Effect of shiftwork schedule change on the occupational stress in South Korean female nurses

Bokim Lee PhD, MPH, RN
Background & Purpose
1 Definition of Shiftwork

- A method of organization of working time in which workers succeed one another at the workplace so that the establishment can operate longer than the hours of work of individual workers (ILO, 1990)

- Any arrangement of daily working hours other than the standard daylight hours (7/8am-5/6pm)
Occurrence of Shiftwork

- shift worker

- EU (2005) 17%
- USA (2004) 15%
- Korea (2010) 11%


Negative Effects of Shiftwork

Withstand shiftwork

20% Stop shiftwork

10% Don’t complain

70% Withstand shiftwork

Mitigate negative effects of shiftwork

Healthy shiftwork

- Schedule change
- Controlled light & dark
- Behavioral Intervention
- Drug
5  shiftwork schedule change and health

Changing from backward to forward rotation

- Increased sleep quality
- Increased total sleep length & leisure-time activity
- Improvements in triglycerides, glucose, blood pressure

Changing from 8-hr to 12-hr shifts

- Increased sleep quantity & quality
- Increased physical fitness
- No change of blood pressure

RQ 1. Do the level of occupational stress differs according to shiftwork schedule change?

RQ 2. Is shiftwork schedule change a significant predictor of occupational stress when other predictors are controlled?
Research Methods
Baseline Survey

June 2012 (TP1)

781 nurses response

659 Female nurses

One year after Survey

June 2013 (TP2)

680 nurses response
June 2012 (TP1)          June 2013 (TP2)

SS group  
Shiftwork    →    Shiftwork    : 419 (63.6%)

SN group  
Shiftwork    →    Non-shiftwork    : 45 (6.8%)

NS group  
Non-shiftwork    →    Shiftwork    : 25 (3.8%)

NN group  
Non-shiftwork    →    Non-shiftwork    : 170 (25.8%)

659 (100.0%)
Instruments

Demographic characteristics
- Age
- Marital status
- Weight/Height
- Working position

Working condition characteristics
- No. of night shifts
- Working days
- Working hours

Occupational stress
- Job demand
- Job control
- Interpersonal conflict
- Job insecurity
- Organizational system
- Lack of reward
- Occupational climate
- Physical environment

The Korean Occupational Stress Scale (KOSS)
3 Data collection

- Institutional review board (IRB) approval
- Posters announcing the study
- Oral and written explanations about the self-determined, anonymity and confidentiality of the study
- Gift card worth 50 thousand WON (about 50 USD)
RQ 1. Do the level of occupational stress differs according to shiftwork schedule change?

- **ANOVA**

RQ 2. Is shiftwork schedule change a significant predictor of occupational stress when other predictors are controlled?

- **Multiple regression analysis**
### Characteristics of participants

<table>
<thead>
<tr>
<th>Variables</th>
<th>TP1 (2012)</th>
<th>TP2 (2013)</th>
<th>$\chi^2$</th>
<th>$p$</th>
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<tbody>
<tr>
<td>Marital status</td>
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<tr>
<td>Married</td>
<td>216 (32.8)</td>
<td>246 (37.3)</td>
<td>3.76</td>
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<tr>
<td>Non-married</td>
<td>443 (67.2)</td>
<td>413 (62.7)</td>
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<tr>
<td>Working position</td>
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<td>0.131</td>
<td>.988</td>
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<tr>
<td>Staff nurse</td>
<td>601 (91.2)</td>
<td>598 (90.7)</td>
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<td>Head nurse</td>
<td>58 (8.8)</td>
<td>61 (9.3)</td>
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<td>BMI (kg/m²)</td>
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<td>1.15</td>
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<tr>
<td>Underweight (18.4 or less)</td>
<td>117 (17.8)</td>
<td>122 (18.5)</td>
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<tr>
<td>Normal (from 18.5 to 22.9)</td>
<td>429 (65.1)</td>
<td>426 (64.6)</td>
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<tr>
<td>Overweight (from 23 to 24.9)</td>
<td>68 (10.3)</td>
<td>63 (9.6)</td>
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<tr>
<td>Obese (25 or more)</td>
<td>25 (3.8)</td>
<td>32 (4.9)</td>
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<tr>
<td>Missing</td>
<td>20 (3.0)</td>
<td>16 (2.4)</td>
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<tr>
<td>Shift work</td>
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<td></td>
<td>1.42</td>
<td>.234</td>
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<tr>
<td>Yes</td>
<td>464 (70.4)</td>
<td>444 (67.4)</td>
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<tr>
<td>No</td>
<td>195 (29.6)</td>
<td>215 (32.6)</td>
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<tr>
<td>Total</td>
<td>659 (100.0)</td>
<td>659 (100.0)</td>
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<td>-----------------------------------</td>
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<tr>
<td>Number of night shifts (time/month)</td>
<td>3.89 (2.96)</td>
<td>3.46 (2.92)</td>
<td>2.60</td>
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<tr>
<td>Working days (day/month)</td>
<td>20.64 (1.47)</td>
<td>20.33 (1.71)</td>
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<td>Working hours (hour/week)</td>
<td>46.04 (6.74)</td>
<td>47.80 (6.19)</td>
<td>-4.69</td>
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<tr>
<td>Occupational stress</td>
<td>47.61 (9.14)</td>
<td>48.78 (9.19)</td>
<td>-2.31</td>
<td>.021</td>
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</table>
Differences in occ. stress according to shiftwork schedule change

Level of occupational stress

( F=5.05, p=.002 )
### Predictors of occ. Stress variation

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Standard β</th>
<th>T Value</th>
<th>p-value</th>
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</thead>
<tbody>
<tr>
<td>Change in marital status</td>
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<tr>
<td>Unchanged</td>
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<tr>
<td>Changed</td>
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<td>Change in working position</td>
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<tr>
<td>Unchanged</td>
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<tr>
<td>Changed</td>
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<td>BMI change</td>
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<tr>
<td>Unchanged</td>
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<td>-0.05</td>
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<td>Increase</td>
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<td>.146</td>
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<tr>
<td>Change in number of night shift</td>
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<tr>
<td>Decrease</td>
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<tr>
<td>Unchanged</td>
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<td>2.70</td>
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<td>Increase</td>
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<td>1.80</td>
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<td>Change in work day per month</td>
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<tr>
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<tr>
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<td>Change in work time per week</td>
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<tr>
<td>Decrease</td>
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<tr>
<td>Unchanged</td>
<td>0.879</td>
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<td>Increase</td>
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<td>Change in working schedule</td>
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<tr>
<td>SS group</td>
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</table>
Occ. stress management for shift workers

- **Increase** worker productivity
- **Prevent** the work-related disease
- **Raise** the Occupational stress

More pay attention to Occ. stress management of nurses, who change their shiftwork schedule from non-shiftwork to shiftwork.
- Providing financial incentives for companies that provide childcare
- Encouraging employers to set maximum hours
- Providing additional pay for shift workers
- Limiting on mandatory shift overtime

- Designing adequate ergonomic shift system
  - early starts for the morning shift X
  - regular shift system
  - guarantee many free weekends
  - adequate time off between shifts
  - rest days after the night duty period
Internationally-joint research projects

- Develop a shiftwork system more beneficial to nurses
- International comparative studies on shiftwork schedule changes and workers’ health conditions
3 Limitation and strength of the study

- Can’t determine causality of shiftwork schedule change and occupational stress.
- Self-reported questionnaire; Possibility to under- or over-estimate level of occupational stress.
- Convenience sampling technique; Limitation on the generalization of this results.

- A pioneering research on association between shiftwork schedule change and occupational stress of South Korean nurses.
Thank you !!