

Low sex ratio in children of men in alcohol-related occupations

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In a recently published report by the Royal College of Physicians [1], it was indicated that alcohol can damage all systems in the body. The injurious effects of alcohol on the reproductive system have been demonstrated previously in studies showing low birth weight [2] and diminished fertility. In a report produced by the Office of Population Censuses and Surveys (OPCS) [3], three groups of occupations were shown to have proportionally more low birth weight babies. One of these groups contained publicans, club stewards and barmen, who had 8.6, 11.9 and 8.4 per cent births under 2500 g respectively. The publicans' rate was statistically significantly different from the national percentage of 6.64 at the 95 per cent confidence level. Although men were the subjects of the study, the OPCS report added that 'it is possible that the wives of these men drink more than average.'

The sex ratio of births is normally about 106 males to 100 females, but this ratio may be altered appreciably in a variety of circumstances. The ratio may be affected by exogenous or endogenous sex hormones [4,5]; for instance butchers in England and Wales had an excess of daughters when oestrogens were used as growth promoters in cattle in the 1970s, and this changed to a significant excess of sons when androgens were introduced in later years [6], although causality in these associations could not be proven. Occupational stresses or toxins may also lower the sex ratio of births, as in abalone divers [7], fighter pilots [8], male anaesthetists [9] and production workers in the dibromochloropropane industry [10]; in some cases the mechanism may be through the reduction of testosterone levels. Alcohol also lowers testosterone levels in males. Given the low fertility induced by excessive consumption of alcohol [1], the low birth weight referred to above, and the effect of alcohol on testosterone levels in males, we decided to test the hypothesis that a large group of workers exposed occupationally to alcoholic beverages would have low birth sex ratios in 1931 [11] and 1980-1982 [3] (these data were from 10 per cent random samples). The chi-square test was used to assess the significance of the differences in sex ratios between

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this group of workers and the remainder of the occupational group in each report (Tables 1 and 2).

The sex ratio of the group of workers associated with dispensing alcohol was significantly lower than that of the other occupations in the 1931 report, and was significantly lower in the 1980-1982 report. Furthermore, in a 1978 report which was not published in full, dispensers of alcohol (publicans, barmen and waiters combined) had the low sex ratio of 101.5 [3].

Methodological difficulties arise in this type of study. First, the nomenclature of the occupational subgroups was not identical in these reports. Second, the degree of daily exposure to alcohol in some subgroups is obviously conjectural. However, in 1970-1972 the groups of publicans and innkeepers, barmen and barmaids, boarding house and hotel proprietors, and restaurateurs had standardised mortality ratios for cirrhosis of the liver of 1,576 (106 deaths), 633 (16 deaths), 506 (16 deaths) and 385 (17 deaths) respectively [12]; the corresponding ranks for highest mortality were 1, 3, 6 and 8 respectively.

This association between low sex ratios of births and the handling and serving of alcoholic drinks is consistent with the links between alcohol and reproductive problems already noted [1-3]. As the OPCS report suggested [3],

Table 1. Handlers of alcoholic drinks—1931 Report.

Code	Occupation	No. of births	Sex ratio
384	Beer bottlers	57	96.6
385	Cellarmen	312	93.8
388	Other skilled workers	20	100.0
861	Restaurant keepers	758	103.2
864	Inn, hotel-keepers; publicans, beersellers	1757	100.1
865	Barmen	1198	102.0
866	Waiters	1253	93.1
867	Restaurant and refreshment room counter hands	104	79.3
Total of above		5459	98.44*
Remainder, derived from Table A [11]		598536	104.8

*Chi-square (Yates correction) = 5.25; *df* = 1; *p* = 0.022.

the sex ratio of births 'may provide a useful warning of something requiring further investigation.' The present association between occupational exposure to alcohol and an abnormal sex ratio of births appears to act as endorsement.

Table 2. Handlers of alcoholic drinks—1980–82 Report.

Code	Occupation	No. of births	Sex ratio
102	Hotel and restaurant club managers	250	74.8
103	Publicans	503	105.3
104	Restaurateurs	999	94.7
105	Club stewards	59	63.9
144	Waiters	429	107.2
145	Barmen	226	91.5
197	Brewery and vinery process workers	124	106.7
202	Food and drink n.e.c.	914	94.1
Total of above		3504	95.43*
Remainder, derived from Table 2.3 [3]		630986	105.2

*Chi-square (Yates correction) = 8.19; $df = 1$; $p = 0.004$.

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Book review

The Speckled Monster. By J. R. Smith. Essex Record Office, Chelmsford, 1987. 217pp. £14.95.

It is just ten years since the scourge of smallpox was officially relegated to history. And here is that history, taken entirely from primary sources by an historian and archivist, of the disease as it afflicted the English from 1670 to 1970. The fascination of Mr Smith's account lies in the detail he gives for the rural communities of Essex. He lets his archival material speak for itself. In doing so he makes clear the burden of personal suffering and community expense that smallpox extorted. The impact of inoculation and then of vaccination is seen in terms of community response as well as in a statistical analysis of the preventive methods on the health of the people. Like any public health measure today, there was the usual confusion of inadequate measures of outcome, rumours, accusations and vocal pressure groups. Nothing much seems to change.

Lady Mary Wortley Montagu's introduction of inoculation for smallpox, watched by the ubiquitous Hans Sloane, became increasingly popular to reach a peak of favour from 1752 to 1798. Essex was in the forefront of this movement because of the work of Daniel Scrutton, centred on Ingatestone. As a self-styled inoculator he

irritated the local medical profession because he was skilful and made more money than they did. He attracted a large number of grateful patients and aroused the fears of his neighbours who rightly worried about the spread of infection from his inoculated subjects.

Jenner's introduction of vaccination has perhaps been over-emphasised by medical historians. It is salutary to discover that it took about 40 years for the transition from inoculation to vaccination, for the good reason that inoculation had proved effective. Compulsory vaccination produced its own problems in terms of civil liberties. Pest houses gave way to smallpox hospitals, that included ships moored in the Thames. The later years of this history show the declining risk of smallpox against the risks of compulsory vaccination. All this is well documented in this book which must be read by anyone interested in an even-handed account of a complex subject.

Any doctor interested in the history of medicine will take great pleasure in reading Mr Smith's book. For all those who are professionally concerned with the health of the community this book is required reading as an illustration of how people react to public health measures. In short, here is a fascinating slice of history based on sources not immediately available to the public.

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