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ALCOHOL CONSUMPTION, PREGNANCY, AND LOW BIRTHWEIGHT

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Summary The relation between alcohol consumption during pregnancy and birthweight was investigated prospectively in 900 white women. With adjustment for social class and cigarette smoking, women drinking more than 100 g alcohol a week had a risk of delivering a baby on or below the 10th centile more than double that of women drinking less than 50 g a week. The effect of alcohol was synergistic with that of smoking. Drinking at about the time of conception seems to be important for this effect; therefore, health education should be directed at reducing alcohol consumption before pregnancy.

Introduction

THE fetal alcohol syndrome—a combination of growth retardation, facial abnormalities, mental retardation, and other congenital anomalies—was first described in English by Jones and co-workers[1] and many cases have since been recognised throughout the world.[2] This syndrome is found only in the offspring of mothers who regularly consume more than 80 g alcohol a day in pregnancy and seems to be rare in the United Kingdom.[3] Whether more moderate alcohol consumption in pregnancy is harmful (for example, mid-trimester abortion,[4,5] low birthweight, delayed achievement of developmental goals) is less clear, but the data were considered sufficiently suggestive for both the Royal College of Psychiatrists in Britain and the Surgeon General in the U.S.A. to recommend that pregnant women should abstain from alcohol. This advice, however, is controversial.[6]

The relation between drinking before or during pregnancy and birthweight has been investigated in various centres with conflicting results.[7-13] None of these studies, however, has completely allowed for other confounding variables such as maternal age, smoking, and socioeconomic status. We have examined this question as part of a continuing study of drinking habits and pregnancy outcome in women attending the Charing Cross Hospital department of obstetrics in the West London Hospital.

Patients and Methods

Drinking histories were obtained from all women attending the antenatal booking clinic (usually between 8 and 14 weeks' amenorrhoea) by the interviewing doctor, using a questionnaire that we had validated previously.[14] This concerned drinking before the patient knew she was pregnant. She was then asked to complete a further questionnaire (available on request from the authors) concerning alcohol consumption during pregnancy and, in particular, in the week preceding the visit to the clinic. This was completed at home and returned by post. This second questionnaire also contained questions on drug use and past occupations and included a shortened version of the Michigan Alcohol Screening Test.[15] In addition, a dietary, drug, smoking, obstetric, and medical history was taken in the antenatal clinic. Routine blood tests included blood count and gamma-glutamyl transpeptidase. We have reported an evaluation of these screening tests for drinking in pregnancy.[16]

On the basis of the prepregnancy questionnaire, the patients were classified into "heavy" drinkers, consuming 100 g or more alcohol a week; "moderate" drinkers, consuming 50–100 g alcohol a week; "light" drinkers, consuming less than 50 g alcohol a week, including teetotallers.

No effort was made to influence drinking habits and the information was not available to the clinician looking after the patient. After delivery, the case-notes were reviewed and the pregnancy outcome was recorded. From the initial interview group of 1122 patients (delivery data available in 1108), we have studied all 900 white patients giving birth to a singleton fetus after 28 weeks' gestation, 85% of whom completed the second questionnaire. From the birthweight, gestation, and sex of the infant, centile weight was calculated from the Castlemead centile weight chart.[17] Social class was assessed from the father's occupation according to Registrar General's classification.

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TABLE I—NUMBER OF BABIES WITH BIRTHWEIGHT LESS THAN 10TH CENTILE BY SMOKING STATUS AND SOCIAL CLASS

	Non-smokers				Smokers				
	Alcohol intake				Alcohol intake				
Social class	Heavy	Moderate	Light	Total	Heavy	Moderate	Light	Total	All
I and II	11/84	5/79	11/169	27/332	6/28	3/13	1/26	10/67	37/399
III	4/22	3/25	12/162	19/209	4/17	2/7	6/38	12/62	31/271
IV and V	0/14	1/18	12/91	13/123	7/19	2/18	8/70	17/107	30/230
	15/120	9/122	35/422	59/664	17/64	7/38	15/134	39/236	98/900

Results

10·9% of the babies had a birthweight on or below the 10th centile. Table I shows the interrelations between level of drinking, social class, cigarette smoking, and low birthweight. Overall, 20% of the mothers were heavy drinkers and 26% smoked during pregnancy. Twice as many patients in social class I–II (28%) were heavy drinkers as in social class III–V (14%). On the other hand, smoking was much more common in social classes IV–V (47%) than in social classes I and II (17%) or III (23%). Smoking and drinking are, however, not independent since in all social classes more smokers were heavy drinkers (27%) than non-smokers (18%). The group with the highest proportion of heavy drinkers (42%) were the smokers in social classes I and II whilst the lowest proportion of heavy drinkers was in non-smokers of social classes III, IV, and V (11%). Age differences among the subgroups were small, the maximum difference between any two groups being 2·8 years. Therefore, in computing of adjusted relative risks for both heavy and moderate drinking (Mantel-Haenszel method[18]) the confounding variables included were smoking and social class. Table II shows the outcome of the Mantel-Haenszel analyses.

Relative Risk of Birthweight less than 10th Centile

Moderate drinking does not give a significantly increased relative risk, but heavy drinking gives a point estimate of 3·43 (χ^2MH = 9·20; $p<0·01$) for the smokers and a point estimate of 2·27 (χ^2MH 9·98; $p<0·01$) for smokers and non-smokers combined. The point estimate of relative risk in non-smokers is almost exactly half that in smokers for both heavy and moderate drinking (table II), which suggests that smoking and drinking are synergistic in lowering birthweight. In non-smokers, the relative risk for heavy drinkers in social classes I–V inclusive as compared with light drinkers is non-significant at 1·71. However, if the very few heavy drinking non-smokers in classes IV and V are excluded, the relative risk for heavy drinking non-smokers in classes I–III becomes 2·33 (χ^2MH = 5·56; $p<0·05$).

Effect of Reducing Alcohol Consumption during Pregnancy

Only 31 (26%) of the non-smoking heavy drinkers continued to drink heavily during pregnancy and 5 (17%) of these produced a light baby. Of the remaining 74% who reduced their drinking to 100 g alcohol a week or less, 10% produced a baby whose weight was on the 10th centile or less The difference in low birthweight outcome between these two groups does not approach statistical significance (χ^2 1·11; $p=0·29$). In the smoking group, 24 (38%) of heavy drinkers continued to drink heavily during pregnancy and 8 (33%) of those produced a light baby. Of the 62% of heavy drinkers who reduced their consumption to less than 100 g a week, 30% produced a light baby ($\chi^2=0·06$; $p=0·81$).

These data do not suggest any benefit from reduction of heavy drinking in the later stages of pregnancy in either smokers or non-smokers.

Discussion

Our results show that alcohol consumption of more than 100 g a week around the time of conception carries an increased risk of low birthweight in the child. This effect is much more impressive in women who also smoke. In terms of birthweight there was no apparent benefit from reducing drinking once pregnancy had been confirmed, but there may be other adverse effects of continued drinking throughout the course of pregnancy. The size of our cohort does not permit any definite statements to be made about midtrimester abortion;[4,5] and, since the assessment of the infants was in the neonatal period only, we have no data on any possible delay in achieving developmental goals.

Only 20% of our mothers were "heavy" drinkers (more than 10 drinks or 100 g alcohol a week) and it must be emphasised that this level of consumption (which we classed as heavy only in the context of pregnancy) is much less than the currently recommended 40 g maximum daily intake for non-pregnant women.[19] While only one of our mothers admitted to drinking more than 80 g a day and was, therefore, at risk of having a child with fetal alcohol syndrome, 4·8% of the mothers were exceeding 50 g and were at risk of hepatic damage. These figures are in broad agreement with the findings of a community survey of drinking among non-pregnant women in England and Wales.[20] 37 patients in our sample admitted to heavy binge drinking (more than 150 g of alcohol in a single session) at least once a month. The effects of this pattern of drinking are being studied further.

Our findings lend support to the reports of Little,[12] Hanson,[8] and Mau.[7] Little's study of 262 "middle class" women suggested that birthweight was reduced by 3 g for every 1 g alcohol drunk in early pregnancy, but this regression calculation was based on results in just 70 women and there were only 7 infants who were under 2·5 kg. Hanson

TABLE II—ADJUSTED RELATIVE RISK OF BIRTHWEIGHT LESS THAN 10TH CENTILE

Drinking groups	Non-smokers	Smokers	All
Heavy *v* light	1·71 (0·86–3·35)	3·43 (1·52–7·54)*	2·27 (1·36–3·86)*
Moderate *v* light	0·96 (0·49–2·13)	2·00 (0·77–5·53)	1·24 (0·80–1·58)

*$p=0·01$.

et al.[8] have shown that the regular consumption of 2–4 drinks a day before pregnancy leads to a slight reduction in birthweight. In Mau's prospective study of 7525 pregnant women, only 353 (4%) of whom were recorded as "drinking a little every day", there was an association with reduced birthweight. A study by van den Berg[13] showed adverse effect of drinking on birthweight only in smokers. These reports, however, have not been confirmed by studies in Colorado[16] on some 268 women, in whom there was no apparent association between drinking and birthweight, or in France,[11] where reduction in birthweight was found only in mothers drinking more than 45 g alcohol a day.

These low-birthweight babies may be disadvantaged in later life. Streissguth[21] in her follow-up study of babies born to moderate drinkers shows that growth and mental and motor development at 8 months were significantly delayed compared with those in a teetotal control group.

Our data suggest that drinking should be cut to less than 100 g a week before pregnancy, to reduce the risk of low birthweight, and that those women planning a pregnancy should also give up cigarette smoking. In our experience the women particularly at risk are in social classes I and II—a group that might be particularly responsive to health education. However, information and advice must be widely disseminated in the general practitioner's surgery and family planning clinic if any impact is to be made, and more attention should be given to the role of preconception clinics.

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CAUSE OF DEATH IN PATIENTS ADMITTED TO HOSPITAL FOR PULMONARY TUBERCULOSIS

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Summary Study of hospital case-notes and necropsy reports of 60 patients certified as dying from tuberculosis over 7 years identified a group of 16 patients (27%) who died suddenly and unexpectedly and in whom the cause of death was obscure. In 14 of the 16 death followed initiation of antituberculous chemotherapy.

Introduction

THE mortality in patients with tuberculosis continues to cause concern, but little is known of the actual cause of death. We have tried to assess the cause of death in 60 patients certified as having died from tuberculosis.

Patients and Methods

The case-notes of patients who had died in hospital between 1974 and 1981 for whom pulmonary tuberculosis was noted in part 1 or 2 of the death certificate were studied retrospectively. Details of the patients' final illnesses and the post-mortem findings were assessed. Patients were divided into six groups, depending whether tuberculosis had ever been substantiated; if so whether it was active or inactive at the time of death; and the contribution of tuberculosis to the final illness (table I).

Results

Over the 7-year period 889 patients with active pulmonary tuberculosis were admitted to Monsall Hospital (a sub-regional tuberculosis centre). 62 patients died with a death-certificate diagnosis of pulmonary tuberculosis; case-notes were available for 60. In group 1a death certification was totally inaccurate through misdiagnosis. In groups 1b1, 1b2, and 1c tuberculosis was inactive. 6 patients died from cor pulmonale secondary to obliterative lung disease following pulmonary tuberculosis up to 30 years previously (group

TABLE I—GROUPS OF PATIENTS

—	Features	n	Death due to TB		Death un-expected	Cause of death unsure
			Directly	Indirectly		
Group 1:						
1a	Inaccurate diagnosis*	7	0	0	1	0
1b1	Inactive healed TB; not associated with cor pulmonale	4	0	0	0	0
1b2	Inactive healed TB; associated with cor pulmonale	6	0	6	0	0
1c	Recently completed treatment; TB quiescent	7	0	0	1	1
Group 2:						
2a	Recently commenced treatment; TB active but well controlled; symptom-free	19	0	4	10	9
2b	Recently commenced treatment; TB active and partially controlled; with symptoms	17	10	0	4	7
Total	..	60	10	10	16	17

*Oesophageal-bronchial neoplastic fistula (1), granulomatous lung disease (1), fibrosing alveolitis (1), infection with *M kansasn* (1), congestive biventricular failure (1), anaplastic lung carcinoma (1), squamous cell bronchial carcinoma (1).