Acupuncture Can Reduce Perceived Pain, Mood Disturbances and Medical Expenses Related to Low Back Pain among Factory Employees

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Abstract: To investigate the effects of acupuncture on perceived pain, mood disturbances and medical expenses related to low back pain (LBP), an intervention study was performed among 72 employees of a steel company, 70 males and 2 females, aged 53.1 ± 7.1 (mean ± SD) yr, with LBP. They received acupuncture treatment once a week for 8 wk (from October to December 1998) by licensed acupuncturists, adopting a new hypothesis of the Meridian test. Perceived pain scale, and Profile of Mood States (POMS) were administered. Past and present histories of employees’ visits to hospitals and their medical expenses for LBP were surveyed from receipts obtained from the subjects’ branch factory and from receipts from another nearby branch factory (control) during the period from April 1998 to March 1999. After 8 wk of treatment, patients with LBP reported diminished pain (p<0.01). POMS showed a significant decrease in the total mood disturbance score (p<0.001). The number of visits to conventional hospitals (12.1 ± 8.0 vs. 0.8 ± 0.8 per month, p<0.05) and standardized medical expenses for LBP (100.1 ± 89.6 vs. 7.3 ± 6.9 per month, p<0.05) after acupuncture intervention (November 1998 to March 1999) were significantly decreased as compared with those before intervention (April 1998 to October 1998). In contrast, such decreases were not observed in employees from the control branch factory. It is suggested that acupuncture can reduce medical expenses for LBP through improvement in mood and pain.

Key words: Low back pain, Factory employees, Mood, Medical expense, Acupuncture, Complementary and alternative medicine

Introduction

Low back pain (LBP) has been shown to be an occupational disease with important health and socio-economic consequences. It often results in increased absenteeism from work, reduced productivity and high medical expenses1). Thus, the treatment options for factory employees with LBP should be investigated.

Although its mechanism is still uncertain, acupuncture is amongst the most popular alternative and complementary medicine treatment modalities used by patients with LBP2, 3). Acupuncture therapy is also one of the most scientifically researched therapies4). People have gradually come to believe that acupuncture is as worth paying for as conventional medicine5). Although a large number of studies have been conducted on the effects of acupuncture on pain and the resulting medical expenses of facto-
Subjects and Methods

The study protocol was approved by all responsible ethical review boards (Ethics committees of Graduate School of Medicine/Department of Medicine, Mie University, No.844).

Subjects

Employees of two branch factories (G and P) of a major steel manufacturing company, company S (with approximately 20,000 employees), engaged in the same kind of physical labor such as transportation of materials, assembly, and steel welding operations were included in the study. Some employees worked in assembly line operations, while others worked individually. Employees spent most of their working time in the upright position. They were also exposed to continuous machinery vibration and noise. They worked in factories with no air conditioning systems, ambient temperature depending on outside weather conditions. Employees worked under a three-shift rotation. There were 249 employees (245 males and 4 females) in branch factory G and 474 employees (468 males and 6 females) in branch factory P. All employees had undergone an annual physical checkup by occupational health physicians. One-hundred and fifty-two employees of branch factory G were enrolled in our trial, of whom 72 employees (70 males and 2 females) aged 53.1 ± 7.1 yr (mean ± SD) were diagnosed by occupational health physicians as suffering from LBP of more than about three months duration. They received acupuncture treatment once a week for eight weeks from October 22nd 1998 to December 16th 1998. All 474 employees of branch factory P, aged 44.8 ± 12.5 yr, served as controls. We compared the records of patients from the two branch factories (G and P), who were engaged in the same kind of work. All the subjects were well informed about the study both verbally and in writing, and the study was conducted after obtaining their informed consent.

Methods

Acupuncture (insertion of sterile single-use needles at classic acupuncture points) was provided for a maximum of 20 treatment sessions. At a maximum, 20 points were stimulated by press tack needles (SEIRIN Jr., Length 1.3 mm). The price of one tack needle was about 20 yen; the maximum cost of treatment was a total of 400 yen per subject. Treatment points were selected from the results of the Meridian test, a diagnostic test developed by Yoshito Mukaino, which consists of identifying movements (stretches) that increase symptoms or pain

Results

During the eight sessions of treatment, there was a significant reduction in LBP pain scale scores in the 72 employees who received acupuncture. Compared with pain scores of the first week (6.3 ± 3.2), significant differences were observed from the fourth week onwards.
Fig. 1. Meridian test is a method for selection of acupuncture treatment points and consists of identifying movements (stretch) that increase symptoms or pain.

Table 1. POMS before and after eight weeks of acupuncture in 72 employees

<table>
<thead>
<tr>
<th>POMS (Scores):</th>
<th>Before</th>
<th>After</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total mood disturbance</td>
<td>10.5 ± 6.7</td>
<td>9.1 ± 6.5</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Tension-anxiety</td>
<td>10.6 ± 5.3</td>
<td>9.5 ± 5.4</td>
<td>N.S.*</td>
</tr>
<tr>
<td>Depression-dejection</td>
<td>12.6 ± 9.8</td>
<td>10.0 ± 8.9</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Anger-hostility</td>
<td>11.5 ± 7.5</td>
<td>8.1 ± 6.8</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Vigor-activity</td>
<td>12.4 ± 5.5</td>
<td>13.0 ± 6.0</td>
<td>N.S.*</td>
</tr>
<tr>
<td>Fatigue-inertia</td>
<td>8.0 ± 5.5</td>
<td>6.7 ± 5.3</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Confusion-bewilderment</td>
<td>8.5 ± 4.1</td>
<td>7.5 ± 3.9</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

*N.S. = p>0.05.
Data are expressed as Mean ± SD.

Fig. 2. Differences in NRS (pain scale) scores in employees of branch factory G, as compared with first week data. p<0.05, p<0.01 as compared to first week data.
There were many factors in the working environment of the participants of this study that could have contributed to LBP. Though we did not identify the cause of LBP in individual employees, perceived pain was observed to decrease with acupuncture, suggesting that a press tack acupuncture needle, the length of which is only 1.3 mm, might be an effective option in the treatment of pain and disability associated with chronic LBP. Moreover, the use of press tack needles had the advantage of shortening the treatment time and decreasing the fear of acupuncture. After the fourth week, there was a significant reduction in LBP. Our results were consistent with the observations of randomized control trials showing that minimal acupuncture interventions (i.e. press tack needles) are effective in the treatment of muscle pain and stiffness12–15).

POMS scores decreased significantly after acupuncture treatment, indicating improvements in terms of total mood disturbance, depression-dejection, anger-hostility, fatigue-inertia and confusion-bewilderment. Weidenhammer et al. also reported that pain reduction after acupuncture had significant relationships with depression16). Some of the POMS scores significantly decreased after acupuncture treatment sessions, suggesting that decreased pain might have contributed to improvement of the mental well-being of the employees.

We compared the number of hospital visits and medical expenses index of employees of the two branch factories. In branch factory G, both these variables showed a significant decrease after acupuncture treatment was introduced. This suggests that acupuncture treatment can reduce the frequency of visits to conventional hospitals and the medical expenses of employees, due to its beneficial effects on LBP. Moreover, after eight weekly sessions of acupuncture treatment, there was little change in the number of hospital visits and medical expenses index during the succeeding three months. On the other hand, there were no remarkable decreases in these variables in branch factory P employees in whom acupuncture treatment was not introduced.

As per White et al.5) suggestion that carefully targeted acupuncture may reduce referral costs for musculoskeletal problems, acupuncture seems useful for the care of musculoskeletal problems. Consequently, we can expect wide-ranging economic effects from the introduction of acupuncture treatment in companies, along with reduction in medical expenses. Although acupuncture treatment was provided free of charge in this study and only medical expense indices were traced, the high reduction rate of hospital visits of factory employees suggests that acupuncture treatment, which requires neither massive equipment investments nor material costs as compared to conventional medicine, can contribute much to the reduction of total medical expenses.

Moreover, we observed an improvement in psychological factors (POMS) together with a decrease in pain. Other studies have concluded that acupuncture for LBP confers a modest benefit to health, as measured by SF3616, 17) and quality adjusted life years (QALYs)18–20). In our study too, a lot of employees responded to the questionnaire by saying that acupuncture treatment for LBP was effective.

In conclusion, further studies are needed to elucidate the cost-benefit and the mechanisms of the effects of acupuncture treatment for LBP. We hope this study will contribute to the introduction of acupuncture treatment for industrial health and health promotion of factory workers.

Table 2. Number of visits to hospitals and standardized medical expenses due to low back pain in employees of branch factory G (N=249) and branch factory P (N=474) per month before (April 1998 to October 1998) and after (November 1998 to March 1999) acupuncture

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
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<tbody>
<tr>
<td>Branch factory G</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of visits to hospitals:</td>
<td>12.1 ± 8.0</td>
<td>0.8 ± 0.8</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Medical expense*:</td>
<td>100.1 ± 89.6</td>
<td>7.3 ± 6.9</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Branch factory P</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of visits to hospitals:</td>
<td>8.0 ± 2.6</td>
<td>8.0 ± 3.0</td>
<td>N.S</td>
</tr>
<tr>
<td>Medical expense*:</td>
<td>140.2 ± 109.2</td>
<td>140.1 ± 97.4</td>
<td>N.S</td>
</tr>
</tbody>
</table>

N.S. = As in Table 1.
*Medical expenses in April 1998 were defined as 100.
Data are expressed as Mean ± SD.
Acknowledgements

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References


