Sewing-machine operators' work and musculo-skeletal complaints

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The purpose of the study was to obtain information about the possible occupational origin of the high occurrence of musculo-skeletal rheumatoid complaints among sewing-machine operators. The subjects were chosen by random sampling and comprised 40 sewing-machine operators with short work cycles (30–60 s) and 20 seamstresses as the reference group. The two groups were matched with respect to age and length of service. A survey of working postures showed that the sewing-machine operators' work was more static. Musculo-skeletal complaints occurred more frequently among the sewing-machine operators, especially in the neck and shoulders \(p<0.001\) and the lower limbs \(p<0.01\). It is concluded that the occupational change from seamstresses' work to sewing-machine operators' work is associated with an increase in the occurrence of musculo-skeletal complaints.

1. Introduction

In the clothing industry, the development of mass production methods has meant that work previously done by seamstresses is now done by sewing-machine operators. A high prevalence of musculo-skeletal complaints has been observed in many studies on sewing-machine operators (Teiger et al. 1973, Vanekova et al. 1977, Sillanpää and Frilander 1980). The purpose of this study was to find out whether these complaints could be attributed to occupational factors. Seamstresses were used as the reference group.

2. Subjects and methods

2.1. Subjects

Nine workplaces with 198 employees involved in the manufacture of clothing were chosen by random sampling (Vihma 1981) from all the small industrial workplaces employing less than 50 people in Uusimaa, the southernmost province of Finland. The subjects comprised 40 female sewing-machine operators who manufactured light garments and had a short work cycle (30–60 s). The seamstresses \(N=20\), each of whom carried out all the sewing operations required for a dress or a suit, were used as the reference group. The mean age of the sewing-machine operators was 42 years (range 19–64) and their mean length of service in the present occupation was 15 years (range 1–40). The seamstresses were slightly older (mean age 46 years, range 21–64) and their length of service was longer (mean 23 years, range 3–45).

2.2. Methods

The length of the work cycle of each sewing-machine operator was assessed by one of the authors through observation and by interviewing the management. Working postures were described by a trained physiotherapist after observing each employee for an average of 30 min and after interviewing both the management and the employees.
about the average duration of each posture (Vilhna 1981). The occurrence of musculo-
skeletal symptoms was surveyed by means of a questionnaire using a figure to illustrate
the sites of symptoms (see the figure).

Have you had in your present
work recurrent pain or aching in
one of the following locations
during or after work?
1. neck or shoulders
2. upper arm
3. elbow or forearm
4. wrist
5. fingers
6. back
7. thigh or calf
8. ankle or foot

Questionnaire of the complaints.

The index group and the reference group were individually matched (2:1 matching)
with respect to age and duration of service in the present occupation. The relative
occurrence of symptoms was calculated by contrasting pairs with discordant illness
experience (Miettinen 1970) and by using the Mantel and Haenszel (1959) procedure of
obtaining a point estimate of relative risk. The significance of difference in symptoms
recurrences between the groups was tested with a corresponding statistic (Miettinen
1969).

3. Results

3.1. Working postures

The sewing-machine operators' work was more static than the seamstresses' work.
All the sewing-machine operators (N = 40) and eight of the seamstresses (N = 20) spent
more than 6 hours a day sitting (p < 0.01). None of the sewing-machine operators but 17
of the 20 seamstresses stood or moved more than once an hour (p < 0.001).

3.2. Recurrent musculo-skeletal complaints

The complaints were more frequent among the sewing-machine operators than
among the seamstresses in all anatomical regions. The most significant differences are
presented in the table.

Occurrence of recurrent musculo-skeletal complaints among sewing-machine operators and
seamstresses

<table>
<thead>
<tr>
<th>Location of the complaints</th>
<th>Sewing-machine operators (N = 40)</th>
<th>Seamstresses (N = 20)</th>
<th>Relative risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neck or shoulder</td>
<td>98</td>
<td>60</td>
<td>16 (p &lt; 0.001)</td>
</tr>
<tr>
<td>Lower limbs</td>
<td>43</td>
<td>5</td>
<td>16 (p &lt; 0.01)</td>
</tr>
<tr>
<td>At least four complaints</td>
<td>38</td>
<td>0</td>
<td>&gt; 15 (p &lt; 0.01)</td>
</tr>
</tbody>
</table>
4. Discussion

The sewing-machine operators' work was more monotonous and more intensive than the seamstresses' because it was divided into short work cycles. It was also clearly more static, as was demonstrated by the survey of work postures.

Leisure time activities may well influence the occurrence of musculo-skeletal complaints. However, the groups of women studied were similar in age and social status, and probably had similar leisure time activities (Motelj 1975).

The occurrence of musculo-skeletal complaints among sewing-machine operators in other studies has been of the same magnitude as that found here (Teiger et al. 1973, Vaneckova et al. 1977, Sillanpää and Frilander 1980).

In sewing-machine operators' work there is a considerable static work load on both the neck and shoulders and on the lower limbs (Teiger et al. 1973, Vihma 1978). These were the anatomical sites which revealed the clearest differences in the occurrence of symptoms between the two groups.

A short work cycle in the sewing-machine operators' work diminishes the duration of a working posture involving a forward bend (Vaneckova et al. 1977, Vihma 1978). However, the static work load does not diminish correspondingly; a shorter cycle increases the speed of the work operations, so that muscles do not relax between the cycles (Teiger et al. 1973, Vihma 1978). The mental work load associated with short cycles may also increase the occurrence of musculo-skeletal complaints by increasing muscle tension. The mental work load may also lower the threshold at which symptoms are reported (Kagan and Levi 1974).

This study, therefore, provides additional evidence for the occupational origin of the higher occurrence of musculo-skeletal complaints among sewing-machine operators, than among seamstresses.

L'objet de cette étude était de recueillir des informations relatives à l'origine professionnelle possible de la forte fréquence des affections musculo-squelettiques (rhumatisantes) chez des ouvrières travaillant sur des machines à coudre. Les sujets ont été sélectionnés aléatoirement pour former un groupe de 40 ouvrières sur machine opérant avec des cycles de travail courts (30 à 60 s) et un groupe de référence de 20 couturières. Les deux groupes ont été équilibrés en tenant compte de l'âge et du temps passé dans l'emploi. L'étude des postures de travail à montre que le travail des ouvrières sur machine était plus statique. Les troubles musculo-squelettiques étaient plus fréquents chez les ouvrières sur machine, en particulier, dans la nuque et les épaules ($p<0.001$) ainsi que dans les membres inférieurs ($p<0.01$). Il est apparu finalement que le changement d'emploi de la couturière vers l'ouvrière sur machine était accompagné par un accroissement de la fréquence des affections musculo-squelettiques.

References


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