

Influence of telework during the COVID-19 pandemic on cervical pain



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ABSTRACT

Objective. This is an integrative review to analyze the factors that influenced the prevalence of neck pain in the period before the COVID-19 pandemic and compare it with the factors that caused neck pain during the pandemic. **Methods.** The bibliographic survey was divided into two different

steps: the first was to include articles published between 2015 and 2019 with the selection of 18 articles and used the following keywords: neck pain, work, and prevalence; the databases were PubMed and Google Academic. The second step was to analyze articles published between 2020 and 2021 in the context of the pandemic and the keywords were: cervical pain, telework, quarantine, and covid-19. The searches were conducted using the Scielo, PubMed, and Google Scholar databases. **Results.** With the analysis of the results found, it became evident that mental health and incorrect ergonomics differentiated the occurrence of neck pain in the pandemic compared to the period before the pandemic. **Conclusion.** Furthermore, teleworking has a great tendency to be a working model in force even after the release of the pandemic. It is noticed that it will be necessary for companies to provide adequate means for employees to work remotely to decrease damage to physical health.

Keywords: Neck pain, Work, Prevalence, Telework, Quarantine, Covid-19.

1 INTRODUCTION

Neck pain is the fourth leading cause of disability, second only to back pain, depression, and arthralgia, in addition, it has an annual prevalence rate greater than 30% and approximately half of individuals will experience an episode of neck pain throughout life (COHEN, 2015). Neck pain is a multifactorial disease and identifying the risks can enable the prevention, diagnosis, treatment, and management of pain (SULLMAN et al., 2022). In addition, neck pain is a condition that directly affects the individual's physical, social and psychological aspects, which contributes to the increase in public health expenditures in a country and negatively affects the labor sector (VITTA et al., 2017).

With the recognition of the disease COVID-19 as a pandemic on March 11, 2020 (WORLD HEALTH ORGANIZATION 2020), most countries began to outline different isolation and quarantine strategies to try to contain the advance and exposure to the Sars-Cov-Virus. 2 (WILEY et al., 2020). Staying at home has become one of the combat strategies to reduce the transmission of Covid-19, thus



reducing mortality and preventing the increase of infected people (LEVIN et al., 2020). In addition, they addressed that the change in the work scenario resulting from the COVID-19 pandemic was carried out by many employees who changed their everyday work environments to work at home and in different occupations (KRAMER, 2021).

In May 2020, there were 8.7 million remote workers (PNAD, IBGE, 2020). A technical note from the Institute of Applied Economic Research (IPEA) showed that, in Brazil, only 22.7% of workers are capable of teleworking (MARTINS et al., 2020). It was allied with an urgent adherence to remote teaching that caused challenges for teachers and students, forcing them to adapt to new teaching strategies (BELMONTE et al., 2021).

2 METHODOLOGY

The present study is a literature review, classified as bibliographic research. This review was carried out in two distinct phases. The first phase was carried out from December 2021 to March 2022 and followed the following criteria: works published between 2015 and 2019. The keywords used were neck pain, work, and prevalence; the databases were PubMed and Google Scholar.

Nine thousand six hundred works were found, of which 48 were selected by reading the title and abstract; the exclusion criterion was neck pain not associated with work. These 48 works underwent an integral reading, allowing the selection of 18 studies. Then, the main information of each of the 18 selected articles was summarized, with the main information and conclusions of each work. The information was analyzed to identify the causes of neck pain in the pre-pandemic context of COVID-19 in work carried out in offices.

The second phase was carried out from August 2021 to November 2021 and was limited by year of publication considering research in the context of the COVID-19 pandemic from 2020 to 2021. For the first stage, the research topic was neck pain during the COVID-19 pandemic, and the research question was whether telecommuting influenced the occurrence of neck pain during the pandemic.

For the bibliographic survey, the keywords were used: cervical pain, telework, quarantine, and covid-19 used single and in pairs. The databases were: Scielo, PubMed, and Google Scholar and the inclusion criteria used for the selection were to relate cervical pain to remote work during the Covid-19 pandemic.

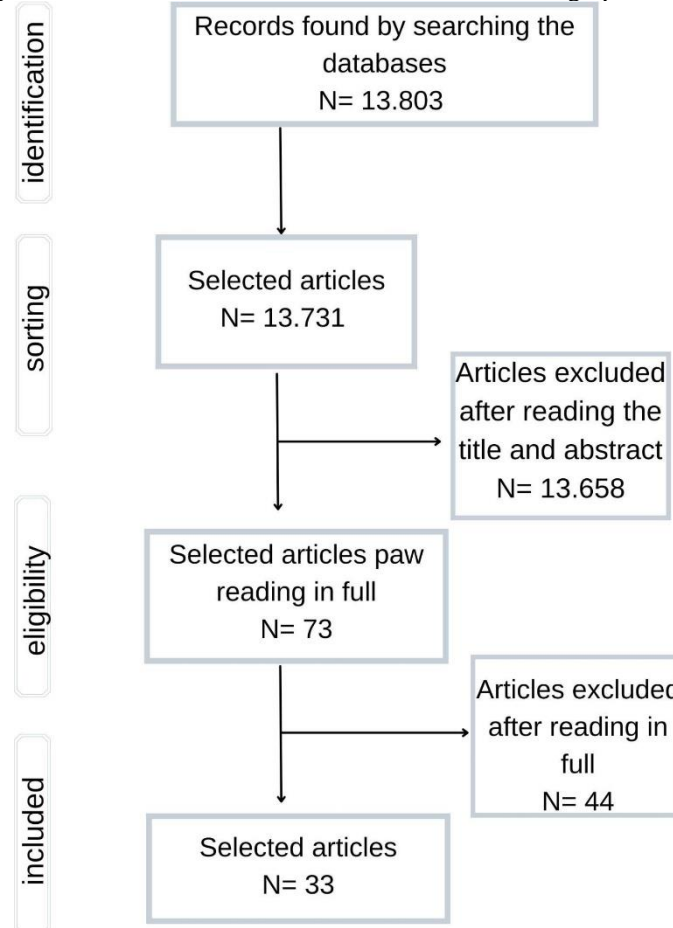
Four thousand two hundred three studies were found. Of these, 24 were selected by reading the title and abstract. These underwent an integral reading, allowing the selection of 15 studies, and the 9 studies were disregarded because they did not correlate neck pain with teleworking. Then the main information of each selected article was summarized, with each work's primary information and conclusions. The information was analyzed in order to identify evidence of whether teleworking



influences the occurrence of cervical pain during the pandemic and what the causes were that caused this possible increase.

The articles selected in the first and second phases were evaluated regarding methodological execution and the use of quality-of-life indicators in the questionnaires applied. The steps for elaborating the bibliographic research are shown in figure 1 based on the PRISMA methods. (ITENS P. 2015)

Fig 1 Flowchart of the selection of articles for the bibliographic review



3 RESULTS

With the analysis of the works obtained by the two phases of the research, 33 articles were obtained, of which 22 are cross-sectional studies, 5 are systematic reviews, 5 are prospective studies, and 1 is a meta-analysis. The complete list of selected articles and the most relevant results are presented in table 1.



Table 1: List of selected studies in the literature review

Authors and year	incorrect ergonomics	laptop use	Use of inappropriate properties	Stress and emotional exhaustion	Excessive working hours	Sedentary lifestyle	Most affected female	inappropriate posture
Eerd et al. (2015)	X							
Lai W. K. et al (2015)	X							
Graves L.E.F. et al (2015)	X							
Collins D.J. et al (2015)							X	
Memari et al. (2015)	X							
Louw Q. et al (2015)								X
Mohammadi H et al. (2016)				X	X			
Vasilavicius P. et al (2016)	X				X			X
Ward J. et al (2016)					X		X	X
Chaves T.C. et al (2017)	X							X
Yu Z. et al (2017)	X	X						
Louw S. et al (2017)						X		
Vitta A. et al (2017)	X			X				X
Kim R. et al (2018)						X		X
Baker R. et al (2018)				X				X
Fouda K.Z. et al (2018)		X						
Holzgrev F. et al (2018)	X							



Stanam A. et al (2019)	X				X			
Antimo M. et al. (2020)	X			X				
Sahu S. et al (2020)				X		X		
Davis K.G. et al (2020)	X	X						X
Khatri A.S. et al (2021)	X					X		X
Patil A. et al (2021)					X	X		
Oliveira A.S. et al (2021)	X			X	X	X		X
Gerding T. et al. (2021)	X	X	X	X				X
Garcia M.G et al (2021)	X			X				
Aegerter M.A. et al (2021)					X			
Bozic T. et al (2021)	X				X	X	X	
Bortolan G.M.Z et (2021)				X				
Xiao Y. et al (2021)	X		X	X		X	X	
Rubio C.C. et al (2021)						X	X	
Martin A. et al (2021)	X	X						X
Suman K. et al (2021)								X

Source: the authors



4 DISCUSSION

Neck pain is among the five causes of disability, with an annual prevalence rate of over 30% (COHEN, 2015). It is estimated that half of all individuals will experience an episode of clinically significant neck pain throughout their lives, this pain classified as acute or chronic, affects different age groups (HARTVIGSEN et al., 2006).

Whether attributed to work, injury or other activities, pain in the cervical region generates immeasurable damage to the quality of life of individuals. Some factors are related to the worsening or persistence of the clinical picture; they are: psychopathology, low job satisfaction, occupation/work environment, female gender, genetics, concomitant back pain / other rheumatological conditions, catastrophizing, trauma / previous neck injury, sedentary lifestyle, smoking and headache (LEIVSETH et al., 2013; KOES et al., 2008; VINGARD et al., 2005; KNARDAHL et al., 2014; CARSTENSEN et al., 2012). These factors cause drastic changes in the lifestyle of patients and are often associated with significant psychiatric comorbidities (HART et al., 1990).

The literature review in the two researched periods demonstrated the factors that influence the occurrence of neck pain in people who work in offices and in the telework environment in the pre-pandemic and COVID-19 pandemic contexts, respectively. Neck pain is a recurrent complaint among workers who carry out their activities sitting and using a computer. Moreover, cross-sectional studies have shown the prevalence of neck pain among sedentary activities; more than 70% of people who perform sedentary activities complain of musculoskeletal pain (SOLTANZADEH et al., 2016). When analyzing the context that precedes the COVID-19 pandemic, it was possible to verify that about 55% of the analyzed works correlate neck pain with incorrect ergonomics, and 38% addressed incorrect posture. The study showed that the workers' lack of knowledge about the importance of proper posture and the factors that affect ergonomics contribute to neck pain (BATISTA et al., 2021).

On the other hand, the analysis of studies in the context of the pandemic showed that 60% of the studies correlated neck pain with incorrect ergonomics, and 40% addressed inadequate posture (GERDING et al., 2021; OLIVEIRA et al., 2021; XIAO et al., 2021; BOZIC et al., 2021; ANTIMO et al., 2020; DAVIS et al., 2020; KHATRI et al., 2021; GARCIA et al., 2021; SUMAN et al., 2021). The explanation for this fact differs from the pre-pandemic context, in which there was a loss of adequate structure for carrying out work when migrating from the work environment to the home. The appropriate furniture for a workplace allows the worker to adapt it to their anthropometric characteristics and adapt to the demands of the work activity (SULLIVAN et al., 2015). However, many workers had to improvise by using inadequate tables and chairs and poorly positioned electronic equipment (LOUW et al., 2015).

Poor posture due to the use of non-ergonomic equipment in our population promotes the appearance of musculoskeletal disorders, especially lumbar and cervical pain. This finding is not



surprising, according to the cross-sectional study, most participants had irregularities in the postural domain in addition to inadequacies related to the position of the arms, forearms, lumbar, knees, feet, and head (HOPKINS et al., 2015). In addition, an inadequate posture affects the state of musculoskeletal balance, generating a high effort and overload, unprotecting body structures against injuries or deformities (LOUW et al., 2015)

Regarding the most used electronic devices, excessive use of computers, cell phones, and tablets had a strong relationship with the development of neck pain. This is verified because maintaining the forward posture of the head intensifies the compressive loads on the cervical spine, which generates painful conditions (VASILAVICIUS et al., 2016). In the context of the pandemic, many people had to adapt technological tools to perform the work. In addition, stress and emotional exhaustion were the most expressive factors in the scenario of the Sars-Cov 2 pandemic for the development of neck pain (GERDING et al., 2021; ROSSI et al., 2021; XIAO et al., 2021; FERREIRA et al., 2021; JUNIOR et al., 2020).

Pain perception is multifactorial, with physical and emotional factors directly affecting the degree of intensity (COATS et al., 2017). In this context, the substantial subjective influence of pain was observed during the pandemic, in which it was necessary to have social isolation of individuals to contain the spread of the virus, with this the lack of interpersonal relationships can negatively affect people's mental health in addition to the uncertainty and fear (CHAVES et al., 2017).

Excessive working hours contribute to developing neck pain, while in pre-pandemic work, the working hours are well regulated by companies. In the home office, workers do not have a regular workload and no rest space is dissociated from the work environment, which means that the individual has several hours of the day dedicated to working activities (ZHANG et al., 2021). In addition, the worker can be called several times by the employer, thus affecting the rest breaks and the end of work hours, causing an overload of work (LOUW et al., 2017).

The work's evaluation found that a sedentary lifestyle was a more significant factor in triggering cervicalgia during the pandemic compared to the pre-pandemic period. Social restriction caused a significant reduction in moderate to vigorous physical activity levels and increased time spent in sedentary behavior (HORN et al., 2018). According to these authors, regular physical activity can increase the body's metabolism and circulation, and release endorphins and other hormones, which is beneficial for both physical health and mental well-being, strengthening muscles and supporting bones, improving joint performance, and minimizing pain.

Another factor that was well evidenced in the research carried out in both contexts was the influence of the female gender on neck pain. The analysis of the studies allowed us to infer that the reason for this finding is different; in the context prior to the pandemic, the occurrence of neck pain in women can be explained by the data that states that neck pain affects females more than males (REY



et al. al, 2018). During the pandemic period, working from home can be more challenging for women, as they tend to be more responsible for household chores, in addition to mothers who work under much more intense pressure at home due to a lack of support from their parents, studies and child care (LOLASCON et al., 2020).

5 CONCLUSION

The social isolation caused by the Sars-Cov-2 pandemic intensified workers' perception of cervical pain. Incorrect ergonomics, inadequate posture during work activities, and inadequate technological resources were important factors for this fact. Female sex, psychological exhaustion, stress from the context of social confinement, and sedentary lifestyle were also related to increased perception of neck pain.

The definition of a predisposed profile and the knowledge of the factors that lead to the increase in neck pain will allow the development of public and private policies aimed at interdisciplinary approaches to the prevention of workers' health



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