Beer, wine, spirits and subjective health

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Abstract

Study objective—To examine the association between intake of different types of alcoholic beverages and self reported subjective health.

Design—Cross sectional health survey with assessment of intake of beer, wine and spirits (at last non-weekend day), smoking habits, social networks, physical activity, body mass index, educational level, presence of chronic disease, and self reported health.

Setting—WHO Copenhagen Healthy City Survey, Denmark.

Participants—4113 men and 7926 women aged 18 to 100 years.

Main results—Of the 12 039 subjects, 8680 reported their health as optimal, and 3359 reported a suboptimal health. After controlling for the covariates, the relation between total alcohol intake and the proportion reporting suboptimal health was J shaped. Heavy drinkers of any of the three types of alcoholic beverages had a higher prevalence of suboptimal health than non-drinkers. However, only light (1–2 glasses of wine yesterday) and moderate (3–5) wine drinkers had significantly lower odds ratios for suboptimal health—0.72 (95% confidence limits; 0.56 to 0.92) and 0.65 (0.49 to 0.87), respectively—when compared with non-wine drinkers. Moderate beer or spirits drinkers did not differ significantly from non-drinkers of these beverages with regard to prevalence of suboptimal health. Consistently, beer preference drinkers had an odds ratio of 1.50 (1.25 to 1.80) for suboptimal health compared with wine preference drinkers.

Conclusions—A light to moderate wine intake is related to good self perceived health, whereas this is not the case for beer and spirits. The causal relations creating this association are unknown and should be considered when interpreting the relation between different types of alcoholic beverages and subsequent morbidity and mortality.

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It has recently been suggested that the J shaped relation between alcohol intake and all cause mortality may be influenced by type of alcoholic beverage.^{1 2} These studies were adjusted for well known or potential confounders of the relation between different types of alcoholic beverages and mortality, such as sex, age, social class and smoking habits. However, differences in other characteristics of drinkers

of the different types of beverages may account for the observed differences in mortality.³

Self reported subjective health at baseline is a well established strong predictor of both coronary heart disease and all cause mortality.^{4–6} Middle aged British men who assessed their health as suboptimal had an increased risk of dying compared with those who stated their health to be good.⁷ A recent cross sectional study showed a J shaped association between total alcohol intake and subjective health, suggesting that a light to moderate alcohol intake is related to self perceived good health.⁸ The aim of this study was to assess the relation between intake of beer, wine and spirits, respectively, and subjective health.

Methods

During October/November 1991 a self administered questionnaire was mailed once to a random sample of 26 000 subjects from Copenhagen. This was conducted to assess health of the citizens of Copenhagen, as a part of the WHO Copenhagen Healthy City Survey 1991. Thus, the present sample is different from the prospective population study previously reported.² Complete information on beer, wine and spirits was obtained from 4113 men and 7926 women (response rate 46.3%).

Alcohol intake was assessed by questions about the intake of number of drinks of ordinary beer, strong beer, red or white wine, fortified wine or hard liquor on the last non-weekend day (Monday to Thursday). With regard to total alcohol intake, as well as types of alcohol, subjects were categorised into four groups: (1) 0 drinks, (2) 1–2 drinks, (3) 3–5 drinks, (4) more than 5 drinks yesterday.

Subjects were subsequently categorised according to their preference of intake. Wine preference drinkers were defined as those who drank more wine than beer or spirits, and vice versa for beer and spirits preference drinkers.

The subjects were questioned about their present state of health and asked to describe their health as: (1) very good, (2) good, (3) average, (4) bad, or (5) very bad. Good and very good health was considered to be optimal subjective health while the remaining categories were considered to be suboptimal subjective health.

The participants were further questioned about a large number of health related issues. The following known predictors of mortality were chosen as covariates in the analyses: (A) Smoking habits: (1) never smoker, (2) ex smoker, (3) current smoker. (B) Contact to family: (1) daily, (2) 1–2 per week, (3) 1–2 per month, (4) seldom, (5) never. (C) Contact to friends: (1) daily, (2) 1–2 per week, (3) 1–2 per

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Table 1 Distribution of the 12 039 subjects in Copenhagen Healthy City Survey 1991 on subjective health and intake of beer, wine and spirits. Numbers (%) of subjects shown. (Percentages add to 100 horizontally)

	Subjective health				
	Very good	Good	Average	Bad	Very bad
Beer, drinks yesterday					
0	992 (32.9)	3580 (39.3)	1990 (21.9)	447 (4.9)	96 (1.1)
1–2	609 (32.4)	809 (43.0)	382 (20.3)	66 (3.5)	14 (0.7)
3–5	195 (29.0)	272 (40.5)	166 (24.7)	32 (4.8)	7 (1.0)
>5	82 (21.5)	141 (36.9)	111 (29.1)	42 (11.0)	6 (1.6)
Wine, drinks yesterday					
0	3132 (31.9)	3828 (39.0)	2237 (22.8)	514 (5.2)	116 (1.2)
1–2	516 (34.0)	656 (43.2)	291 (19.2)	51 (3.4)	5 (0.3)
3–5	222 (34.8)	291 (45.6)	104 (16.3)	20 (3.1)	1 (0.2)
>5	8 (14.5)	27 (49.1)	17 (30.9)	2 (3.6)	1 (1.8)
Spirits, drinks yesterday					
0	3677 (32.7)	4514 (40.1)	2412 (21.4)	537 (4.8)	115 (1.0)
1–2	177 (27.7)	243 (38.0)	176 (27.5)	39 (6.1)	5 (0.8)
3–5	16 (14.4)	38 (34.2)	47 (42.3)	7 (6.3)	3 (2.7)
>5	8 (24.2)	7 (21.2)	14 (42.4)	4 (12.1)	

month, (4) seldom, (5) never. (D) Physical activity: (1) hard, (2) moderate, (3) light, (4) sedentary. (E) Educational level: (1) high, (2) middle, (3) low. (F) Presence of chronic disease: (1) yes, (2) no. (G) Body mass index was computed as self reported weight (kg) divided by squared self reported height (m^2).

Using logistic regression crude and adjusted odds ratios for suboptimal health were related to intake of wine, beer and spirits (SPSS package version 6.1). In the analysis of the relation between beer, wine, and spirits, and suboptimal health, abstainers were excluded. This was

Table 2 Prevalence of suboptimal health among 12 039 subjects in the Copenhagen Healthy City Survey 1991. Number of subjects and percentage of suboptimal health of category of covariates, respectively

Characteristic	Subjects (n)	Suboptimal health
Sex		
Female	7926	28.9
Male	4113	25.9
Age (y)		
18–24	2162	11.8
25–44	4965	16.1
45–66	2277	40.0
67–100	2635	52.9
Chronic disease, present		
Yes	4268	55.6
No	7372	11.6
Educational level		
Low	3167	37.5
Middle	5740	27.5
High	2463	14.1
BMI (kg/m^2)		
Less than 20	2075	24.8
20–25	6861	22.7
25–29	2063	37.1
More than 29	842	52.6
Smoking habits		
Never	4048	20.3
Ex-smoker	2437	33.0
Frequent	5554	31.2
Physical activity level		
Hard	485	8.5
Moderate	1856	11.9
Light	7249	24.1
Sedentary	2187	55.2
Networks, contacts to family		
Daily	2072	26.2
1–2 per week	4336	26.0
1–2 per month	3433	25.2
Seldom	1626	34.2
Never	192	53.1
Networks, contacts to friends		
Daily	3372	20.1
1–2 per week	4262	22.7
1–2 per month	2476	29.1
Seldom	919	45.7
Never	128	64.1

done to avoid bias from the very different traits between none drinkers of one or two types of beverages and teetotalers. This means that the reference group (relative risk = 1.00) is non-drinkers of the specific type of beverage.

A subsequent analysis included preference of beer, wine and spirits instead of the variables for wine, beer and spirits, respectively. The reference group (relative risk = 1.00) is wine drinkers. These analyses were controlled for total alcohol intake.

Data were further analysed stratified on sex, chronic disease and smoking habits, respectively.

Results

The distribution of the 12 039 participants by subjective health and type of alcoholic beverages is shown in table 1, and the characteristics of the participants by subjective health are shown in table 2. Only a small fraction of the subjects had an intake of more than five drinks yesterday of all types of alcoholic beverages, but a substantial number of respondents had a light to moderate intake of one of the types of beverages yesterday.

The relation between total alcohol intake and prevalence of suboptimal health was J shaped. Drinkers of 1–2 and 3–5 drinks yesterday had odds ratios of 0.82 (95% confidence limits; 0.76 to 0.88) and 0.84 (0.75 to 0.92), respectively, compared with non-drinkers, whereas heavy drinkers (more than 5 drinks yesterday) had an odds ratio of 1.54 (1.42 to 1.66).

Table 3 shows the results for each type of alcoholic beverages. A light and a moderate wine intake was associated with significantly lower odds of suboptimal health, and consumption of more than five glasses was not associated with significantly higher odds. This was different from the pattern for beer and spirits. More than three drinks of these beverages were associated with increased odds for suboptimal health. Adjustment for age, sex, intake of other types of alcoholic beverages, smoking habits, social networks, physical activity, body mass index, educational level and presence of chronic disease did not change the associations significantly (table 3). A subsequent analysis showed that chronic disease did not modify the relation between the different types of beverages and subjective health (table 4).

Preferers of beer had a higher odds ratio of suboptimal health than preferers of wine; 1.50 (1.25 to 1.80) (table 5). Furthermore, mixed drinkers (subjects who did not prefer one type to another) had an odds ratio of suboptimal health of 1.34 (1.04 to 1.72), while abstainers had an odds ratio for suboptimal health of 1.51 (1.29 to 1.77). The few subjects who preferred spirits did not differ from wine preferers with regard to suboptimal health, when controlled for the covariates including alcohol.

Analysis stratified on gender revealed no differences in the odds ratios for men and women.

Discussion

In this cross sectional study of a random sample of the whole adult population of Copenhagen we confirm the J shaped association between total alcohol intake and prevalence of

Table 3 Adjusted odds ratio for suboptimal health, according to intake of different type of alcoholic beverages. Copenhagen Healthy City Survey 1991

Type of alcohol	Subjects (n)	Crude OR	95% CL	Adjusted* OR	95% CL
Beer, drinks yesterday					
0	9 105	1.00	—	1.00	—
1–2	1 880	0.92	0.74, 1.13	0.90	0.70, 1.14
3–5	672	1.48	1.13, 1.93	1.37	1.01, 1.86
More than 5	382	2.58	1.90, 3.50	1.71	1.19, 2.45
Wine, drinks yesterday					
0	9 827	1.00	—	1.00	—
1–2	1 519	0.72	0.58, 0.89	0.72	0.56, 0.93
3–5	638	0.64	0.50, 0.83	0.65	0.49, 0.87
More than 5	55	1.37	0.75, 2.49	1.11	0.56, 2.16
Spirits, drinks yesterday					
0	11 255	1.00	—	1.00	—
1–2	640	1.04	0.84, 1.27	0.98	0.77, 1.25
3–5	111	1.96	1.30, 2.96	1.72	1.08, 2.75
More than 5	33	2.56	1.20, 5.49	2.71	1.14, 6.45

*Adjusted for age, sex, intake of other types of alcoholic beverages, presence of chronic disease, educational level, body mass index, smoking habits, level of physical activity and social networks.

Table 4 Adjusted odds ratio for suboptimal health, according to intake of different type of alcoholic beverages, stratified on presence and absence chronic disease. Copenhagen Healthy City Survey 1991

Type of alcohol	Yes		No	
	Adjusted* OR	95% CL	Adjusted* OR	95% CL
Beer, drinks yesterday				
0	1.00	—	1.00	—
1–2	0.82	0.66, 1.03	0.90	0.71, 1.14
3–5	1.30	1.92, 1.83	1.25	0.89, 1.76
More than 5	2.30	1.43, 3.66	1.37	0.88, 2.13
Wine, drinks yesterday				
0	1.00	—	1.00	—
1–2	0.63	0.49, 0.81	0.75	0.60, 0.94
3–5	0.69	0.49, 0.99	0.62	0.41, 0.92
More than 5	1.73	0.26, 2.05	1.86	0.67, 5.15
Spirits, drinks yesterday				
0	1.00	—	1.00	—
1–2	0.95	0.70, 1.31	0.88	0.59, 1.31
3–5	2.02	1.86, 4.73	1.63	1.80, 3.31
More than 5	2.34	1.53, 10.3	3.36	0.91, 12.29

*Adjusted for age, sex, intake of other types of alcoholic beverages, educational level, body mass index, smoking habits, level of physical activity and social networks.

Table 5 Crude and adjusted odds ratio for suboptimal health, according to preference of type of alcoholic beverages. Copenhagen Healthy City Survey 1991

Preference	Number	Crude OR	95% CL	Adjusted* OR	95% CL
Wine	1 626	1.00	—	1.00	—
Beer	2 372	1.47	1.27, 1.70	1.50	1.24, 1.80
Spirits	101	1.40	0.87, 2.24	1.11	0.63, 1.86
Mixed	605	2.18	1.78, 2.66	1.34	1.04, 1.72
None	7335	1.59	1.40, 1.80	1.51	1.29, 1.77

*Adjusted for age, sex, presence of chronic disease, educational level, body mass index, smoking habits, level of physical activity, social networks, and alcohol intake.

self perceived suboptimal health, recently described in Finland by Poikolainen *et al.*⁸ Our results expanded this finding by suggesting that the main contribution to the J shaped association is a lower prevalence of suboptimal health among moderate wine drinkers.

A point estimate of alcohol intake, based on the last non-weekend days reported consumption, may entail some disadvantages, as well as some advantages. The most serious disadvantage is that, for example, weekend drinkers are misclassified as non-drinkers. This misclassification of subjects, would most probably blur the differences between the associations under study. Despite this we do find a significant J shaped relation between wine intake and self reported health, while no such relation for beer or spirits. A bias attributable to differences in reporting beer, wine and spirits seems unlikely.⁹

KEY POINTS

- Self reported subjective health is an independent predictor of both coronary heart disease and all cause mortality.
- Intake of different types of alcoholic beverages was explored in the light of its association with self reported subjective health.
- This study shows that wine drinkers are more likely to be in self perceived good health than non-wine drinkers, while on the contrary this is not the case for beer and spirits.
- The causal relation creating this association should be investigated in depth before messages in support of moderate wine consumption are promoted.

Furthermore, it has recently been suggested that drinking pattern is of importance.¹⁰ Questions about intake yesterday may not be a proper tool in the separation of binge from steady drinkers.¹¹ On the other hand, this is not a major problem in the present (Danish) population, as it may be in other countries.¹²

One advantage may be that present state of health may affect current alcohol intake. Therefore, this point estimate of a very recent alcohol intake may be a more appropriate measure for the present purpose.

The response rate in this study was quite low (46.3%). Non-response was more common among men than women and among elderly than younger subjects. No other data on determinants for non-response are available. It is probable that non-responders differ from responders with regard to, for example, wine intake and perhaps self reported health, but it is unlikely that the relation between wine intake and self reported health is different among non-responders.

The use of a body mass index based on self reported height and weight may introduce bias. On the other hand, as seen from table 3, estimates are not changed dramatically when adjusted for the covariates.

Several prospective studies of the relation between alcohol intake and morbidity and mortality have approached the issue of objective health status at baseline.^{13–15} Although subjective health status is a well established predictor of morbidity and mortality,^{7 16–18} this factor has not been considered in studies of alcohol and mortality.

In a recent prospective study we demonstrated lower mortality among wine drinkers than among drinkers of beer and spirits.³ Daily drinkers of wine had a significantly lower risk of approximately 0.5 compared with non-wine drinkers, while drinkers of beer and spirits experienced no such advantages. In fact, daily drinkers of spirits experienced a significantly increased risk of dying compared with non-spirits drinkers. The present data indicate that drinkers of wine, beer, and spirits differ with respect to subjective health status at baseline, and this may have implications for the interpretation of our previous findings.

The drinking pattern with regard to both volume and type of alcohol differs for men and women. Therefore, we conducted a stratified analysis on gender. We found that the dose response increase in risk for suboptimal health persisted among beer and spirits drinkers, while the U shaped relation between wine intake and suboptimal health persisted in both genders. The possibility of an interaction between chronic disease and beverage type on subjective health was also assessed. As seen in table 4, the U shaped relation persisted among subjects with and subjects without chronic disease. Furthermore, alcohol intake is associated with smoking habits, but we found no interaction with smoking either (data not shown).

A cross sectional study like this one does not allow causal inference. Drinking habits, such as amount and type of alcoholic beverages may be established earlier in life and, thus, before development of suboptimal health.¹⁹ If so, suboptimal health may be considered a mediator of the relation between wine intake and mortality. In this case, suboptimal health is a factor of interest in the pathogenic pathway, and should not be controlled for in the statistical analyses. If, on the other hand, self perceived good health leads to a moderate intake of wine, this should be taken into account when considering the relation between wine intake and mortality. Conclusively, this issue should be carefully investigated before further promotion of a message of good health effects of consuming moderate amounts of wine.^{20 21}

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