

The home office and the ergonomic impacts resulting from the pandemic in an academic community of a Brazilian educational institution

O home office e os impactos ergonômicos decorrentes da pandemia em comunidade acadêmica de instituição de ensino brasileira

La oficina en casa y los impactos ergonómicos de la pandemia en la comunidad académica de una institución educativa brasileña

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Abstract

In the current scenario of public health crisis, the work environment has become the Home Office. The present article has the objective of performing a case study, in the form of an opinion survey, about the ergonomics of the academic community of a higher education institution that started to work in a home office regime, aiming to study the impacts related to the transition from work outside the home to the home office due to the COVID-19 pandemic. The present work consists of a descriptive research of the case study type using a form, whose data were treated quantitatively and qualitatively. The methodology of this study was divided into the following steps. The first stage consisted of the literature review, whose objective was to find documents and scientific productions relevant to the topic discussed in this article. Then, a Google Forms form was created, to be directed to the academic community (teachers and administrative technicians) of the Polytechnic School of Pernambuco - POLI/UPE. After completing the application of the form, the information collected was treated according to the Bardin Method. Among the employees of the analyzed EI, 88% reported complaining of pain in at least one part of the body while working in the home office model, even though 55% of them previously considered that the ergonomic conditions of their respective workstations were "good or excellent". Among the complaints, neck pain (64.4% of the cases), stand out.

Keywords: Ergonomics; Home office; Workplace; Teaching; Academic community.

Resumo

No atual cenário de crise de saúde pública, o ambiente de trabalho tornou-se o Home Office. O presente artigo tem como objetivo a realização de um estudo de caso, sob a forma de pesquisa de opinião, sobre a ergonomia da comunidade acadêmica de uma instituição de ensino superior que começou a trabalhar em regime de home office, visando estudar os impactos relacionados com a transição do trabalho fora de casa para o home office devido à pandemia da COVID-19. O presente trabalho consiste numa pesquisa descritiva do tipo de estudo de caso utilizando um formulário, cujos dados foram tratados quantitativa e qualitativamente. A metodologia deste estudo foi dividida nas seguintes etapas. A primeira etapa consistiu na revisão da literatura, cujo objetivo era encontrar documentos e produções científicas relevantes para o tema discutido neste artigo. Em seguida, foi criado um formulário Google Forms, a ser dirigido à comunidade acadêmica (professores e técnicos administrativos) da Escola Politécnica de Pernambuco - POLI/UPE. Após o preenchimento do formulário, a informação recolhida foi tratada de acordo com o Método Bardin. Entre os funcionários da IE analisada, 88% queixaram-se de dores em pelo menos uma parte do corpo enquanto trabalhavam no modelo de escritório em casa, apesar de 55% deles considerarem anteriormente que as condições ergonômicas dos seus respectivos postos de trabalho eram "boas ou excelentes". Entre as queixas, destacam-se as dores no pescoço (64,4% dos casos).

Palavras-chave: Ergonomia; Home office; Local de trabalho; Ensino; Comunidade acadêmica.

Resumen

En el actual escenario de crisis de la sanidad pública, el entorno laboral se ha convertido en el Ministerio del Interior. El presente trabajo tiene como objetivo realizar un estudio de caso, en forma de encuesta, sobre la ergonomía de la comunidad académica de una institución de enseñanza superior que comenzó a trabajar en régimen de home office, con el fin de estudiar los impactos relacionados con la transición del trabajo fuera de casa al home office debido a la pandemia del COVID-19. El presente trabajo consiste en una investigación descriptiva del tipo estudio de casos mediante un formulario, cuyos datos fueron tratados cuantitativa y cualitativamente. La metodología de este estudio se dividió en las siguientes etapas. La primera etapa consistió en una revisión bibliográfica, cuyo objetivo era encontrar documentos y producciones científicas relevantes para el tema tratado en este artículo. A continuación, se creó un formulario de Google Forms dirigido a la comunidad académica (profesores y técnicos administrativos) de la Escuela Politécnica de Pernambuco - POLI/UPE. Tras rellenar el formulario, la información recogida se trató según el método Bardin. Entre los empleados de la EI analizada, el 88% se quejaba de dolores en al menos una parte del cuerpo mientras trabajaba en el modelo de oficina en casa, aunque el 55% de ellos consideraba previamente que las condiciones ergonómicas de sus respectivos puestos de trabajo eran "buenas o excelentes". Entre las quejas, destaca el dolor de cuello (64,4% de los casos).

Palabras clave: Ergonomía; Home office; Lugar de trabajo; Enseñanza; Comunidad académica.

1. Introduction

According to Donthu and Gustafsson (2020), Covid-19 is "a sharp reminder that pandemics, like other rarely occurring catastrophes, have happened in the past and will continue to happen in the future." According to IBGE - PNADCOVID19, as of May 2020, there were 8.7 million Brazilian workers in remote activity. Therefore, millions of workers had their work activities impacted and needed to adjust to a new way of working, that of exercising their professional functions remotely, in home office (Bridi et al., 2020).

According to the International Labor Organization (ILO, 2020), telework is defined as any activity performed in a place where, away from central offices or workshops, the worker does not maintain personal contact with his colleagues, but can communicate with them through information technology. The Brazilian Law N. 13,467, of July 13, 2017, defines Home Office as "the provision of services mainly outside the employer's premises, with the use of information and communication technologies that, by their nature, do not constitute external work" (Brasil, 2017). Home office emerged more than 50 years ago, with changes in the way work is performed, and also in the way workers perform their activities in their own homes, while maintaining the employment relationship with the company. In Brazil, it started in private companies and has been practiced in the public sector for the last 10 years (Haubrich & Froehlich, 2020).

The COVID-19 and the resulting measures of social distancing caused the need for immediate adaptation of labor relations (Mesquita & Soares, 2020). Thus, in the context of the pandemic, remote jobs (home office) are jobs performed and made possible by information technologies (IT) such as computers, notebooks, tablets and smartphones with Internet connection (Bridi et al., 2020).

The Home Office was the solution adopted by part of the workforce and expressed significant challenges, especially for companies that relied on in-person attendance control as a pillar of labor relations (Losekann & Mourão, 2020). With the recommendation of isolation and social distancing, the modality has gained an even greater space in various segments and economic sectors in Brazil and worldwide (Bridi et al., 2020), besides offering the significant opportunity to maintain occupations for a portion of the world's population (Losekann & Mourão, 2020).

Thus, in the current scenario of public health crisis, the work environment has become the Home Office. However, most homes do not have adequate conditions to accommodate work environments, either due to lack of space, inappropriate furniture or even the multiplicity of functions in the same environment (Mesquita & Soares, 2020). The space and amount of equipment available for the range of activities are, in many households, less than ideal. The time for tasks and activities to ensure a consistent level of performance for each of these functions requires considerable coordination and effective teamwork both within the household, but also with virtual teams with the workplace and with educational institutions (Gulotta et al.,

2021).

The pandemic brought with it several impacts on the work of the population. The literature reveals several transformations in the way of teaching as a result of the pandemic scenario (Beech & Anseel, 2020; Brammer & Clark, 2020). Sigahi et al. (2021) conducted a systematic review that found that the education sector was second only to the health sector in the number of publications. Chart 1 exemplifies the consequences of changes at work.

Chart 1 - Changes in academic work as a result of COVID-19.

ASPECT	RESULTS FOUND IN THE LITERATURE
Psychological and emotional support	<ul style="list-style-type: none"> The quarantine has undermined students' performance and made them feel separated from family, peers, and friends (Meo et al., 2020). Moderate to extreme levels of anxiety, depression, and stress were reported by 50.43% of 2530 academic workers in Spain (Odriozola-González et al., 2020). The work of "someone whose job it is to think, reflect and criticize " can be seen as non-urgent and irrelevant in the midst of the Covid-19 outbreak (Hage, 2020, p. 1).
Workload	<ul style="list-style-type: none"> Educators and scholars need support to cope with the additional burden (Cleland et al., 2020). Educators performed extra work and tasks, such as providing emotional support and free extra help for students. They felt constrained to do so, sometimes to the detriment of family time (Fagell, 2020), a problem that particularly affects women (Boncori, 2020; Gao & Sai, 2020; Korbel & Stegle, 2020). Other important problems are the virtual invasion of home space (Boncori, 2020) and inaccurate expectations of productivity held by co-workers and supervisors (Ryvasy & Michalak, 2020).
Resources and infrastructure	Faculty members and students have experienced problems in this regard, which includes difficulties with wi-fi connection (Reyes-Chua et al., 2020), online teaching, software, and technical glitches (Pather et al., 2020).
Competencies	Educators lack training in technological tools for teaching and assessment (Reyes-Chua et al., 2020), new pedagogies, effective communication strategies (Pather et al., 2020), and skills to succeed as a distance worker (Ryvasy & Michalak, 2020).
Search	Editors and reviewers can discuss how to adapt peer review, given that publications on Covid-19related topics are strategic, but simultaneously, academics have faced work overload during the pandemic (Eisen et al., 2020).

Source: Adapted from Sigahi et al. (2021).

In relation to teachers, Pascoal and Silva (2019) state that they are not restricted only to the classroom, as they need extra-class hours for other work-related activities, such as planning their classes, correcting tests and activities, researching the content to be worked on, participating in pedagogical and administrative meetings. Bridi et al. (2020) carried out a research whose sample field was made up of 92.6% of PhDs and 28.04% of the professionals were of exclusive dedication in the area of education, with the purpose of observing the main changes resulting from working at home office. Table 2 indicates the main changes in the home office work of teachers.

Chart 2 - Main changes in the home office work routine.

ASPECT	RESULTS FOUND IN THE LITERATURE
Hours per day worked	An increase of 113.69% of workers who perform their work activities for more than 8 hours a day in remote work was identified.
Days worked weekly	<ul style="list-style-type: none"> Before the pandemic, 8.39% of workers performed their work activities on 6 days a week, increasing to 18.10% during the pandemic, representing an increase of 115.78%. Likewise, there was an increase in the range of 7 days a week, whose number varied from 2.32% to 17.77%, accounting for an increase of 666.66% of respondents who work every day of the week in remote work, i.e., without any rest days in the current scenario.
Rhythm and quality of work	48.45% considered that the pace of work became faster with remote work, and 87.2% answered that the quality of face-to-face work is better or equal to remote work.
Productivity	25.05% had a productivity goal increase in the pandemic period.

Source: Bridi et al. (2020).

Bentaib et al. (2019) argue that distance education systems are not satisfactory for all learners. The authors further cite ergonomic, aesthetic, practical, and time-based concerns as reasons for student dissatisfaction. In the distance learning process, students' performances are affected by psychosocial, anthropometric, and environmental factors (Barattucci, 2019; W. Liang et al., 2019; Pereira et al., 2021). Students cannot learn effectively using computers that they feel uncomfortable with (Oyadeyi, 2018). Students may experience discomforts such as eye diseases, hand and wrist pain, waist, back and neck injuries, and headaches while studying in front of a computer screen for a long time (Alaydrus & Nusraningrum, 2019; Portello et al., 2012; Talwar et al., 2009).

Home offices often include workstations that are poorly designed and can be improved by placing a pillow for lumbar support, raising the screen or monitor for better posture, and ensuring windows located behind the monitor to prevent glare (Davis et al., 2020). It is emphasized that the region most affected by work-related musculoskeletal pain is the lower back, due to the nature of workstations. However, it has been verified that complaints regarding pain in the shoulder and neck regions are becoming very frequent (Mesquita & Soares, 2020).

In this context, to continue to disregard the reality of this work modality can lead to irreversible damage to the workers' health, being necessary the development of research in the area, which proves that creativity and collaboration are the best tools at the moment, and can, potentially, be the new focus of action for several Occupational Safety professionals (Mesquita & Soares, 2020).

Ergonomics, considered an occupational risk, should ensure, through a systemic and interdisciplinary approach, the best conditions of productivity, quality, safety and preservation of health and well-being of the individual (Mesquita & Soares, 2020). For this, it is necessary to take into consideration not only the constant evolutions that occur in the world of work, but also the changes in the sociodemographic and epidemiological profile of workers and their consequences (Hyeda & Costa, 2017).

This paper aims to conduct a case study, in the form of an opinion poll, on the ergonomics of the academic community of a higher education institution that started working in a home office regime, in order to study the impacts related to the transition from working away from home to home office as a result of the COVID-19 pandemic.

2. Methodology

As well as in the works developed by Guimarães (2015) and Sampaio and Batista (2021), the present work consists of a descriptive research of the case study type using a form, whose data were treated quantitatively and qualitatively. The methodology of this study was divided into the following steps.

2.1 Literature review

The first stage consisted of the literature review, whose objective was to find documents and scientific productions relevant to the topic discussed in this article. A search was made regarding the theme in the SCOPUS database (Elsevier, 2019), the largest database of abstracts and citations of literature reviewed by: scientific journals, books and conference papers and also in GOOGLE SCHOLAR. For the sake of comprehensiveness, the English keywords "Ergonomics", "Telework", "Home office", "Pandemic", "Working conditions", "Covid-19" and "Workplace" were used.

2.2 Form

Then, a Google Forms form was created, based on the requirements of Regulatory Standard 17 - Ergonomics (NR-17), to be directed to the academic community (teachers and administrative technicians) of the Polytechnic School of Pernambuco - POLI/UPE, object of this study.

The form was sent by e-mail, through the institutional e-mail of the Human Resources sector of the institution and consisted of closed answers, with few fields to dissect, requiring little time to answer. The electronic form did not ask for the name or e-mail address of the person who was answering, reinforcing the fact that no one was identified.

2.3 Data analysis

After completing the application of the form, the information collected was treated according to the Bardin Method (1977), which consists of dividing the results into three phases. The first phase consists of a pre-analysis of the initial ideas, organizing the data obtained. Then, the material is explored, which consists in explaining all the data organized in the previous phase. And finally, the treatment of results, inference, and interpretation, which are the raw results organized according to the researchers' best understanding.

Given that the data are objective and behavioral in nature, descriptive statistics were used in the data treatment phase. This method helps both to explain the main objective of studies and to indicate the behavioral tendency of the sample field, illustrating how the participants sought to adapt to the changes in the work regime.

After the data treatment, graphs were prepared, aiming at a better visualization of the results obtained to be analyzed and discussed properly.

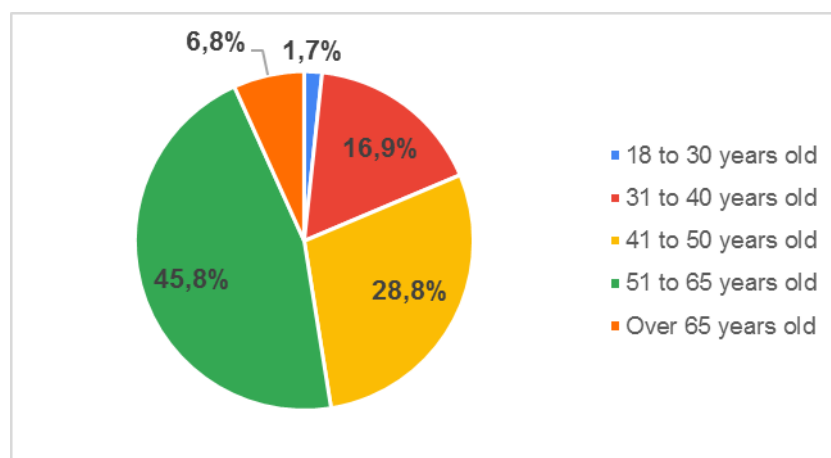
3. Results and Discussion

Data collection took place over 15 days, with only one electronic questionnaire application cycle. Based on the methodology of Statistical Process Control (Deming, 1967) and using the *snow ball* technique (Biernacki & Waldorf, 1981), it was found that the survey exceeded the minimum number of responses to obtain the necessary statistical validity and the results were divided into the two categories presented below.

3.1 Sample field characteristics

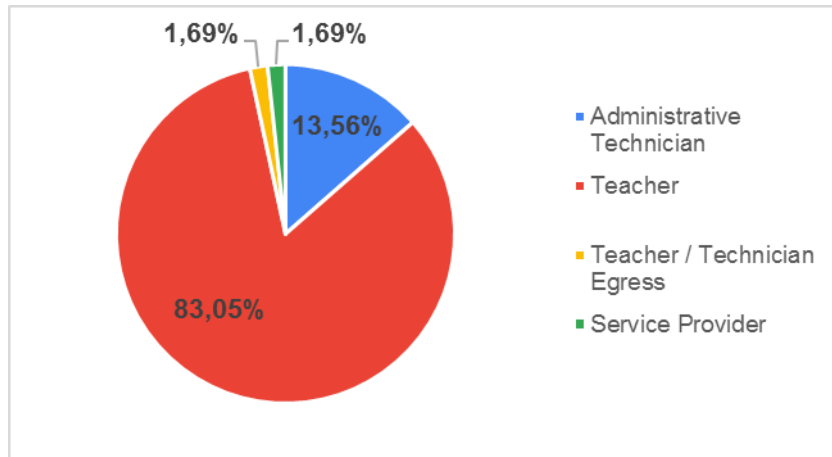
First, as shown in Figure 1, the participants were asked what age group they were and what position they held in the educational institution (EI) (Figure 2).

Figure 1 - Age group of the research participants.



Source: Authors (2021).

Figure 2 - Employment relationship of the research participants.

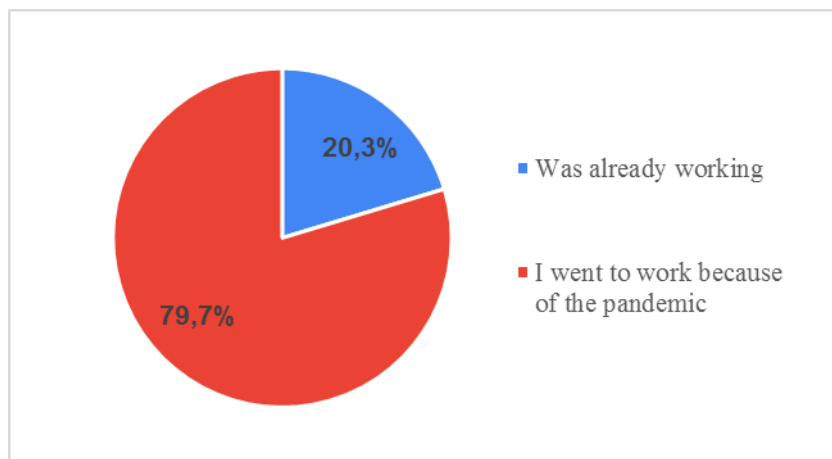


Source: Authors (2021).

Analyzing Figure 1, it is evident that a large part of the employees of the university studied has a high age. It can be seen that more than half are over 50 years old, and more than 80% are over 40. As expected, according to Figure 2, it is noted that the majority of employees are professors, with 85% of the data. Relating the information in Figures 1 and 2, one can conclude that EI has a teaching staff that is mostly older.

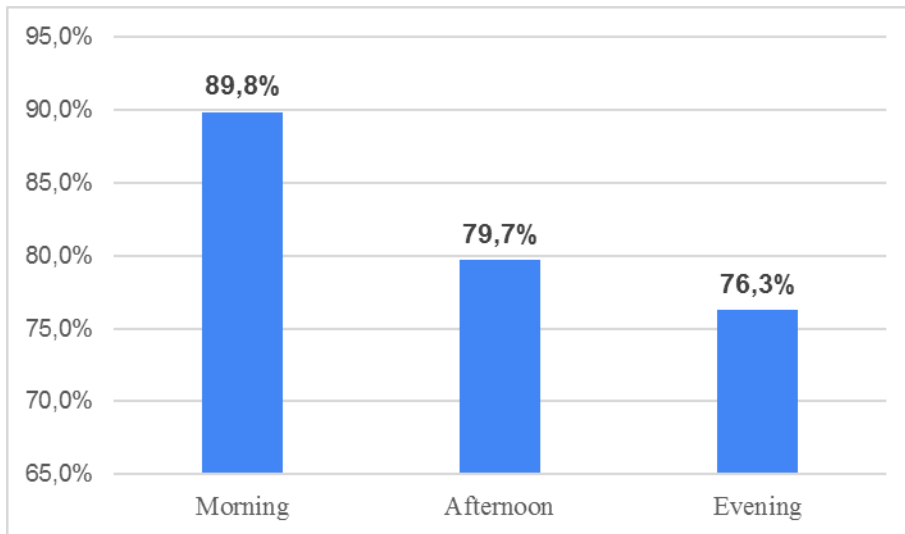
Next, as shown in Figures 3 and 4, information was gathered regarding the working conditions in the home office model of the research participants.

Figure 3 - Beginning of implementation of the home office of the research participants.



Source: Authors (2021).

Figure 4 - Home office work shifts of the research participants.

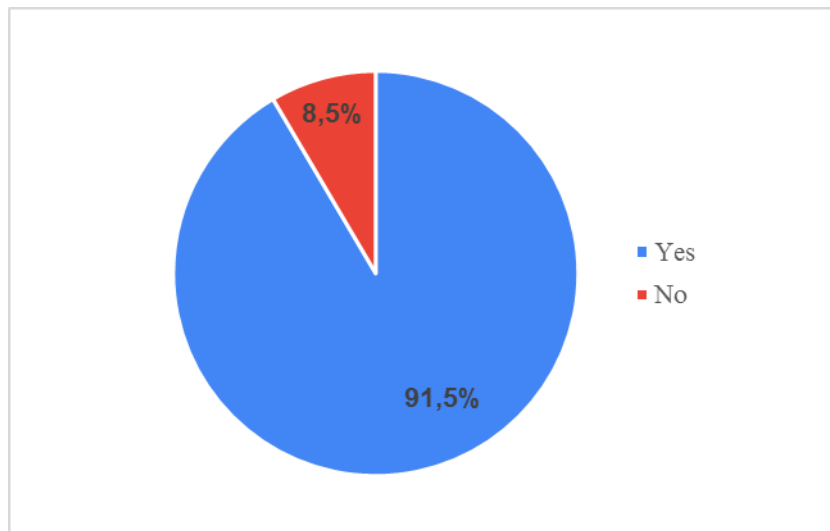


Source: Authors (2021).

In the graph in Figure 3, almost 80% of the EI employees started working in the home office model due to the COVID-19 pandemic scenario, while just over 20% already used this modality to work. Among the shifts, all the participants pointed out that they work more than one shift in home office. In Figure 4, the morning shift stands out (almost 90%), while the afternoon and evening shifts are statistically similar and not so far from the percentage of the morning shift.

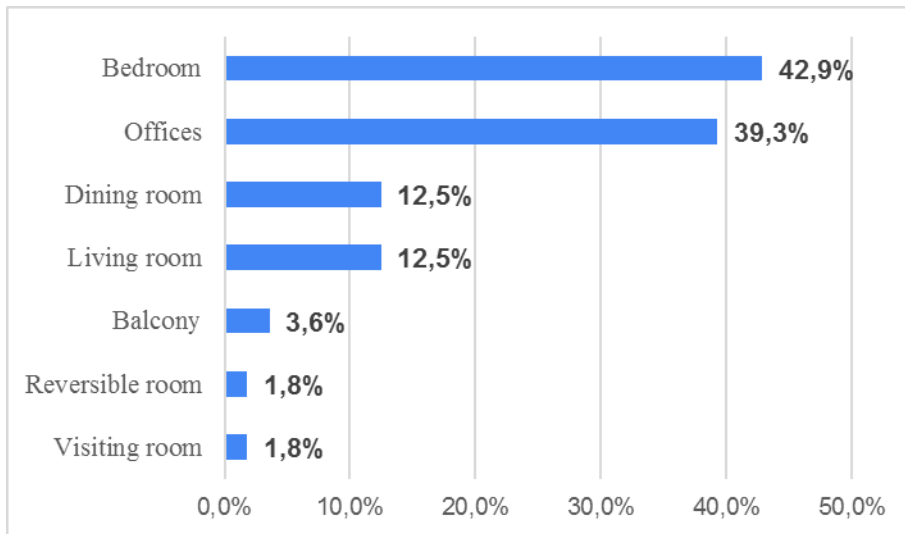
Regarding the location of the home environment used for work, the answers are presented in Figures 5 and 6.

Figure 5 - Research participants' availability of a fixed workplace.



Source: Authors (2021).

Figure 6 - Work environment location of the research participants.

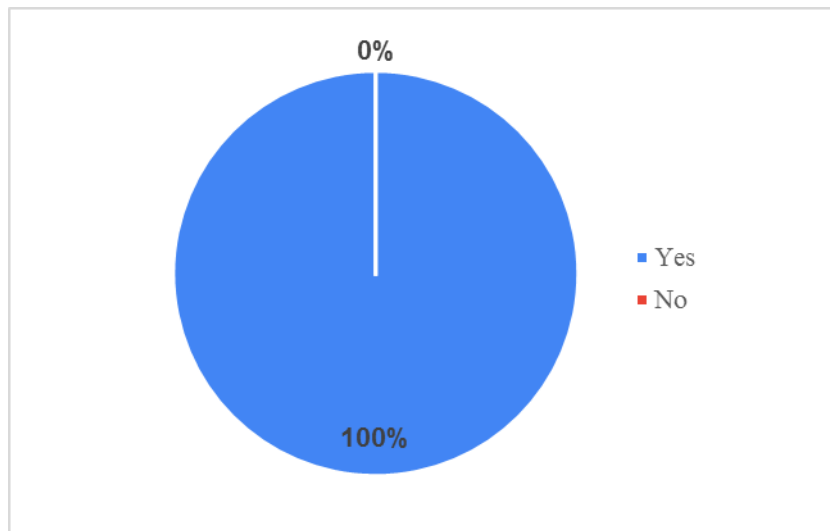


Source: Authors (2021).

The graphs in Figures 5 and 6 show that most of the interviewees (91.5%) have a fixed place to work. Among those who work at a fixed location, we observe a predominance for the use of bedrooms and offices as the points of residence most chosen for the performance of home office activities, presenting more than 80% of the cases.

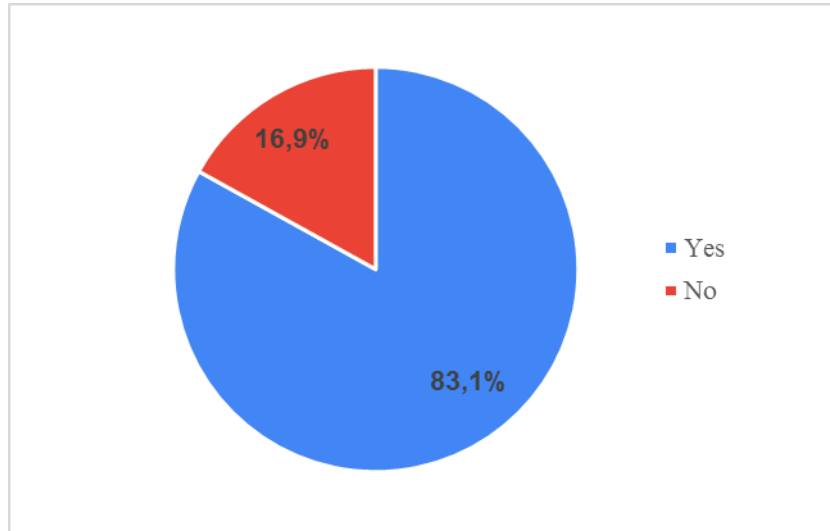
Finally, the participants were asked about the role of electronic devices in their work (Figure 7) and whether they had vision problems of any kind (Figure 8).

Figure 7 - Research participants' use of electronic equipment at work.



Source: Authors (2021).

Figure 8 - Vision problems of the research participants.



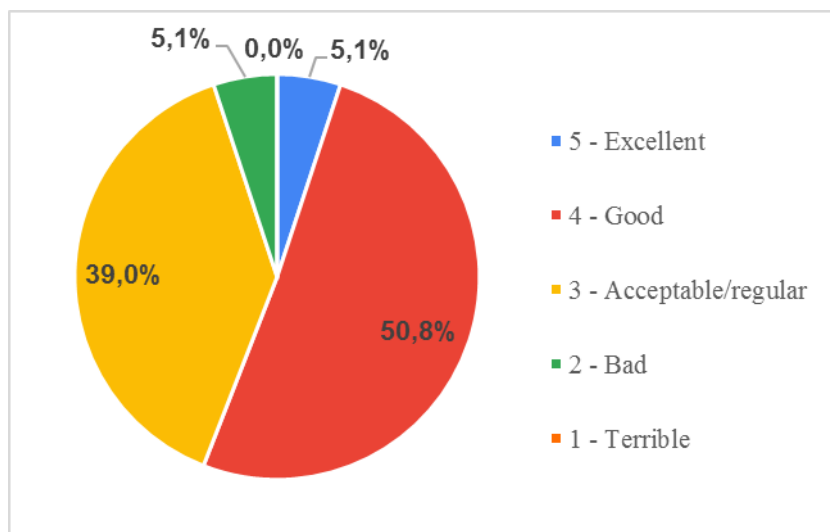
Source: Authors (2021).

As expected, Figure 7 confirmed that all respondents use electronic equipment in order to perform their work at home office. We know that the use of equipment such as computers and cell phones can wear out vision, and Figure 8 shows that a good number of the EI employees already have some problem of this specific nature.

3.2 Ergonomic conditions of the sample field

According to a study by Ayyildiz and TaskinGumus (2021), "Psychosocial Health and Satisfaction" are the main factors in distance learning. Also according to the authors, "Computer/Workstation", "General Room/Office Condition", "Seating" and "Equipment" appear as the second, third, fourth and fifth main factors in terms of distance learning ergonomics. Then, after collecting more personal information from the participants, the actual survey regarding ergonomic working conditions was carried out. Previously, the interviewees were asked how they evaluated the comfort conditions of their respective workplaces (Figure 9).

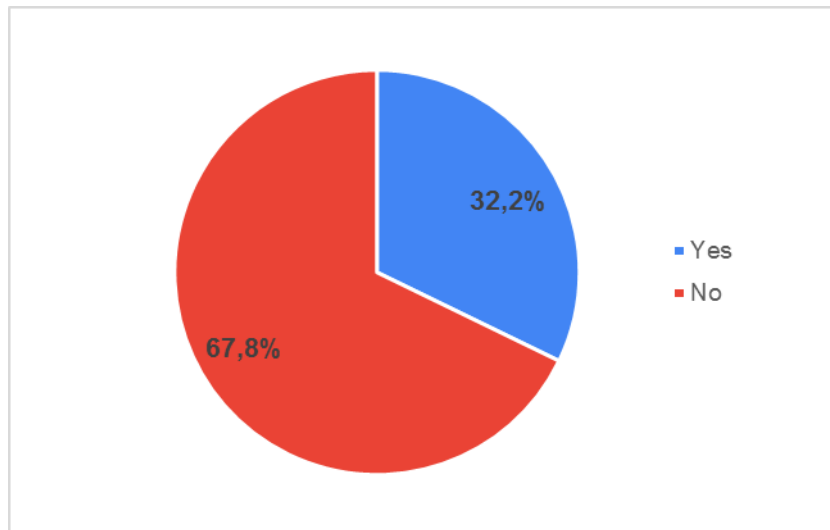
Figure 9 - Classification of comfort in the work environment.



Source: Authors (2021).

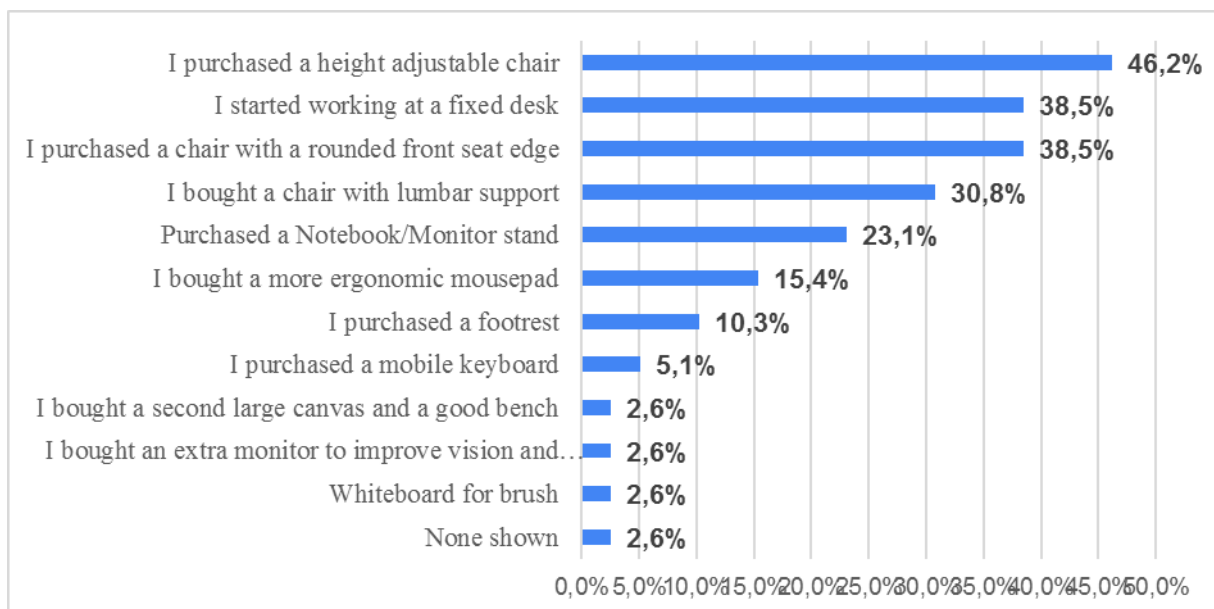
It was difficult to find anyone who did not rate their work environment with ergonomic conditions at least at an acceptable/regular level (Figure 9). Only 5% of the respondents rated the comfort of their work environment as bad and none as poor. Therefore, as shown in Figures 10 and 11, EI employees were asked whether they had implemented ergonomic improvement measures at their workstations in the home environment and, if so, what these measures were.

Figure 10 - Measures of adequacy aiming at ergonomic comfort.



Source: Authors (2021).

Figure 11 - Implemented suitability measures.



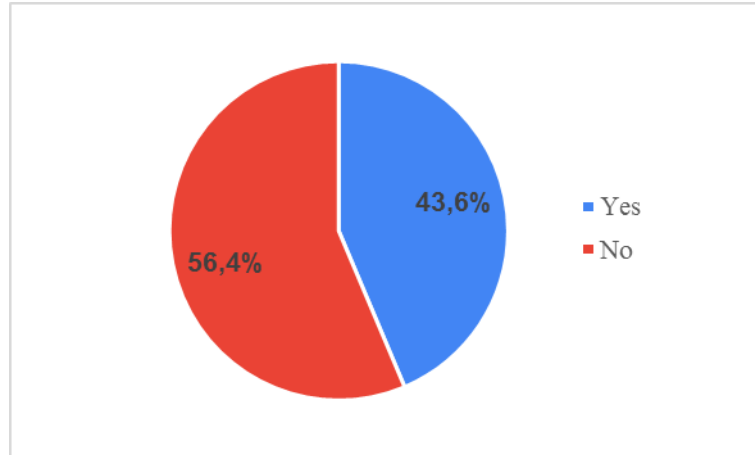
Source: Authors (2021).

More than 32% of the employees carried out measures to improve the ergonomic conditions of their workstations (Figure 10). Among such measures, Figure 11 highlights the acquisition of seats with adjustable height and rounded front edge (46.2% and 38.5% of the cases respectively), which contribute to a better circulation of blood in the lower limbs, and those who started to work on fixed benches intended exclusively for home office. Generally, it is not considered worthwhile to invest money in chairs. But according to data from Fundacentro (2001), it must be taken into consideration that a chair lasts for years,

and that its cost per day is only a small fraction of the cost per hour of labor (an estimate is 0.1%, even reaching 0.01%). A good chair, which improves productivity and job satisfaction, offsets this minimal cost.

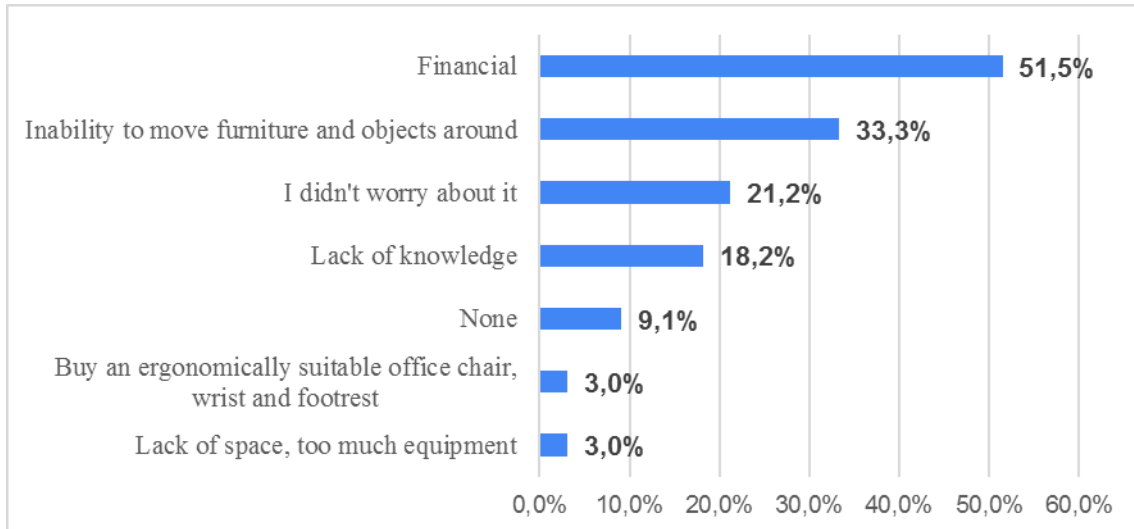
It was also asked if there were any difficulties in implementing the suitability measures (Figure 12), and if so, what were the difficulties (Figure13).

Figure 12 - Difficulties for the implementation of the adequacy measures.



Source: Authors (2021).

Figure 13 - Difficulties for the implementation of the adequacy measures.

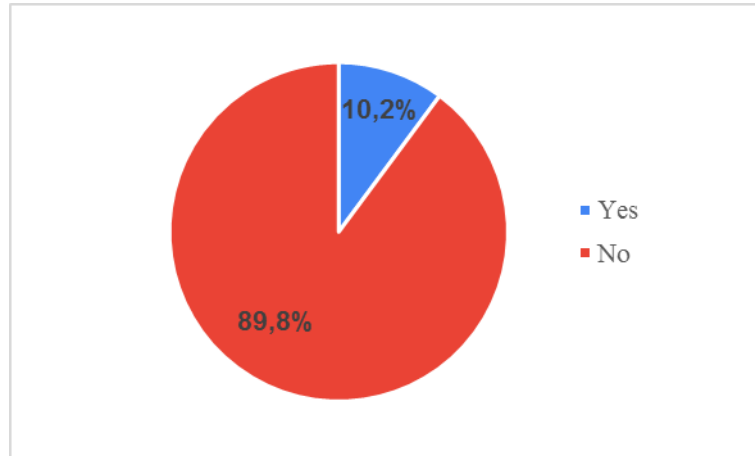


Source: Authors (2021).

Less than half (43,6%) of the employees of EI found difficulties to implement the improvement measures (Figure 12). Among such difficulties, the Figure 13 indicates that more than 50% of the cases were due to financial issues and also the impossibility to move furniture from place to place, with 33.3% of the cases.

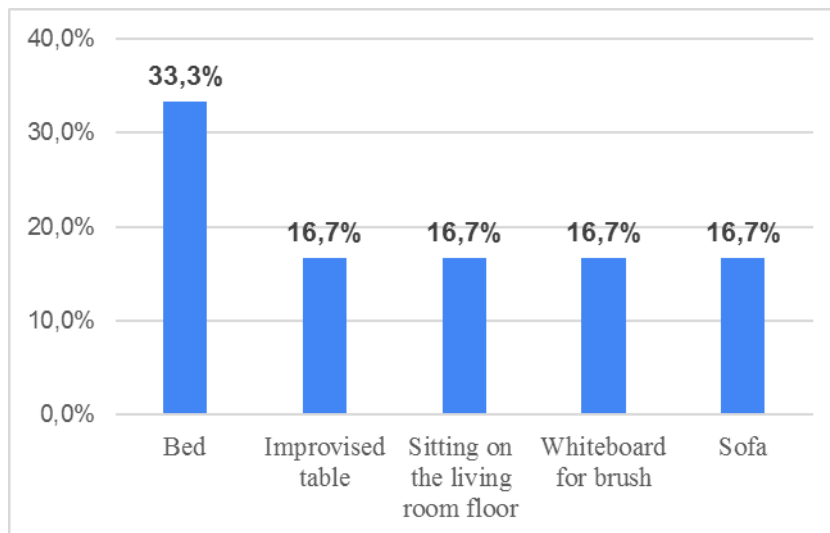
Next, the issue of the benches and seats used by EI employees at their workstations was investigated (Figures 14 to 16).

Figure 14 - Use of tables or benches in the execution of the work.



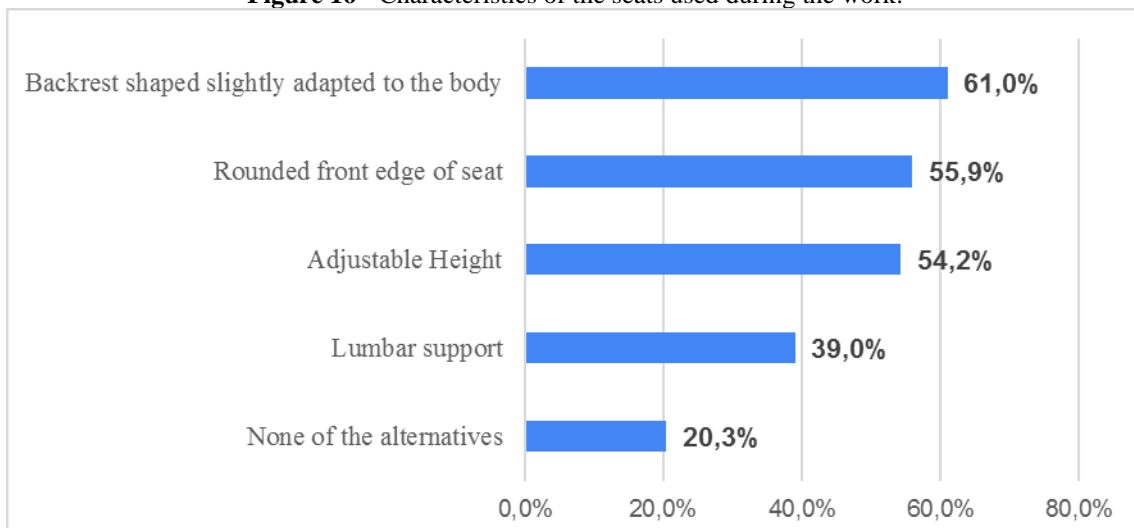
Source: Authors (2021).

Figure 15 - Where those who do not use a fixed desk work.



Source: Authors (2021).

Figure 16 - Characteristics of the seats used during the work.



Source: Authors (2021).

The concern with the characteristics of the seat is justified because a seat that does not allow a proper working posture causes risk of pain and discomfort in those who use them. Guimarães (2015) conducted a survey of information regarding the risks of pain that workers are subjected to due to seats without ideal ergonomic conditions used at work, and reached the results shown in Table 1.

Table 1 - Risk of pain due to posture conditions generated by workstation seating.

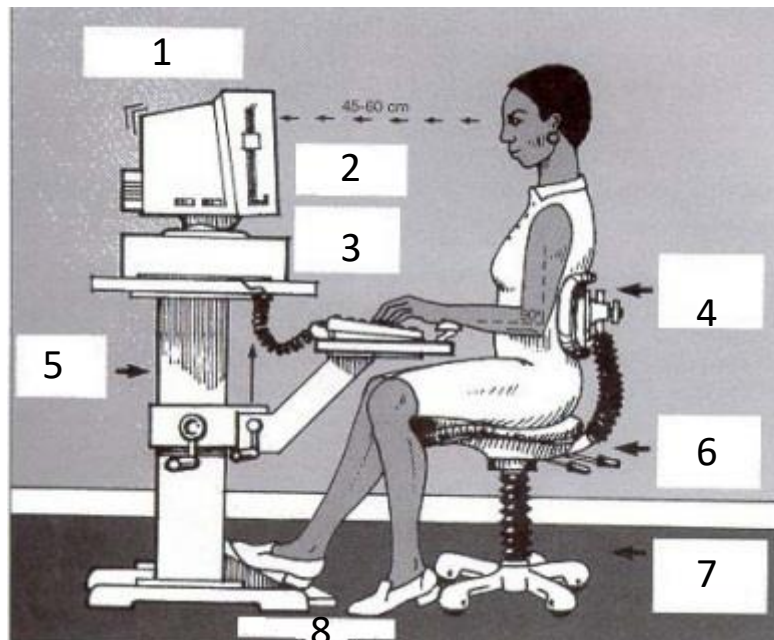
Posture/posture	Risk of pain
Sitting without backrest	extensor muscles of the dorsum
Seat too high	lower back, legs, knees and feet
Seat too low	back and neck

Source: Guimarães (2015).

As shown by Guimarães (2015), a seat without conditions to contribute to an ergonomically suitable posture for users becomes a risk to their health and comfort. Studies by Edwar et al. (2020), indicate that several factors of distance education contribute to musculoskeletal disorders of both students and teachers. Therefore, ergonomic factors should be considered when choosing a chair.

In addition to a proper seat, a workstation that meets the ergonomic requirements for proper working conditions is composed of several factors. Figure 17 illustrates an example of a workstation that complies with ergonomic guidelines.

Figure 17 - Example of a workstation suitable for the home office.

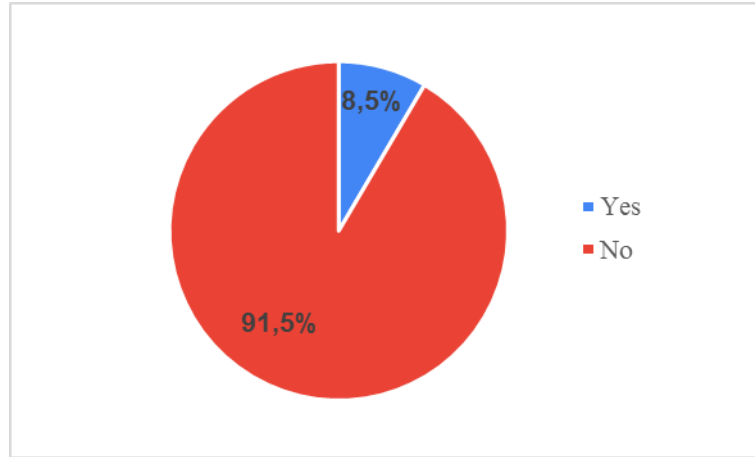


1 - monitor with adjustable position and angle; 2 - adjustable text support; 3 - mobile and adjustable keyboard; 4 - adjustable backrest; 5 - table with adjustable height; 6 - adjustable seat height; 7 - chair with stable base and wheels; 8 - footrest. Source: Fundacentro (2001).

In an ergonomic study conducted by Sampaio and Batista (2021), in a law office, it was found that the main ergonomic irregularities referred mainly to the lack of equipment that assists ergonomics, then seats that contribute to a better sitting and finally the layout conditions of the work environment. In view of the important role that equipment can play in

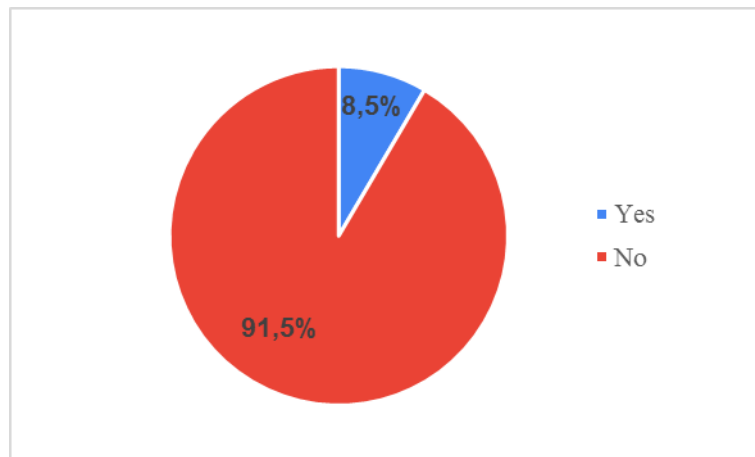
ergonomic health, Figure 18 to 22 indicates the questions that were asked precisely to investigate many of the factors indicated in Figure 17.

Figure 18 - Use of footrest.



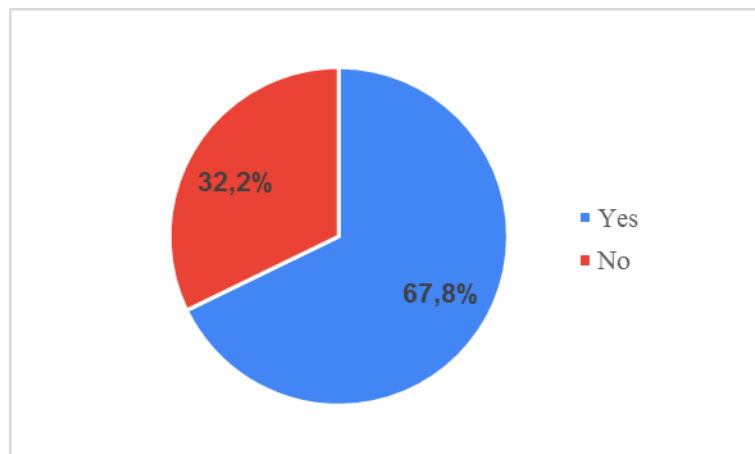
Source: Authors (2021).

Figure 19 - Use of adjustable media for dynamic document reading.



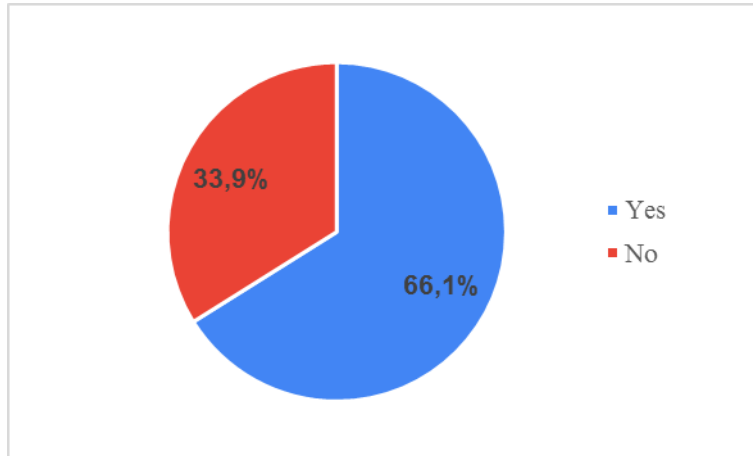
Source: Authors (2021).

Figure 20 - Mobility of electronic equipment screen settings.



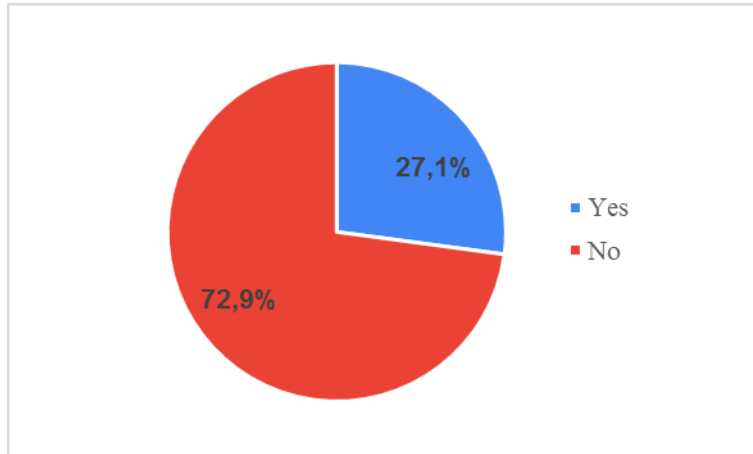
Source: Authors (2021).

Figure 21 - Height of mouse and keyboards allow for a straight fist.



Source: Authors (2021).

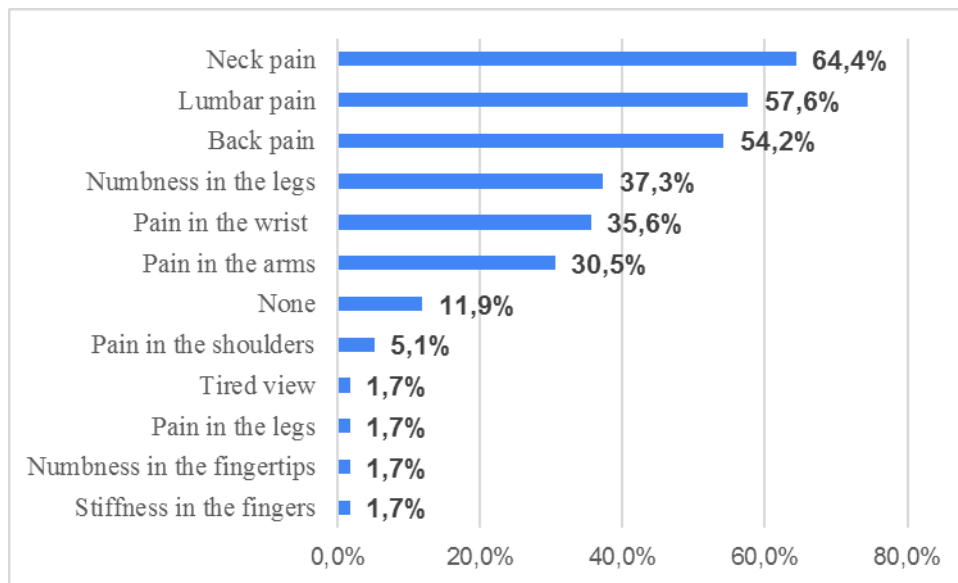
Figure 22 - Availability of electronic equipment height adjustment.



Source: Authors (2021).

According to the data in the previous charts, only the issue of screen angulation (Figure 20) and the height of the mouse and keyboard (Figure 21) were higher than 50% of the cases. Next, the research participants reported the parts of the body where there were more complaints of pain and discomfort while working (Figure 23).

Figure 23 - Main complaints related to home office.



Source: Authors (2021).

Almost 12% of the interviewees have no complaints about the execution of the work (Figure 23). This is in line with what was seen in the graph in Figure 9, because more than 55% considered the ergonomic conditions as good or excellent.

The graph in the Figure 23 indicates that the main complaint is about neck pain. According to information from Fundacentro (2001), absenteeism and burden (particularly neck, shoulder, and back pain) can be reduced by adapting the workstation to the correct placement of screens and controls in relation to the height of the worker's eyes and hands. Thus, the high complaint of neck pain can be justified by the fact that most of them (91.5%) do not have adjustable stands to facilitate simultaneous reading and typing (Figure 19) and the electronic equipment used during work is not supported on height-adjustable stands (72.9%), as indicated in Figure 22.

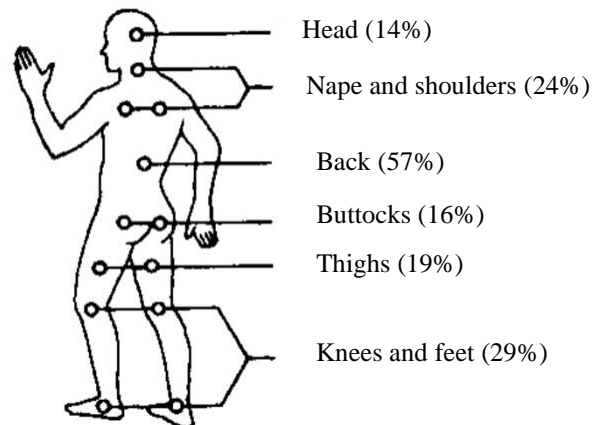
Right after neck pain, we have low back pain and back pain, with practically the same statistical values. Taking the statistical value of who has a chair with lumbar support in Figure 16 (39%) and comparing it with the lumbar region complaints in Figure 23 (57.6%), we see that they complement each other. Therefore, it is possible to conclude that most of the interviewees whose seats did not have lumbar support were the ones who complained of pain in the region.

Now, observing the data referring to pain in the arms and wrists, 30.5% and 35.6%, respectively (Figure 23), and comparing it with the graph in Figure 21, where 33.9% of the interviewees did not have the computer mouse and keyboard aligned at an adequate height, we can conclude that the values are statistically similar. Thus, it is implied that those whose mouse and keyboard were not at an ergonomically adequate height were the same ones who complained of pain in their arms and wrists.

Only 8.5% of the respondents had a footrest (Figure 18). Compared to the 39% who complained of numbness and pain in the legs (Figure 23), we observe that footrests did not play such a significant role in the statistics of complaints. In contrast, the fact that more than half of the respondents have height-adjustable seats and rounded front edges, contributing to better blood circulation in the legs, may be more related to EI employees who do not complain of leg problems.

In a research conducted by Grandjean (1978), he followed 246 different people who worked sitting in their homes and found the parts of the human body that presented the most problems in this way of working. The results are presented in Figure 24.

Figure 24 - Main complaints related to sitting work.



Source: Adapted from Grandjean (1978).

Analyzing the information in the Figure 24 and comparing it with the data collected in this research, we notice that the complaints about working in the home office model have not changed much over the last 43 years. The parts of the body most affected are the back, the lower limbs, and the neck/neck. Thus, the existence of physical stress and diseases such as low back pain, exhaustion, and muscle strains, among others, have been common for quite some time in this work model (Gomes et al., 2017).

In this context, ergonomics is one of the factors of great importance and influence on productivity and comfort of employees (Menezes, 2017). According to INBEP (2016), when investing in ergonomics, among several benefits, one can highlight:

- Reduction in the number of absences and leaves of absence;
- Reduction of waste;
- Improved quality of life;
- Professional valorization;
- Productivity.

Therefore, when a work system receives an intervention-for example, a physical workplace redesign, a work process change, or updated equipment-being carried out from a participatory ergonomic perspective, it is often emphasized how important it is to involve stakeholders in the analysis and design process so that their perspectives contribute to the development, and ensure acceptance of the solution (Berlin et al., 2021).

4. Final Considerations

With the pandemic scenario of COVID-19, education systems had to undergo considerable changes to adapt to the new reality. It was not only the students who had to migrate to the home environment to perform their academic activities, the EI faculty and administrative staff also had to adjust to the new reality and start implementing the home office as a work model. Thus, ergonomics gained strength and a prominent role in the new global scenario.

In the present research, among the employees of the analyzed EI, 88% reported complaining of pain in at least one part of the body while working in the home office model, even though 55% of them previously considered that the ergonomic conditions of their respective workstations were "good or excellent". Among the complaints, neck pain (64.4% of the cases), back pain (57.6% in the lumbar region and 54.2% in the upper part of the spine), numbness in the legs (37.3%), and pain in the wrists and arms, with 35.6% and 30.5%, respectively, stand out.

It was found that the lack of improvements in equipment and furniture and interventions in the comfort conditions of the workstations directly influenced the complaints of the research participants. Thus, analyzing the previous information, we conclude that the adoption of measures aimed at ergonomic comfort in the home office is directly related to better physical working conditions. Thus, the adoption of an adequacy measure brings improvement in the performance and health of the worker who is in home office model.

Finally, it is important to continue investigations regarding the ergonomic conditions of more economic classes directly affected by the COVID-19 pandemic. Thus, it is recommended that future work continue to show the importance of proper working conditions for those working in the home office format.

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