**SHORT REPORT**

**Relationship between self-reported low productivity and overtime working**

Takashi Shimizu¹, Seichi Horie², Shoji Nagata¹ and Eiji Marui³

**Objective**
To investigate the relationship between overtime working and self-reported low productivity due to poor health over the course of 1 year.

**Methods**
The subjects were 94 random-sampled workers at a Japanese manufacturing company. The data on sickness absence and low productivity due to poor health were collected by self-report questionnaires every month from October 1999 to September 2000. Seventy-four workers returned complete answers. The complete data on overtime hours of forty-nine of these employees were obtained from company records.

**Results**
In those reporting low productivity, cold-like symptoms and sleep loss were given as the causes. Low productivity was closely linked to overtime worked, whereas sick leave tended to increase during periods of change in overtime working.

**Conclusion**
Our results suggest the possibility of a relationship between overtime working and self-reported low productivity.

**Key words**
Overtime; self-reported; sickness absence; work productivity; worksite.

**Introduction**
There is strong evidence of the deleterious effect of long overtime hours on production and their connection with absenteeism [1].

Recently in Japan there has been rising concern about the relationship between long overtime hours and workers’ illnesses, such as cerebrovascular and cardiovascular disease [2]. However, no study has investigated the relationship between overtime hours, sickness absence and work loss due to illness. The present study investigated overtime and subjective self-reported low productivity caused by poor health in order to evaluate the relationship between them.

**Materials and methods**
The subjects were 94 random-sampled daytime workers at a manufacturing company in the Kyushu area. The company, in October 1999, had 426 employees (327 males and 99 females) working 8 h per weekday, including break time. It had a financial year from April to March and tended to receive more urgent orders during the fourth quarter than at any other time.

From October 1999 to September 2000, we mailed a self-administered questionnaire, which was compiled with reference to a previous study [3], to the subjects at the end of every month and collected them within the first week of the following month. Questions included: ‘How many days did you take as sick leave this month?’ and ‘How many days did you feel your work efficacy reduced by at least 20% or more due to health problems as compared to that of a healthy day?’ We defined health problems as physical or mental illness. The respondents

¹Department of Mental Health, Institute of Industrial Ecological Sciences, University of Occupational and Environmental Health, Fukuoka, Japan.
²Department of Health Policy and Management, Institute of Industrial Ecological Sciences, University of Occupational and Environmental Health, Fukuoka, Japan.
³Department of Public Health, Juntendo University School of Medicine, Japan.

Correspondence to: Takashi Shimizu, Department of Mental Health, Institute of Industrial Ecological Sciences, University of Occupational and Environmental Health, 1-1 Is Eigoka, Yahatanishi-ku, Kitakyushu-shi, Fukuoka 807-8555, Japan. Tel: +81 93 691 7475; fax: +81 93 692 5419; e-mail: t-shimizu@nifty.com

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supplied the duration of sick leave and low productivity per month, along with the reasons for these. Seventy-four (79%) workers returned complete answers.

We collected complete data on overtime hours of 49 (52%) of these employees from the company records.

Results

The overall mean age (SD) of the respondents reporting low productivity was 41.8 (9.3) years and 70.3% of them were male. The mean age (SD) of the respondents working overtime was 39.0 (9.3) years and 83.7% of them were male. There was no significant statistical difference between gender or mean age of respondents working overtime and reporting low productivity.

The cumulative durations of sick leave and low productivity during the period were 281 and 705 days, respectively. The main reasons for these were cold-like symptoms and sleep loss (Table 1).

Using Friedman’s test, the durations of sick leave, low productivity and overtime hours changed significantly (P < 0.05) during the year. The mean durations of low productivity and overtime hours peaked in February and March, whereas sick leave had two peaks, in January and April 2000 (Figure 1).

Discussion

Cold-like symptoms and sleep loss were the main causes of sick leave and low productivity. This was compatible with other studies showing that sleep disturbance was a serious health problem among Japanese workers [4] and that most sick leave was caused by respiratory diseases [5].

The cumulative duration of low productivity was greater than that of sick leave. This implies that much low productivity due to poor health was concealed beneath sickness absence.

Low productivity tended to increase in tandem with overtime hours. This was compatible with other studies that have suggested that two or more hours of overtime per day worsened workers’ lifestyles and increased job stress [6]. Park et al. [7] indicated that 60 or more working hours per week increased subjective fatigue. These poorer lifestyles and increased fatigue through overtime working were considered to cause the low productivity.

Self-reported sick leave tended to increase before and after the peak of overtime hours. We considered that the increase of sick leave before the peak was caused by worsening lifestyles and increased fatigue, and that its increase after was induced by accumulated fatigue due to overtime. The decrease of sick leave during the peak was considered to be caused by a perception of being far too busy at work to be absent.

The present study had two limitations, i.e. the disparity

Table 1. Reasons for sickness absence and low productivity due to poor health

<table>
<thead>
<tr>
<th>Sickness absence</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold-like symptoms</td>
<td>28.8</td>
</tr>
<tr>
<td>Treatment</td>
<td>24.8</td>
</tr>
<tr>
<td>No response</td>
<td>43.9</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Low productivity due to poor health</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleep loss</td>
<td>45.0</td>
</tr>
<tr>
<td>Cold-like symptoms</td>
<td>23.2</td>
</tr>
<tr>
<td>No response</td>
<td>11.1</td>
</tr>
</tbody>
</table>

Figure 1. Trends of mean durations of overtime hours, sick leave and lost productivity due to illness.
between overtime hours and self-reported low productivity, and the reliability and validity of self-reported low productivity. Further studies should investigate reliability and validity in this context.

In conclusion, our results suggest a possible relationship between overtime working and self-reported low productivity.

References