Lumbar Supports and Education for the Prevention of Low Back Pain in Industry

A Randomized Controlled Trial

Mireille N. M. van Poppel, MSc; Bart W. Koes, PhD; Trudy van der Ploeg, MD; Tjabe Smid, PhD; Lex M. Bouter, PhD

Context.—Low back pain is a frequent and costly health problem. Prevention of low back pain is important both for the individual patient and from an economic perspective.

Objective.—To assess the efficacy of lumbar supports and education in the prevention of low back pain in industry.

Design.—A randomized controlled trial with a factorial design.

Setting.—The cargo department of an airline company in the Netherlands.

Participants.—A total of 312 workers were randomized, of whom 282 were available for the 6-month follow-up.

Interventions.—Subjects were randomly assigned to 4 groups: (1) education (lifting instructions) and lumbar support, (2) education, (3) lumbar support, and (4) no intervention. Education consisted of 3 group sessions on lifting techniques with a total duration of 5 hours. Lumbar supports were recommended to be used during working hours for 6 months.

Main Outcome Measures.—Low back pain incidence and sick leave because of back pain during the 6-month intervention period.

Results.—Compliance with wearing the lumbar support at least half the time was 43%. In the 282 subjects for whom data were available, no statistically significant differences in back pain incidence (48 [36%] of 134 with lumbar support vs 51 [34%] of 148 without, $P = .81$) or in sick leave because of low back pain (mean, 0.4 days per month with lumbar support vs 0.4 days without, $P = .52$) were found among the intervention groups. In a subgroup of subjects with low back pain at baseline, lumbar supports reduced the number of days with low back pain per month (median, 1.2 vs 6.5 days per month; $P = .03$).

Conclusions.—Overall, lumbar supports or education did not lead to a reduction in low back pain incidence or sick leave. The results of the subgroup analysis need to be confirmed by future research. Based on our results, the use of education or lumbar supports cannot be recommended in the prevention of low back pain in industry.

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From the Institute for Research in Extramural Medicine (Ms van Poppel and Drs Koes, Smid, and Bouter) and the Faculty of Movement Sciences (Dr Smid), Vrije Universiteit, Amsterdam, the Netherlands; and the Department of Health, Safety, and Environment, KLM Royal Dutch Airlines, Schiphol Airport, the Netherlands (Drs van der Ploeg and Smid).

Corresponding author: Mireille N. M. van Poppel, MSc, Institute for Research in Extramural Medicine, Faculty of Medicine, Vrije Universiteit, Van der Boechorststraat 7, 1081 BT Amsterdam, the Netherlands (e-mail: mnm.van_poppel.emgo@med.vu.nl).

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LOW BACK PAIN occurs frequently and is one of the most costly health problems affecting industry and society. Lifetime prevalences of 60% to 90% have been reported[1] and the total (direct and indirect) costs for back pain were estimated to be $27.9 billion in 1990 in the United States.[2] Therefore, it is not surprising that many measures are available that claim to reduce low back pain and its recurrence. Aside from ergonomic adjustments in the workplace, the most commonly used preventive strategies in industry are fitness exercises, education on back mechanics and lifting techniques, and lumbar supports.[3] Although these measures are widely used, their efficacy is still uncertain.

For editorial comment see p 1826.

In particular, the efficacy of lumbar supports is under debate. To date, at least 3 randomized trials are available that evaluate the effect of lumbar supports on the prevention of back pain in industry. In 2 of these, no effect of lumbar supports was reported.[4,5] The third study found a small reduction in the number of days lost from work in a group receiving both a lumbar support and education compared with a control group.[6] In addition, 2 nonrandomized controlled trials reported a positive effect of lumbar supports in the reduction of back pain incidence.[7,8] Review articles concluded there is insufficient evidence for or against the effectiveness of lumbar supports in the prevention of low back pain and that further research is needed.[3,9-11] The same conclusion was reached in a report of the US National Institute for Occupational Safety and Health (NIOSH) and, consequently, the use of lumbar supports among uninjured workers was not recommended by NIOSH.[12]

We conducted a randomized controlled trial to determine the effectiveness of lumbar supports and education in the prevention of back pain in industry conducted in the Netherlands.

METHODS

Design

A factorial randomized design was used: group 1 received both a lumbar

support and education in the form of lifting instructions, group 2 received only education, group 3 received only a lumbar support, and group 4 received no intervention (control group). In a factorial design, in addition to assessing the effect of interventions by comparing them with a control group, the combination of 2 interventions is compared with each intervention alone and with a control group, thus allowing investigation of the interaction between the 2 interventions.

Subjects

Workers were recruited from the cargo department of a major Dutch airline at Schiphol Airport. All workers whose jobs included manual material handling were invited to participate. Typical tasks of these workers included the loading and unloading of cargo pallets and containers and the sorting and transportation of cargo, both manually and with a forklift truck. Workers who had a permanent partial work disability were excluded from the study. The study was approved by the Medical Ethical Committee of the Vrije Universiteit, Amsterdam, the Netherlands. Workers received personal information about the procedures of the trial and enrolled after giving consent. The duration of the intervention period was 6 months.

Lumbar Supports

The Work S'port back support (The Saunders Group Inc, Chaska, Minn) was chosen over 2 other lumbar supports in a pilot study. In the pilot study the comfort of the different supports was tested in a group of 20 workers who were not included in the randomized trial. The lumbar support used in the study has adjustable elastic side pulls with Velcro fasteners and flexible stays, and is kept in place with an anchor belt. The lumbar support has no shoulder straps and is available in 4 sizes. The workers were given written and verbal instructions on the use of the lumbar support and were instructed to wear the lumbar support at all times during work hours and to tighten the side pulls for stronger support when performing strenuous tasks.

Education

Education was given in the form of lifting instructions. The lifting instructions were given by 2 experienced paramedical therapists. Instructions were designed to make workers aware of their movements and postures during work. Lifting instructions were given in 3 sessions for groups of 10 to 15 workers; the first session of 2 hours took place at the start of the intervention period, and the other 2 sessions of 1.5 hours each were given at 6 weeks and at 12 weeks. In the first session, information was given about the anatomy of the spine and back muscles and about lifting techniques. Lifting techniques were practiced in simple situations. In the second session, the instructions on lifting techniques were repeated, and relaxation exercises for neck, shoulder, and back muscles were explained and practiced. In the third session, which took place at the workplace when workers were actually loading and unloading cargo, individual advice was given on working methods.

Assignment

The work at the cargo department was organized in work modules (n = 6), with each work module consisting of 6 work groups containing 6 to 20 workers each. Workers in all work modules performed manual lifting tasks and used a forklift truck. The work modules differed slightly in the proportion of time spent using a forklift truck and performing lifting tasks. A total of 380 workers in 36 work groups were eligible for the study. We assumed that compliance would be higher if all workers in a group, rather than a subset of the group, were asked to wear a lumbar support. Furthermore, it was practical to use the existing workgroup organization for the education sessions. Therefore, the 36 work groups, not individual subjects, were randomized over the 4 treatment groups. Because of the slight variation in tasks among some work modules, randomization was stratified for work modules.[13] For each work module, a separate randomization list was prepared. Random permuted blocks of 4 were used within each stratum. The blocks were assigned to the strata using a random numbers table.

Randomization was performed by an investigator who was blinded with respect to the characteristics of the work modules and the workers within the work groups. Assignment to the intervention groups took place after completion of the baseline measurements.

Main Outcome Measures

At baseline subjects completed a questionnaire on demographic data, history of back pain, work perception,[14] and health status.[15,16] During the intervention period, subjects received a monthly questionnaire on the occurrence of low back pain and sick leave. Subjects were asked if they had experienced low back pain in the past month and, if they answered positively, how many days they experienced low back pain. They were also asked if they had lost time from work in the past month (and the number of days lost) and if they had lost time from work because of back pain (and the number of days lost). All subjects worked full time. The same questionnaire on back pain and sick leave was completed at 9 months and 12 months after randomization.

At baseline and at 6 months, the end of the intervention period, trunk-muscle strength was measured to assess whether wearing a lumbar support affected trunk muscle strength. Subjects with current or past back pain who felt they might injure or reinjure their backs by performing the tests were excluded from the trunk-muscle tests. The endurance strength of the abdominal muscles was determined with subjects lying supine with knees at 90° and feet flat on the floor or table without support.[17] Subjects were asked to curl up with hands straight toward knees and fingertips of both hands reaching midpatella. This posture was held for a maximum of 240 seconds. If the posture was lost, the test was stopped and the number of seconds was noted. The dynamic strength of the abdominal muscles was measured with subjects lying supine with knees at 90° and feet flat on the floor without support.[18] Subjects were asked to perform 3 series of 5 sit-ups with increasing difficulty. The number of sit-ups performed by each subject was noted. Endurance strength of the back muscles was determined with subjects prone on the examination table with buttocks and legs fixed and trunk unsupported.[19] Subjects were asked to hold their upper body and head horizontal for a maximum of 240 seconds. If the posture was lost and could not be corrected, or if a subject showed signs of exhaustion, pain, or cramping, the test was stopped and the number of seconds was noted.

Compliance with wearing the lumbar support was measured every month. In the monthly questionnaire subjects were asked if they had worn the lumbar support in the previous month. Subjects were considered compliant if they reported wearing the lumbar support in more than half of the questionnaires.

Statistical Analysis

Based on the difference in days lost from work and corresponding variance reported by Walsh and Schwartz,[6] it was estimated that with a significance level of .05 and a power of 80%, a difference of 0.9 lost work day per 6 months could be detected with 50 subjects per intervention group. Our goal was to include 75 subjects per intervention group in order to prevent inadequate power because of low compliance or withdrawals.

Differences in outcomes at the 6-month follow-up were analyzed for the 4 intervention groups. Differences between groups were tested for statistical significance by using χ^2 tests for categorical data (ie, experience of back pain

and sick leave) and Student t tests for continuous data (ie, age, scores on trunk muscle tests). Nonparametric testing (the Mann-Whitney U test or the Kruskal-Wallis test, corrected for ties) was used for data on the number of days with back pain or sick leave, since the distribution of these data is skewed. Differences were considered statistically significant at the .05 level. For categorical data, differences between groups and 95% confidence intervals (CIs) were calculated.[20]

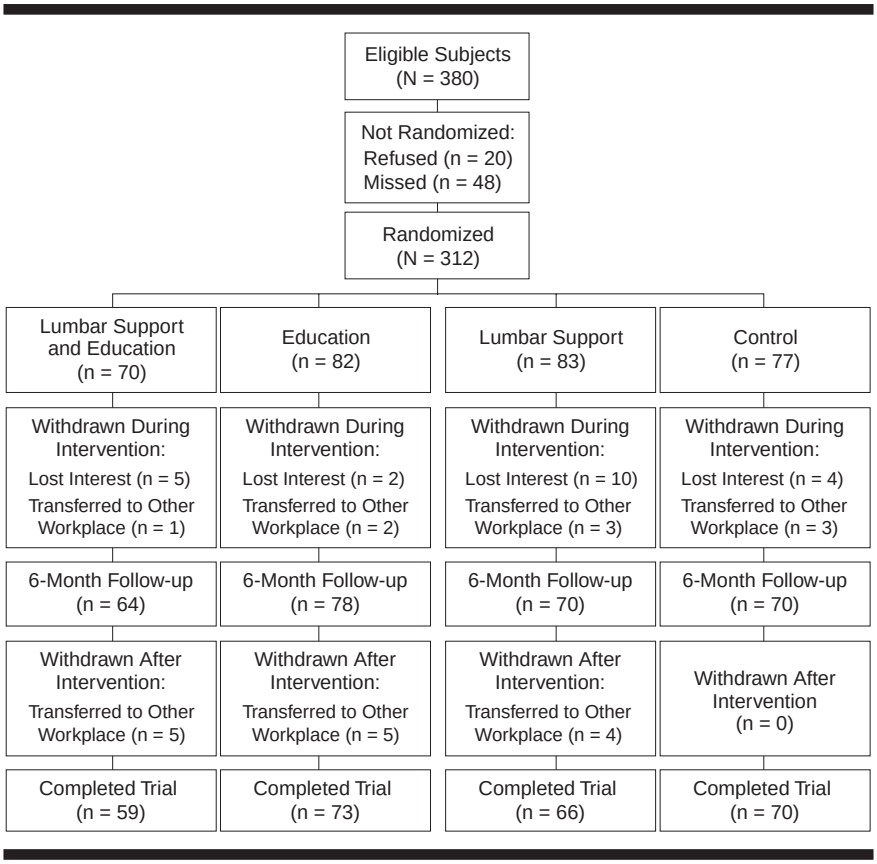
Possible effect modification in the group with both lumbar support and education was studied in an analysis in which the 2 groups with a single intervention were combined and compared with the group that received both interventions. The control group was removed from this analysis. If effect modification were present, the groups would differ significantly. If no effect modification were present in the group with the combination of lumbar support and lifting instructions, groups would be combined as follows to increase the number of subjects in the compared groups. The 2 groups with lumbar supports would be compared with the 2 groups without lumbar supports, and a similar comparison would be made for education.

For the effect of lumbar supports, 2 types of analyses were performed: an analysis of the intervention group in which all subjects for whom data were available were included, regardless of compliance with wearing the lumbar support; and 2 subgroup analyses assessing only subjects who were compliant with lumbar support use and whether subjects had a history of low back pain at baseline.

RESULTS

Participant Flow and Follow-up

Of 380 eligible workers, 20 (5%) refused to participate and 312 (82%) completed the baseline measurements (Figure). Because of holidays and a large workload, workers were not always available for the study. Consequently, baseline measurements were missing for 48 workers. During the intervention period of 6 months, 30 workers (10%) withdrew from the study. Twenty-one workers (7%) withdrew because they lost interest in the study after the baseline measurement (mostly because workers did not think that the study was useful to them). Nine workers (3%) transferred to another workplace or left the company. Another 14 workers (4%) transferred to other workplaces in the second 6 months of the follow-up period. Only 1 of the 23 workers who transferred to another workplace left the cargo department because of low back pain. The distribution of the withdrawals among the intervention groups is shown in the Figure. A description of the study population is given in Table 1. There were no substantial differences among the 4 intervention groups regarding the most important prognostic factors, such as age, history of back pain, and past sick leave because of back pain. Work modules were evenly distributed among the intervention groups; for all modules, about half of the workers were given education and half received a lumbar support.



Flowchart of the randomized trial.

Table 1.—Distribution of Prognostic Factors Among Intervention Groups at Baseline

Factor	Lumbar Support and Education (n = 70)	Education (n = 82)	Lumbar Support (n = 83)	Control (n = 77)	Total (n = 312)
Age, mean (SD), y	35.5 (8.1)	35.4 (7.7)	33.8 (7.0)	35.5 (8.5)	35.1 (7.8)
Employment in cargo department, mean (SD), y	6.6 (6.3)	6.6 (6.4)	5.2 (4.8)	6.9 (6.2)	6.3 (5.9)
No. (%) of subjects with previous low back pain	41 (59)	42 (51)	48 (58)	41 (53)	172 (55)
No. (%) of subjects with low back pain at baseline	13 (19)	11 (13)	15 (18)	10 (13)	49 (16)
Total sick leave in past year, mean (median), d	26.0 (17)	23.6 (22)	31.6 (28)	31.7 (16)	28.2 (19)
Sick leave in past year because of low back pain, mean (median), d	3.5 (0)	3.9 (0)	4.0 (0)	6.5 (0)	4.5 (0)

At baseline, 243 subjects were asked about their expectations of preventive measures. Of these, 146 (60%) expected that lumbar supports could be helpful in the reduction of low back pain in the workplace, and 170 (69%) felt lifting instructions could be useful. The attendance rate for the first educational session was 80%, and all workers attended at least 2 of the 3 sessions. Subjects were asked each month if, in their own opinion, they lifted according to the techniques taught in the educational sessions. Of 142 subjects, 16 (11%) answered that they always lifted as taught, 104 (73%) answered that they lifted as taught some of the time, and 15 (11%) answered that they never lifted as taught. Compliance with wearing the lumbar support was low; only 58 (43%) of the 134 subjects in the lumbar support

Table 2.—Main Outcomes for Combined Intervention Groups at 6-Month Follow-up*

Outcome Measure	Lumbar Support (n = 134)	No Lumbar Support (n = 148)	Risk Difference, % (95% CI)	*P* Value	Education (n = 142)	No Education (n = 140)	Risk Difference, % (95% CI)	*P* Value
No. (%) of subjects with low back pain	48 (36)	51 (34)	1 (−10 to 13)	.81†	50 (35)	49 (35)	0 (−11 to 11)	.97†
No. of days per month with low back pain, mean (median)	1.7 (0)	2.1 (0)	. . .	.92‡	1.7 (0)	2.2 (0)	. . .	.77‡
No. (%) of subjects with sick leave because of low back pain	17 (13)	13 (9)	4 (−3 to 11)	.29†	12 (8)	17 (13)	−4 (−12 to 3)	.23†
No. of days per month of sick leave because of low back pain, mean (median)	0.4 (0)	0.4 (0)	. . .	.52‡	0.5 (0)	0.3 (0)	. . .	.41‡

*CI indicates confidence interval; ellipses, data not applicable.
†Difference between groups tested with χ^2 test.
‡Difference between groups tested with Mann-Whitney *U* test corrected for ties.

Table 3.—Outcomes for Subjects Compliant With Wearing a Lumbar Support at 6-Month Follow-up*

Outcome Measure	Lumbar Support (n = 58)	No Lumbar Support (n = 148)	Risk Difference, % (95% CI)	*P* Value
No. (%) of subjects with low back pain	17 (29)	51 (34)	−5 (−19 to 9)	.48†
No. of days per month with low back pain, mean (median)	1.6 (0)	2.1 (0)	. . .	.54‡
No. (%) of subjects with sick leave because of low back pain	4 (7)	13 (9)	−2 (−10 to 6)	.66†
No. of days per month of sick leave because of low back pain, mean (median)	0.1 (0)	0.4 (0)	. . .	.38‡

*CI indicates confidence interval; ellipses, data not applicable.
†Difference between groups tested with χ^2 test.
‡Difference between groups tested with Mann-Whitney *U* test corrected for ties.

groups reported wearing the support in more than half of the questionnaires. In random checks by the principal investigator at the workplace, compliance was approximately the same as the subjects reported (40%-50%). When subjects were asked how satisfied they were with the lumbar support, 39 (49%) of 79 subjects reported the support restricted their freedom of movement, 39 (48%) of 81 reported they could not sit comfortably with the support, and 36 (45%) of 80 thought the support was too warm. On the other hand, 49 (62%) of 79 thought the support provided support for the back and 37 (46%) of 80 reported the support was easy to use.

Analysis

No data were available for 30 subjects (Figure, subjects withdrawn during intervention). Of the remaining 282 subjects, 99 (35%) experienced an episode of low back pain during the intervention period and 29 (10%) reported having taken sick leave because of low back pain (Table 2). No statistically significant differences were found among the 4 intervention groups. No effect modification could be detected when comparing the group with lumbar support and education with the other 2 intervention groups combined. Therefore, the groups receiving lumbar supports were combined, as were those receiving education. Table 2 shows the main outcomes for the groups. No statistically significant differences were present. Low back pain incidence was about 35% in all groups, and subjects reporting sick leave due to low back pain varied from 8% to 13%.

Subgroup Analysis

A subgroup analysis was conducted in which subjects who wore the lumbar support were compared with subjects in the groups without lumbar support. No significant differences were observed (Table 3).

Table 4 shows the results of the analysis of subgroups based on the history of back pain. In the subgroup of subjects who had never had low back pain (n = 130), a higher number of days of sick leave because of low back pain was observed in the group with lumbar support ($P = .05$), although the median number of days of sick leave per month was 0 days in both groups. In the subgroup of subjects with low back pain at baseline (n = 42), a reduction in the number of days with low back pain per month was found in the group with lumbar support compared with the group without lumbar support (median of 1.2 days per month vs 6.5 days per month; $P = .03$). No significant differences were found between groups with and without education in the subgroup analysis (data not shown).

Adverse Effects

To detect possible adverse effects of lumbar supports, we measured trunk-muscle strength before and after the intervention period. Furthermore, after the intervention period, subjects were followed up for an additional 6 months to evaluate the occurrence of low back pain after subjects discontinued wearing the lumbar supports. In the group compliant with lumbar support use during the intervention period, 25% of the subjects reported low back pain during the 6 months following completion of the intervention vs 20% in the group without lumbar support (risk difference = 5%; 95% CI, −13% to 23%; $P = .6$). Compliant subjects had a mean of 1.8 days of back pain vs 1.1 days in the group that did not receive the lumbar support (median of 0 days in both groups; $P = .5$ by Mann-Whitney *U* test corrected for ties). Results of the trunk-muscle strength tests are shown in Table 5. Thirty-eight subjects felt they would injure or reinjure themselves by performing the trunk-muscle tests and were excluded from the tests (10 in the combination group, 5 in the education only group, 12 in the lumbar support only group, and 11 in the control group). Most subjects scored lower in the posttest, but the difference between compliant subjects and subjects without lumbar support was not significant.

COMMENT

Effect of Lumbar Supports and Education

No effect of education alone in the prevention of low back pain could be demonstrated in this study. This result confirms previous controlled trials,[4,6,21-24] all of which found no effect of providing lifting instructions or instructions on body mechanics. The only controlled study that reported a positive effect of education was a study in a population of bus drivers who received no lifting instructions but received a back school program consisting of information on back care,

physical fitness, nutrition, relaxation, and coping with stress.[25]

Lumbar supports were not effective in the prevention of low back pain and sick leave in this study. Two other randomized studies have reported the same findings.[4,5] Some nonrandomized studies reported positive findings,[7,8,13] but these studies are more susceptible to various forms of bias. A recently published study by Kraus et al[26] that included 36 000 subjects reported a reduction in acute low back injury rate. However, because of the nonrandomized, noncontrolled design of the trial, the findings may be explained by confounding factors, such as changes in exposure or workers' compensation laws.

In our study, the combination of lumbar support and education also was not effective. Two other studies that combined these interventions showed conflicting results. Walsh and Schwartz[6] reported a reduction in the number of days with sick leave, while Reddell et al[4] found no effect. The cause of the contradictory results is unknown, but factors such as work characteristics, differences in lumbar support (the study by Walsh and Schwartz[6] used a rigid plastic support), and compliance rates could be important.

Compliance

The study by Reddell et al[4] had a compliance rate nearly identical to our study (42% and 43%, respectively). The only other study reporting compliance rate is the study by Anderson et al,[7] in which the compliance was 80% according to the supervisors at the workplace. Although our analysis of only subjects who were compliant failed to show a positive effect of lumbar supports, it is possible that because of self-selection of compliant subjects, an effect of lumbar supports may have been missed. However, in the Netherlands an employer would be unlikely to require use of lumbar supports or impose sanctions in the case of noncompliance. Therefore, the results presented here represent what can be expected if an employer provides but does not require lumbar supports for manual material–handling workers.

Subgroup Analysis

Subgroup analysis is difficult because it is potentially misleading, even if the analysis is prospectively planned.[27,28] Yusuf et al[27] state that they "regard observed qualitative interactions (treatment is beneficial in one subgroup and harmful in another) with considerable skepticism, for they are often shown to be spurious when the same comparison is made in similar trials." Yusef et al[27] recommend that results from subgroup analyses should not be accepted until they are confirmed by the results of other studies.

The present study demonstrates a qualitative interaction. On one hand, the use of a lumbar support seemed to increase sick leave due to low back pain in subjects who had never had low back pain before the start of the intervention (n = 130). On the other hand, in a small group of subjects who had low back pain at the start of the intervention (n = 42), the use of lumbar supports reduced the number of days per month with low back pain.

Among workers without a history of low back pain, the differences between groups were small (0.6 vs 0.2 mean days per month of sick leave) and perhaps not clinically relevant, and because we did not correct for multiple comparisons, differences may be due to chance. Therefore, we draw no conclusions from this analysis but believe studies should investigate the effect of lumbar supports for this subgroup in more detail.

Walsh and Schwartz[6] reported a larger effect of the combination of lumbar supports and education in a subgroup of workers who had low back pain in the 6 months prior to the study, while we found no effects in a group of subjects who had low back pain in the year prior to the study (n = 69).

A review on the effectiveness of orthoses in the treatment of back pain concluded that the therapeutic effect of lumbar supports for subjects with back pain has not yet been demonstrated, although some promising findings were reported

Table 4.—Outcomes for Subgroups Analyzed by History of Low Back Pain at Baseline*

Outcome Measure	Lumbar Support (n = 134)	No Lumbar Support (n = 148)	Risk Difference, % (95% CI)	*P* Value
No. (%) of subjects with low back pain				
Never low back pain	13/59 (22)	14/71 (20)	2 (−18 to 16)	.75†
Low back pain in past	8/21 (38)	4/20 (20)	18 (−9 to 45)	.20
Low back pain in past year	12/32 (38)	17/37 (46)	−8 (−32 to 15)	.48
Low back pain at baseline	15/22 (68)	16/20 (80)	−12 (−38 to 14)	.38
No. of days per month with low back pain, mean (median)				
Never low back pain	1.0 (0)	1.2 (0)	. . .	.79‡
Low back pain in past	2.4 (0)	0.4 (0)	. . .	.13
Low back pain in past year	1.8 (0)	1.4 (0)	. . .	.66
Low back pain at baseline	3.1 (1.2)	8.4 (6.5)	. . .	.03
No. (%) of subjects with sick leave because of low back pain				
Never low back pain	7/59 (12)	2/71 (3)	9 (0 to 18)	.08§
Low back pain in past	2/21 (10)	1/20 (5)	5 (−11 to 20)	1.00§
Low back pain in past year	5/32 (16)	6/37 (16)	0 (−18 to 17)	.95†
Low back pain at baseline	3/22 (14)	4/20 (20)	−6 (−29 to 16)	.69§
No. of days per month of sick leave because of low back pain, mean (median)				
Never low back pain	0.6 (0)	0.2 (0)	. . .	.05‡
Low back pain in past	0.6 (0)	0.1 (0)	. . .	.54
Low back pain in past year	0.1 (0)	0.6 (0)	. . .	.65
Low back pain at baseline	0.1 (0)	1.2 (0)	. . .	.53

*Subgroups are defined as follows: never low back pain indicates subject had never had low back pain at baseline; low back pain in past indicates subject had low back pain in the past, but not in the year prior to the baseline measurement; low back pain in past year indicates subject had low back pain in the year prior to the baseline measurement, but not at baseline or in the week prior to the baseline measurement; low back pain at baseline indicates subject had low back pain at baseline or in the week prior to the baseline measurement. CI indicates confidence interval; ellipses, data not applicable.
†Indicates difference between groups tested with χ^2 test.
‡Indicates difference between groups tested with Mann-Whitney *U* test corrected for ties.
§Indicates difference between groups tested with the Fisher exact test.

Table 5.—Differences in Trunk-Muscle Test Scores for Compliant Subjects at 6-Month Follow-up*

Outcome Measure	Lumbar Support (n = 48)	No Lumbar Support (n = 132)	Difference Between Means (95% CI)†	*P* Value‡
Abdominal muscle strength, mean (SD), change in No. of sit-ups	−0.1 (2.9)	−0.3 (2.3)	0.1 (−0.9 to 1.2)	.78
Abdominal muscle endurance, mean (SD), change in seconds	25.2 (81.2)	11.2 (82.9)	14.0 (−20.1 to 48.1)	.42
Back muscle endurance, mean (SD), change in seconds	44.3 (42.2)	34.0 (53.5)	10.3 (−11.5 to 32.2)	.35

*Data are differences between pretests and posttests. Thirty-eight subjects did not participate because of concern that they would reinjure themselves.
†CI indicates confidence interval.
‡Difference between groups tested with the Student *t* test.

in the literature.[29] This is consistent with our finding of a positive effect of lumbar supports in the subgroup of workers with low back pain at baseline. Nevertheless, future randomized trials on the effects of lumbar supports for patients with low back pain are needed to determine their therapeutic value, if any.

Adverse Effects

No effects of lumbar supports on trunk-muscle strength were observed. Other studies also reported no adverse effects of lumbar supports on abdominal and back-muscle strength.[6,30] These results indicate the use of lumbar supports will not cause atrophy of trunk muscles.

Reddell et al[4] reported an increase in incidence of sick leave because of back injury in groups of workers who stopped wearing a lumbar support during the intervention period. We could not reproduce these findings, as no increase in the incidence of back pain was found after compliant workers discontinued wearing lumbar supports.

Limitations of the Study

The major limitation of this study is the lack of blinding; neither the subjects nor the therapists who conducted the educational sessions were blinded for the intervention. The direction and magnitude of the potential bias is not clear. It could lead to a larger estimate of the effect of the intervention,[31] or perhaps to a smaller estimate, depending on the expectations of subjects and investigators. However, at baseline most workers believed both interventions would be beneficial, so any potential bias from expectations would be in the positive direction.

The subjects in our study all had very similar work tasks of loading and unloading cargo, including heavy-lifting tasks. Extrapolation of the results is most relevant for situations in which workers perform similar lifting tasks.

Based on the results of our study, we do not recommend education (in the form as investigated in our study) or the use of lumbar supports in the prevention of low back pain. The therapeutic effectiveness of lumbar supports for workers with low back pain in industry needs further investigation.

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