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### **A Prospective Cohort Study of Shift Work and Risk of Ischemic Heart Disease in Japanese Male Workers**

The study finds evidence in support of an association between rotating shift work and death due to ischaemic heart disease. There was no association with cerebrovascular disease.

A prospective study of 17,649 men (initial age between 40 and 59). Causes of death were obtained from death certificates. At baseline all men were employed in full time work and had no history of myocardial infarction or cerebrovascular disease. The follow up period extended approximately 13 years. Altogether there were 233,869 person-years of follow-up.

The workers were asked to answer: "During your working life, until the present, what shift (time of day) did you work most: mainly daytime, mainly night (i.e., fixed-night shift), or alternate night and daytime (that is, rotating-shift work)?"

Alternative explanatory variables were reduced by self-report: smoking, alcohol intake, hypertension, diabetes, perceived stress, exercise, type of job.

There were 86 deaths attributed to ischaemic heart disease and 132 attributed to cerebrovascular disease (e.g. stroke). 5% mostly worked nights, 11% mostly worked in rotating shifts, and the rest were day workers. Overall death rates were the same in each work pattern.

Compared with the day workers, the rotating-shift workers had a significantly higher risk of death due to ischemic heart disease (RR = 2.32, 95% (CI) = 1.37, 3.95) whereas fixed-night work was not associated with ischemic heart disease (RR = 1.23, 95% CI = 0.49, 3.10). Rotating shift workers were otherwise equivalent to day and night shift workers except that they had slightly lower rates of diabetes and hypertension at baseline, but were more likely to be smokers (by a very small margin). There was no information on cholesterol levels.

In the multivariate model for ischemic heart disease,

- the relative risk associated with hypertension was 1.81 (95 % CI = 1.07, 3.06),
- the relative risk associated with diabetes was 2.53 (95% CI = 1.29, 4.97),
- that of current smokers was 4.76 (95 %CI = 2.05, 11.02),
- that of body mass index of 26 and over was 2.07 (95% CI= 1.15, 3.73).

[The results for alcohol intake were not statistically significant]

The risk of death due to cerebrovascular disease did not differ significantly among the three types of workers. Adjustment for multiple potential risk factors did not significantly alter these results.

#### Comment

On balance this report finds evidence that a majority exposure to rotating shift work is associated with higher risk of death due to ischaemic heart disease. Actual work patterns were not objectively determined and death certificates are unreliable but there was no reason to suspect different shift patterns would be reported differently.

The strength of association with shift work was comparable to the predictive power of hypertension, diabetes and being overweight. Smoking was the strongest predictor.

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