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Smart working during the COVID-19 pandemic: the prevalence of musculoskeletal and visual disorders in administrative staff of a large international company

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Keywords: Smart working; White collar workers; Low back pain
Parole chiave: Smart working; Personale amministrativo; Dolore lombare

Abstract

Introduction. *During the COVID-19 Pandemic, the use of digital devices during work activities has increased with important repercussions on the psychological and physical well-being of the employees. The aim of this study was to investigate the prevalence of musculoskeletal and visual disorders related to the use of computers and home workstation.*
Methods. *The study is a cross-sectional study. A checklist, from the National Institute of Health, was administered to white collar workers of a large international pharmaceutical company based in Italy.*
Results. *Our study showed that postural breaks have a protective effect on neck/shoulder pain (OR 0.32, CI 0.16-0.62), back and lower extremity pain (OR 0.35, CI 0.18-0.69), and eye burning (OR 0.50, CI 0.27-0.94) of study participants.*
Conclusions. *The research recommends that remote employees who often change their workstations should establish a suitable work environment and obtaining enough risk training from an occupational physician. This is essential for maintaining their mental and physical well-being.*

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Introduction

During the COVID-19 Pandemic, the use of digital devices during work activities has increased worldwide, creating an innovative challenge in workers of all ages, with important repercussions on the psychological and physical well-being of the employees (1). Remote working is preferred by some workers, due to a greater flexibility in the workday organization; however, it can also entail work-related difficulties and increased occupational risks for some categories of employees, including ergonomic and visual risks for video-terminal users (2). In Italy, the 'Shared Protocol for the Regulation of Measures to Combat and Contain the Spread of the Virus in the Workplace' was published and signed on 14 March 2020. This protocol, among other provisions, recommends the use of 'agile' or 'smart working' where feasible, to minimize contact among employees within the same company (3-4).

The pandemic scenario has required and continues to require changes in the organization of the working environment, as well as the need to adapt it to a new setting. While working remotely, employees may not respect health and safety regulations due to a lack of information or difficulties in monitoring the working environment and set-up by employers and supervisory authorities (5). Furthermore, it has been highlighted that, during the COVID-19 pandemic, workers have been spending more time sitting down and have been more susceptible to reduced sleep quality. In turn, the lack of sleep has been causing changes in mood and lack of concentration, resulting in reduced productivity, and worsened emotional well-being (6-7).

Due to the changes that shifting from presence to remote working entailed, it has been highlighted that new physical and mental health issues have been reported in workers; Xiao et al. conducted a study in employees working from home, highlighting 64.8% of respondents reported new physical health issues and 73.6% reported new mental health issues since they started working remotely (8).

The increased prevalence of musculoskeletal and oculo-visual disorders appears to be caused by both the increased use of digital devices and the changing working methods (working remotely and/or from home). Moreover, as reported in the study of Regmi A. et al., a higher prevalence of oculo-visual (43.1%) and musculoskeletal (45%) symptoms were found in workers who had to reorganize their working activities from home by using non-ergonomic chairs and digital devices for several hours during the day (9). Many literature studies show the consequences of remote working on the musculoskeletal apparatus (use of non-ergonomic chairs, inadequate postures, and an insufficiently organized workstation), such as a high prevalence of repetitive strain injuries (10-11).

In an Italian study, Moretti et al reported an increased incidence of musculoskeletal pain since participants started working remotely, with 70.5% of respondents reporting this type of pain in at least one site; the most frequent were low back pain (41.2%) or neck pain (23.5%), while 23.5% participants reported pain in multiple sites (12). Moretti et al also highlighted that 38.1% participants reported an increase of low back pain severity, and 50% reported the worsening of previous neck pain.

Another important consequence of shifting from working on site to working remotely is the workstation that may not be on par with ergonomic standards if employees are not appropriately informed about the desired characteristics. An ergonomic and adjustable workstation is instrumental in the prevention of musculoskeletal disorders. Seva et al. conducted a study in the Philippines, investigating the setup of the remote workstation that employees; most participants reported they had their keyboards, monitors, and mouse in the recommended positions, but the majority did not have their armrest at the same height as their keyboard, did not lean with their back against the backrest did not have their knees extending past their seat, and did not have a chair with adjustable/proper height (13).

The aim of this study was to investigate the prevalence of musculoskeletal and visual disorders related to the use of computers and related workstation, with reference to the activity carried out while working remotely during the COVID-19 pandemic, to assess and possibly suggest strategies to improve the worker's work comfort and psychophysical well-being.

Methods

Sample and questionnaire

The study is a cross-sectional study. A checklist was administered in Italian and English language to white collar workers of headquarters of a large international pharmaceutical company based in Italy. Using an online platform (Microsoft Forms), a specific invitation was sent from the company's occupational doctor (to maintain the anonymity of all personal and medical data) to all eligible employees. The participants were sent a link to participate in the survey but had to read through the information about the aim of the study before they could access the questionnaire; if consent to participate was not given, the survey could not be filled out.

Information was collected through Microsoft Form and downloaded automatically in a Microsoft Excel spreadsheet by the occupational physician, gathering in this database all the survey responses. The questionnaire was completed anonymously; no data on name, e-mail address, or IP address was collected.

The aggregated health and risk data of workers undergoing health surveillance, who consented to participate in the study, were provided anonymously to the researchers by the occupational physician, following authorization from the company's Data Protection Officer (DPO).

The checklist was taken from the Computer Workstation Ergonomics: Self-Assessment Checklist of the National Institutes of Health, Office of Research Services, Division of Occupational Health and Safety (14) website and then modified.

The questionnaire included 35 questions and it was divided into 2 sections.

The first section consisted of six items. The first four assessed gender, age range, company affiliation, and work seniority. Two other questions asked where the work was carried out when smart working, whether at one's home or at another public place, and whether at one's home, in a dedicated environment for exclusive use or not.

The second part was taken from the National Institute of Health checklist. It was in turn divided into macro-topics that investigated the ergonomics of the workstation related to the use of the work chair (5 items) and the health status of the worker, i.e., whether the worker experienced pain/ discomfort in the neck/ shoulders due to the chair being used (1 item) or in the back/low limbs (1 item).

The remaining items investigated the ergonomics of the workstation related to the use of the keyboard and mouse (6 items) and the health status of the worker, i.e., whether the worker at the end of the workday experienced arms pain/discomfort (1items); and the use of the work surface (7items) and whether burning in the eyes and/or visual fatigue was experienced at the end of the workday (1 items).

The last questions investigated when and how work breaks were taken (2 items) and the use of accessories such as laptop, headset, and document holder (5 items).

Inclusion Criteria

To be included in the study, employees had to be working for the large international pharmaceutical company in which the study took place, had to be working remotely, and had to freely give their informed consent to participate in the study and to have their data processed according to the European and Italian legislation (see Ethical statement paragraph).

Exclusion Criteria

Employees who did not work remotely and those who did not provide informed consent to participate in the survey were excluded from the study.

Statistical Analysis

To assess the association between pain or disturbs in different districts of the body, logistic regression was performed. We selected the most common situations where office employees usually complain of pain or discomfort, that is neck and shoulders pain, back and lower limbs pain, pain to one or both arms, eye burning and/or lacrimation, and put this outcome against specific items of the *Computer Workstation Ergonomics: Self-Assessment Checklist of the National Institutes of Health*, based on current level of knowledge in occupational health.

First, we calculated the odds ratio (OR) and the corresponding confidence interval (CI) at 95% for each item of the checklist and the corresponding disturbance by itself, then we added biographical confounders to the model such as sex and age (divided in three equally distributed categories) and we added the information of if the place chosen for smart working was exclusively dedicated for working or not. We decided not to include the 'Seniority' variable because we notice a very close collinearity with the 'Age' factor (Spearman's rank correlation of 0.79 with a p-value <0.001). We didn't use the 'Company' variable because of the strong imbalance among the different companies and for the same reason we judged it appropriate not to add the 'Place of smart working' variable, as most of the participants (99.2%) answered they were using their own house for smart working. Finally, to complete the analysis we put all the "disturbance specific" variables in order to adjust the model.

For data analysis, we used RStudio 2022.07.01 Build 554 with R version 4.1.2 (2021-11-01).

Results

The sample included 506 employees, all part of administrative staff of headquarters of a large international pharmaceutical company based in Italy, of whom 245 gave their consent to participate (response rate: 48.4%). Of the 245 who gave consent to complete the questionnaire, 5 were eliminated due to missing data. The final sample consisted of 240 participants. Of these, 77 (32%) were male and 163 (68%) were female. The age range was ≤ 40 years for 100 participants (42%), 41 to 50 for 67 participants (28%), and 51 and over for 73 (30%). In terms of seniority, there were 105 (44%) employees working from 0 to 10 years, from 11 to 20 years there were 59 (24%), and from 21 years onwards there were 76 (32%). 238 (99%) responded to us that in smart working they do their work in their own home, 2 (1%) in another public place. 122 (51%) in dedicated environment for their exclusive use, 118 (49%) no (Table 1).

Table 1 - Socio-demographic and occupational characteristics of the population (n=240)

Variables	n. (%)
Gender	
Male	77 (32.1)
Female	163 (67.9)
Age (years)	
≤ 40	100 (41.7)
41 – 50	67 (27.9)
≥ 51	73 (30.4)
Seniority (years)	
≤ 10	105 (43.7)
11 – 20	59 (24.6)
≥ 21	76 (31.7)
Place of smart working	
Home	238 (99.2)
Public Place	2 (0.8)
Exclusive use for smart working	
No	118 (49.2)
Yes	122 (50.8)

Among the 240 participants, 130 (54%) complained of neck/shoulder pain, while 110 (46%) participants did not complain of neck/shoulder pain. Of those who had neck/shoulder pain, 43 (33%) claimed to have a chair with no adjustable height, seat, and backrest, 30 (23%) reported to have no resting place for their feet, 50 (38%) had no lumbar support, 41 (31.5%) felt pressure on the back of their knees, 54 (41.5%) had no adjustable armrests, and 110 (84.6%) did not take postural breaks. Of the participants who did not complain of neck/shoulder pain, 85 (77%) claimed to have a chair with adjustable height, seat, and backrest, 98 (89%) claimed to have a place to rest their feet, 83 (75%) claimed to have lumbar support, 82 (74.5%) claimed not to feel pressure on the back of their knees, 80 (72.7%) claimed to have adjustable armrests, 41 (37.3%) claimed to take postural breaks. Postural breaks were found to have a protective effect on neck/shoulder pain, with a strongly significant value (OR 0.32, CI 0.16-0.62). As expected, having the feet rested also represents an ergonomic and protective posture for the onset of neck/shoulder pain with an OR that initially was 0.46 (CI 0.22-0.97) adjusted for some biographical data, significance is lost by adjusting for the other variables (OR 0.45, CI 0.20-1.00). Lumbar support was initially found to be a protective factor (OR 0.52, CI 0.29-0.93) for neck/shoulder pain, however, adjusting for the other variables lost significance (OR 0.64, CI 0.31-1.31) (Table 2).

Among the 240 participants, 121 (50.4%) reported back or lower limbs pain, 119 (49.6%) did not. Of those with back or lower limbs pain, 40 (33.1%) did not have a chair with adjustable height, 30 (24.8%) reported they did not have a support for their feet, 42 (34.7%) did not have a support for their back, 37 (30.6%) felt pressure behind their knees, 48 (39.7%) did not have armrests, 101 (83.5%) did not take postural breaks. Of the participants with no back or lower limbs pain, 91 (76.5%) had adjustable chair height, 107 (89.9%) had a support to lean their feet on, 84 (70.6%) had support for their back, 87 (73.1%) felt no pressure behind their knees, 83 (69.7%) had armrests, 41 (34.5%) took postural breaks.

Having a support to lean the feet was significantly correlated to the absence of back and lower limbs pain in participant (OR 0.33, CI 0.15-0.74); this remained significative even when adjusted for all other variables. Taking postural breaks was significantly related to not having back and lower limbs pain in participants (OR 0.35, CI 0.18-0.69); this remained significative even when adjusted for all other variables (Table 3).

Of the 240 participants, 55 (22.9%) reported arm pain, while 185 (77.1%) reported no pain. Seventeen (30.9%) of the participants with arm pain reported that the keyboard or mouse was not at elbow height, 2 (3.6%) did not have their usual work tools within reach, 32 (58.2%) did not keep their wrists properly straight and their arms relaxed, and 44 (80.0%) did not take postural breaks while using the video screen. With a highly significant value, keeping arms relaxed and keeping wrists properly rested was found to have a protective effect on arm pain (OR 0.26, CI 0.13-0.52) (Table 4).

Table 2 - Neck/shoulder pain (Odds ratios and 95% confidence intervals)

	Neck/shoulder pain			OR (95% CI)[b]	OR (95% CI)[c]
	No n (%)	Yes n (%)	OR (95% CI)[a]		
Adjustable height					
No	25 (22.7)	43 (33.1)	Ref.	Ref.	Ref.
Yes	85 (77.3)	87 (66.9)	0.60 (0.33-1.06)	0.65 (0.35-1.19)	1.11 (0.52-2.38)
Feet resting					
No	12 (10.9)	30 (23.1)	Ref.	Ref.	Ref.
Yes	98 (89.1)	100 (76.9)	0.41 (0.20-0.84)	0.46 (0.22-0.97)	0.45 (0.20-1.00)
Lumbar support					
No	27 (24.5)	50 (38.5)	Ref.	Ref.	Ref.
Yes	83 (75.5)	80 (61.5)	0.52 (0.30-0.91)	0.52 (0.29-0.93)	0.64 (0.31-1.31)
Knee pressure					
No	82 (74.5)	89 (68.5)	Ref.	Ref.	Ref.
Yes	28 (25.5)	41 (31.5)	1.35 (0.77-2.38)	1.45 (0.81-2.59)	1.72 (0.92-3.21)
Armrests					
No	30 (27.3)	54 (41.5)	Ref.	Ref.	Ref.
Yes	80 (72.7)	76 (58.5)	0.53 (0.31-0.91)	0.57 (0.32-1.01)	0.70 (0.37-1.33)
Postural breaks					
No	69 (62.7)	110 (84.6)	Ref.	Ref.	Ref.
Yes	41 (37.3)	20 (15.4)	0.31 (0.17-0.57)	0.32 (0.17-0.61)	0.32 (0.16-0.62)

[a]Unadjusted; [b]Adjusted estimates for sex, age, society of affiliation, work seniority, place of work (home or public place), if place for exclusive use or not; [c]Adjusted estimates for all other variables.

Table 3 - Back/lower limbs pain (Odds ratios and 95% confidence intervals)

	Back/lower limbs pain			OR (95% CI)[b]	OR (95% CI)[c]
	No	Yes	OR (95% CI)[a]		
	n (%)	n (%)			
Adjustable height					
No	28 (23.5)	40 (33.1)	Ref.	Ref.	Ref.
Yes	91 (76.5)	81 (66.9)	0.62 (0.35-1.10)	0.63 (0.35-1.15)	0.75 (0.35-1.59)
Feet resting					
No	12 (10.1)	30 (24.8)	Ref.	Ref.	Ref.
Yes	107 (89.9)	91 (75.2)	0.34 (0.16-0.70)	0.36 (0.17-0.75)	0.33 (0.15-0.74)
Lumbar support					
No	35 (29.4)	42 (34.7)	Ref.	Ref.	Ref.
Yes	84 (70.6)	79 (65.3)	0.78 (0.46-1.35)	0.77 (0.44-1.35)	1.09 (0.53-2.22)
Knee pressure					
No	87 (73.1)	84 (69.4)	Ref.	Ref.	Ref.
Yes	32 (26.9)	37 (30.6)	1.20 (0.68-2.10)	1.25 (0.71-2.22)	1.39 (0.75-2.56)
Armrests					
No	36 (30.3)	48 (39.7)	Ref.	Ref.	Ref.
Yes	83 (69.7)	73 (60.3)	0.66 (0.39-1.13)	0.68 (0.38-1.19)	0.86 (0.46-1.60)
Postural breaks					
No	78 (65.5)	101 (83.5)	Ref.	Ref.	Ref.
Yes	41 (34.5)	20 (16.5)	0.38 (0.20-0.69)	0.39 (0.20-0.72)	0.35 (0.18-0.69)

[a]Unadjusted; [b]Adjusted estimates for sex, age, society of affiliation, work seniority, place of work (home or public place), if place for exclusive use or not; [c]Adjusted estimates for all other variables.

Table 4 - Arm pain (Odds Ratios and 95% confidence intervals)

	Arm pain			OR (95% CI)b	OR (95% CI)c
	No	Yes	OR (95% CI)a		
	n (%)	n (%)			
Keyboard/Mouse elbow height					
No	23 (12.4)	17 (30.9)	Ref.	Ref.	Ref.
Yes	162 (87.6)	38 (69.1)	0.32 (0.15-0.65)	0.32 (0.15-0.67)	0.57 (0.25-1.33)
Neighboring objects					
No	1 (0.5)	2 (3.6)	Ref.	Ref.	Ref.
Yes	184 (99.5)	53 (96.4)	0.14 (0.01-1.62)	0.18 (0.02-2.03)	0.30 (0.02-4.21)
Wrists rested					
No	19 (10.3)	14 (25.5)	Ref.	Ref.	Ref.
Yes	166 (89.7)	41 (74.5)	0.34 (0.16-0.72)	0.31 (0.14-0.69)	0.54 (0.22-1.31)
Straight wrists and relaxed arms					
No	42 (22.7)	32 (58.2)	Ref.	Ref.	Ref.
Yes	143 (77.3)	23 (41.8)	0.21 (0.11-0.40)	0.20 (0.10-0.39)	0.26 (0.13-0.52)
Mouse near keyboard					
No	9 (4.9)	7 (12.7)	Ref.	Ref.	Ref.
Yes	176 (95.1)	48 (87.3)	0.35 (0.12-0.99)	0.32 (0.11-0.93)	0.55 (0.17-1.80)
Comfortable touchpad					
No	49 (26.5)	17 (30.9)	Ref.	Ref.	Ref.
Yes	136 (73.5)	38 (69.1)	0.81 (0.42-1.56)	0.79 (0.40-1.56)	1.07 (0.50-2.29)
Postural breaks					
No	135 (73.0)	44 (80.0)	Ref.	Ref.	Ref.
Yes	50 (27.0)	11 (20.0)	0.67 (0.32-1.41)	0.73 (0.34-1.55)	0.78 (0.35-1.78)
Laptop use					
No	42 (22.7)	7 (12.7)	Ref.	Ref.	Ref.
Yes	143 (77.3)	48 (87.3)	2.01 (0.85-4.78)	1.98 (0.83-4.76)	1.86 (0.71-4.88)

[a]Unadjusted; [b]Adjusted estimates for sex, age, society of affiliation, work seniority, place of work (home or public place), if place for exclusive use or not; [c]Adjusted estimates for all other variables.

Of the 240 participants, 170 (70,8%) reported burning eyes, while 70 (29,2%) reported no pain. 17 (10.0%), 41 (24.1%), 50 (29.4%) of the participants with burning eyes reported that the position, distance, and height of the monitor were not adjusted correctly. 38 (22.4%) and 13 (7,6%), of the participants with burning eyes have stated that they had the computer monitor with reflections and did not have adequate light connected to the workstation. Active visual breaks from computer work have been found to be a protective factor against the occurrence of eye burning (OR 0.50, CI 0.27-0.94) (Table 5).

Discussion

The COVID-19 pandemic has certainly brought about a significant shift in the way people work, with smart working or remote work becoming the norm for many. As a result, changing the workstation for those working from home has become a crucial aspect of ensuring productivity and well-being. One of the most significant challenges of working from home is finding a suitable space to work. Many people do not have a dedicated home office and have had to make do with setting up their workspace in shared living spaces or bedrooms. This can be detrimental to productivity and health, as these spaces are often filled with distractions, interruptions and are not adequate to work (15).

To combat this, it is essential to create a dedicated workspace, preferably in a quiet and well-lit area of the home. This space should be equipped with all the necessary tools and equipment to perform tasks efficiently, such as a comfortable chair, a desk, and a computer with a reliable internet connection. As shown in Figure 1, this should be the ergonomic posture and

Table 5 - Burning/lacrimation eyes (Odds Ratios and 95% confidence intervals)

	Burning/lacrimation eyes			OR (95% CI)[b]	OR (95% CI)[c]
	No	Yes	OR (95% CI)[a]		
	n (%)	n (%)			
Monitor position					
No	4 (5.7)	17 (10.0)	Ref.	Ref.	Ref.
Yes	66 (94.3)	153 (90.0)	0.55 (0.18-1.68)	0.45 (0.14-1.46)	0.49 (0.14-1.70)
Monitor distance					
No	17 (24.3)	41 (24.1)	Ref.	Ref.	Ref.
Yes	53 (75.7)	129 (75.9)	1.01 (0.53-1.93)	1.09 (0.55-2.13)	1.44 (0.69-3.00)
Monitor height					
No	17 (24.3)	50 (29.4)	Ref.	Ref.	Ref.
Yes	53 (75.7)	120 (70.6)	0.77 (0.41-1.46)	0.80 (0.42-1.54)	0.92 (0.46-1.83)
Reflection-free monitor					
No	9 (12.9)	38 (22.4)	Ref.	Ref.	Ref.
Yes	61 (87.1)	132 (77.6)	0.51 (0.23-1.13)	0.47 (0.21-1.05)	0.53 (0.23-1.24)
Adequate light					
No	6 (8.6)	13 (7.6)	Ref.	Ref.	Ref.
Yes	64 (91.4)	157 (92.4)	1.13 (0.41-3.11)	1.02 (0.36-2.88)	1.34 (0.45-3.97)
Visual breaks					
No	39 (55.7)	124 (72.9)	Ref.	Ref.	Ref.
Yes	31 (44.3)	46 (27.1)	0.47 (0.26-0.83)	0.48 (0.27-0.88)	0.50 (0.27-0.94)

[a]Unadjusted; [b]Adjusted estimates for sex, age, society of affiliation, work seniority, place of work (home or public place), if place for exclusive use or not; [c]Adjusted estimates for all other variables

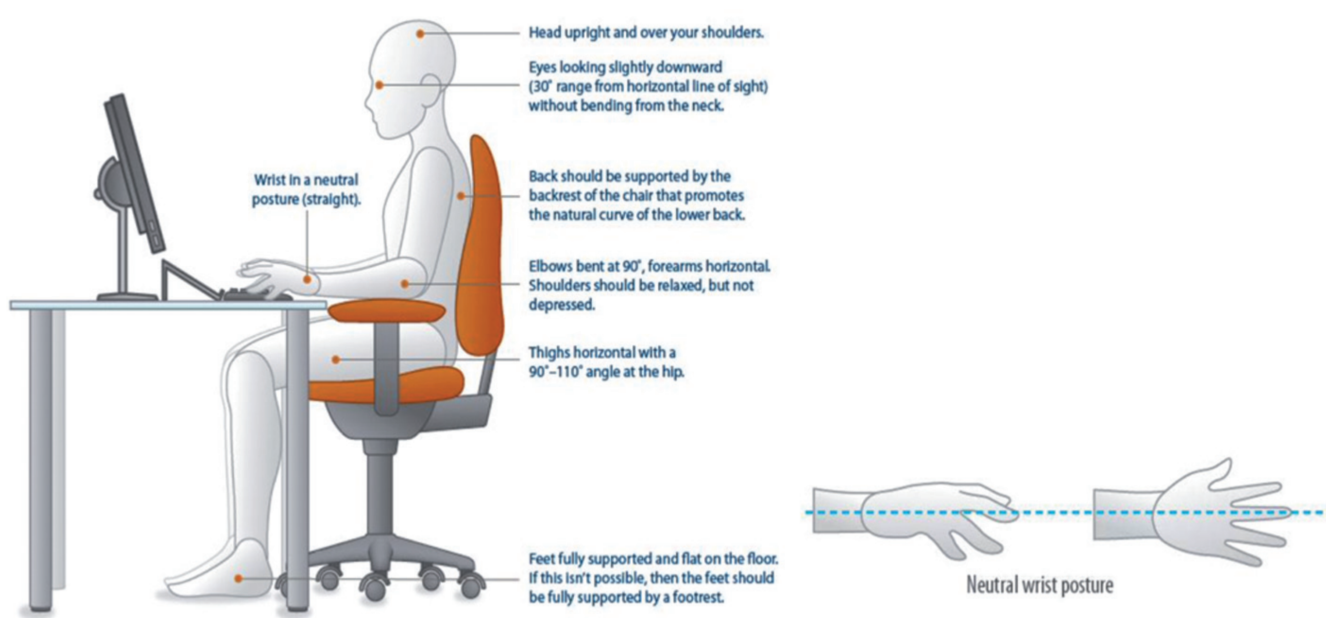

Figure 1 - From "Computer Workstation Ergonomics: Self-Assessment Checklist del National Institutes of Health, Office of Research Services, Division of Occupational Health and Safety website."

workstation organization, which employees should also adopt at home.

Among the 240 participants of the study, 130 (54%) complained of neck/shoulder pain, 121 (50.4%) reported back or lower limbs pain, 55 (22.9%) reported arm pain, 170 (70,8%) reported burning eyes. Of these, they took postural or visual breaks from the workstation or monitor, respectively, 20 (15.4%) of those who had neck/shoulder pain, 20 (16.5%) back/lower limbs pain, 11 (20.0%) arm pain, 46 (27.1%) burning eyes. Overall, it's important to take regular breaks and maintain good posture, as sitting for extended periods can have negative effects on one's health. Our study showed that, Postural breaks have a protective effect on neck/shoulder pain (OR 0.32, CI 0.16-0.62), back and lower extremity pain (OR 0.35, CI 0.18-0.69), and eye burning (OR 0.50, CI 0.27-0.94) of study participants. This effect was found to have a strongly significant value. Postural breaks are short, frequent pauses or adjustments in body position that help relieve the physical strain and tension that can build up when we sit or stand in the same position for extended periods. These breaks can be as simple as standing up and stretching or changing the angle of your chair or computer monitor. Neck/shoulder pain and back/lower extremity pain are common musculoskeletal disorders that can be caused by poor posture and prolonged periods of sitting or standing in one position. Postural breaks can help to prevent or alleviate these conditions by reducing the amount of time that the body spends in a static, uncomfortable position. One way that postural breaks protect against neck and shoulder pain is by reducing the tension that builds up in the neck and shoulder muscles when we hold our heads in a fixed position for long periods. When we work at a computer, for example, we tend to crane our necks forward to look at the screen, which can cause strain in the neck and shoulder muscles. Taking a postural break to stretch or adjust our position can help to relieve this tension and prevent the development of pain. Similarly, postural breaks can help to prevent and alleviate back and lower extremity pain by reducing the pressure that builds up in the spine and lower extremities when we sit or stand for long periods. When we sit, for example, the pressure on our spine increases as we compress our disks, and our hip flexors can become tight and shortened, leading to lower back pain. Taking a postural break to stand up and stretch can help to relieve this pressure and prevent the development of pain. In addition to relieving physical strain and tension, postural breaks also promote circulation and blood flow throughout the body. This increased circulation can help to prevent the development of pain by delivering oxygen and nutrients to the muscles and tissues that are at risk of becoming strained or overworked. Overall, postural breaks are an important protective factor for neck/shoulder pain and back/lower extremity pain. By reducing physical strain and tension, promoting circulation, and preventing the development of pain, postural breaks can help to keep the body healthy and pain-free even in the face of prolonged periods of sitting or standing (16-17).

In Italy, D. Lgs. 81/08 (18) stipulates that video screeners have a break from PC use of a quarter of an hour every 2 hours of work, to rest their eyesight and prevent damage from occurring in the long run. It is also important for the company's physician in charge to train and inform workers on this issue.

Our study also shows that holding correct posture such as straight wrists and relaxed arms (see Figure 1.) prevents arm pain (OR 0.26, CI 0.13-0.52), and those feet properly resting on the floor (see Figure 1.), prevent back and lower limb pain (OR 0.33, CI 0.15-0.74).

Moreover, across the cohort of individuals participating in the survey who engage in remote work, just 51% said that they operate inside a designated and well-equipped workspace exclusively devoted to business-related activities. This can have several consequences: firstly, the decrease in productivity, working in a dedicated workspace can help people maintain concentration. Those who do not have a dedicated workspace may find it more difficult to concentrate, resulting in lower productivity levels. Secondly, work-life balance problems; this can lead to burnout and increased stress levels. Third, security and privacy issues; if remote workers do not work in a secure and confidential environment, there may be data security risks. Confidential information could be exposed if family members or other people have access to their work area (19-20).

Results from this study highlighted that the workers with ergonomic chairs – and an ergonomic workstation in general – complained less musculoskeletal pain compared to those workers without ergonomic workstations. This raises the important question of social disparities in working from home. The employer can intervene improving the knowledge the workers have about the importance of ergonomics in the workplace, and formation and information programs are necessary to educate workers on the right set up when working remotely. However, some disparities can only be leveled intervening directly: the large international pharmaceutical company investigated in this study, for example, had a fund accessible to all employees through which the employer would contribute to the purchase of an ergonomic chair for the home workstation, and other tools necessary for the ergonomic wellbeing of employees.

A difference has been reported for the average paycheck between jobs that can be performed remotely compared to jobs which need to be performed on site (21), however social disparities exist within these categories. Since results from this study showed that an ergonomic workstation can be instrumental in improving the wellbeing of employees, employers should take actions to ensure that all workers have the proper workstation when working from home. Interventions – both educational and economical by the employer – are instrumental in reducing social disparities affecting the physical wellbeing of workers. The role of the occupational physician is fundamental to ensure that all workers can recognize an unsafe set up and can participate in improving their home workstation (22).

Study limitations

This study has some limitations. One limitation is due to the study design, which is cross-sectional observational in nature, so there are no reevaluations of oculo-visual and musculoskeletal disorders related to computer use and related workstation in Angelini House employees after administration of the questionnaire. Another limitation of this study lies in the selection bias due to the enrollment of participants, so the questionnaire will be administered with prior consent, free and informed, on a voluntary basis only.

Conclusions

For people who work from home and change workstations, it is crucial to maintain their emotional and physical well-being, by creating an appropriate workspace and proper risk training by the occupational health physician.

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Riassunto

Smart working durante la pandemia da COVID-19: la prevalenza di disturbi muscoloscheletrici e visivi nel personale amministrativo di una grande azienda internazionale

Introduzione. Nel corso della pandemia da COVID-19, si è osservato un aumento dell'utilizzo dei dispositivi digitali durante le attività lavorative, con significative implicazioni per il benessere psicofisico dei lavoratori. Lo scopo di questo studio è stato quello di esaminare la prevalenza dei disturbi muscolo-scheletrici e visivi associati all'uso del computer e alla postazione di lavoro domestica.

Metodi. Lo studio è stato condotto utilizzando un disegno trasversale. Una checklist del National Institute of Health è stata somministrata ai dipendenti di una grande azienda farmaceutica internazionale con sede in Italia.

Risultati. I risultati del nostro studio hanno evidenziato che le pause posturali hanno un effetto protettivo sul dolore al collo/spalla (OR 0,32, IC 0,16-0,62), sul dolore alla schiena e agli arti inferiori (OR 0,35, IC 0,18-0,69) e sul bruciore agli occhi (OR 0,50, IC 0,27-0,94) dei partecipanti.

Conclusioni. Si raccomanda ai lavoratori che svolgono la propria attività in modalità smart working di predisporre un ambiente di lavoro ad uso esclusivo, dopo aver ricevuto una formazione specifica sui rischi correlati a cura del proprio medico del lavoro. Tale misura risulta fondamentale per preservare il loro benessero fisico e mentale.

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