

Telework Conditions, Ergonomic and Psychosocial Risks, and Musculoskeletal Problems in the COVID-19 Pandemic

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Objective: To evaluate the association of telework conditions with ergonomic and psychosocial risks and with the occurrence of musculoskeletal problems among employees of the Brazilian Labor Judiciary during the COVID-19 pandemic. **Methods:** A cross-sectional study was conducted with 934 workers from August to October 2021. The data were collected via Web using a self-administrated questionnaire survey. Nonparametric tests and generalized linear regression analysis were used. **Results:** Previous experience in telework was associated with a better evaluation of the home workstation, a lower increase in workload, a greater increase in productivity, and greater preference to continue teleworking after the pandemic. The lack of a place dedicated to telework was specially related to greater ergonomic and psychosocial risks and to the greater occurrence of musculoskeletal problems. **Conclusions:** Companies should monitor telework conditions to reduce health risks among their employees.

Keywords: ergonomics, musculoskeletal pain, occupational health, risk factors, teleworking, workplace

The first regulations on telework among employees of the Labor Judiciary in Brazil emerged in 2012.¹ After 3 years of experience, this work modality was considered successful based on productivity data and was permanently incorporated into the institutional practices so that up to 30% of the staff could perform telework.² From the COVID-19 pandemic outbreak in March 2020, face-to-face work was suspended and telework was provisionally extended to all approximately 40,000 employees of the Brazilian Labor Judiciary.³

Until the COVID-19 pandemic, regulations established telework as a voluntary modality, dependent on leadership indication and predicting a productivity increase compared with face-to-face work. It also required that the employees would undergo a health assessment and attend a course on the health risks related to telework, including ergonomic aspects. From the COVID-19 pandemic onwards, the other employees were subjected to compulsory, unexpected, and indefinite telework due to the orientation toward social isolation. This emergency situation during which telework was imposed, especially in the initial phase of the pandemic, admittedly affected the employees' and employers' ability to respectively adapt and supervise the home working conditions.⁴

Some of the studies that evaluated the working conditions during the COVID-19 pandemic among workers who had to adopt telework in this period pointed out that lack of a dedicated place at the homes to work and inadequacy of the furniture and the workplace were among the main problems faced by the participants.⁵⁻⁹ For most of the workers who started teleworking as a result of the pandemic, the ergonomic conditions of the home workstation were significantly worse to those found in the company's premises,¹⁰ even with repercussions on the increase in musculoskeletal pain among the workers.¹¹

A number of studies that evaluated the ergonomic conditions of the workstation pointed out that most of the workers surprised by the imposition of telework only had a laptop to work at their homes and mostly used inappropriate chairs and tables, even many months after the beginning of the pandemic.¹²⁻¹⁴ Many workers used inappropriate chairs, without any possibility of adjusting the seat or backrest, and pointed to lack of space on the work table to provide adequate support for the forearms and to the absence of adequate support for the feet.¹⁵ A number of studies that carried out a quantitative assessment of telework workstations during this period showed that approximately half of the evaluations performed pointed to ergonomic inadequacies in which immediate intervention in the workstation was suggested.¹⁶⁻¹⁸

In most of the studies, it was noticed that there was an increase in the prevalence of musculoskeletal problems after adopting telework as a result of the COVID-19 pandemic, although without establishing a direct relationship with the participants' working conditions,^{6,7,13,19-23} whereas some others pointed out that this increase was related to environmental and ergonomics conditions in telework, such as lack of a dedicated place where the workers could concentrate for work.^{10,24-26} Ergonomic and environmental suitability of the workplace at home can also be related to a positive view and to the perception of the advantages of telework, as well as to productivity.²⁷ In the same sense, the positive evaluation of the ergonomic suitability of the furniture and the computer equipment used to work at home, as well as the company's support regarding supply of these materials, can be related to higher levels of productivity and satisfaction with telework.⁹

Traditionally, telework has been related to an increase in workload, greater autonomy, and a reduction in social support due to the difficulties communicating with colleagues and with the leaders.²⁸⁻³⁰ In the transition to telework, there are changes in the boundaries between personal and professional life, not only in terms of physical structure shared between home and workplace but also in terms of working time, which is no longer limited by the time spent at the company's premises, and regarding the psychological aspects related to the social roles that have to be fulfilled at home and at work. As telework reduces the boundaries between home and workplace, it tends to increase the working hours as a way of compensating for the time that would be spent commuting, and it can create communication barriers with the colleagues.³¹⁻³³ Specifically during the COVID-19 pandemic, previous studies pointed to an increase in workload when compared with face-to-face work carried out before the pandemic,^{6,7,34} whereas the participants mentioned an increase in productivity and satisfaction with telework, with a large percentage of workers expressing an interest in maintaining partial or full telework after the pandemic.^{1,23,24,35,36}

Telework, which has already shown growth in recent years around the world,³⁷ was widely adopted during the COVID-19 pandemic, and there is a tendency for many workers to remain working from home after the need for social isolation.³⁸ Thus, it is essential that the conditions in which telework is carried out and its relationships with workers' health are taken into consideration. The objectives of this study were to evaluate the conditions in which telework was carried out during the COVID-19 pandemic among employees of a Brazilian Labor Judiciary Court and to compare the ergonomic and psychosocial risks and the occurrence of musculoskeletal symptoms, according to some of those telework conditions.

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METHODS

Procedure and Participants

A cross-sectional study with a quantitative approach was conducted among the employees from a Brazilian Regional Labor Court (*Tribunal Regional do Trabalho*). A total of 2849 employees from *Tribunal Regional do Trabalho* judicial and administrative units whose work activity had not been significantly modified in telework when compared with face-to-face work were invited to participate in this research. Employees who had worked less than 1 year at the institution and those who were on vacation or on sick leave during the data collection period were oriented not to join the study. Data from participants who did not complete the instruments in full were excluded from the analysis.

The invitations to participate in this study were sent to the employees' institutional e-mail address with basic information on the research, its objectives, and form of participation. Data collection was carried out between August and October 2021. Questionnaires were made available via the Internet through the SurveyMonkey® online questionnaire and survey platform.

This study was approved by the Research Ethics Committee (CEP) of the University of Campinas (Unicamp) under opinion 4,862,756/2021. Participants' access to the questionnaires was only possible by agreeing to the informed consent form presented on the survey initial page.

Measures

Diverse information was collected from the participants, referring to the following: age, sex, family status, people under care living in the same household (cohabitants in care), regular physical activity, weight, height, position, work unit, working time in the institution, effective weekly working hours, and number of working days per week.

The following questions were used to collect information specifically related to telework conditions:

- “Have you been teleworking before the onset of the pandemic (Y/N)?”
- “Do you have a dedicated space or a room intended exclusively for work in your residence (Y/N)?”
- “Have you purchased furniture and/or equipment or made any adjustments to your workplace at home for comfort and pain prevention (Y/N)?”
- “How do you rate the workplace provided by the Court for face-to-face work for comfort and ergonomics (very bad/bad/regular/good/very good)?”
- “How do you rate your workplace at home for comfort and ergonomics (very bad/bad/regular/good/very good)?”
- “With regard to face-to-face work, do you consider that your workload in telework has increased, decreased, or remained the same?”
- “With regard to face-to-face work, do you consider that your productivity in telework has increased, decreased, or remained the same?”
- “If it were solely up to you, would you choose which type of work you can choose from the possibility of returning to face-to-face work: face-to-face, telework, or hybrid?”

The assessment of ergonomic and psychosocial risks among teleworkers was performed by means of the Brazilian version of the Maastricht Upper Extremity Questionnaire.³⁹ This is an instrument that assesses the risk factors related to musculoskeletal problems in work with intensive use of computers. Higher risks are associated to inadequate workstation and body posture at work, low control over work, excessive work demands, insufficient rest breaks, and reduced social support.⁴⁰ The workstation domain (six questions) assesses the suitability of the desk, chair, and computer equipment. The body posture during work domain (six questions) assesses whether the worker

maintains awkward postures during work activities. The control domain (nine questions) assesses the worker's autonomy in conducting the work tasks in relation to their skills. The demands domain (seven questions) addresses the workload, pressure, and difficulty of completing tasks during the working day. The breaks domain (six questions) addresses the worker's perception of the conditions to take rest breaks and vary work tasks. The social support domain (seven questions) addresses the worker's perception about the relationship with colleagues and supervisors.^{39,40}

The occurrence of musculoskeletal problems in the last 12 months and in the last 7 days was assessed by the Brazilian version of the Nordic Musculoskeletal Questionnaire added with a numerical rating scale from 0 (absence of pain) to 10 (worst possible pain) for each body region.⁴¹ The Nordic Musculoskeletal Questionnaire standardizes the assessment of musculoskeletal symptoms in an occupational context by dividing the body into a diagram with nine regions: neck, shoulders, upper back, elbows, wrists/hands, lower back, hips/thighs, knees, and ankles/feet.^{41,42} This approach with a quantitative evaluation of the complaints in each body region (numerical rating scale) made it possible to evaluate musculoskeletal problems in relation to the number of body regions with complaints for each employee and the intensity of the complaints in each body region.

Statistical Analysis

Descriptive analyses present absolute and percentage values, position, and dispersion measures. Chi-squared and Fisher exact tests were performed to evaluate the associations between previous experience with telework and other telework conditions. Mann-Whitney *U* test was used for the comparison between the employees with previous experience in telework (group 1) and those who started telework during the pandemic (group 2) and for the comparison between the employees with and without a place dedicated to telework at home. A generalized linear regression analysis was conducted to assess the relationship between previous experience in telework and the existence of a place dedicated to telework in the house (independent variables selected using the stepwise backward method) with ergonomic and psychosocial risks and the occurrence of musculoskeletal problems (dependent variables). *P* values < 0.05 were considered statistically significant, and SAS, version 9.4, was used for the analyses.

RESULTS

Among the workers eligible to join the study, 1014 accessed the link sent by e-mail and answered the free and informed consent form, and nine did not accept to participate. Of all 1005 employees who agreed to participate in the study, 71 were excluded because of incomplete filling out of the data collection instruments. The final sample consisted of 934 employees, resulting in a 32.78% response rate.

Among the study participants, 27.62% stated having already teleworked before the beginning of the COVID-19 pandemic (group 1), whereas 72.38% had no previous experience in telework (group 2). In both groups, most of the participants were female and married, lived with one to three people, and practiced regular physical activities. The participants from group 1 were younger, had less time working at the institution, and, in greater proportion, held the position of judicial analyst and worked in the Court's second instance (Table 1).

The participants from group 1 cited a dedicated place at their homes to work and made changes to their workplace aiming at comfort and ergonomics in a significantly greater proportion than the other participants. Group 1 also rated their workstation at home better and reported a lower increase in the working hours when migrating to telework ($P < 0.001$) and a greater increase in productivity in telework in relation to face-to-face work when compared with group 2 ($P = 0.003$). Both groups showed certain preference for telework after the pandemic; however, among the participants from group 2, there was a preference for the

hybrid modality (partial telework) and for face-to-face work in a significantly greater proportion (Table 2).

When compared according to previous experience in telework and the existence of a dedicated place to work, the participants who started teleworking during the pandemic and those with no dedicated place presented significantly higher ergonomic and psychosocial risks (except for job control in previous telework) and greater occurrence of musculoskeletal problems (Tables 3 and 4).

The generalized linear regression analysis pointed that previous experience in telework was significantly related to lower risks in workstation, job demands, and break time domains. This analysis also showed that group 1 had a significantly lower occurrence of musculoskeletal problems in the last 12 months (intensity and body regions with complaints) and in the last 7 days (body regions with complaints). The lack of a place dedicated to telework in the house was significantly related to greater ergonomic and psychosocial risks (except job demands) and to the greater occurrence of musculoskeletal problems in both periods, regardless of previous experience in telework (Table 5).

DISCUSSION

This study verified that the participants with previous experience in voluntary telework (group 1) presented better working conditions at their homes and a greater preference for staying in telework when compared with those who started teleworking compulsorily as a result of the COVID-19 pandemic (group 2). The participants from

TABLE 1. Descriptive Analysis of Sociodemographic and Occupational Characteristics According to Previous Experience in Telework (N = 934)

Characteristics	Group 1 (n = 258) n (%) or Mean (SD)	Group 2 (n = 676) n (%) or Mean (SD)
Age (years)	43.38 (7.14)	46.92 (8.61)
Sex		
Male	97 (37.60)	267 (39.50)
Female	161 (62.40)	409 (60.50)
Marital status		
Single	41 (15.89)	124 (18.34)
Married	191 (74.03)	456 (67.46)
Divorced	25 (9.69)	85 (12.57)
Widower	1 (0.39)	11 (1.63)
Number of cohabitants		
0	25 (9.69)	86 (12.72)
1	67 (25.97)	174 (25.74)
2	83 (32.17)	171 (25.30)
3	62 (24.03)	187 (27.66)
More than 3	21 (8.14)	58 (8.58)
Cohabitants in care		
No	137 (53.10)	442 (65.38)
Yes	121 (46.90)	234 (34.62)
Regular physical activity		
No	90 (34.88)	272 (40.24)
Yes	168 (65.12)	404 (59.76)
BMI	25.60 (3.94)	26.03 (4.51)
Role		
Judicial technician	158 (61.24)	470 (69.53)
Judicial analyst	95 (36.82)	164 (24.26)
Executor	5 (1.94)	42 (6.21)
Sector		
1 st instance	139 (53.88)	378 (55.92)
2 nd instance	101 (39.15)	97 (14.35)
Administrative area	18 (6.98)	201 (29.73)
Working time (years)	13.65 (7.57)	16.46 (9.45)
Weekly workload (hours)	39.98 (5.09)	39.79 (5.95)
Working days per week	5.15 (0.42)	5.09 (0.34)

BMI, body mass index.

TABLE 2. Telework Conditions According to Previous Experience in Telework (N = 934)

Variable	Group 1 (n = 258) n (%)	Group 2 (n = 676) n (%)	P
Dedicated place			
No	28 (10.85)	245 (36.24)	<0.001 ^a
Yes	230 (89.15)	431 (63.76)	
Workplace changes			
No	47 (18.22)	251 (37.13)	<0.001 ^a
Yes	211 (81.78)	425 (62.87)	
Face-to-face workstation			
Very bad or bad	13 (5.04)	26 (3.85)	0.270 ^a
Regular	49 (18.99)	98 (14.50)	
Good	129 (50.00)	355 (52.51)	
Very good	67 (25.97)	197 (29.14)	
Telework workstation			
Very bad or bad	1 (0.39)	99 (14.64)	<0.001 ^a
Regular	58 (22.48)	245 (36.24)	
Good	116 (44.96)	228 (33.73)	
Very good	74 (28.68)	104 (15.38)	
Workload in telework			
Decreased	13 (5.04)	36 (5.33)	<0.001 ^a
Remained the same	141 (54.65)	278 (41.12)	
Increased	104 (40.31)	362 (53.55)	
Productivity in telework			
Decreased	12 (4.65)	81 (11.98)	0.003 ^a
Remained the same	61 (23.64)	157 (23.22)	
Increased	185 (71.71)	438 (64.79)	
Current preference			
Face-to-face work	2 (0.78)	67 (9.91)	<0.001 ^b
Hybrid	69 (26.74)	294 (43.49)	
Telework	187 (72.48)	315 (46.60)	

^aChi-squared test.

^bFisher exact test.

group 1 also presented reduced ergonomic and psychosocial risks and lower occurrence of musculoskeletal problems when compared with those from the second group. The existence of a dedicated place in the house to work was especially related to the reduction of these risks and to the lower occurrence of musculoskeletal problems, regardless of previous experience in telework.

Among the participants from group 1, 89.15% had a dedicated place to work at their homes, 81.78% had already made changes to their home workplace aiming at comfort and pain prevention, and 73.64% rated their workstations at home as good or very good. These results were significantly better in relation to those obtained by the participants from group 2. The participants from group 1 also showed a lower increase in the working hours, as well as a greater increase in productivity in telework, when compared with those from group 2. Whereas 72.48% of the participants with previous experience mentioned certain preference for continuing to telework full time after the pandemic, only 46.60% indicated this preference among participants who compulsorily teleworked. Previous studies verified lower percentages of participants with a dedicated place at their homes specifically intended for teleworking (between 23% and 45%), even in relation to group 2 in our study, and observed smaller proportions of employees interested in continuing teleworking.^{5,6,24,25}

Considering the total sample, although the participants in our study rated workstations at their homes as worse in relation to face-to-face work, as was observed in other studies,¹⁰⁻¹⁶ we were able to notice that this trend was not verified in group 1. Among the participants from this group, 5.04% rated the workstations in the company's premises as bad or very bad and only 0.39% rated the home workstation as such. Among the participants from group 2, whereas 3.85% rated the workstation in the company's premises as bad or very bad, 14.64% rated the home workstation as such.

TABLE 3. Comparison Between Ergonomic and Psychosocial Risks and Musculoskeletal Problems According to Previous Experience in Telework (n = 934)

Variable	Previous Telework	n	Median (IQR)	Min-Max	P ^a
MUEQ-Br revised					
Workstation	No	676	1.00 (2.00)	0.00–6.00	<0.001
	Yes	258	0.00 (0.00)	0.00–6.00	
Posture	No	676	6.00 (4.00)	0.00–17.00	0.005
	Yes	258	5.00 (4.00)	0.00–15.00	
Job control	No	676	4.00 (5.00)	0.00–22.00	0.081
	Yes	258	4.00 (4.00)	0.00–16.00	
Job demands	No	676	7.00 (7.00)	0.00–21.00	0.016
	Yes	258	6.00 (7.00)	0.00–20.00	
Break time	No	676	4.00 (4.00)	0.00–18.00	<0.001
	Yes	258	3.00 (3.00)	0.00–15.00	
Social support	No	676	1.00 (2.00)	0.00–18.00	0.002
	Yes	258	0.00 (2.00)	0.00–14.00	
Total score	No	676	24.00 (17.00)	2.00–74.00	<0.001
	Yes	258	20.00 (15.00)	1.00–61.00	
Musculoskeletal problems					
Total intensity in the last 12 months	No	676	23.00 (29.00)	0.00–84.00	0.003
	Yes	258	19.00 (25.00)	0.00–76.00	
Regions with complaints in the last 12 months	No	676	6.00 (5.00)	0.00–9.00	0.002
	Yes	258	5.00 (4.00)	0.00–9.00	
Total intensity in the last 7 days	No	676	13.50 (26.00)	0.00–82.00	0.006
	Yes	258	9.00 (22.00)	0.00–72.00	
Regions with complaints in the last 7 days	No	676	3.00 (4.00)	0.00–9.00	0.002
	Yes	258	3.00 (4.00)	0.00–9.00	

IQR, interquartile range; Max, maximum; Min, minimum; MUEQ-Br, Brazilian version of the Maastricht Upper Extremity Questionnaire.

^aMann-Whitney U test.

The higher proportion of judicial analysts and employees who worked in the second instance in group 1, whose tasks of procedural analysis and sentence writing are more individualized and less dependent on the collaboration of colleagues, can indicate that the participants from this group had a more appropriate profile for telework

and should be better prepared regarding adequacy of their workplace and the organization of work at their homes.

The participants from group 2 mentioned an increase in the working hours that was proportionally higher in relation to face-to-face work in our study. This may have been due to a greater effort to

TABLE 4. Comparison Between Ergonomic and Psychosocial Risks and Musculoskeletal Problems According to the Existence of a Dedicated Place to Work at Home (N = 934)

Variable	Dedicated Place	n	Median (IQR)	Min-Max	P ^a
MUEQ-Br revised					
Workstation	No	661	2.00 (2.00)	0.00–6.00	<0.001
	Yes	273	0.00 (1.00)	0.00–5.00	
Posture	No	661	7.00 (5.00)	0.00–17.00	<0.001
	Yes	273	5.00 (3.00)	0.00–15.00	
Job control	No	661	5.00 (6.00)	0.00–19.00	<0.001
	Yes	273	4.00 (4.00)	0.00–22.00	
Job demands	No	661	8.00 (8.00)	0.00–21.00	0.014
	Yes	273	7.00 (7.00)	0.00–21.00	
Break time	No	661	4.00 (4.00)	0.00–18.00	<0.001
	Yes	273	4.00 (4.00)	0.00–18.00	
Social support	No	661	1.00 (2.00)	0.00–18.00	<0.001
	Yes	273	1.00 (2.00)	0.00–15.00	
Total score	No	661	27.00 (17.00)	4.00–74.00	<0.001
	Yes	273	22.00 (14.00)	1.00–72.00	
Musculoskeletal problems					
Total intensity in the last 12 months	No	661	26.00 (29.00)	0.00–84.00	<0.001
	Yes	273	20.00 (28.00)	0.00–82.00	
Regions with complaints in the last 12 months	No	661	6.00 (4.00)	0.00–9.00	<0.001
	Yes	273	5.00 (4.00)	0.00–9.00	
Total intensity in the last 7 days	No	661	16.00 (28.00)	0.00–82.00	<0.001
	Yes	273	10.00 (22.00)	0.00–82.00	
Regions with complaints in the last 7 days	No	661	4.00 (5.00)	0.00–9.00	<0.001
	Yes	273	3.00 (4.00)	0.00–9.00	

IQR, interquartile range; Max, maximum; Min, minimum; MUEQ-Br, Brazilian version of the Maastricht Upper Extremity Questionnaire.

^aMann-Whitney test.

TABLE 5. Generalized Linear Regression Analysis Between Previous Experience in Telework and Dedicated Place to Work at Home (Independent Variables) With Ergonomic and Psychosocial Risks and Musculoskeletal Problems (Dependent Variables) (*n* = 934)

Variable	Previous Telework (Yes)		Dedicated Place (Yes)	
	β	<i>P</i>	β	<i>P</i>
MUEQ-Br revised				
Workstation	-0.308	<0.001	-1.078	<0.001
Posture	–	–	-1.071	<0.001
Job control	–	–	-1.285	<0.001
Job demands	-0.861	0.019	–	–
Break time	-0.821	<0.001	-0.791	<0.001
Social support	–	–	-0.510	<0.001
Total score	-2.975	<0.001	-5.129	<0.001
Musculoskeletal problems				
Total intensity in the last 12 months	-3.133	0.027	-5.224	<0.001
Regions with complaints in the last 12 months	-0.419	0.039	-0.770	<0.001
Total intensity in the last 7 days	–	–	-5.862	<0.001
Regions with complaints in the last 7 days	-0.448	0.034	-0.879	<0.001

MUEQ-Br, Brazilian version of the Maastricht Upper Extremity Questionnaire.

adapt to telework without proper preparation and to the lack of a dedicated place to work at their homes, with more frequent interruptions and greater difficulty concentrating for work. In telework, greater autonomy and flexibility in terms of timetables and activities can favor rest breaks and better distributed working hours during the day, although they can also favor longer workdays when compared with face-to-face work.⁴³ In the studies carried out during the COVID-19 pandemic, the workers commonly reported longer workdays, with longer meetings and a reduction in the number of rest breaks.^{6,7} On the other hand, positive experiences with telework during the pandemic were also related to greater flexibility in timetables and higher productivity due to fewer interruptions while working at home.³⁶ A study conducted with researchers from a Brazilian public company pointed out that the participants' perceptions regarding telework were highly positive, with increased autonomy and productivity. Most of the participants revealed their expectation that the teleworking regime would be maintained after the pandemic, especially in the hybrid modality.³⁵

Considering that, before the pandemic, the indication for telework was considered a form of recognition by the leadership regarding the responsibility and work performed by the employee, it is expected that the participants from group 1 had a relationship of trust and a good history of productivity to keep working remotely. Some studies indicate that a good relationship with the leaders is positively related to job satisfaction and that reduced communication with co-workers is related to increased productivity, reduced stress, and a lower number of unwanted interruptions among teleworkers, in contrast to the effects of social isolation.^{27,44} Another previous study observed that the employees who preferred to telework experienced less psychological distress with increasing telework frequency, whereas those who preferred not to telework suffered more psychological distress with increasing telework frequency.⁴⁵

Other studies carried out during this period pointed out that, even among employees who started telework as a result of the pandemic, most of the participants would like to continue doing so even after this period.^{24,34} Especially those with previous experience in telework and those without any health problems showed greater satisfaction with teleworking during this period.²³ The increase in productivity in telework can be positively related to the workers' physical and mental health and to the existence of a dedicated place to work at their homes.³⁴ In another study, this condition was also related to a better assessment of the suitability of the workplace in relation to those without a dedicated place to work at their homes, and the ergonomic and environmental suitability of the home workplace was linked to a positive view and a better perception of the advantages of teleworking and

to greater productivity.^{5,46} Another previous study showed that having an exclusive room for work, an ergonomically correct workstation, and knowledge of how to adjust the workstation were associated with lower chances of experiencing new health problems.⁴⁷

Most of the studies that evaluated the teleworking conditions during the COVID-19 pandemic pointed to worse ergonomic conditions of the home workstation in relation to face-to-face work and greater occurrence of musculoskeletal problems, but some only evaluated participants who started teleworking specifically as a result of the pandemic and did not assess the relationship between the telework conditions and the occurrence of these problems.^{7,13,19,20} Although our study was carried out approximately 1 year and 6 months after the beginning of the pandemic, the conditions of the home workstation were evaluated as worse to the face-to-face working conditions among those in group 2. A previous study carried out approximately 9 months after the beginning of the pandemic showed that ergonomic working conditions had not changed among the participants in relation to the first months of the pandemic, which can indicate lack of investment on the part of companies and workers facing the permanent perspective of returning to face-to-face work.¹⁴

A previous study noticed a reduction in musculoskeletal symptoms during telework in the pandemic period when compared with the previous face-to-face period, although without evaluating how this reduction could be related to the telework conditions or to ergonomic aspects.⁴⁸ Another study showed that the mere migration to telework at the beginning of the COVID-19 pandemic exerted no effect on the intensity of neck pain among the participants but that the greater intensity of this pain was related to worse ergonomic conditions of the home workstation, the number of hours working in the computer, and fewer breaks during the workday.¹⁰ In the same sense, other studies pointed out that the musculoskeletal complaints among teleworkers were mediated by inadequate ergonomic conditions and were related to the intensity of telework (days per week of telework) only when the telework conditions were deficient, such as lack of a home workplace where the employees could concentrate for work.^{22,24-26}

Although our study may provide important information to assist companies in the implementation or expansion of telework among their employees, some limitations must be pointed out. Data collection for this research was conducted approximately 1 year and 6 months after the beginning of the pandemic, which may have favored a better adaptation of the participants from group 2 and reduced the difference in terms of the risks and occurrence of musculoskeletal problems in relation to group 1. Our sample consisted of employees from the Brazilian Federal Judiciary, who are well-paid workers with good

housing conditions, which must have favored a higher proportion of participants with a dedicated place at their homes to work and with the ability to make changes aiming at comfort and pain prevention in their home workplaces. Consequently, these results cannot be generalized to other professional categories. Finally, another significant limitation is that the cross-sectional design of the study does not allow establishing cause-and-effect relationships between the variables. For this purpose, we suggest that longitudinal studies be conducted.

CONCLUSION

The results of our study indicate that the comparative analysis involving ergonomic and psychosocial risks and the occurrence of musculoskeletal problems among telework employees in relation to face-to-face work must take into account the conditions in which telework is being performed. In our study, the participants who voluntarily teleworked before the COVID-19 pandemic, and especially those who reported having a dedicated place to work at their homes, presented reduced ergonomic and psychosocial risks and lower occurrence of musculoskeletal problems. These results suggest that companies consider the conditions under which their employees are working from their homes to reduce the ergonomic and psychosocial risks and minimize the occurrence of musculoskeletal problems in telework.

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