Physical activity, physical fitness and body composition of Canadian shift workers

Findings from the Canadian Health Measures Survey Cycles 1 & 2

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Acknowledgements

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  - Kristin Campbell
  - Paul Demers

- UBC Research Data Centre

- Statistics Canada CHMS Methodologists

- Funding sources
Shift work in Canada

- $\frac{1}{3}$ of Canadian workforce outside 9-5 (Williams, 2008 Statistics Canada)

- 24h society

- Increased risk of many chronic diseases (Wang, Occup Med 2011)

Shift work takes a toll on heart
People who work shifts should be vigilant about risk factors like smoking, high cholesterol, and high blood pressure, researchers advise.
CBC News  Posted: Jul 26, 2012 6:32 PM ET

Shift work linked to risk of heart attack, stroke, new study suggests
BY SHARON KIRKEY, POSTMEDIA NEWS  JULY 27, 2012

5 health risks of shift work
Sleep problems aren't the only health concerns associated with working overnight and shift work. Here's how irregular work hours may be impacting your health
By Diane Peters

Shift worker syndrome impacts some veterinarians
January 31, 2013
By: Phyllis DeGioia
For The VIN News Service

Shift workers are 'more likely to be fat and suffer health problems such as diabetes and high blood pressure'

- Unpredictable hours trigger the problems largely as a result of sleep loss
- Experts warn the situation is especially worrying given the increasing number of people working outside the traditional 9-5 schedule
- Majority of shift workers are 'men, minorities and those working in hospitals, production and the shipping industry'

Is shift work deadly?

TRALEE PEARCE
The Globe and Mail
Published Sunday, Oct. 23 2011, 10:27 PM EDT
Last updated Monday, Sep. 10 2012, 1:28 PM EDT

By ANNA HODGEKISS FOR MAILONLINE
Health behaviours of shift workers

- Less likely to report leisure-time physical activity (Vandelanotte, J Phys Act Health, 2014)
- Higher obesity rates (Ramin, Occup Env Med 2015)
- More likely to become obese over time (Kubo Occup Environ Med, 2011)
- Increased rates of smoking, alcohol use, poorer dietary habits (Nabe-Neilsen, JOEM 2011)
- Limitations in the literature to date...
Canadian Health Measures Survey

- National, cross-sectional, Statistics Canada survey
- Individuals age 6-79 years old
- Multi-stage sample strategy

**Components**

1. In-home health questionnaire
2. Visit to mobile clinic
3. Physical activity monitor for 7 days
Research Question:

How do Canadian shift workers compare to Canadian day workers with respect to:

1. Physical activity and sedentary time
2. Physical fitness (cardiovascular and muscular)
3. Body composition
Study Sample

- >18 years old
- Currently employed
- Not pregnant, PAR-Q cleared

Work Schedule

- Regular day work
- Shift work: regular night shift, rotating shifts
  - Excluded - irregular, on-call, split shift, unknown
Outcome Measures

Physical Activity (7-day Actual accelerometer)
- Moderate-vigorous physical activity
- Sedentary time

Physical Fitness
- Cardiovascular fitness (mCAFT Sub-maximal step test)
- Muscular fitness (Handgrip strength, handheld dynamometer)

Body Composition
- Body Mass Index, Waist Circumference, Waist-Hip Ratio
- Risk categories from World Health Organization (WHO, 2008)
Data Analysis

- All analyses using PROC SURVEY commands in SAS
  - Present results without sample weighting

Demographic characteristics

**Linear regression**
- Sedentary time (min/day)
- Cardiovascular fitness (predicted VO2 max, mL/kg/min)
- Handgrip strength (kg)

**Logistic regression**
- Meet physical activity guidelines (150 min/week)
- Obese: BMI > 30.0 kg/m$^2$
- High Risk Waist-Hip Ratio: > 0.9 (men) or 0.85 (women)
- High Risk Waist Circumference: > 102 cm (men) or > 88 cm (women)
Participant Characteristics

Shift workers were:

- Younger (36.5 vs. 41.7 years)
- Less likely to be married
- Less likely to work full time
- More likely to work multiple jobs

![Bar chart showing distribution of shift types: Nights only (86.9%), Rotating shifts (10.3%), Days only (2.8%)](image-url)
Physical Activity and Sedentary Time

- Average of 10.2 min/day MVPA
- 15.9% of shift workers met guidelines (vs. 15.5% of day workers)

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- Average of 9.6 h/day sedentary
  - Shift workers were less sedentary

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No difference in hand grip strength

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- Shift workers had poorer body composition across all measures

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Strengths & Limitations

- Large cross-section of workers across Canada in different industries
- Objective measures

But…

- Potential selection bias
- Not representative of the Canadian population
- Definition of shift work and work history
- Physical activity: occupational activity vs. purposeful exercise?
Conclusions

- Canadian shift workers are more likely to be high risk for chronic disease based on body composition than day workers.

- Shift workers have lower cardiovascular fitness than day workers, despite no differences in the odds of meeting physical activity guidelines.

- Targeted interventions are needed for this high-risk occupational group to reduce the risk of cancer and other chronic diseases.
Questions?