Cardiovascular disease

Loud noise at work and night shifts may raise risk of IHD

Occupational exposure to high levels of noise, greater than 90 dBA, and night shift work appear to be associated with an increased risk of ischaemic heart disease (IHD), a population-based study from New Zealand has found. However, no such association was seen for long working hours and sedentary work.

The investigators carried out a longitudinal data linkage study using Statistics New Zealand's (Stats NZ) Integrated Data Infrastructure, a longitudinal meta-dataset of routine datasets administered by government agencies, Stats NZ surveys (including the 2013 census) and non-government organisations.

The study population consisted of all New Zealand residents aged 20-64 years who were employed at the time of the 2013 census. The authors gathered data on incident IHD between 2013 and 2018 based on hospital discharge, prescription and death records.

Information on occupation and number of working hours was obtained from the census. Exposure to sedentary work, loud noise and night shift work was assessed using New Zealand job exposure matrices.

Hazard ratios (HR) were adjusted for age, socioeconomic status, smoking and ethnicity.

Of the 811,470 men and 783,207 women in employment at the time of the census, 15,012 men (1.9%) and 5,595 women (0.7%) were identified with incident IHD during a median follow-up of 5.8 years. The majority of cases, 81% of men and 75% of women with IHD, were identified through hospital discharge records.

For men, there was a higher risk of IHD for the highest category of noise exposure (> 90 dBA):

- HR 1.19 (95% CI: 1.07-1.33)

Night shift work was associated with a raised risk of IHD for both men and women:

- Men HR 1.10 (95% CI: 1.05-1.14)
- Women HR 1.25 (95% CI: 1.17-1.34)

The population attributable fractions for night shift work were 1.8% for men and 4.6% for women.

No clear association with working long hours and sedentary work and IHD were observed.

As well as the traditional risk factors for cardiovascular disease environmental and psychological factors are also implicated and these factors can be linked to occupation.

The study authors state: 'In conclusion, this study showed an association between night shift work, high levels of noise and higher IHD risk. The impact of night shift work on IHD in New Zealand may be significant, as suggested by the population attributable fractions of 1.8% for males and 4.6% for females.'

They add: 'The study does not support a role for sedentary work or long working hours, although results need to be interpreted with caution due to exposure assessment limitations, in particular the absence of information on exposure duration.'

These findings may aid in risk stratification of patients and inform employers regarding health risks associated with working conditions and patterns.

DR PETER SAVILL

Eng A, Denison HJ, Corbin M et al. Long working hours, sedentary work, noise, night shifts and risk of ischaemic heart disease. *Heart* Published Online First 8 August 2022

Respiratory disease

How do genetic factors influence lung cancer risk in smokers and non-smokers?

The presence of genetic risk factors significantly increases the probability of developing lung cancer in smokers, particularly heavy smokers. However, even with a high genetic risk for lung cancer, individuals who never smoke do not have a significantly increased risk of developing the condition, a prospective cohort study has found.

Data were used from the UK Biobank study which recruited more than 500,000 individuals aged 40-69 between 2006 and 2009. As well as giving detailed lifestyle information these volunteers contributed blood samples for genotyping.

A total of 33 genetic variants associated with lung cancer were used to calculate a polygenic risk score. Individuals were classified as high, intermediate and low genetic risk.

Individuals with a diagnosis of lung cancer after their baseline assessment were identified from national cancer registries.

Multivariable Cox proportional hazard models were used to explore the association between genetic risk categories, smoking categories, and the combination of genetic risk and smoking categories. Interactions between polygenic risk scores and smoking status were tested.

A total of 345,794 individuals, mean age 56.3 (53.9% female) with complete data on genotype and phenotype, were followed up for a median of 7.2 years, and included in the analysis. There were 90,727 (26.2%) former smokers and 33,994 (9.8%) current smokers; 40,889 (11.8%)

had intermediate smoking exposure (20-39.9 pack-years) and 19,027 (5.5%) heavy smoking exposure (≥ 40 pack-years).

Over the 2,454,915 person-years of follow-up there were 1,687 cases of incident lung cancer. As the genetic risk increased, the incidence rate and hazard ratio (HR) of lung cancer gradually increased.

As expected, increased numbers of pack-years were associated with more frequent incident lung cancer. After adjusting for the polygenic risk score, compared with never smoking:
Current smoking HR 14.54
(95% CI: 12.47-16.94)
Heavy smoking HR 17.80
(95% CI: 15.23-20.81).

For individuals who had never smoked the risk of lung cancer in the high genetic risk group was not significantly different from those in the low genetic risk group.

For smokers with a high genetic risk, risk of lung cancer was significantly increased, especially in heavy smokers.

Risk of incident lung cancer according to genetic risk and smoking status

- **Low genetic risk and current smoking:**
HR 11.31 (95% CI: 7.84-16.33)
- **High genetic risk and current smoking:**
HR 22.46 (95% CI: 15.99-31.53)
- **High genetic risk and heavy smoking (≥ 40 pack years):**
HR 27.02 (95% CI: 19.28-37.88)

This study reinforces evidence that smoking is demonstrably a causal factor for lung cancer and in smokers with a genetic risk the probability of developing lung cancer significantly increases further. However, even with a high genetic risk for lung cancer, individuals who never smoke do not have a significantly increased risk of developing the condition.

DR PETER SAUL

Zhang P, Chen P-L, Li Z-H et al. Association of smoking and polygenic risk with the incidence of lung cancer: a prospective cohort study. *Br J Cancer* 2022;126:1637-46

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