Exercise in the workplace? Employee preferences!

Avinash M. Waikar and Martha E. Bradshaw
Southeastern Louisiana University, Hammond, Louisiana, USA

Introduction

Use of computers and video display terminals (VDTs) in workplaces has increased dramatically during the last two decades. At present, there may be as many as 80 million VDTs in the workplace (OSHA, 1991). Computers and VDTs are used by office and sales personnel, managers, engineers and technical workers, such as designers, draftspersons, etc.

Working with computers and/or VDTs is sedentary work. It involves constrained postures which impart static loads on the neck, back, shoulders and upper extremities. These loads in turn place musculoskeletal (physical) stress on a worker’s body which can, at times, be excessive and result in discomfort or pain (Sauter et al., 1991; Torner et al., 1991). Thus, even though computers have improved productivity and made work easier for us, they have had adverse effects as well. These effects include musculoskeletal stress, physical discomfort, visual, and psychological stress.

Physical exercise has the potential to reduce work-related musculoskeletal stress, perhaps because it improves the ability to relax, both immediately and over a long-term period (Austin, 1984). Physical exercise programmes have been adopted and used successfully in many oriental countries such as China, Japan and Korea. However, in the USA and Europe, the primary emphasis for reducing physical stress has been on improving the workstation by applying ergonomic principles (Sauter, 1986; Povlotsky, 1987).

The primary advantages of exercise programmes are low cost and ease of implementation. Given the widespread use of computers, it may be more appropriate now than ever before to consider exercises that could be performed at the workstation to relieve musculoskeletal discomfort resulting from sedentary work. An exercise programme, of course, can supplement improvements resulting from application of ergonomic principles. However, no major scientific efforts to develop further or increase use of exercises to alleviate physical stress have yet been made.

In 1993, Waikar et al., provided information about exercise programmes that can be useful in relieving physical stress in sedentary work. Evaluation of available programmes was based on several criteria: conspicuity, ease of
performance, time requirement, etc. During their review, they found that some simple, quick, easy-to-understand exercises that take a minimal amount of employees’ time (for example, shoulder roll, neck rotation, head nod, wrist flex, finger fan, knee raise, etc.) can be performed at the workstation. It was felt that such exercises may relieve some physical stress resulting from sedentary work without major demands on time.

In addition, software programs are available that prompt workers to perform exercises to relieve physical stress after they have worked on the computer for a period of time (Wexler, 1991). These programs can be used with most software packages commonly found in businesses.

Organizations also can design their own exercise programmes targeted at specific parts of the body to relieve physical stress caused by sedentary work. Another viable option would be to select from existing programmes exercises that take very little employee time, are easy to understand and perform at the workstation. In fact, some of the exercises can be performed by the employee while waiting for the computer to respond to user requests. Such exercise programmes should be inexpensive and easy for management to implement.

Regardless of how they are designed, exercise programmes are more likely to be acceptable to employees if they meet certain criteria and preferences of the employees. Therefore, it is important to determine employee attitudes towards exercise in the workplace and preferences regarding features and characteristics of the exercises to be included in a programme. A literature review revealed that such a study had not yet been reported.

The purpose of this study was to determine:

- employees’ preferences about exercise programmes in the workplace;
- employees’ willingness to have exercise programmes in the workplace; and
- the status of exercise programmes in local businesses for reducing musculoskeletal stress.

To gather data, a questionnaire was administered to 203 employees in 21 southeast Louisiana businesses.

This study could be beneficial to employers and to employees engaged in sedentary work. Results of the survey can help employers determine what their employees want and prefer in regard to exercise programmes for the relief of musculoskeletal stress. It can also help employers to select and design exercise programmes that are acceptable to and desired by employees. Implementation of exercise programmes could benefit workers’ by reducing physical discomfort and by reducing the risk of musculoskeletal injuries such as back and neck pain, and some upper extremity disorders caused by cumulative trauma. It can also result in desired benefits for the employer, such as improved productivity, reduced absenteeism, etc.
**Review of literature**

In the USA, Emmanuel and Glonek (1974) introduced exercise as a part of a programme aimed at relieving physical stress in microscope operators at a semiconductor firm. However, lack of motivation from the microscopists meant that the exercise programme had to be discontinued before its possible beneficial effects could be assessed.

Ostrom (1981) pointed out that “dynamic sitting”, implying a change in posture every five minutes, is important for comfort and promoting good circulation. Sauter (1986) has suggested physical exercises for relieving or reducing musculoskeletal stress in VDT work.

The predominant modes of interaction between office, managerial and technical workers, and computers are data entry, word processing, information retrieval and interactive communication. In data-entry work, information is keyed, often in a repetitive manner, according to a set format. This can result in discomfort in joints through repetitive and prolonged use of fingers, hands and wrists, which may lead to CTD (cumulative trauma disorder). “CTD is a collective term for syndromes characterized by discomfort, impairment, disability, or persistent pain in joints, muscles, tendons, and soft tissues with or without physical manifestations” (Kroemer, 1992). Reports of CTD, including carpal tunnel syndrome among VDT users, have been cited by other researchers also (NIOSH, 1992; Pot et al., 1987).

LeGrande (1993) reported catastrophic occurrences of repetitive motion health symptoms and disorders among directory assistance operators of Communications Workers of America, all of whom were engaged in sedentary work. The 1992 survey indicated the following symptoms: hand and wrist pain, 73 per cent; numbness and tingling of fingers, 59 per cent; arm and shoulder pain, 78 per cent; neck and back pain, 86 per cent; and leg pain, 53 per cent. Some instances of carpal tunnel syndrome have been reported among computer keyboard workers in the USA (BNA, 1992).

Sauter et al. (1991) reported high prevalence rates of musculoskeletal discomfort among 539 data-entry VDT users. Almost constant discomfort was reported for low back (33 per cent), followed by neck and buttocks discomfort (27 per cent each), and almost constant right shoulder discomfort (15 per cent). Lu et al. (1993a; 1993b) also confirm shoulder and neck areas to be major sites of discomfort. Other health complaints offered by VDT operators are headaches, stomach pain, ringing or buzzing in the ears (NIOSH, 1981) and skin symptoms (Stenburg, 1993).

Past research has identified many factors, such as demographic, task-related, workstation-related, ergonomic, and psychosocial factors, associated with health complaints of employees engaged in sedentary work. Individual factors, such as age, gender, eye quality and work habits, may also have certain effects on the workers’ performance and health (NIOSH, 1992; Asakura and Fujigaki, 1993; Berggqvist and Knave, 1993).

Asakura and Fujigaki (1993) found that the impact of office computerization on perceived job characteristics differs by gender. Lim and Carayon (1993)
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found that gender was significantly related to upper extremity CTD: women reported the higher incidence. A recent NIOSH study (1992) found that factors associated with upper extremity disorders included demographics and prior medical conditions.

However, some studies have found a weak (or a lack of) relationship between demographic data and musculoskeletal discomfort. Sauter et al. (1991) investigated musculoskeletal discomfort and related factors among 539 data-entry VDT users. Their regression analyses were aimed at examining the effects of demographics (i.e. age, height, weight, mass and vision) on VDT exposure discomfort measures. They found that all of the demographic and VDT exposure variables except weight and the wearing of spectacles had an effect on at least one of the discomfort measures. However, none of the demographic or VDT exposure variables contributed an increment of a discomfort measure. They concluded that none of the demographic and VDT exposure variables can be used for the prediction of musculoskeletal discomfort. Lim and Carayon (1993) found no significant relationship between demographic variables and discomfort. Other studies also found that only a few demographic variables were related to a few worker strain variables (Carayon, 1992; Yang and Carayon, 1993).

Thus, several studies have examined the problem of musculoskeletal discomfort and pain among VDT users and the factors that affect this discomfort. However, no study has been reported that has attempted to determine:

- the attitude of employees towards having an exercise programme to minimize musculoskeletal discomfort resulting from sedentary work; and
- the preferences of employees regarding features and characteristics of the exercises to be included in such a programme. These are the objectives of this study.

Methodology

A questionnaire (see Appendix) was developed to determine:

- whether businesses provide formal exercise programmes for personnel to relieve musculoskeletal discomfort and stress,
- the willingness of personnel to participate in formal exercise programmes; and
- employees' preferences regarding features of an exercise programme.

Based on information revealed in the literature review, the questionnaire also included demographic and personal factors and questions on various musculoskeletal and visual complaints.

The questionnaire was divided into four sections. The first section on demographic information was designed to elicit personal information from...
participants, including gender, age, years of experience and job title. The second general information section asked workers: how much time they spent at their computers and workstations, what types of pain/discomfort they experience; whether they have medical conditions which could contribute to their pain/discomfort; whether they think an exercise programme would be beneficial to them; whether their company has exercise facilities for employees; and whether their company has a formal exercise programme.

Depending on whether their company does or does not have a formal exercise programme, respondents completed the third or the fourth section of the questionnaire. The third section (on status) asked for information about existing exercise programmes: number of times employees engage in formal exercises during the working day; length of exercise sessions; where exercises are performed, and what types of pain/discomfort the exercises are targeted to relieve.

The fourth section, answered by those whose companies do not have formal exercise programmes, requested information about whether respondents exercise on their own at work (in the absence of a formal or informal company exercise programme) and whether they would be willing to participate in a formal exercise programme.

If a new, formal exercise programme is to be designed, certain things must be considered. For example, people are unwilling to do or accept something new for different reasons: the instructions may be too difficult to follow (the reason many people let their VCRs flash 12:00 constantly); the tasks may be too difficult to perform; time demands, etc. Therefore, respondents were asked to indicate their preferences for alternatives in each of the following categories (assuming that a formal exercise programme is to be designed):

- ease of comprehending instructions for performing the exercises;
- degree of difficulty of exercises;
- degree of privacy when exercising;
- how exercises are initiated;
- length of exercise breaks;
- level of embarrassment of exercises;
- place where exercises completed; and
- types of exercise.

These categories were determined after informal discussions with a number of experts from varied disciplines (e.g. kinesiology, physical therapy and ergonomics). Respondents were requested also to rank the categories on an ordinal scale ranging from most to least important, using a given number rank only once.

The questionnaire was pilot-tested and refined. It then was sent to personnel managers in approximately 40 south-east Louisiana businesses. They were asked to encourage employees who routinely use a computer and/or are
engaged in sedentary work to complete a questionnaire about exercise in the workplace. A letter explaining the purpose of the study and giving instructions for completing the survey was attached to each questionnaire. After telephone follow-ups and visits, 21 businesses had employees \((n = 203)\) complete the questionnaire.

The companies which participated in the survey seemed to represent a reasonable cross-section of the local industries and businesses. The sample included financial institutions, service sector companies, consulting companies, hospitals, manufacturing companies, chemical companies, law firms, retailers, educational institutions, etc.

Employers and employees are more likely to be receptive to exercise programmes if they meet certain criteria. This study should help employers in determining employee needs and preferences regarding features of the exercise programmes in their businesses. Then, they can design the exercise programme that meets these needs and preferences, making it more acceptable to the employees and enhancing the probability of its success after implementation.

**Results and discussion**

Data were analysed to determine frequencies and percentages of responses reported by the survey participants on the questionnaires.

**Demographic information**

Participants responded to four demographic questions on gender, age, number of years in an office position and job title.

**Gender.** More females (82.3 per cent) than males (17.7 per cent) completed the survey. This could be characteristic of the businesses included in the sample. However, it is possible that more females engage in sedentary jobs that do not require a high level of physical effort.

**Age.** As shown in Table 1, most of the respondents were between the ages of 20 and 50, with fairly even distribution of those in their twenties, thirties and forties.

**Number of years in an office position.** Over half the respondents had been employed in jobs requiring sedentary work for fewer than 11 years, and over one-third for fewer than five years. Fifteen per cent had more than 20 years of experience.

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency</th>
<th>Percentage</th>
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</thead>
<tbody>
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<td>Less than 20</td>
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<td>0.5</td>
</tr>
<tr>
<td>20-29</td>
<td>67</td>
<td>33.2</td>
</tr>
<tr>
<td>30-39</td>
<td>58</td>
<td>28.7</td>
</tr>
<tr>
<td>40-49</td>
<td>55</td>
<td>27.2</td>
</tr>
<tr>
<td>50-59</td>
<td>19</td>
<td>9.4</td>
</tr>
<tr>
<td>60 and over</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td>Total</td>
<td>202</td>
<td>100.0</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Age</th>
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<td>9.4</td>
</tr>
<tr>
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<td>1.0</td>
</tr>
<tr>
<td>Total</td>
<td>202</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**Table 1.**

Age distribution of questionnaire respondents
this type of work experience. Even though many respondents had not been engaged in sedentary work for a very long time, the overwhelming majority (82.8 per cent) indicated that they do experience pain and discomfort as a result of work. (Actually, as reported in Table II, 17.2 per cent reported “No pain experienced” which implies that 82.8 per cent experience some type of discomfort or pain.) This may indicate that physical stress in sedentary work may manifest itself relatively quickly, thus encompassing a large portion of the working population.

**Job title** The questionnaire asked respondents to write in their job title. After the responses had been studied, five categories were established and percentages determined: secretarial, 54.9 per cent; management, 15.2 per cent; financial, 14.0 per cent; technical, 10.4 per cent; and other, 5.5 per cent.

**General information**

The general information section requested data regarding length of time employees spent at workstations, types of pain/discomfort they suffered, and desirability and status of exercise programmes in their workplace, as discussed in the following paragraphs.

**Length of time at computer and workstation.** Table III indicates the number of hours respondents spent at their computers and at their workstations. A high proportion of workers indicated that they spent six hours or more at their computers (55.7 per cent) and workstations (75.4 per cent). Spending such a large portion of the day engaged in sedentary activity may precipitate the pain and discomfort that 82.8 per cent of the respondents reported.

**Types of pain/discomfort suffered.** Respondents were also asked to indicate the type(s) of pain/discomfort they suffered as a result of working at their computers or workstations. The results are shown in Table II. (Total does not equal 100 per cent since respondents were asked to check all types that apply.) Of the 203 who responded, 82.8 per cent indicated that they had some pain and discomfort as a result of work. More than half suffered eye fatigue, and more than 40 per cent suffered back and neck pain. These findings are consistent with the findings of other research studies (Sauter et al., 1991; LeGrande, 1993). Only 29.1 per cent of respondents in this study reported hand/wrist/arm discomfort.

<table>
<thead>
<tr>
<th>Pain/discomfort</th>
<th>Frequency</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>No pain experienced</td>
<td>35</td>
<td>17.2</td>
</tr>
<tr>
<td>Back pain</td>
<td>90</td>
<td>44.3</td>
</tr>
<tr>
<td>Eye fatigue</td>
<td>109</td>
<td>53.7</td>
</tr>
<tr>
<td>Hand/wrist/arm discomfort</td>
<td>59</td>
<td>29.1</td>
</tr>
<tr>
<td>Headache</td>
<td>65</td>
<td>32.0</td>
</tr>
<tr>
<td>Leg pain</td>
<td>30</td>
<td>14.8</td>
</tr>
<tr>
<td>Neck pain</td>
<td>88</td>
<td>43.3</td>
</tr>
<tr>
<td>Other</td>
<td>19</td>
<td>9.4</td>
</tr>
</tbody>
</table>

**Table II.** Types of pain/discomfort suffered
discomfort in comparison with 73 per cent of the respondents surveyed by LeGrande (1993).

Since other factors might contribute to the pain and discomfort suffered in the workplace, those respondents who indicated they had some type of pain/discomfort were asked whether they had any medical condition(s) that might contribute to it. Surprisingly, 15.3 per cent said “yes” and 84.7 per cent “no”. This may be an indication that the physical stress and discomfort resulted from sedentary work rather than a medical condition; i.e., sedentary work may be a causal factor.

Desirability of exercise programme. When asked whether they thought a formal exercise programme in the workplace would be beneficial to them, 70 per cent indicated “yes” and 5 per cent “no”; 25 per cent were unsure.

Status of exercise programmes. Even though 25.4 per cent of the office workers indicated that their companies had some type of exercise facility, only 3.0 per cent of the respondents indicated that their companies had a formal exercise programme for employees engaged in sedentary work.

Status of existing exercise programmes

Only six of the 203 respondents (3.0 per cent) indicated that their companies have formal exercise programmes and therefore completed the “status” section of the questionnaire. Of these six, most reported that they do not do exercises to help relieve discomfort or pain in any specific part of the body but that they are generally receptive to the exercise programme as it exists in their company.

Preferences about exercise programmes

The 197 (97.0 per cent) individuals who indicated that their company did not have a formal exercise programme were asked to respond to the final section of the questionnaire. This section determined:

- whether individuals exercise on their own to relieve work-related pain/discomfort;
- whether they would be willing to participate in a formal exercise programme, and
- what their preferences are regarding an exercise programme if one were to be put in place.

<table>
<thead>
<tr>
<th>Hours</th>
<th>Computer Frequency</th>
<th>Computer Percentage</th>
<th>Workstation Frequency</th>
<th>Workstation Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fewer than two hours</td>
<td>10</td>
<td>5.2</td>
<td>2</td>
<td>1.1</td>
</tr>
<tr>
<td>Two to three hours</td>
<td>31</td>
<td>16.1</td>
<td>14</td>
<td>7.5</td>
</tr>
<tr>
<td>Four to five hours</td>
<td>44</td>
<td>22.9</td>
<td>30</td>
<td>16.0</td>
</tr>
<tr>
<td>Six hours or more</td>
<td>107</td>
<td>55.7</td>
<td>141</td>
<td>75.4</td>
</tr>
<tr>
<td>Total</td>
<td>192</td>
<td>99.9</td>
<td>187</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table III. Time spent at computer and workstation each day
The results are given in the following paragraphs.

**Informal exercises.** Almost two-thirds (65.8 per cent) of the employees indicated that they do not exercise on their own (during work hours) to help relieve pain and discomfort resulting from working at their workstations. Of the 34.2 per cent who do self-initiated exercises, most (84.4 per cent) exercise between one and four times per week.

**Willingness to participate.** Over two-thirds (69.4 per cent) responded that they would be willing to participate in a formal exercise programme if one were offered by their company. Seven per cent responded “no”, and 23.5 per cent were unsure about participating.

**Preferences.** Exercise programmes may be more acceptable to employees if they meet certain criteria considered important by them. Therefore, employees were asked to indicate which stipulation in a number of categories they would prefer if an exercise programme were to be implemented in their company. Table IV shows the results.

As indicated in Table IV, about half the respondents indicated that they will accept exercises that are somewhat difficult to perform if they are more beneficial than simpler exercises, and 38.6 per cent indicated that they were indifferent to the ease of comprehension of instructions.

Somewhat expected results were observed in the context of degree of privacy when exercising, level of embarrassment associated with exercise performance, and the place where exercises are completed. Approximately one-third of the respondents said that they prefer to exercise in a group, and about 40 per cent indicated that embarrassment is not an issue. This would seem to be a rational response, since those who exercise in a group are doing the same exercises as the others and therefore would not consider embarrassment an issue. About one-third indicated that privacy was not an issue to them. This would seem to be consistent with the approximately 40 per cent who indicated that no embarrassing exercises are acceptable to them. If embarrassing exercises are not acceptable and will not be performed, then privacy is not necessary; alternatively, if they are willing to exercise in public, they would not want to perform embarrassing exercises. Most (59.3 per cent), however, prefer to exercise in a private room on company premises. Some of them may have reservations about performing exercises at the workstation.

Surprisingly, only 6.2 per cent of the participants want to be prompted by computer software to perform exercises to relieve physical stress. Approximately half (49.5 per cent) prefer to determine for themselves when exercises should be performed. It seems natural to want to relieve discomfort or pain *when it occurs*, rather than being prompted when not needed or at inconvenient times. On the other hand, 40 per cent prefer the company to schedule an exercise period. This may be because, in general, people will do things when they are scheduled – perhaps even exercises.

Over half (59.3 per cent) said that they prefer exercises targeted at specific parts of the body. This may be because specific parts are affected by sedentary work. It also may show that they are willing to exercise to relieve pain and
### Table IV.
**Employee preferences for exercise programmes**

<table>
<thead>
<tr>
<th>Categories</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intelligibility (ease) of instructions ($n = 189$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Easy to understand</td>
<td>116</td>
<td>61.4</td>
</tr>
<tr>
<td>Does not matter</td>
<td>73</td>
<td>38.6</td>
</tr>
<tr>
<td>Degree of difficulty of exercises ($n = 192$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Easy to perform</td>
<td>58</td>
<td>30.2</td>
</tr>
<tr>
<td>Somewhat difficult, but more beneficial</td>
<td>97</td>
<td>50.5</td>
</tr>
<tr>
<td>Physically demanding</td>
<td>14</td>
<td>7.3</td>
</tr>
<tr>
<td>Does not matter</td>
<td>23</td>
<td>12.0</td>
</tr>
<tr>
<td>Degree of privacy when exercising ($n = 196$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercise individually at workstation</td>
<td>40</td>
<td>20.4</td>
</tr>
<tr>
<td>Exercise individually away from workstation on company premises</td>
<td>33</td>
<td>16.8</td>
</tr>
<tr>
<td>Exercise in a group</td>
<td>62</td>
<td>31.6</td>
</tr>
<tr>
<td>Does not matter</td>
<td>61</td>
<td>31.1</td>
</tr>
<tr>
<td>Determination of exercise time ($n = 194$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-determined (as needed)</td>
<td>96</td>
<td>49.5</td>
</tr>
<tr>
<td>Computer software prompts to exercise</td>
<td>12</td>
<td>6.2</td>
</tr>
<tr>
<td>Company scheduled time for exercise</td>
<td>86</td>
<td>44.3</td>
</tr>
<tr>
<td>Length of exercise breaks ($n = 194$)</td>
<td></td>
<td></td>
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<tr>
<td>Five or fewer minutes</td>
<td>41</td>
<td>21.1</td>
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<td>Six to ten minutes</td>
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<td>More than ten minutes</td>
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<td>34.0</td>
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<tr>
<td>Level of embarrassment of exercise ($n = 192$)</td>
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<td></td>
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<tr>
<td>No embarrassing exercise acceptable</td>
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<td>40.1</td>
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<td>Moderate embarrassment tolerated</td>
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<td>17.7</td>
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<tr>
<td>Embarrassment not an issue</td>
<td>81</td>
<td>42.2</td>
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<tr>
<td>Place exercises completed ($n = 189$)</td>
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<td></td>
</tr>
<tr>
<td>At workstation</td>
<td>51</td>
<td>27.0</td>
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<tr>
<td>In open area of company</td>
<td>26</td>
<td>13.8</td>
</tr>
<tr>
<td>In private room on company premises</td>
<td>112</td>
<td>59.3</td>
</tr>
<tr>
<td>Types of exercise ($n = 194$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercise targeted for specific parts of body to relieve musculoskeletal stress</td>
<td>105</td>
<td>54.1</td>
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<tr>
<td>Light aerobic exercises</td>
<td>34</td>
<td>17.5</td>
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<tr>
<td>Aerobic exercises</td>
<td>16</td>
<td>8.2</td>
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<tr>
<td>Does not matter</td>
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<td>20.1</td>
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<table>
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<tr>
<th>Category description</th>
<th>Composite score</th>
<th>Overall rank</th>
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<tbody>
<tr>
<td>Types of exercise</td>
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<td>1</td>
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<tr>
<td>Degree of difficulty of exercises</td>
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<td>2</td>
</tr>
<tr>
<td>Initiation of exercises</td>
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<td>Length of exercise breaks</td>
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<tr>
<td>Place exercises completed</td>
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<td>5</td>
</tr>
<tr>
<td>Degree of privacy when exercising</td>
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<td>6</td>
</tr>
<tr>
<td>Intelligibility (ease) of instructions</td>
<td>705</td>
<td>7</td>
</tr>
<tr>
<td>Level of embarrassment of exercises</td>
<td>647</td>
<td>8</td>
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</tbody>
</table>

**Table V.**
Overall ranking of categories from most to least important
discomfort induced by sedentary work. Very few (8.2 per cent) prefer aerobic exercises to be included in an exercise programme.

**Rankings:** Employees then were asked to rank the eight categories (given in Table IV) on a scale from 1 to 8 with 1 being most important and 8 being least important. Since rankings differed from employee to employee, a scheme had to be devised to obtain overall ranking for each category. The category considered most important and assigned a rank of 1 by respondents was given a numerical value of 8; the category assigned a rank of 2 was given a numerical value of 7; etc. The category considered least important was assigned a rank of 8 and a numerical value of 1. A composite score for a given category was obtained by multiplying the frequency of responses for that category by the numerical value assigned to that category; the category with the highest composite score was deemed most important. The overall rankings for all the categories (from most important to least important) are presented in Table V.

“Types of exercise” and “Degree of difficulty of exercises” were the two most important categories to the participants. Since they want exercises targeted for specific parts of the body and are willing to perform more difficult exercises if they are beneficial, it appears that relieving discomfort in specific parts of the body is what the participants are concerned with most. “Level of embarrassment of exercises” was found to be the least important category.

**Workstation design**
After the questionnaires were returned, managers from companies participating in the survey were requested to provide general information about the design of their employees’ workstations. Only one company indicated that employees used ergonomically designed workstations and were provided with training to use the ergonomic features for the most benefit. Another company had four ergonomic workstations. The remaining companies had workstation components with some ergonomic features (specifically, adjustable chairs and tilt computer screens). Respondents in this survey who worked at ergonomically designed workstations still reported some pain or discomfort.

**Summary**
The results of the survey in this research show that employees engaged in sedentary work do suffer musculoskeletal discomfort and pain, which is consistent with the findings of other researchers. It appears that individuals engaged in sedentary work are interested in relieving this discomfort and pain by participating in an exercise programme. Companies that are interested in designing an exercise programme for employees should include exercises targeted for specific parts of the body (back, neck, legs, eyes, etc.). Rather than having software prompt them to exercise, workers prefer to initiate exercises as needed or to exercise at a scheduled time. In addition, employees seem to be willing to accept exercises with difficult instructions and to perform difficult exercises.
A positive programme of exercise activities and rest breaks can help alleviate musculoskeletal stress suffered by employees engaged in sedentary work and this can lead to improved productivity. This is especially important because sedentary workers do not have built-in “posture changes” or “dynamic sitting” in their work routine. Such a programme also could act as a morale booster for employees who then may view management as being actively involved and interested in their wellbeing.

References


Appendix. Survey to assess the desirability of exercise programmes in the workplace

**Demographic information**

1. What is your gender?
   - Female
   - Male

2. What is your age?
   - less than 20
   - 20-29
   - 30-39
   - 40-49
   - 50-59
   - 60 and over

3. How many years have you worked in an office position?
   - 5 or fewer
   - 6-10
   - 11-15
   - Over 20

4. What is your job title?

**General information**

5. Approximately how much time do you spend at your computer (C) and your workstation (W) each day?
   - C
   - W
   - fewer than 2 hours
   - 2 to fewer than 4 hours
   - 4 to fewer than 6 hours
   - 6 hours or more

6. What types of pain/discomfort do you suffer as a result of working at your workstation?
   - No back pain experienced
   - Back pain
   - Eye fatigue
   - Hand/wrist/arm discomfort
   - Headache
   - Leg pain
   - Neck pain
   - Other (specify)

7. Do you have any medical condition(s) that might contribute to the pain/discomfort you indicated in the previous question?
   - Yes
   - No
   - No pain indicated

8. Do you think an exercise program would be beneficial to you?
   - Yes
   - No
   - Not sure

9. Does your company have any exercise facilities for employees?
   - Yes
   - No
   - No pain indicated

10. Does your company have a formal exercise program for office personnel?
    - Yes (If yes, answer 11-17).
    - No (If no, answer 18-21).

11. How many times per day do office employees engage in formal exercise activities during an eight-hour day?
    - 1 time
    - 2 times
    - 3 times
    - More than 3 times

12. How long do exercise sessions generally last?
    - Fewer than 5 minutes
    - 5 to 10 minutes
    - More than 10 minutes

13. Where are the exercises performed?
    - At the workstation only
    - Away from the workstation but on company premises
    - Both at the workstation and away from the workstation on company premises

14. For what reasons are exercises completed? (Check all that apply.)
    - Back pain
    - Eye fatigue
    - Hand/wrist/arm discomfort
    - Headache
    - Leg pain
    - Neck pain
    - Relaxation
    - Other
15. Are office employees generally receptive to the exercise programme?
   __ Yes __ No

16. Are employees offered any reward for participating in the exercise programme?
   __ Yes __ No

17. Have benefits of the exercise programme been evaluated?
   __ Yes (please share results on another sheet, if possible) __ No __ Don’t know

18. Do you exercise on your own (during work hours) to help relieve pain and discomfort caused by working at your workstation?
   __ Yes __ 1 to 4 __ 5 or more
   If yes, how many times a week?

19. Would you be willing to participate in a formal exercise programme if offered by the company you work for?
   __ Yes __ No __ Not sure

20. If an exercise programme were to be implemented, which stipulation in each of the following sets would you prefer. (Please place a check mark by the one stipulation most suitable to you.)
   Ease of comprehending instructions
   __ Easy to understand __ Does not matter
   Degree of difficulty of exercises
   __ Easy to perform __ Somewhat difficult but more beneficial __ Physically demanding __ Does not matter
   Degree of privacy when exercising
   __ Exercise individually at workstation __ Exercise individually away from workstation on company premises __ Exercise in a group __ Does not matter
   Initiation of exercise
   __ Self-determined (as needed) __ Computer software prompts to exercise __ Company scheduled time for exercise
   Length of exercise breaks
   __ 5 or fewer minutes __ 5 to 10 minutes __ More than 10 minutes
   Level of embarrassment of exercises
   __ No embarrassing exercises acceptable __ Moderate embarrassment tolerated __ Embarrassment not an issue
   Place exercises completed
   __ At workstation __ In open area of company __ In private room on company premises
   Types of exercises
   __ Exercises targeted for specific body parts to relieve musculoskeletal stress __ Light aerobic exercises __ Aerobic exercises __ Does not matter

21. In order of importance, rank the following categories (from the preceding items) from 1 to 8 with “1” being most important, “2” being second most important, “3” being third most important, …and “8” being least important. Use each number once only.
   __ Ease of comprehending instructions __ Degree of difficulty of exercises __ Degree of privacy when exercising __ Initiation of exercise __ Length of exercise breaks __ Level of embarrassment of exercises __ Place exercises completed __ Types of exercises