



**Laura da Silva**

**Problemas de sono e conciliação entre vida profissional e pessoal em trabalhadores europeus durante a COVID-19**

**Trouble sleeping and work-life balance in european workers in the COVID-19**



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Dissertação apresentada à Universidade de Aveiro para cumprimento dos requisitos necessários à obtenção do grau de Mestre em Psicologia da Saúde e Reabilitação Neuropsicológica, realizada sob a orientação científica da Doutora Maria Piedade Brandão, Professora Adjunta da Escola Superior de Saúde da Universidade de Aveiro e coorientação científica da Doutora Margarida Fonseca Cardoso, Professora Auxiliar do Departamento de Estudo de Populações do Instituto de Ciências Biomédicas Abel Salazar da Universidade do Porto e da Doutora Anabela Sousa Pereira, professora Catedrática convidada no Departamento de Educação e Psicologia da Universidade de Aveiro.

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## palavras-chave

Sono; Equilíbrio Trabalho-Vida; Europa; Saúde Mental; COVID-19.

## resumo

**Enquadramento:** Existem várias consequências causadas e/ou intensificadas pela pandemia da doença COVID-19 na vida dos cidadãos em todo o mundo. As medidas de confinamento para o combate a essa pandemia implicaram alterações ao nível profissional, pessoal e social assim como no bem-estar físico e mental das pessoas. Diante dessa situação atípica, é provável que o sono seja afetado. **Objetivo:** O objetivo deste estudo foi caracterizar o perfil de sono de trabalhadores residentes na Europa com 50 anos ou mais e analisar a percepção dos mesmos sobre as alterações desse padrão durante a pandemia COVID-19 assim como as implicações na conciliação entre a vida pessoal e profissional. **Métodos:** Estudo transversal com dados do *Survey of Health, Ageing and Retirement* (Wave 9). Selecionou-se uma amostra de 65.318.138 trabalhadores de 27 países da Europa. **Resultados:** Cerca de um quarto dos entrevistados (24,5%) referiram ter problemas de sono sendo principalmente as mulheres quem mais o referiram (30,7% vs19%). No que respeita ao número de horas de trabalho, independentemente se aumentaram ou diminuíram durante o confinamento COVID-19, a proporção de pessoas com problemas de sono foi sempre superior àqueles que não referiram esse problema. Dos que relataram problemas de sono, a proporção aumentou naqueles com sintomas negativos de saúde mental (*tristes ou deprimidos; ansiosos, nervosos ou no limite*) e naqueles que referiram dificuldades financeiras (*necessidade de recorrer a poupanças*). Quanto às alterações no padrão de sono, cerca de um terço dos indivíduos perceberam um agravamento dos seus problemas de sono desde a primeira onda observando-se aqui uma proporção mais elevada nos homens do que nas mulheres (40,6% vs 28,2%). Ter trabalhado a partir de casa e ter experienciado sentimentos de insegurança parecem também estar relacionados com esses agravamentos. **Conclusões:** Os resultados sugerem que os problemas de sono agravaram-se durante o confinamento COVID-19 em trabalhadores europeus e que afetaram a conciliação entre a vida profissional e pessoal.

## keywords

Sleep; Work-Life Balance; Europe; Mental Health; COVID-19.

## abstract

**Framework:** There are several consequences caused and/or intensified by the pandemic disease COVID-19 in the lives of citizens around the world. The containment measures to combat this pandemic have entailed changes at the professional, personal, and social levels as well as in people's physical and mental well-being. Faced with this atypical situation, sleep is likely to be affected. **Objective:** The aim of this study was to characterize the sleep profile of workers residing in Europe aged 50 years or older and to analyze their perception of changes in this pattern during the COVID-19 pandemic as well as the implications on work-life balance. **Methods:** Cross-sectional study using data from the Survey of Health, Ageing and Retirement (Wave 9). A sample of 65,318,138 workers from 27 countries in Europe was selected. **Results:** About a quarter of the respondents (24.5%) reported having sleep problems being mainly women who reported this most (30.7% vs19%). Regarding the number of working hours, regardless of whether they increased or decreased during the COVID-19 confinement, the proportion of people with sleep problems was always higher than those who did not report such a problem. Of those who reported sleep problems, the proportion increased in those with negative mental health symptoms (sad or depressed; anxious, nervous, or on edge) and those who reported financial difficulties (need to draw on savings). As for changes in sleep pattern, about a third of the individuals perceived a worsening of their sleep problems since the first wave observing here a higher proportion in men than in women (40.6% vs 28.2%). Working from home and experiencing feelings of insecurity also seem to be related to these worsening problems. **Conclusions:** The results suggest that sleep problems worsened during COVID-19 confinement in European workers and affected work-life balance.

## Index

<b>Introduction</b> .....	<b>1</b>
<i>Main Purpose</i> .....	3
<b>Methods</b> .....	<b>4</b>
DATA .....	4
<i>Participants</i> .....	5
<i>Study Design</i> .....	5
<i>Measures</i> .....	5
<i>Ethical Considerations</i> .....	7
<i>Statistical Analysis</i> .....	7
<b>Results</b> .....	<b>7</b>
<b>Discussion</b> .....	<b>18</b>
<b>Study Limitations</b> .....	<b>21</b>
<b>Future Suggestions</b> .....	<b>22</b>
<b>Main Conclusions</b> .....	<b>22</b>
<b>Study Contribution</b> .....	<b>23</b>
<b>Acknowledgement:</b> .....	<b>23</b>
<b>References:</b> .....	<b>24</b>

## Table index

<b>Table 1</b> - <i>Estimated proportion of trouble sleeping among workers aged 50+ per country. ....</i>	8
<b>Table 2</b> - <i>Distribution of individual' profiles according to recent sleep pattern (with or without trouble sleeping) separately for male and female EU workers aged 50+. ....</i>	10
<b>Table 3</b> - <i>Distribution of variations in sleep problems (with trouble sleeping group) according to gender among EU workers aged 50+. ....</i>	12
<b>Table 4</b> - <i>Distribution of variations in sleep (without trouble sleeping group) according to gender among EU workers aged 50+. ....</i>	12
<b>Table 5</b> - <i>Distribution of male profiles according to sleep pattern variation (less so; about the same; more so) separately for individuals with and without trouble sleeping in EU workers aged 50+. ....</i>	14
<b>Table 6</b> - <i>Distribution of female profiles according to sleep pattern variation (less so; about the same; more so) separately for individuals with and without trouble sleeping in EU workers aged 50+. ....</i>	16



## **Introduction**

In December 2019, the world experienced a pandemic situation due to COVID-19, a disease caused by the SARS-CoV-2 virus, discovered in Wuhan in China (Estevão, 2020). This virus is characterized by the severe impairment of the respiratory system, which in some cases can lead to pneumonia (Ciotti et al., 2020). Some of the most common symptoms are cough, increased body temperature, shortness of breath and fatigue (Singhal, 2020).

The pandemic situation was experienced globally, which led to the need to adopt a set of strategies and measures to combat the spread of the virus (e.g., physical isolation, social distancing, suspension/closure of many resources and services (schools, non-essential stores and production, borders) and the guarantee of minimum services) (Bénassy-Quére & Mauro, 2020; Duarte, 2020; Hirsch, 2020). Although this has been a worldwide need, many countries have adopted different measures, in terms of chronology and form, adapted to the needs of each country and their pandemic situation (Tragaki, 2022). Europe was one of the most affected regions globally, leading to its countries to implement lockdown-measures at an international, national, or partial level (Hirsch, 2020). Italy was the first country to declare lockdown, followed by Denmark, Macedonia, Spain, Luxembourg, France, Portugal, and others (Tragaki, 2022).

Social distancing had major repercussions at different levels (e.g., work, social relationships, social income) requiring the reorganization of individuals' lives, companies, and institutions, leading them to create strategies to adapt to these changes (Ordem dos Psicólogos [OPP], 2020).

Work turned out to be one of the most affected levels in individuals' lives. Many professions/jobs that used to be performed in person, had to adapt to the pandemic-measures, leading professionals to switch to telecommuting. Although telecommuting has its advantages it can lead to the increase difficulty in separating work and personal life, causing problems in managing both simultaneously (Giurge & Bohns, 2020; Peasley, 2020). Individuals needed to coordinate telework with other obligations and responsibilities (e.g., household chores, social life, care, and support of family members) (OPP, 2020). According to Gigauri (2020), individuals who work from home have higher distractions, which can affect their productivity levels. The adaptation to this new reality was not easy and impacted their work-life balance.

There are several studies that point to the importance of the separation between personal and professional life in maintaining mental health (Giurge & Bohns, 2020). However, nowadays, this separation is becoming increasingly difficult. The pandemic period is characterized by uncertainties and changes in financial, health, personal, family, and professional demands, contributed to increased stress, exhaustion, and burnout (Peasley, 2020).

Work-life balance (WLB) has been studied over the years. This concept was initially approached through only two components, based on a traditional model: work, and personal life. While the work component was associated with a full-time working life, personal life component was linked to domestic duties assigned to women (e.g., caring for children) (Kelliher et al., 2019). Nowadays due to the changes in social roles, the traditional concept about WLB has evolved in order to adapt to the new reality of the twenty-first century.

Work and family are two domains that differ depending on the characteristics of the individual's life (e.g., rules, behaviors, different environments), which tend to determine their life balance. WLB is also related to job satisfaction, stress, time management, and time dedicated to work (Ramakrishnan, 2020).

However, the period of pandemic COVID-19, was not solely characterized by work-related consequences. Atzendorf and Gruber (2021) mentioned that mental health was also triggered and intensified during the pandemic (e.g., sadness, depression, and loneliness).

COVID-19 pandemic contributed to change people's routines drastically and also affect their quality of sleep. Such worries and changes in work life balance have also been responsible for affecting/altering people's sleep pattern and quality, which in turn influence biopsychosocially, such as impaired physical and mental health (Lucena et al., 2021). Researchers from different countries have pointed out that, the absence of good sleep during the pandemic was linked to emotional difficulties and stress (Casagrande et al., 2020; Sandín et al., 2020; Voitsidis et al., 2020). High levels of anxiety and depression due to the pandemic, were also pointed out as contributing factors of sleep disorders (Mello et al., 2020; Silva et al., 2020). Sleep disorders (e.g., insomnia, obstructive sleep apnea (OSA), fatigue, sleep deprivation, excessive daytime sleepiness (EDS)) are very common and can have negative implications on people's functioning and health (e.g., onset or triggering of cardiovascular diseases, diabetes, hypertension, and strokes) (Skaer et al., 2010; Colten et al., 2006). Sleep is essential for maintaining cognitive functions and well-being, therefore sleep deprivation can affect negatively work-life balance, safety, physical and mental health (Skaer et al., 2010). Lack of sleep is also associated with difficulty in decision-making, increased likelihood of having accidents and mood swings (e.g., irritability) (Medic et al., 2017). According to studies conducted in Spain and Italy, the prevalence of sleep disorders is higher among women and young adults (Casagrande et al., 2020; Sandín et al., 2020). Women are the gender considered more likely to experience emotional problems, higher levels of anxiety, depression, and stress. (Zivin et al., 2011). Lima et al. (2021) suggests that, in Brazil, the increase in household chores during the pandemic, along with work, may have triggered an increase in fatigue, stress, worries, and lack of time, which may have limited the quality of sleep in women (Lima et al., 2021).

Studies point out that sleep problems are very recurrent in the pandemic period, affecting approximately 40% of the general population (Jahrami et al., 2021). According to the literature explored, the prevalence of sleep problems is more frequent in females, as is the prevalence of depression, anxiety disorders, and emotional problems (Pinto et al., 2020; Zivin et al., 2011).

It is important to recognize that sleep and WLB are topics that are currently studied in an interconnected way, as they affect individuals' life. However, most of the sleep research done is on before and during the pandemic and there are few studies that only analyze the development and evolution of trouble sleeping and work-life balance during the pandemic. Mostly in these studies the sample covers a certain profession, a certain population (e.g., health care workers, students) as can be seen by the limitation of the study by Marelli et al (2021) in which they refer to the impossibility of extending these results to the general population because they presented a restricted cohort of participants. Studies with small, heterogeneous samples and with unbalanced numbers of genders also make it difficult to generalize the results (Tejero et al., 2021; Ayar et al., 2022; Florea et al., 2021). To understand the consequences, the profiles, and the evolution of the problem, it is necessary to understand this reality in which we live through an analysis of a more generalized population. Studying several countries of a given continent, such as the EU, about trouble sleeping and work-life balance are somewhat relevant. It may help to overcome the difficulty of generalization pointed out in several studies. Europe is made up of 27 members, 447.7 million inhabitants with 24 official languages and different cultures (europa.eu). In other words, it represents a large, comprehensive, and diverse population. The more knowledge we obtain on the subject, the better interventions, measures, and strategies will be implemented. This will improve the personal, professional and health consequences of this period that had a huge impact on people's lives.

### *Main Purpose*

Throughout the world, the pandemic had a huge impact on different aspects of people's lives. A significant number of changes occurred in the personal and professional lives of individuals, as well as in their sleeping patterns. The present study aims to identify profiles of EU workers 50 + who did or did not report sleep problems considering work-life balance (e.g., work, economic, social, security, and mental health status), as well as their perception of changes in sleep patterns during the COVID-19 pandemic. To accomplish this, we used the database from the Survey of Health, Ageing and Retirement in Europe (SHARE), a project that includes 27 European Countries.

## Methods

### DATA

This study is based on data SHARE. The SHARE is an ongoing multidisciplinary project ([www.share-project.org](http://www.share-project.org)), of European character that aims to study various issues in the social, financial, environmental and health policies in nationally representative samples of older adults (50+). Currently, this survey includes 27 European countries and Israel, allowing us to understand and analyze the conditions of individuals at a European level, through its wide-ranging (i.e., large sample size). SHARE has been conducting interviews since 2004 until the present data and presents 9 waves.

On November 1<sup>st</sup>, 2020, was developed the SHARE-COVID-19, to understand the current reality about the consequences of the decisions taken to control the pandemic (e.g., economic, social relationships and health). This is a longitudinal project that aims to explore the consequences before, during, and after the pandemic, on a behavioral, psychological, social, work, and economical levels. Afterward, policies are created to fill these gaps, enabling the EU to prevent and protect the most vulnerable citizens over the age of 50.

However, the collection of the data had to be suspended due to the outbreak of the pandemic, and after having arranged for alternatives to collect the results they decided to create a new wave (wave 9), created to follow the development of the pandemic. SHARE-COVID-19, namely a special data set SHARE Corona Survey where the participants had to answer a questionnaire between June and August 2021. Due to the limitations of the pandemic (e.g., limited social gatherings, social distancing measures, remote work activities), this study incorporated telephone interviews as an alternative methodology (Brugiavini et al., 2021; Börsch-Supan, 2020).

Thus, SHARE Corona's data collections were conducted through Computer-Assisted Telephone Interviews (Scherpenzeel, 2020). The SHARE's most recent wave, WAVE 9 also known as Wave 8.0.0, consists of 27 countries from EU (Austria, Germany, Sweden, Netherlands, Spain, Italy, France, Denmark, Greece, Switzerland, Belgium, Czech Republic, Poland, Luxembourg, Hungary, Portugal, Slovenia, Estonia, Croatia, Lithuania, Bulgaria, Cyprus, Finland, Latvia, Malta, Romania, Slovakia) and Israel (Börsch-Supan, 2022). In our study, we use this last wave (WAVE 9), however, according to the main objective of our study, only working citizens were considered, excluding Israel. This selection was made, because we wanted to examine changes in sleep quality and work-life balance during the pandemic period, which in this case was in 2020 and 2021, in European workers only.

### *Participants*

The participants of our study come from 27 EU countries (Austria, Germany, Sweden, Netherlands, Spain, Italy, France, Denmark, Greece, Switzerland, Belgium, Czech Republic, Poland, Luxembourg, Hungary, Portugal, Slovenia, Estonia, Croatia, Lithuania, Bulgaria, Cyprus, Finland, Latvia, Malta, Romania, Slovakia). The data was weighted using cross-sectional calibrated weights as provided by SHARE, resulting in a sample size of 65,318,138 participants.

### *Study Design*

This is a cross-sectional descriptive study.

### *Measures*

Our analysis was performed through three main variables: i) sleeping pattern; ii) sleeping patterns since 2020 (yes); iii) sleeping patterns since 2020 (no) and iv) other important variables. Next are detailed all variables:

#### *i) Sleeping pattern*

The first variable is about the sleeping pattern, and is explored through the question: “*Have you had trouble sleeping recently?* (Between June and August 2021). Participants had two options of response: 1 – *trouble with sleep or recent change in pattern*; 2 – *no trouble sleeping*. This variable will be explored throughout the study as presenting or not sleep problems, as it refers to the individuals' perception of sleep pattern in the period close to the data collection.

#### *ii) Sleeping patterns since 2020 (yes)*

The second variable analyzes sleeping patterns since 2020, but only those who reported recent sleep problems answered this question: “*Was that less, about the same, or more than during the first wave?*”, in which participants had three options of response: 1 – *less so*; 2 – *about the same*; 3 – *more so*.

#### *iii) Sleeping patterns since 2020 (no)*

The third variable also analyzes sleeping patterns since 2020, but only those who stated they did not have any trouble sleeping recently answered this question: “*Was that less so or about the same as during the first wave?*”. Participants had two options of response: 1 – *less so*; 2 – *about the same*.

#### *iv) Other variables*

The other variables of the study include socio-demographic, work situation, safety feeling, social life, economic situation, and mental health:

- a) *Socio-demographic variable*: includes gender (male or female) and age in 2021;

- b) *Work status variable*: participants had to answer questions about their work status since the last interview during the pandemic situation. Initially they were asked about where they worked: *“During the pandemic some people worked at home, some at their usual workplace and others at some other workplace. How would you describe your work situation since the last interview?”*, in which they had three options of response (could select more than one option): 1 – *worked from home*; 2 – *worked at the usual workplace outside the home*; 3 – *worked elsewhere, at a different workplace*. Subsequently, they were asked about their worked hours: *“Did you work shorter hours since your last interview?”*, in which they had two options: 1 – *yes*; 5 – *no*; *“Did you work longer hours since the last interview?”* – 1 – *yes*; 5 – *no*.
- c) *Safety feeling variable*: in this variable, the respondents had to say how safe they felt health-wise at their workplace. In this case, only the participants that worked at the usual place or at the different place responded: *“How safe did you feel health-Wise at our workplace? Was it very safe, somewhat safe, somewhat unsafe, or very unsafe?”* in which they had four options: 1 – *very safe*; 2 – *somewhat safe*; 3 – *somewhat unsafe*; 4 – *very unsafe*;
- d) *Economic situation variable*: this variable explored whether the participants, considering their household income, were able to make ends meet: *“Thinking of your household’s total monthly income (since your last interview), would you say that your household has been able to make ends with great difficulty, with some difficulty, fairly easily, or easily?”* in which they had four options of response: 1 – *with great difficulty*; 2 – *with some difficulty*; 3 – *fairly easily*; 4 – *easily*. The second question pertains to the savings: *“Since the last interview, did you ever need to dip into your savings to cover the necessary day-to-day expenses?”*. Participants responded: 1 – *yes*; 5 – *no*; 9 – *had no savings*;
- e) *Social life variable*: this variable refers to whether participants have been out of the house during the past three months: *“During the last three months, did you ever leave your home?”*. Participants responded: 1 – *yes*; 5 – *no*;
- f) *Mental health variable*: in this variable there were asked two questions that explored feelings of being nervous, anxious/on edge, sad/depressed in the last month: *“In the last month, have you felt nervous, anxious, or on edge?”*, where participants responded: 1 – *yes*; 5 – *no*. *“In the last month, have you been sad or depressed?”*, where participants responded: 1 – *yes*; 5 – *no*.

### *Ethical Considerations*

The SHARE project is under constant ethical review. The first four waves have been reviewed and approved by the ethics committee of the University of Mannheim. The following waves have been reviewed by the ethics committee of the Max Planck Society and the country implementations approved by the respective ethics committees or institutional review. All sub-projects are in line with legal regulations and following with international ethical standards.

### *Statistical Analysis*

The data analysis was done through Statistical Package for the Social Sciences (SPSS), version 27 (IBM, 2020). In this study, we used relative descriptive statistical measures, absolute and relative frequencies, means and standard deviations (SD).

Based on the response (Yes or No) from the first question i) *“Have you had trouble sleeping recently?”*, the sample was divided into two groups: "With Trouble Sleeping" and "Without Trouble Sleeping" six remaining variables were compared (social demographics, work situation, safety feeling, economic situation, social life, and mental health). Since gender differences have been noted in several investigations, we examined the sleep problems separately for females and males in the present study. Analysis according to gender was also carried out with regard to the perception of variation of sleep pattern between 2020 and 2021, comparing the six variables (*Socio-demographic; Work status; Safety feeling; Economic situation; Social life; Mental health*) with the answer of the two following questions: ii) *“Was that less so, about the same, or more so than during the first wave?”* and iii) *“Was that less so or about the same during the first wave?”*.

## **Results**

The sample consists of 65,318,138 individuals with ages ranging from 50 to 86 years old, where the mean is 58.68 (SD=  $\pm 3.488$ ) in the group of individuals without sleep problems and 58.73 (SD= $\pm 3.561$ ) in the group of individuals with sleep problems. The participants classified their quality of sleep by answering whether they had recent sleep problems or not. Most participants (75.5%) reported no sleep problems (M= 81% and W=69.3%), with 24.5% of participants stated having trouble sleeping (W=30.7% and M=19%). Socio-demographic characteristics of those having or not trouble sleeping were explored.

An analysis was also performed on the estimated proportion of trouble sleeping among workers aged 50+ from EU. It is possible to verify that the largest proportion of individuals reporting trouble sleeping are from Luxembourg 50.1%, France 35.6%, Estonia 30.8%, Lithuania 29.8%, and

Germany 29.1%. The lowest proportion are from Hungary 6.6%, Cyprus 11%, and Romania 11.7%.

**Table 1**  
*Estimated proportion of trouble sleeping among workers aged 50+ per country.*

	With Trouble Sleeping	
	N	% Of Total
<b>Country</b>		
Malta	7,596/49,049	15,5%
Luxembourg	41,906/83,704	50,1%
Cyprus	11,885/108,124	11,0%
Estonia	69,231/224,934	30,8%
Slovenia	60,054/255,444	23,5%
Latvia	68,076/279,715	24,3%
Croatia	81,719/393,739	20,8%
Lithuania	135,663/455,315	29,8%
Slovakia	142,516/696,348	20,5%
Finland	202,083/814,592	24,8%
Austria	136,011/941,962	14,4%
Denmark	147,961/988,026	15,0%
Bulgaria	232,855/1,019,495	22,8%
Hungary	80,533/1,213,656	6,6%
Romania	170,153/1,460,065	11,7%
Greece	237,121/1,422,445	16,7%
Switzerland	242,121/1,456,224	16,6%
Czech Republic	205,685/1,523,682	13,5%
Portugal	405,967/1,620,652	25,0%
Belgium	434,538/1,646,171	26,4%
Sweden	484,010/1,868,745	25,9%
Netherlands	633,187/3,286,013	19,3%
Poland	1,053,411/4,112,698	25,6%
Spain	867,557/5,866,041	14,8%
Italy	2,183,088/9,292,434	23,5%
France	3,326,692/9,356,571	35,6%



Germany	4,317,541/14,828,041	29,1%
<b>Total</b>	15,979,160/65,263,885	24,5%/

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Next, the remaining variables previously mentioned in the methodology, were analyzed for the two groups (With Trouble Sleeping and Without Trouble Sleeping). Since many people had to change their workplace due to the pandemic, participants were asked about their workplace since the last interview. In this case, results suggest that the workplace does not seem to be associated with sleeping problems, as the distribution of different workplaces reported (home; usual place; different place) is similar among those with or without sleeping problems (see Table 2).

Regarding the number of hours worked since the last interview in 2020, most participants stated that they have not worked fewer or more hours since. There is a higher proportion of subjects with sleep problems that worked fewer hours (M=19.5%, W=17.6%) compared to subjects without sleep problems (M=10.1% vs W=11.4). Regarding subjects with sleep problems, the proportion of subjects that worked longer hours (M=15.8% W=24.8%) is higher than in subjects without sleep problems (M=11%; W=11.8%).

Concerning the feeling of job safety in terms of health (answered only by those individuals who work at their usual place or a different workplace), most people feel safe at their workplace (i.e., very safe, and somewhat safe). However, when it comes to job insecurity, the proportion of individuals feeling somewhat insecure or very insecure increases when having sleep problems (M=16.3% and 2.6% W=11.8% and 3.8%) compared to individuals without sleep problems in both genders (M=7.1% and 2.1% W=10.7% and 2.8%).

In terms of the economic situation, there is a higher proportion of individuals who reported they could get by fairly easily and easily with the family's monthly income. It is possible to observe an increase in the proportion of individual with sleep problems who reported being able to get by with great difficulty or some difficulty (M=7.6% and 27.5%; W=5.3% and 24.7%) compared to individuals without trouble sleeping (M=3.4% and 18,7%; W= 5.1% and 16.2%). When it comes to savings, the proportion of those with sleep problems who had to draw on their savings to cover their daily expenses, was higher (M=51.1%, W=42.2%) when compared to those who had no sleep problems (M=23.2%, W=26.5%).

On the social level, when asked about having been out of the house in the last three months, it was possible to verify that the majority of the sample answered having been out. The proportions of individuals with sleep problems and those without sleep problems according to gender are very similar (M=98.8% versus M=95.9%; W=98.1% versus 97.6%).

For mental health, participants had to indicate whether they had experienced sadness/depressed and anxiety in the previous month. Most respondents reported they had not experienced these feelings. However, the results suggest an increase of the proportion of individuals with sleep problems who stated they had felt this way (M=56.1%, W=46.7%) and a decrease of the proportion of in the group of individuals without sleep problems who felt that way (M=13.4% and W=15.9%). The same is visible for those who claimed feeling nervous, anxious or on edge in the last month (M=57%, W= 53.3% vs M= 18%, W=24.50%).

**Table 2**  
*Distribution of individual' profiles according to recent sleep pattern (with or without trouble sleeping) separately for male and female EU workers aged 50+.*

	Male				Female				
	With Trouble Sleeping		Without Trouble Sleeping		With Trouble Sleeping		Without Trouble Sleeping		
	N	%	N	%	N	%	N	%	
<b>Place of Work<sup>a</sup></b>									
Home	1.790.751	27.6%	5.821.667	21.1%	2.806.555	30.2%	6.191.845	29.3%	
Usual Place	4.950.477	76.4%	24.466.004	88.7%	7.793.101	83.8%	17.666.084	83.7%	
Different Place	316.699	4.9%	1.145.898	4.2%	486.041	5.2%	917.112	4.3%	
<b>Worked Shorter Hours</b>	1.275.194	19.5%	2.787.765	10.1%	1.661.248	17.6%	2.421.603	11.4%	
<b>Worked Longer Hours</b>	1.032.292	15.8%	3.047.913	11.0%	2.332.156	24.8%	2.520.356	11.8%	
<b>Felt safe at Work</b>									
Very Safe	2.134.776	41.4%	11.728.972	46.9%	3.182.227	39.5%	6.546.280	36.3%	
Somewhat Safe	2.044.808	39.7%	10.988.665	43.9%	3.619.517	44.9%	9.063.483	50.2%	
Somewhat Unsafe	838.752	16.3%	1.775.993	7.1%	948.460	11.8%	1.935.903	10.7%	
Very Unsafe	134.561	2.6%	525.728	2.1%	307.246	3.8%	500.640	2.8%	
<b>Households' ability to make ends</b>									
With great difficulty	299.612	7.6%	589.225	3.4%	335.706	5.3%	649.086	5.1%	
With some difficulty	1.084.341	27.5%	3.211.741	18.7%	1.572.981	24.7%	2.081.524	16.2%	
Fairly easily	930.033	23.6%	6.911.041	40.2%	2.424.890	38.1%	5.200.994	40.5%	
Easily	1.633.681	41.4%	6.465.943	37.6%	2.027.638	31.9%	4.916.947	38.3%	
<b>Need to dip into savings</b>									

Yes	707.509	51.1%	829.057	23.2%	746.946	42.2%	719.716	26.5%
No	519.771	37.6%	1.488.587	41.6%	648.829	36.7%	1.510.282	55.6%
Had no savings	156.673	11.3%	1.256.896	35.2%	373.898	21.1%	484.655	17.9%
<b>Ever left home</b>								
<b>(last 3 months)</b>								
Yes	6.468.843	98.8%	26.808.645	95.9%	9.256.279	98.1%	20.826.762	97.6%
<b>Sad or</b>								
<b>depressed (last</b>								
<b>month)</b>								
Yes	3.672.128	56.1%	3.677.096	13.4%	4.406.725	46.7%	3.375.514	15.9%
<b>Felt Nervous</b>								
<b>(last month)</b>								
Yes	3.727.824	57.0%	4.937.605	18.0%	5.032.340	53.3%	5.211.549	24.50%

a. The sum may exceed 100% since participants could select more than one option.

A more detailed analysis was made of the profiles of individuals with and without sleep problems during the pandemic since the last interview in 2020. Participants who previously reported sleep problems were asked if these problems had improved, remained, or worsened since their last interview. Individuals who claimed having no sleep problems were asked if they had continued or improved. Therefore, those who stated they maintain the absence of sleep problems, mean that since 2020 they have not changed their sleep pattern. (i.e., had no sleep problems in 2020 and still do not have any). On the other hand, those who reported an improvement, indicate they had sleep problems in 2020, but do not have any at the time of the interview (2021). This analysis was performed individually according to gender (i.e., males were analyzed first, followed by females). An analysis was performed according to the proportions of the sleep pattern in the group with trouble sleeping, in both genders (see Table 3). Results suggest that a proportion of 6.4% of the participants in the group with trouble sleeping improved their sleep 60.3% maintained the sleep pattern, 33.3% worsened. That is, there is a higher proportion of men and women who have had worse sleep since the first wave compared to the ones that had improvements (M= 40.6% and W=28.2% vs M=7.5% and W=5.7%). With males being the gender that presented the highest proportion compared to females.

In addition, the same analysis was conducted for the group without sleep problems (see Table 4). The participants in the group "without trouble sleeping" in 2021 were asked whether they have improved or maintained their sleep problems since 2020, obtaining the following distribution: 6% of the participants improved (M=6.1% and W=6%) and 94% maintained (M= 93.9% and W= 94%).

**Table 3**

*Distribution of variations in sleep problems (with trouble sleeping group) according to gender among EU workers aged 50+.*

	With Trouble sleeping					
	Less so		About the same		More so	
	N	%	N	%	N	%
Male	486,914	7.5%	3,366,904	51.9%	2,639,330	40.6
Female	535,788	5.7%	6,222,834	66.1%	2,649,652	28.2%
Total	1,022,702	6.4%	9,589,738	60.3%	5,288,982	33.3%

**Table 4**

*Distribution of variations in sleep (without trouble sleeping group) according to gender among EU workers aged 50+.*

	Without Trouble sleeping			
	Less so		About the same	
	N	%	N	%
Male	1,696,582	6.1%	26,014,302	93.9%
Female	1,269,298	6%	19,945,573	94%
Total	2,965,880	6.1%	45,959,875	93.9%

We explored the males' characteristics according to the perception of changes in the sleep pattern since the first wave (see Table 5). In terms of the analysis of the workplace, in all subgroups analyzed, it was possible to observe an increase in the proportion of individuals who worked at the usual place. However, it is important to note that there is a higher number of individuals who worked at their usual place of work in both subgroups (with sleep problems and without sleep problems). Results indicate that the proportion of men "with sleep problems" who have perceived a decrease of sleep problems, the proportion increases when worked at their usual place (96.90%). In the group without trouble sleeping the same can be observed, the proportion of men who perceived no change in sleep pattern (about the same), 89% and has perceived improvements (less so) 85% increase in those who worked from their usual location. In the group of men who had perceived worsening of sleep problems, 50.4% worked from home (i.e., higher proportion than when compared to those who perceived a decrease of sleep problems and maintained the same problems who also worked from home). When we evaluated the group of men with sleep problems who reported a sleep worsening, we observed a higher proportion of individuals worked from home than in the group of men without sleep problems who claimed have improved (50.4% vs 16.4%). Worked in a different location is the profile with the lowest proportion in both groups.

In addition to this, it was decided to explore the safety variable. Results demonstrate in the group of men who report having sleep problems, those who have perceived worsening in their sleep quality have a higher proportion of individuals who feel unsafe at work (somewhat unsafe and very unsafe = 32.1%) than in those who have maintained or improved their sleep quality and feel this way (13.3% and 7%). In men "without trouble sleeping" and who claim maintained no change in sleep pattern, there is a higher proportion of individuals who feel insecure (32.1%) than in those who claim improved their sleep quality (7.7%).

Regarding the number of hours, in the group of males "with trouble sleep" who had affirmed decrease in sleeping problems, 31.3% worked fewer hours compared to the other subgroups (about the same 12.1% and more so 27.1%). Of the men "without trouble sleeping" 4.4% who reported improvements and 10.5% that did not report change their sleep pattern worked fewer hours. On the other hand, in the group of men "with trouble sleeping" who claimed to maintain the same sleeping problems, 18.2% worked longer hours, the ones that claimed got worse 15.5% (worked longer hours) and the individuals that claimed to improve the sleep pattern, 0.4% worked longer hours, the lowest proportion. In the group "Without sleeping problems", in the ones that perceived improvements 8.2% of the individuals worked more hour, whereas the individuals that perceived maintain absence of sleep problems 11.1% worked longer hours.

Regarding economical level and the variable of ability to make ends, results indicate a negative correlation. Of the individuals with sleep problems who perceived improvement, 78% stated great difficulty or some difficulty coping with the monthly household income (6.6% and 71.4%) higher proportion compared to those with perceived worsening problems 47% (12.1% and 35.2%).

In the variable of the need to go to savings, in the "with trouble sleeping" group that said they had improved sleep problems, 100% resourced to savings. In the group without trouble sleeping, it is possible to observe an increase on the proportion in the subgroup that perceived improvements of sleep problems, where 59.9% didn't resourced to savings.

For the social situation variable, the analysis is the same as in the general analysis. Almost the entire sample claims to have left home in the last month.

Concerning the mental health variable, it is possible to verify a majority of the proportion of individuals who claimed to get worse in the group of men with trouble sleeping, in which 73.8% reported feeling sad/depressed in the last month. Beyond that, results indicate that of the individuals of the "without trouble sleeping" group that had perceived sleep improvements 29.7% felt sad or depressed in the last month and of individuals who had no perceived change in sleep pattern only 12.5% felt the same way.

The same is visible for the last variable in the "without trouble sleeping" group. In those who had stated increasingly sleep problems, 77% felt nervous, anxious, or on edge, 31.7% of those who

claimed improvements and 17.2% in the ones who claimed to maintain the absence of sleep problems, also reported feeling this way.

**Table 5**  
*Distribution of male profiles according to sleep pattern variation (less so; about the same; more so) separately for individuals with and without trouble sleeping in EU workers aged 50+.*

Male										
	With Trouble sleeping						Without Trouble Sleeping			
	Less so		About the same		More so		Less so		About the same	
	N	%	N	%	N	%	N	%	N	%
<b>Place of work<sup>a</sup></b>										
Home	27,733	5.7%	449,058	13.4%	1,307,326	50.4%	273,359	16.4%	5,469,712	21.2%
Usual place	471,659	96.9%	2,775,484	82.9%	1,651,576	63.7%	1,416,851	85.0%	22,905,521	89.0%
Different place	0	0.0%	257,935	7.7%	58,765	2.3%	208,059	12.5%	937,839	3.6%
<b>Felt safe at work</b>										
Very safe	157,460	33.4%	1,371,268	46.0%	599,415	35.4%	578,687	35.9%	11,070,228	47.6%
Somewhat safe	281,132	59.6%	1,213,388	40.7%	549,902	32.5%	517,604	32.1%	10,407,487	44.7%
Somewhat unsafe	25,995	5.5%	349,241	11.7%	463,516	27.4%	482,123	29.9%	1,293,869	5.6%
Very unsafe	7,071	1.5%	48,333	1.6%	79,157	4.7%	35,763	2.2%	489,965	2.1%
<b>Worked shorter hour</b>										
Yes	152,544	31.3%	408,145	12.1%	714,504	27.1%	75,360	4.4%	2,712,405	10.5%
<b>Worked longer hours</b>										
Yes	1,828	0.4%	613,521	18.2%	410,310	15.5%	138,370	8.2%	2,891,725	11.1%
<b>Ability to make ends</b>										
With great difficulty	13,313	6.6%	56,256	3.1%	230,043	12.1%	13,507	1.7%	575,718	3.5%
Some difficulty	144,153	71.4%	270,256	15.0%	669,933	35.2%	117,538	14.7%	3,094,202	18.9%
Fairly easy	20,586	10.2%	679,440	37.8%	230,007	12.1%	283,917	35.6%	6,624,920	40.6%
Easily	23,897	11.8%	793,384	44.1%	771,276	40.6%	383,173	48.0%	6,040,976	37.0%
<b>Need to dip into</b>										

<b>savings</b>										
Yes	157,465	100.0%	40,739	12.5%	509,305	56.6%	35,518	27.1%	793,539	23.0%
No	0	0.0%	217,483	66.6%	302,288	33.6%	78,439	59.9%	1,410,148	41.0%
Had no savings	0	0.0%	68,290	20.9%	88,383	9.8%	17,088	13.0%	1,239,808	36.0%
<b>Ever left home (last 3 months)</b>										
Yes	464,134	95.3%	3,328,021	98.8%	2,624,931	99.5%	1,650,416	97.3%	2,4919,581	95.8%
<b>Sad or depressed (last month)</b>										
Yes	285,352	58.6%	1,437,797	42.7%	1,948,594	73.8%	503,406	29.7%	3,172,761	12.5%
<b>Felt Nervous (last month)</b>										
Yes	416,014	85.4%	1,271,289	37.8%	2,033,502	77.0%	537,476	31.7%	4,375,806	17.2%

a. The sum may exceed 100% since participants could select more than one option.

We also explored the females' characteristics according to the perceptions of changes in the sleep pattern since the last wave (see Table 6). Regarding the work variable (i.e., workplace), results demonstrate that in the group "with trouble sleeping", the subgroup that claimed improvements obtained improvements in sleep problems 8.5% works at home, 91.7% at their usual place and 4.3% at a different place. In the subgroup that stated maintain the sleeping problems, 31.2% worked at home, 84% at their usual place and 5.9% at a different workplace. Finally, in the last subgroup that reported worsening the sleep problems, 32.5% worked at home, 81.7% at the usual place and 3.9% at a different place. Concerning to the second group "without trouble sleeping", in the subgroup that claimed improvements (*less so*), 43.9% works at home, 59.8% at their usual place and 2.3% at a different place. It is also possible to observe a higher proportion of individuals who worked at their usual place, and a superior number of individuals concentrated on worked at their usual place in both subgroups (with trouble sleeping and without trouble sleeping) as well as in the male group analysis.

In the safety variable, the same conclusions are drawn in women. Results indicate an increase on the proportion of woman in the group "with trouble sleeping" that had affirmed felt unsafe (19.6%). In the "without trouble sleeping" group, of those who reported improvements in their

sleep 23.7% felt unsafe (some and very) and of those who stated unchanged sleep pattern 13% felt that way (negative correlation).

When it comes to worked hours, in women with sleep problems who had perceived worsening their sleep, the proportion increased for both- those who worked more hours and those who worked fewer hours (shorter hours 24.6% and longer hours 27%). In the group of women without sleep problems who perceived improvements in their sleep, 23.9% individuals worked fewer hours and 9.5% worked longer hours. In both groups (with and without trouble sleeping), data reveals a higher proportion of individuals who worked fewer hours, compared to those who worked longer hours, in the group of individuals who perceived improvements in their sleep quality since the last wave.

At the financial level and in the ability to make ends with the household monthly income, in the group of women "with trouble sleeping" the proportions are very similar in the ones that claimed improvements and worsening (27.6% vs 27%) that felt great and some difficult.

In the savings variable, as it was observed on men, in the group of women with sleep problems who claimed worsening and maintained their sleep problems there was an identical proportion (43% and 43.8%). In women without sleeping problems, the proportions in the two subgroups (*less so* and *about the same*) are very similar in those who answered "yes" (28.6% vs 26.3%), "had no savings" (18.5% vs 17.8%) and the higher proportion in those who responded "no" (52.8% vs 55.9%).

At the social level, what we concluded is that, in both groups, almost all the individuals in the sample had left home in the last months.

When it comes to mental health, among those who had sleeping problems that perceived worsening and improvements, the proportion did not differ much in those who felt sad or depressed (62.6% and 64.3%). In the "without trouble sleeping" in the ones that perceived their sleep pattern to be unchanged, the proportion is similar in those who have felt this way in the last month (*less so*=14.8% vs *about the same*=16%).

Finally, in the group "with trouble sleeping", in those that had report worsening, the proportion increase in those who felt anxiety, nervousness, or on edge compared to the ones that perceived improvements (72.8% vs 64.9%).

**Table 6**  
*Distribution of female profiles according to sleep pattern variation (less so; about the same; more so) separately for individuals with and without trouble sleeping in EU workers aged 50+.*

Female									
With Trouble sleeping						Without Trouble Sleeping			
Less so		About the same		More so		Less so		About the same	
N	%	N	%	N	%	N	%	N	%



<b>Place of work<sup>a</sup></b>											
Home	45,291	8.5%	1,904,215	31.2%	855,911	32.5%	542,810	43.9%	5,589,381	28.3%	
Usual place	489,329	91.7%	5,126,695	84.0%	2,152,233	81.7%	739,126	59.8%	16,828,186	85.2%	
Different place	23,212	4.3%	360,060	5.9%	102,769	3.9%	28,200	2.3%	888,912	4.5%	
<b>Felt safe at work</b>											
Very safe	150,175	30.7%	2,024,353	38.1%	987,087	44.3%	128,140	16.8%	6,355,414	37.0%	
Somewhat safe	271,532	55.5%	2,543,632	47.9%	804,352	36.1%	453,222	59.4%	8,588,104	50.0%	
Somewhat unsafe	52,209	10.7%	577,337	10.9%	314,683	14.1%	99,473	13.0%	1,822,542	10.6%	
Very unsafe	15,412	3.1%	168,856	3.2%	122,977	5.5%	81,944	10.7%	418,695	2.4%	
<b>Worked shorter hour</b>											
Yes	117,470	21.9%	888,759	14.3%	650,788	24.6%	295,644	23.9%	2,120,899	10.6%	
<b>Worked longer hours</b>											
Yes	59,492	11.1%	1,556,374	25.1%	716,290	27.0%	120,555	9.5%	2,367,727	11.9%	
<b>Ability to make ends</b>											
With great difficulty	15,659	3.4%	221,603	5.3%	98,444	5.8%	7,555	1.1%	641,531	5.3%	
Some difficulty	110,360	24.2%	1,103,580	26.2%	358,163	21.2%	178,309	25.3%	1,901,344	15.8%	
Fairly easy	243,445	53.5%	1,341,785	31.8%	839,660	49.8%	336,971	47.8%	4,864,023	40.4%	
Easily	85,757	18.8%	1,549,586	36.8%	391,157	23.2%	182,121	25.8%	4,644,911	38.5%	
<b>Need to dip into savings</b>											
Yes	31,679	25.1%	518,992	43.8%	196,275	43.0%	53,186	28.6%	664,659	26.3%	
No	37,553	29.8%	469,086	39.5%	141,312	30.9%	98,201	52.8%	1,412,081	55.9%	
Had no savings	56,787	45.1%	198,091	16.7%	119,021	26.1%	34,476	18.5%	450,179	17.8%	
<b>Ever left home (last 3 months)</b>											
Yes	531,693	99.2%	6,058,370	97.4%	2,640,235	99.6%	1,213,355	95.6%	19,493,086	97.7%	

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<b>Sad or depressed (last month)</b>	Yes	335,484	62.6%	2,366,124	38.0%	1,703,979	64.3%	184,720	14.8%	3,184,417	16.0%
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<b>Felt Nervous (last month)</b>	Yes	347,669	64.9%	2,749,652	44.2%	1,929,649	72.8%	245,023	19.3%	4,928,074	24.7%
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a. The sum may exceed 100% since participants could select more than one option.

## Discussion

Using a sample of 65,318,138 participants from 27 European countries, this study explores and analyzes the most common profiles of subjects reported having and not having sleep problems during the period of pandemic COVID-19 (2020-2021). It also explores the profile of participants considering the variation (*less so; about the same; more so*) of the perception of sleep problems during this period (since the first wave in 2020). Through this analysis, we can identify which profiles are more prevalent in both groups (with and without sleep problems) as well as their relationship with work-life balance.

When it comes to estimating the proportion of individuals with sleep problems by country, Luxembourg is the country with the highest proportion (50.1%). According to O'Connor (2020), one in three residents of Luxembourg during the pandemic period reported a decline in mental health. The fact that sleep can affect mental health and vice versa (Jansson-Fröjmark, 2008), may be a possible explanation for Luxembourg being one of the countries with the highest proportion of sleep problems in this study.

Making a general analysis of who had reported sleep problems (*i- Have you had trouble sleeping recently?*), we can see that women are the gender with the highest proportion compared to males (30.7% and 19% respectively). According to the revised literature, this result is not a novelty. Studies by Casagrande et al (2020) and Sandín et al (2020) state that women are in fact the gender with the highest propensity to develop sleep disorders. In contrast, when analyzed the perception on the variation of sleep problems during the pandemic, the gender that presented a higher proportion of reported worsening were men when compared to women (40.6% vs 28.2% respectively). It is consistent with the results of a recent study conducted through the sharing platform, however, through survey 1 conducted between June and August 2020, which found that men have reported the most worsening since the outbreak began (Cordeiro et al., 2022). This finding can possibly be

explained by the bidirectional relationship between anxiety and depression, and sleep problems (e.g., insomnia) by Jansson-Fröjmark (2008), since in this study the psychological distress (anxiety and depression) is an intensified picture in the male gender that perceived worsening sleep problems.

As mentioned above, some WLB related components were explored. Considering the importance of professional life in sleep quality and in personal life, some aspects were analyzed in this regard. As far as the workplace is concerned, there seems to be an association between man that reported having sleep problems and worked from home, since it was identified an increase in the proportion of males who worked from home compared to the group that does not report sleep problems (27.6% vs 21.1%). While for women who report do or do not have sleep problems and worked from home the proportions are very similar (30.2% vs 29.3%). Regarding the variation of these problems (*less so, about the same, more so*), the results indicate that there seems to be a relationship between the perception of worsening sleep problems and having worked from home either men or women, as evidenced by the proportion of respondents (50.4% and 32.5% respectively) in comparison to those who report improvements (5.7% and 8.5% respectively). Whereas having worked in the usual place seems to contribute to the perception of decrease of sleep problems (*less so*) in both genders (men and woman) in the with trouble sleep group (96.9% and 91.7% respectively) in comparison to without trouble sleep (63.7% vs 81.7 respectively). These results can be explained through the study by Lima et al, (2021), in which they reported an association between the increase in domestic activities, reconciled with a normal working situation with sleep problems, also emphasizing fatigue, sleep deprivation, nervousness and increased worries. Studies have shown that working from home can lead to sleep disturbances resulting from stress (Thomé et al, 2007). According to Buomprisco et al (2021), some disadvantages of working from home include social isolation, risk of overwork, invasion of privacy, and problems distinguishing between work and home life.

It's not just the workplace that seems to influence sleep quality, there are other aspects that can also have an effect, such as working hours. According to the ILO (2016), the decrease in rest periods and increased workload can negatively affect the work-life balance. These changes in schedules lead to increased fatigue, stress, mental health, and the likelihood of accidents due to these factors. The results of Afonso, Fonseca and Pires (2017) indicate that working more hours leads to less sleep time and the appearance of sleep disorders. However, this finding was only found in males in the group that reported sleep problems. The proportion is higher in the males who perceived worsening and who worked longer hours compared to those who had perceived less problems (15.5% vs 0.4%). Whereas in the men who perceived improvements, the proportion is higher in those who worked less hours in compared to who perceived worsening (31.3% vs 27.1%). On the

other hand, in women that reported sleep problems who perceived worsening in their sleep pattern, the proportion increases in both profiles (shorter hours=24.6% and longer hours=27%). The same result was found in the analysis of sleep problems in men and women, it was observed that the proportion in both genders increased either by worked shorter hours (19.5% vs 10.1% and 17.6% and 11.4% respectively) or longer hours (15.8% vs 11% and 24.8% vs 11.8% respectively) when compared to the group without trouble sleeping. The circumstances surrounding the reduction in working hours are not well known, nor is it known whether the reduction had positive or negative consequences (i.e., salary reduction, increased workload, fear of losing their jobs). This atypical period was characterized by numerous job losses, accompanied by financial difficulties and insecurities, causing repercussions on people's mental health, being related to poor mental health (depressive and anxious symptomatology) (Wilson et al., 2020). However, during the early stages of the pandemic, Wang et al (2022) found that reducing working hours had a protective effect on workers' mental health.

Considering the pandemic context, since the workplace can be an environment susceptible to the transmission of COVID-19 (Ingram et al., 2021), many were the concerns and fears experienced during this period. One of them was about the feeling of security. According to ILO (2020) some of these concerns are related to the fear for their own health, their families, and co-workers, such as the lack of essential equipment for their protection. Fears that cause high levels of stress and anxiety. In the present study, there seems to be an association between reported sleep problems and feeling unsafe at work. Observing only the individuals who felt insecure it was observed that male and female in the group "with sleep problems" who perceived worsening, the proportion increased in those who reported feeling very unsafe and somewhat unsafe in the workplace (32.1% and 19.6% respectively) compared to the improvements (7% and 13.1% respectively). Thus, there seems to be an association between perceived worsening sleep problems and reported feeling insecure at work (very or somewhat). While the perception of improvements of sleep problems (Less so) in the group with trouble sleeping and genders seems to be associated with reported feeling of security, in which most respondents stated that they felt very or somewhat safe, as we can see in masculine and feminine gender (93% and 86.2% respectively).

Another of the various difficulties faced during the pandemic was in relation to the economic situation. During the pandemic, many families were left without income, long periods of time without performing their jobs or even unemployed, which triggered changes in the sleep pattern of the subjects (Lima et al., 2021). As in Lima et al study (2021), in the analysis of sleep problems (in our study) it was possible to see that there is a higher proportion of individuals in the group "with sleep problems" who had stated great, and some difficulties to make ends with the household's total monthly income either in men or women (35.1% and 30% respectively), when compared to the

group “without trouble sleeping” (22.1% vs 21.3% respectively). As far as savings are concerned, there seems to be also an association between the group “with trouble sleeping” and the need to dip into savings, in men and women (51.1% and 42.2% respectively) in compared to the group “without trouble sleeping” (23.2% and 26.5% respectively). As a result, sleep problems seem to be associated with financial difficulties.

Finally, as it was explained earlier in the introduction through the exploration of literature, the perception of felling anxiety and stress caused by the various events listed (e.g., changes of routines; childcare; housework; working longer hours; workplace, among others) can lead to the manifestation of sleep problems. Studies have stated that women are more likely to present emotional problems, as mentioned in the study by García-Fernández et al., (2020). However, in our study, regarding reporting recent sleep problems, there is a higher proportion of men compared to women feeling "*sad or depressed*" (56.1% vs 46.7% respectively) and similar proportions in feeling "*nervous, anxious or/ on edge*" (57% vs 53.3% respectively). In this research there seems to be an association between reported having sleep problems and feel that way (sad or depressed; nervous, anxious or on edge), when comparing the proportions between the "with trouble sleeping" group and the "without trouble sleeping" group. As for the variation in sleep problems, the perception of worsening when compared with the the individuals who perceived improvement, in men seems to be associated with reported feeling "*depressed or sadness*" (73.8% vs 58.6%), while in women it seems to be associated with feeling "*nervous, anxious our/on edge*" (72.8% vs 64.9%). According to the study of the relationship of sleep problems with psychological distress (anxiety and depression) by Cipriano (2021), sleep problems (in quality and quantity) are common in older adults and cause negative consequences on their well-being.

## **Study Limitations**

There are some limitations to the present study. Platform questionnaires presented a major limitation, more specifically the formulation of the questions. With only two possible answers to the question (e.g., “Have you had trouble sleeping recently?”, "1. Trouble with sleep or recent change in pattern; 2. No trouble sleeping"). However, it is not only an obstacle, but it can also be seen as an advantage for substantiating some work of greater depth. In the same way, it is impossible to define or explain how people feel about safety and unsafety at work due to that subjectivity. This is because they can have many connotations, such as fear of contracting COVID-19 or insecurity about losing one's job. Although this study has an evident limitation (subjectivity of the questions), it can be used for comparison with similar studies, as many studies do not collect data on scales or tests (Beck et al., 2020; Çitak & Pekdemir, 2020; Cordeiro et al., 2022).

Another limitation was the fact that there was only a single wave referring to COVID-19, if there were more waves during the pandemic, it would be possible to explore the perceptions of European workers at different times and waves. Despite not exploring other waves, we were able to understand and compare the groups (with trouble sleeping vs. without trouble sleeping) between both genders, thus highlighting of the perceptions of the participants about their actual sleep pattern (2021) and their perception of the variation in sleep pattern since the first wave (2020).

### **Future Suggestions**

Regard to future suggestions, it would be helpful to reformulate the questions to gain a better understanding of this theme and explore it in more depth due to the subjectivity of the questions. With that, it would be more relevant to also discuss changes, impacts, and reasons for these problems (e.g., reasons why the individuals felt insecure).

The sociodemographic level would be an interesting area to examine, to understand if levels of education and professions are related to sleep problems as well as cultural differences.

We suggest analyzing future waves to gain a more complete understanding of the evolution and changes during different periods of the pandemic (longitudinal studies).

Finally, given that some of the results were not in agreement with the literature, it would be interesting to explore the reasons for these results. Understand whether these differences are cultural, whether they differ in countries outside the EU, whether they are differences due to environmental factors, among others, to see if these results are only found in this population or in this atypical period.

### **Main Conclusions**

This study allowed us to identify through the profiles, which individuals are more predisposed to have sleep problems as exploring the implications of the pandemic in WLB.

Through this sample, about a quarter of the participants have reported that they have had difficulty sleeping (in the period close to data collection), women being the gender with the highest proportion. While the gender that had the highest proportion reporting worsening sleep problems since the first wave (2020) was male, also characterized for being the gender with the higher proportion of poor mental health (e.g., sad, anxious, depressed, nervous).

## **Study Contribution**

There can be a variety of social and practical contributions with this study. This knowledge can be used to develop programs, and support to improve the conditions (work, financial, and mental health conditions) above mentioned and, subsequently, increase the balance between personal and professional life, such as reducing sleep problems in times of pandemic or in similar situations.

It is important, for example, to improve workplace security to avoid feeling insecure, as many studies have shown that there was an increased risk of contracting COVID-19 in the workplace (e.g., providing individual protection materials; creating an environment susceptible to social distance) since the vaccination process was still at a very early stage when data were collected.

On a financial level it would be interesting to promote or attend literacy sessions for better money management and preparation for similar events (pandemic situations).

According to this and other studies, this period has implications for the mental health of European workers (Cordeiro, 2022). For these reasons, it would be helpful for organizations to have psychologists on site or to implement strategies such as free psychological care provided by companies to improve or minimize the impact of this period. This early or preventative care can help promote workers' mental health (reduction of anxiety, stress, nervousness, depression) and work-life balance. This support could be provided, for example, by an organizational psychologist through psychological assessments, occupational health promotion, psychological support, among others, which in addition to benefiting workers, also benefits companies (productivity, satisfaction, performance, and well-being) (OPP, 2015). According to OPP (2020), mental health allows us to adapt to new demands and changes. The lack of it makes it difficult to adapt to adverse situations.

There is evidence in the literature that external factors can impact worker productivity and promoting a work-life balance can result in more productivity, fewer mood swings, fewer accidents, and more satisfaction.

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This paper uses data from the generated easySHARE data set (DOI: 10.6103/SHARE.easy.800), see Gruber et al. (2014) for methodological details. The easySHARE release 8.0.0 is based on SHARE Waves 1, 2, 3, 4, 5, 6, 7 and 8 (DOIs: 10.6103/SHARE.w1.800, 10.6103/SHARE.w2.800, 10.6103/SHARE.w3.800, 10.6103/SHARE.w4.800, 10.6103/SHARE.w5.800, 10.6103/SHARE.w6.800, 10.6103/SHARE.w7.800, 10.6103/SHARE.w8.800).

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