The influence of work patterns on indicators of cardiometabolic risk in female hospital employees

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The problem: Health workers have higher personal days lost

Labour force survey estimates (LSF), average days lost for personal reasons per full time employee by NOC-S, Statistics Canada
Lost time is different by sex and health occupations (2010)
Risk factors among female nurses

Canadian Community Health Survey (2003)

- Cross-sectional survey of 135,000 respondents or whom 79,000 had been employed in the past 12 months
- Comparison of 1,900 female nurse survey respondents to 15,700 women with post-secondary education

Differences:
- Higher prevalence of high blood pressure (nurses, 12% vs others, 7%) and back problems (nurses, 24% vs others, 20%)
- More likely to be overweight or obese (nurses, 44% vs others, 34%)
Work and Health of Nurses 2005 Survey (CIHI)

- Average age of nurses in 2005 was 44.3 years
- More than 60% of nurses reported their jobs represented high physical demands
- Back problems, pain, arthritis and depression were commonly reported
- Fair or poor general health was related to components of work stress, strain and high physical demands
- Work absences for health related reasons totaling 20 days or more were common.

About one third of the population reported that their physical health made it difficult to handle the workload.
Hospital work factors potentially associated with poor health

- Duration of work
  - 12 hour shifts

- Shift work
  - Night shift

- Job strain
  - High demand – low control

- Unpredictable, stressful events
  - Trauma, death, illness,

- Low support
  - Hierarchical organizations
The issue: Work related factors impact women's health

- In health care settings, women account for approximately 80% of the workforce.
- Female health workers report greater loss time from work.
- Work characteristics, such as shift work, along with an aging workforce may predispose adult working women to increased risk for chronic disease (i.e., cardiovascular disease).
- Poor health (absenteeism and/or presenteeism) may influence the quality and cost of care.
- Understanding the prevalence of the problem and mechanisms that link work related factors to poor health should inform workplace health and policy.
Research questions

- What is the prevalence of cardiometabolic risk indicators in a cohort of female hospital employees?

- What are the associations between regular and irregular work patterns and indicators of cardiometabolic risk, specifically of the metabolic syndrome?
Methods

• Cross-sectional descriptive design (2008)
• Participants (n ~ 466) were female hospital employees from two hospital sites in southeastern Ontario.
• Indicators of cardiometabolic risk were obtained by clinical exam and serum sampling.
• Self-report data were collected through a questionnaire containing measures of work characteristics and validated measures of covariates (i.e., physical activity).
• Administrative hospital work (paid hour) data.
Outcomes of interest

- **Cardiometabolic risk:** determined by metabolic syndrome criteria (or Tx).
  - High fasting blood glucose (> 5.6 mmol/l)
  - Abdominal obesity (≥ 80 cm)
  - Hypertension (≥130 mmHg systolic or ≥ 85 mmHg diastolic)
  - Elevated triglycerides (≥ 1.7 mmol/l)
  - Low HDL cholesterol (≤ 1.3 mmol/l)
Characteristics of sample

- Mean age 46 years (SD 10)
- 77% married/common-law
- 51% > $75,000 annual household income
- 33% completed university degree or higher
- 42% nurses
- 74% full time
- 36% rotated shifts; 32% worked extended shifts
- 51% had past history of shift work > 6 years
## Characteristics of sample in relation to work patterns

<table>
<thead>
<tr>
<th></th>
<th>Rotational Shift</th>
<th>Length of Shift</th>
<th>Overtime Hours</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Days</td>
<td>Other</td>
<td>8 hour</td>
</tr>
<tr>
<td>n (%</td>
<td>300 (64.4)</td>
<td>166 (35.6)</td>
<td>319 (68.5)</td>
</tr>
<tr>
<td>Age (Mean, SD)</td>
<td>46.8 (8.7)</td>
<td><strong>44.0</strong> *     (10.4)</td>
<td>47.0 (8.9)</td>
</tr>
<tr>
<td>Married</td>
<td>243 (81.0)</td>
<td><strong>117</strong> *     (70.5)</td>
<td>256 (80.3)</td>
</tr>
<tr>
<td>Household income ≥ &amp;75,000</td>
<td>155 (52.9)</td>
<td>82 (50.3)</td>
<td>153 (49.4)</td>
</tr>
<tr>
<td>Highest education (degree or more)</td>
<td>112 (37.5)</td>
<td><strong>40</strong> *     (24.1)</td>
<td>99 (31.1)</td>
</tr>
</tbody>
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### Prevalence of cardiometabolic risk indicators

<table>
<thead>
<tr>
<th>Risk Indicator</th>
<th>Prevalence</th>
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<tbody>
<tr>
<td>Elevated waist circumference</td>
<td>268 (57.5)</td>
</tr>
<tr>
<td>Elevated blood pressure</td>
<td>177 (38.0)</td>
</tr>
<tr>
<td>Elevated glucose</td>
<td>74 (16.5)</td>
</tr>
<tr>
<td>Elevated triglycerides</td>
<td>70 (15.0)</td>
</tr>
<tr>
<td>Reduced HDL cholesterol</td>
<td>97 (20.8)</td>
</tr>
<tr>
<td>Metabolic syndrome (MS)</td>
<td>98 (21.0)</td>
</tr>
</tbody>
</table>
## Associations between work patterns and cardiometabolic risk

<table>
<thead>
<tr>
<th>Adjusted for:</th>
<th>All work patterns combined OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full time vs. part time (referent)</td>
</tr>
<tr>
<td>Age and all work patterns</td>
<td>2.2* (1.18-3.96)</td>
</tr>
<tr>
<td>Previous, plus personal characteristics</td>
<td>2.2* (1.19-4.08)</td>
</tr>
<tr>
<td>Previous, plus leisure time physical activity</td>
<td>1.6 (0.83-3.27)</td>
</tr>
</tbody>
</table>
Summary of findings

- Prevalence of cardiometabolic risk indicators (20%) is relatively high
  - Of particular concern: abdominal obesity and hypertension

- The following work characteristics were associated with a two-fold increase in presence of MS:
  - 12 hour shifts
  - Full time status
  - Working overtime hours

- These associations were completely attenuated by engaging in leisure time physical activity.
Next steps: Ongoing research

• Further analysis will explore the influence of other potential behavioural pathways (i.e., physical activity, diet patterns, home demands)

• Ongoing research: Currently we are conducting a detailed etiological study that is exploring the physiological, behavioural, and social pathways that may link shift work to increased cardiovascular risk and depression. (CIHR:2011-2014)

• Future research: Early indicators of CV risk (i.e., vascular changes) and development of healthy workplace strategies (i.e., screening, monitoring, and intervention)
Linking work characteristics to health: complex and multifactorial

A

Mismatch of circadian rhythms
Internal desynchronization and increase susceptibility
Shift work
Sleep/wake disturbances

B

Behavioural changes

C

Disturbed socio-temporal patterns
Stress

CVD

Knutsson and Boggild, Research Env Health, 2000
Practice and policy implications

Despite a concerted effort to improve the health of the healthcare workforce, there has been minimal impact on the health of female employees. This would suggest that we need to re-examine workplace environments and supports.

Some suggestions are:
- To carefully monitor the health of the workforce
- To clearly identify sources of job strain
- To implement strategies to minimize the influence of potentially harmful work characteristics on health (i.e., awareness of intergenerational needs)
- To provide innovative, accessible and effective health-promotion strategies
In conclusion…

Opportunity for improvement – one step at a time!
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