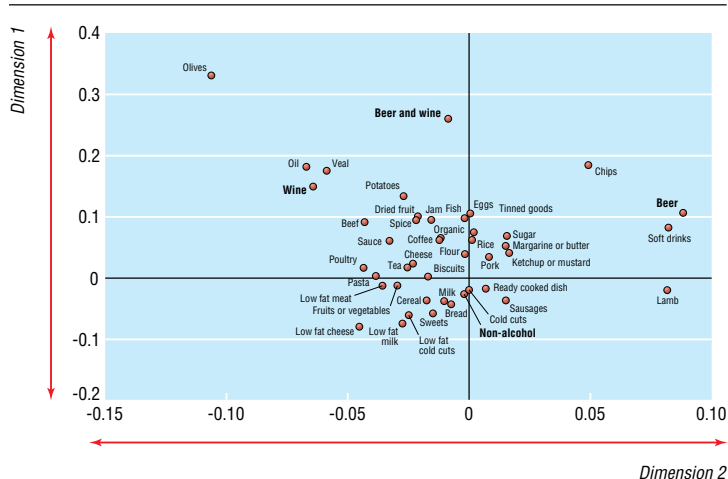


Fig 1 Food items bought by wine and beer buyers. Food items that are highly correlated and more likely to be bought together are closer to each other

Figure 2 shows the results of the logistic regression; beer buyers made fewer purchases of olives, fruit or vegetables, cooking oil, poultry, and low fat milk, cheese, and meat than wine buyers and more purchases of soft drinks, lamb, sausages, butter or margarine, pork, chips, cold cuts, sugar, and ready cooked dishes.

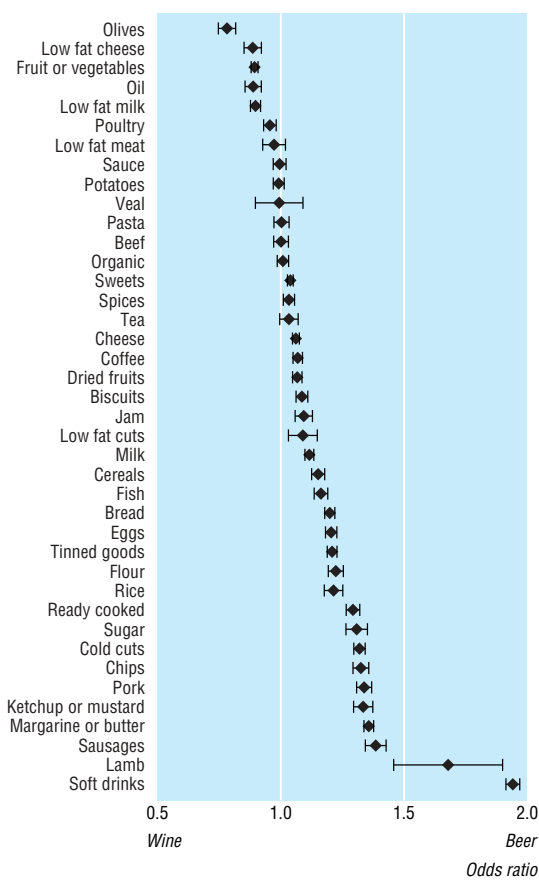


Fig 2 Likelihood of beer and wine buyers buying items of food. Items with an odds ratio lower than 1 are bought more often by wine buyers and items with an odds ratio higher than 1 are bought more often by beer buyers

Discussion

People who buy (and presumably drink) wine purchase a greater number of healthy food items than those who buy beer. Wine buyers bought more olives, fruit or vegetables, poultry, cooking oil, and low fat products than people who bought beer. Beer buyers bought more ready cooked dishes, sugar, cold cuts, chips, pork, butter, sausages, lamb, and soft drinks than people who bought wine. Wine buyers were more likely to buy “Mediterranean” food items, whereas beer buyers tended to buy “traditional” food items.

Customers who bought both beer and wine also bought the largest number of items. We stratified the analyses according to the number of items bought to oppose a possible bias, but similar patterns were found for all strata of number of items.

Strengths and weaknesses of the study

Self reports of alcohol intake are known to be unreliable. Our study was based on data from a random sample of transactions, and used information on what people buy, and presumably consume, rather than what they say they eat or drink, so was not flawed by under-reporting or over-reporting bias. The data obtained are precise figures and the study design (data collected over a long period of time) reduced seasonal variation.

Bilka and Føtex supermarkets are found in all parts of Denmark and have a broad product line, with regard to both food and non-food items, and their customers represent a broad section of the Danish population, although middle income families tend to be over-represented. Most of the beer (and probably most of the wine) traded in Denmark is sold in supermarkets and the customers studied represent a broad spectrum of the Danish population in all parts of Denmark. One drawback of this study is the lack of background information on the customers, such as age, sex, marital status, education, and income. Furthermore, we do not know if customers systematically buy certain items in the supermarket and others in specialist shops. Another potential bias is that different people within the households may consume different food items. Customers who bought both beer and wine also bought the largest number of items, and wine and beer may be consumed by different individuals in the same household. However, we assume that most adult members of the households share drinking habits.

Comparison with other studies

Our results support findings from the United States, Denmark, and France showing that wine drinkers tend to eat fruit, vegetables, and fish and use cooking oil more often and saturated fat less often than those who prefer other alcoholic drinks.³⁻⁵

Possible explanation of the health benefits of drinking wine

The additional beneficial effect of drinking wine, rather than other alcoholic drinks, on mortality and morbidity from coronary heart disease and certain cancers may be due to specific substances in wine or to different characteristics of people who drink other types of alcohol. Drinking habits probably depend on social and cultural factors, lifestyle, and diet. Wine tends to be drunk with meals, in modest amounts, which may have

What is already known on this topic

Drinking wine is associated with lower mortality than drinking beer and spirits

Self reports suggest that wine drinkers have healthier diets than beer or spirits drinkers

What this study adds

An objective measure of alcohol intake and dietary habits found that people who buy and presumably drink wine make more purchases of healthy food items than people who buy beer

metabolic advantages; in contrast, spirits are often consumed at times other than mealtime. In Denmark wine drinkers have a higher level of education, higher income, better psychological functioning, and better subjective health than people who do not drink wine.^{8,9} Similar results have been found in a Californian population: people who prefer wine tend to be educated, healthy, lean, young or middle aged women with a moderate alcohol intake, whereas those who prefer beer tend to be less educated, healthy young men with a higher alcohol intake.¹⁰ Thus, the influence of type of alcoholic drink on mortality could be due to insufficient adjustment for lifestyle factors.⁸

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Competing interests: None declared.

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Chronic stress at work and the metabolic syndrome: prospective study

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Abstract

Objectives To investigate the association between stress at work and the metabolic syndrome.

Design Prospective cohort study investigating the association between work stress and the metabolic syndrome.

Participants 10 308 men and women, aged 35-55, employed in 20 London civil service departments at baseline (the Whitehall II study); follow-up was an average of 14 years.

Main outcome measures Work stress based on the iso-strain model, measured on four occasions (1985-99). Biological measures of the metabolic syndrome, based on the National Cholesterol Education Program definition, measured in 1999.

Results A dose-response relation was found between exposure to work stressors over 14 years and risk of the metabolic syndrome, independent of other relevant risk factors. Employees with chronic work stress (three or more exposures) were more than twice as likely to have the syndrome than those without work stress (odds ratio adjusted for age and employment grade 2.25, 95% confidence interval 1.31 to 3.85).

Conclusions Stress at work is an important risk factor for the metabolic syndrome. The study provides evidence for the biological plausibility of the link between psychosocial stressors from everyday life and heart disease.

Introduction

Stress at work has been linked with coronary heart disease in retrospective and prospective studies.^{1,2} The biological mechanisms remain unclear.³ Plausible pathophysiological mechanisms involve direct neuro-endocrine effects and indirect effects mediated by adverse health behaviours.

The metabolic syndrome is a cluster of risk factors that increases the risk of heart disease and type 2 diabetes (table 1).⁴ Previous studies have found a social gradient in work stress and the metabolic syndrome, and cross sectional studies have linked work stress with components of the syndrome, but this association is not consistent.

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