THE ASSOCIATION BETWEEN SBS SYMPTOMS AND THE PHYSICAL AND PSYCHOSOCIAL ENVIRONMENT OF SCHOOL PERSONNEL

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ABSTRACT

Rapidly changing work structure and work organisation may increase the stress among workers. Particularly high work loads and low personal impact on the work process have been shown to be associated with increased stress and health problems. As part of an indoor-climate investigation covering 70 schools in three districts in the Stockholm area, a standardised questionnaire (MM 040 NA) was sent out to all school personnel, and 2,933 (63%) of them returned the questionnaires filled-in. The relationship between the perceived physical and psychosocial climate was analysed with the perceived symptoms (both in general and work-related). A basic logistic regression model was applied that included sex, atopy and district as covariates. The physical environment was found to be strongly related to the generally perceived symptoms and even more to the work-related symptoms. Psychosocial factors were associated with general symptoms, but only to a minor extent to mucous-membrane irritations and skin symptoms. High work load limited influence at work were factors strongly related to a high prevalence of general symptoms, particularly work-related general symptoms.

INTRODUCTION

Complaints about the indoor climate in non-industrialised buildings are frequent, and factors indoors are suggested to contribute to the reported health effects [1,2]. Previous research has been focused on identifying physical factors in the building. There is, however, a growing awareness of the importance of personal factors and psychosocial factors affecting health [3]. A rapidly changing work structure and work organisation, causing increased demands for work efficiency, a constant need to upgrade personal skills and, in some cases, requirements to take on roles for which the workers are sometimes ill suited, have increased the stress levels [4]. The increased use of visual display units has also changed the work situation tremendously for many people.

Personal factors, such as sex and atopy, have been shown in many studies to be associated with building-related complaints and symptoms [5,6]. Job category has been identified as an important factor in office environments and especially low-grade staff personnel often report building-related symptoms [7]. Limited influence on the work situation and high work load have been associated with an increased prevalence of building-related general symptoms [5].
This is in accordance with the job-control/job-demands model of Karasek, with suggest that low control and high demands lead to stress in the worker [8]. Stress has also been reported as an independent determinant for building-related health complaints [9].

Few studies have been carried out in schools. An association between the perceived air quality and the psychosocial work climate in Swedish schools has been reported [10]. In a study including all personnel at 38 schools, the indoor-air quality was perceived as poor by those who were dissatisfied with their psychosocial work climate [11]. In Swedish schools, large structural and organisational changes have been implemented during the last decade, which has resulted in an altered work situation for personnel. At the same time, a reduction of resources allocated to the educational sector has resulted in a greater number of pupils in classes and an altered occupational role for personnel, both of which might be very stressful.

The main goal of this study was to investigate the relationship between the self-assessed physical and psychosocial environment and the health effects in schools for school personnel.

MATERIAL AND METHODS

In the spring of 1998, the indoor climate in all schools in three districts in the Stockholm area was investigated by means of standardised questionnaires and on-site inspections. One of the districts was located in Central Stockholm and one in a suburb of Stockholm, whereas the third district covered an entire neighbouring municipality. In total, 70 schools were studied. All personnel received a questionnaire. The filled-in questionnaires were returned by 2,933 of them (response rate 63%).

The questionnaire used was the MM 040 NA questionnaire supplemented with an additional set of more detailed questions about the physical environment and one global question about the perceived psychosocial work climate at school [12]. The basic questionnaire contained 12 questions about physical indoor-climate factors and about 12 symptoms often attributed to the indoor climate and their perceived relationships to the work environment. The questionnaire further contained questions about sex, age, atopy, smoking habits and occupation, as well as four questions dealing with the psychosocial climate at work. A recall period of three months was used.

Three groups of symptoms were employed in the analyses. “General symptoms” included weekly incidences of fatigue, heavy-headedness, headaches, dizziness or difficulties in concentrating, “mucous-membrane irritations” – weekly symptoms from eyes, nose, throat or coughing – and “skin symptoms” – weekly skin symptoms. Three more groups of symptoms were employed involving the same symptoms, but only those attributed to the work environment.

Four psychosocial questions measured work satisfaction (“interesting or stimulating work”), work stress (“too much work to do”), personal control at work (“opportunity to influence working conditions” and social support (“getting help from your colleagues when you have a problem at work”). These questions had four possible answers: “yes, often”, “yes, sometimes”, “no, seldom” and “no, never”. A psychosocial index was constructed by forming the sum of the values 1 through 4 assigned to the alternatives for each question (range, 4-16).

A trichotomous categorical psychosocial index was also constructed, whereby a sum of less than 8 was arbitrary defined as “good psychosocial work climate”, and a sum of more than 9
indicated “bad psychosocial work climate”. When analysing the effect of the specific psychosocial questions, the answers “no, seldom” and “no, never” were aggregated.

A physical index was constructed to describe the perceived indoor climate as the sum of “often disturbing” indoor-environmental factors (range, 0-12). This index was also categorised defining “good physical environment” for an index sum of 0-1 and “bad physical environment” for an index sum higher than 3. A temperature factor was defined that included weekly disturbances arising from any temperature factors (draughts and high, low or alternative room temperatures), an indoor-air quality factor was defined from weekly disturbances originating from stuffy, dry air, unpleasant smells or environmental tobacco smoke, and a dust factor was defined from weekly complaints stemming from “dust and dirt”. A dichotomous occupational factor was also constructed (teacher/others).

Multiple logistic regression was applied to estimate odds ratios having 99 % confidence intervals of all symptom groups adjusted for sex, atopy and district in the basic model including categorised indices describing the perceived indoor climate. The model was tested by including different covariates (age, smoking and occupation) and/or replacing the categorised physical and psychosocial variables with the continuous variables. Also tested analogously were the global question about the perceived psychosocial climate at the workplace as well as the four specific psychosocial questions and the three specific indoor climate questions.

RESULTS

The outcome of the questionnaire survey is presented in Table 1. The characteristics of the three districts are similar despite different geographic location and demographic characters.

Table 2 shows the results of the basic logistic regression analyses including sex, atopy and district as covariates together with physical and psychosocial indices describing the perceived indoor climate and the defined symptom groups. Including the covariates age (continuous variable) and occupation or smoking habits did not change the outcome, nor did replacing the categorised physical or psychosocial indices with continuous ones or utilising the global psychosocial question instead of the psychosocial index. Corresponding analyses with work-related symptoms as dependent variables gave higher odds rates for the physical index, although, in total, a similar outcome.

When including the specific psychosocial questions one by one in the basic model (the psychosocial index excluded) the general symptoms were significantly related to all factors, especially high work stress (OR=3.43, CI 2.13-5.50) and personal control (OR=3.30, CI 2.36-4.61). The importance of work stress was even more evident for work-related general symptoms (OR=5.08, CI 2.68-9.61). Including the physical parameters (temperature, air quality and dust) instead of the physical index in the basic model did not change the overall outcome.
Table 1. Personal characteristics, perceived indoor climate and symptoms for school personnel in three districts in the Stockholm area.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total n=2933</th>
<th>District 1 n=1098</th>
<th>District 2 n=1180</th>
<th>District 2 n=655</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex (% male)</td>
<td>25</td>
<td>30</td>
<td>23</td>
<td>19</td>
</tr>
<tr>
<td>Age, mean (SD)</td>
<td>45(11)</td>
<td>46(11)</td>
<td>44(11)</td>
<td>46(10)</td>
</tr>
<tr>
<td>Smoker (%)</td>
<td>14</td>
<td>13</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Atopy* (%)</td>
<td>27</td>
<td>27</td>
<td>26</td>
<td>28</td>
</tr>
<tr>
<td>Teacher (%)</td>
<td>64</td>
<td>67</td>
<td>59</td>
<td>65</td>
</tr>
</tbody>
</table>

Often disturbed by
- temperature (%)                  | 36           | 34                 | 39                 | 35               |
- indoor air quality (%)            | 48           | 46                 | 50                 | 46               |
- dust (%)                          | 42           | 44                 | 41                 | 39               |

Physical index, mean (SD)           | 2.3(2.1)     | 2.2(2.1)           | 2.4(2.1)           | 2.3(2.2)         |
0-1, indoor climate factors (%)     | 44           | 46                 | 41                 | 45               |
2-3, indoor climate factors (%)     | 30           | 29                 | 32                 | 29               |
4-, indoor climate factors (%)      | 26           | 25                 | 27                 | 26               |

Work satisfaction (%)               | 80           | 80                 | 79                 | 81               |
Work stress (%)                     | 48           | 45                 | 51                 | 47               |
Personal influence (%)              | 21           | 23                 | 20                 | 20               |
Social support (%)                  | 57           | 52                 | 59                 | 61               |

Psychosocial index, mean (SD)       | 8.2(1.5)     | 8.2(1.6)           | 8.2(1.15)          | 8.1(1.5)         |
-7, points (%)                      | 34           | 36                 | 32                 | 34               |
8-9, points (%)                     | 48           | 45                 | 50                 | 49               |
10-, points (%)                     | 18           | 19                 | 17                 | 17               |

General symptoms (%)                | 41           | 41                 | 42                 | 40               |
- related to the work environment (%)| 29           | 28                 | 31                 | 26               |
Mucous-membrane irritations (%)     | 24           | 24                 | 22                 | 28               |
- related to the work environment (%)| 16           | 16                 | 14                 | 17               |
Skin symptoms (%)                   | 19           | 17                 | 19                 | 20               |
- related to the work environment (%)| 8            | 8                  | 10                 | 8                |

* Asthma or hay fever               | SD = standard deviation
Table 2. Odds ratios and 99 % confidence intervals estimated from basic model of the logistic regression analyses.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Category</th>
<th>Odds ratio with 99% confidence interval for general symptoms</th>
<th>Odds ration with 99% confidence interval for mucous membrane irritations</th>
<th>Odds ration with 99% confidence interval for skin symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distr</td>
<td>1</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1.01 (0.79-1.30)</td>
<td>0.85 (0.64-1.13)</td>
<td>1.08 (0.80-1.46)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0.88 (0.66-1.18)</td>
<td>1.29 (0.93-1.78)</td>
<td>1.15 (0.81-1.63)</td>
</tr>
<tr>
<td>Sex</td>
<td>female</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>male</td>
<td>0.54* (0.42-0.71)</td>
<td>0.74 (0.54-1.01)</td>
<td>0.71 (0.51-1.00)</td>
</tr>
<tr>
<td>Atopy*</td>
<td>no</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>yes</td>
<td>1.46* (1.14-1.87)</td>
<td>2.38* (1.83-3.09)</td>
<td>1.18 (0.89-1.57)</td>
</tr>
<tr>
<td>Physical index</td>
<td>0-1</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>2-3</td>
<td>1.72* (1.33-2.22)</td>
<td>2.12* (1.54-2.92)</td>
<td>1.75* (1.25-2.44)</td>
</tr>
<tr>
<td></td>
<td>4-</td>
<td>3.93* (2.99-5.16)</td>
<td>5.16* (3.77-7.05)</td>
<td>3.25* (2.35-4.50)</td>
</tr>
<tr>
<td>Psychosocial index</td>
<td>-7</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>8-9</td>
<td>2.14* (1.66-2.74)</td>
<td>1.15 (0.87-1.54)</td>
<td>1.15 (0.85-1.56)</td>
</tr>
<tr>
<td></td>
<td>10-</td>
<td>4.26* (3.08-5.89)</td>
<td>1.64* (1.16-2.34)</td>
<td>1.38 (0.95-2.00)</td>
</tr>
</tbody>
</table>

* Asthma or hay fever * p<0.01

**DISCUSSION**

The analyses showed very stable relationships between the perceived indoor climate and symptoms (both in general and work-related). The perceived physical indoor climate was related to all symptoms groups, particularly mucous-membrane irritations, whereas the psychosocial climate was related to general symptoms, though only to a minor extent to mucous-membrane irritations or skin symptoms. This is in accordance with what was seen in the Danish Town Hall study [5] and is also plausible from a logical point of view. Dose-response relationships were found for both the physical and the psychosocial indices. Work stress and personal control at work were strongly related to general symptoms, which is also in agreement with what has been reported earlier [5,7].

Although the analyses covered three administrative districts with different characteristics (a city district, a suburban district and a municipality with many single-family homes outside Stockholm) the factor “district” never surfaced in the analyses as an important factor, nor did the factors smoking, age or occupational group change the outcome of the basic model. One explanation for this stability may be that school personnel represent a relatively uniform occupational group. They are also motivated in their work, and 80 % of them described their jobs as interesting and stimulating. Almost half of them reported frequent work stress, albeit the situation seems to be similar in all districts.
Both symptoms and the perceived indoor climate were reported by the workers themselves. Although technical data from the inspections of all localities were collected, these have not yet been analyses. While such data might be used to compare the perceived indoor climate with the technical status of the schools, they will provide no further information about the relationships studied here.

REFERENCES


