

**HAND ARM
VIBRATION**



Hand-Arm Vibrations' Association with Myocardial Infarction

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Introduction

- Cardiovascular disease may be deadly or greatly affect people's lives
- One of the most important subgroups is ischemic heart disease, where myocardial infarction (MI) is the most common diagnosis.
- Many occupational exposures may affect the risk of MI
- Less is known of Hand-Arm Vibrations (HAV) effect on this disease



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Introduction

- Experimental studies have found acute effects of HAV on heart rate variability

(Björ et al. 2007, Int. Arch. Occup. Environ. Acute effects on heart rate variability when exposed to hand transmitted vibration and noise).

- Epidemiological studies on HAV effects on ischemic heart disease and myocardial infarction are few

(Tamaian et al. 1998, Occupational exposure to vibration and ischemic heart disease, J. Occup. Health. Björ et al. 2010, Mortality from myocardial infarction in relation to exposure to vibration and dust among a cohort of iron-ore miners in Sweden. Occup. Environ. Med)



Aim

- Study the association between HAV exposure and the risk of first-time myocardial infarction, with adjustment for other occupational exposures

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Materials and methods

- The Swedish National Cohort on Work and Health (SNOW), created using Swedish registers.
- SNOW consists of all individuals born in Sweden from 1930 to 1990 and living in Sweden between 1968 and 2017
- Demographic, occupational, and MI data available between 1968 and 2017.
- All workers in Sweden with an occupational code between 1985 and 2013 were matched to job-exposure-matrix (JEM) on HAV and other occupational exposures known to affect the risk of MI.
- Every occupation in Sweden classified according to occupational classifications of the National Labour Market Board and based on ISCO-88-code system
- Information on MI was gathered from the national patient registry and coded using the International Classification of Diseases, 7th, 8th, 9th, and 10th revisions (ICD-7, ICD-8, ICD-9, and ICD-10).



SWEJEM

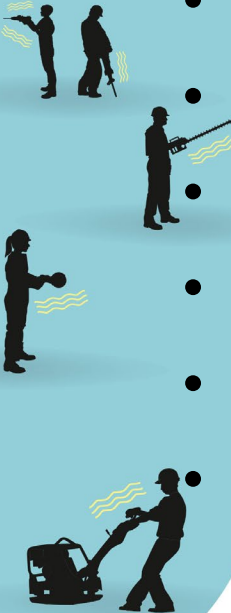
- JEM for occupational noise, demands, decision authority, physical workload index, and chemical/particle exposures has been constructed and used in the analysis.
- The chemical and particle exposures included were carbon monoxide, diesel exhaust, oil mist, polycyclic aromatic hydrocarbons, pulp and paper particles, silica, and welding fumes.



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SWEJEM

- The JEM on HAV consists of the eight-hour equivalent HAV exposure (5349-1) connected to each occupational code.
- HAV levels from earlier measurements (scientific articles, measurement reports, and vibration data-bases, n = 90).
- Exposure categories for the A(8) value were:
 - 0 m/s² or no HAV exposure
 - above 0 up to 1 m/s²
 - above 1 up to 2.5 m/s²
 - above 2.5 up to 5 m/s²
 - above 5 m/s²



Result

Snow 2010

- 3,450,962 individuals (1,819,455 males/ 1,721,590 females)
- Age median of 44 (51.4 males/48.6 females)
- 157,510 males and 6208 females HAV exposed above 2.5 m/s².



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Results

Hand-Arm Vibrations (m/s ²)	Exposed Cases	Model 1 ^a HR (95% CI)	Model 2 ^b HR (95% CI)
0	52,622	1.00 (ref)	1.00 (ref)
>0–1	6524	1.13 (1.10–1.16)	0.98 (0.96–1.01)
>1–2.5	10,471	1.21 (1.19–1.24)	1.02 (1.00–1.05)
>2.5–5.0	5258	1.08 (1.05–1.11)	0.91 (0.88–0.95)
>5.0	562	1.22 (1.12–1.33)	1.01 (0.92–1.11)

^a year, age, gender, income, country of birth, and marital status. ^b model a and noise, decision authority, physical workload, carbon monoxide, diesel exhaust, oil mist, polycyclic aromatic hydrocarbons, pulp and paper particles, silica, welding fumes.

Discussion

- This study found no association between exposure to hand-arm vibrations (HAV) and a first-time myocardial infarction one year later.
- A JEM on HAV and other occupational exposures within the SWEJEM project was used to adjust for other occupational exposures that may be associated with MI.
- By using a JEM, this study was able to gather a large number of individuals over several decades to study the risk of a first-time MI.

