Nurse Shift Work: A Systematic Review

Presented by
Dr. Vickie Hughes
Introduction

- Shiftwork is a universal issue
  - Studies from Taiwan, Australia, New Zealand, Nigeria, Northern Ireland, Canada, United Kingdom, Iceland, Iran, Greece, Korea, Philippines, Norway, Italy, Hong Kong, Japan, Spain, Lebanon, Ethiopia, India and the United States

- Method
  - Abstracts from 90 articles were identified during an electronic data base search using Pubmed, CINAHL, and Health Source
    - Search terms “Health Risks Nurse Night Shift”
    - Full text articles, human subjects, English language, peer reviewed journals
    - All articles published between January 1, 2004 and March 1, 2015
  - Narrowed articles based on relevance
    - 33 studies selected for inclusion
Quality of Studies Assessed

- STROBE checklist criteria for observational, cohort, case control, and cross-sectional studies
- The systematic review studies were evaluated for quality factors utilizing the PRISMA Checklist
- Most studies were deemed good to excellent based on criteria
- No study was eliminated based on quality
Health Risks

- 33 total articles on health risks
  - 19 studies analyzed data from one or more of the Nurses’ Health Studies
    - Majority of the studies utilizing questionnaire database met the IRBs of Brigham and Women’s Hospital and Harvard School of Public Health
  - 14 studies from other sources
    - 6 systematic reviews
    - Self-report surveys
Nurses’ Health Study

- **Nurses’ Health Study I**
  - Nurses enrolled in 1976
  - 121,700 married, RNs in the United States, nurses aged 30-55 years
  - Majority of participants Caucasian females (97%)
  - Follow-up Questionnaire data collected every two years
  - Shift work question first asked in 1988 questionnaire

- **Nurses Health Study II**
  - Established in 1989
  - 116,430 female registered nurses, ages 25 to 42 years

- **Nurses Health Study III**
  - Enrollment began 2010
Nurses’ Health Study Data Base Findings from 19 Studies

- Increase risk of obesity/overweight
  - Highest risk in night shift only group

- Increased risk of type II diabetes
  - When weight eliminated as confounder results no longer significant (1 out 2 studies)

- Increased risk of breast cancer
  - Risk increased with number of years of shift work

- Increased risk for fractures for women who worked 20+ years shift work
  - Findings nor longer present during 12 year follow-up
Nurses’ Health Study Data Base Findings

- Increase risk of mortality related to cardiovascular disease (5 or more years shift work)
  - Also increase risk of mortality from all diseases compared to day-shift only workers
- Increase risk of stroke
- Increased risk of lung cancer
  - But only for current smokers
  - Smokers with 15 or more years of shiftwork associated 61% increase risk
    - (p trend = 0.0006)
Nurses’ Health Study Data Base Findings

• Increased risk hypertension for black nurses
  ▫ Sample consisted of 1,510 black and 94,142 white females
• Increased risk of menstrual irregularities (two studies)
  ▫ 13% increase risk of irregular pattern for every 12 months of rotating shift work
  ▫ Prevalence associated with number of night shifts per month (p trend < 0.0001)
Nurses’ Health Study Data Base Findings

• **Amount of sleep per day for shift workers**
  - 5 or few hours of sleep per day was associated with a higher incidence of hypertension
  - Short sleep durations also more likely to have diabetes and obesity
  - Shorter sleep duration might have protective effects regarding the development of Parkinson’s Disease
Nurses’ Health Study Data Base Findings

- Night Shift work protective effect on certain disease conditions
  - Skin cancer
    - 44% decreased risk of melanoma in nurses who worked 10 or more years of rotating night shifts
  - Parkinson’s Disease
    - 15+ years of working night shift had 50% lower risk of developing Parkinson’s disease
      - (p trend = 0.005)
Nurses’ Health Study Data Base Findings

- No association between rotating night shift work and:
  - Cognition in middle aged nurses
  - Ovarian cancer
  - Endometriosis
    - Cases categorized by infertility status revealed risk was elevated among women with concurrent infertility and 5 or more years of rotating night shift
      - (p trend – 0.005)
  - Telomere length
  - Urinary melatonin concentration and breast cancer
Health Risks from Other Countries

- Burdelak and others (2012): 725 nurses and midwives
  - Thyroid disease 2 times higher in women working 15 years or more on night shift (p trend=0.031) for Polish nurses
- Lo and others (2008): 22 nurses
  - Blood pressures that changed in evening shift returned to baseline on consecutive off-duty day, but did not return to baseline after a night shift (p<0.05) for Taiwan nurses
- Kim and others (2013): 5,287 shift workers and 4,702 non-shift workers
  - Overweight (18.6%) and obesity (7.4%) increased significantly as shift work duration increased from the lowest to highest (p for trend <0.001) for Korean nurses.
  - Subjects with the longer duration of shift work were older (p < 0.001), higher BMI (p < 0.001), hypertension (p = 0.003), diabetes (p < 0.001), hyperlipidemia (p = 0.003) breast cancer (p < 0.001).
Health Risks

• Hansen and Stevens (2011): 58,091 female, Danish nurses
  ▫ Rotating night shifts increase risk of breast cancer
  ▫ More menstrual irregularities

• Wan & Chung (2012): 151 nurses at Chang Gung Memorial Hospital
  ▫ 53% of the nurses who worked rotating shifts exhibited an irregular ovarian cycle pattern

• Zhao, Bogossian, & Turner (2012): 938 Australian/New Zealand nurses
  ▫ Working shift works increased risk of low back by 40%
    • After adjusting for confounders, shift workers were 1.15 times more likely to develop LBP (p=0.03).
    • Shift workers who were overweight or obese had a 61% increase risk of developing LBP compared to day workers
Health Risks

- Nojkov and others (2010) examined data from 399 nurses (214 day, 110 night & 75 rotating shifts)
  - Rotating shift nurses had significantly higher prevalence of irritable bowel syndrome (p<0.01) and abdominal pain (p=0.003) compared to day shift
Systematic Reviews

• Wang and others (2011) systematic review 29 studies
  ▫ 23 cardiovascular disease and chronic conditions
    • Evidence suggestive but not conclusive in relation to risks of CVD, metabolic syndrome and diabetes
  ▫ 6 cancer studies
    • Evidence suggestive for an adverse association between night work and breast cancer but inconclusive for other cancers

• Kolstad (2008) systematic review 13 epidemiological reports
  ▫ 8 breast cancer
    • 5/8 indicated increased risks breast cancer associated with night shift work
  ▫ 3 prostate cancer, 3 colon cancer, and 4 all cancers
    • Concluded insufficient evidence for a causal relationship between prostate, colon and all other cancers
Systematic Reviews of Breast Cancer

• Ijax and others (2013): 16 studies
  ▫ 9% risk increase per five years of night-shift work exposure in case-control studies but not in cohort studies
• Kamdar and others (2013): 15 observational case-control/cohort studies
  ▫ Lack of appropriate accounting for confounders result in weak evidence to support night-shift work is associated with increased breast cancer risk
• Megdal and others (2005): 13 studies
  ▫ Concluded 47% increase risk of breast cancer among shift workers
Burn Out

- Night shift nurses had higher levels of plasma copper, ferritin, interleukin, and aminotransferase (p<.05) than control groups (Chang et. al., 2014)

  ▪ Ferritin and interleukin considered important markers on onset depression

  ▪ The two night shift group demonstrated the highest level of state anxiety
Night Shift Work

• Copertaro and others (2011): 68 shift workers and 28 daytime nurses
  ▫ No relationship between shift work and select immune variables
Summary

• Long term night shift work might have protective effects for the prevention of skin cancer and Parkinson’s Disease
• Health risks associated with nurse night shift work include:
  ▫ Breast cancer
  ▫ Diabetes
  ▫ Obesity
  ▫ Cardiovascular disease
  ▫ Stroke
  ▫ Irritable Bowel
  ▫ Menstrual changes
  ▫ Depression