



## Research article

## Understanding the impact of the COVID-19-related lockdown in university workers. Identifying groups through cluster analysis

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## ABSTRACT

**Objective:** To analyse the COVID-19-related lockdown impact on University workers, to identify groups based on this information, and to study the factors associated with each group.**Study design:** Cross-sectional study.**Methods:** A survey was conducted 3.5 weeks after COVID-19-related lockdown in University workers in Spain. Sociodemographic variables, housing, work, health conditions, levels of anxiety, stress and depression (DASS-21), and social support (MSPSS) were collected. A cluster analysis was performed to identify groups depending on the impact of the lockdown. Differences between groups were tested using Chi-square and Mann-Whitney-U tests, and associated factors with binary logistic regression.**Results:** We identified two groups of workers. "G1: Consequences in the daily life routine" was mainly composed of men, Research and Teaching Personnel (RTP) with more stable professional categories, higher income level, and bigger houses than people in G2. Participants in "G2: Concerns for the current and future well-being" presented worse intensity of pain than before the lockdown, more anxiety, depression, stress and less social support than people in G1. ASP (Administration and Services Personnel) had more risk of belonging to G2 than RTP (OR = 5.863). A higher number of people living at home decreased the risk of being in G2 (OR = 0.439). People with lower pain intensity had less risk of being in G2 (OR = 0.014), and this risk decreased as friends support increased (OR = 0.833).**Conclusions:** In G1, the consequences were immediately reflected in the stress resulting from changes in their daily work routine. In G2, the concerns were related to their professional future, with worse mental health, greater intensity of pain and less social support.

## 1. Introduction

Since the pandemic caused by SARS-Cov2 began in January 2020, the coronavirus disease 2019 (COVID-19) has spread rapidly throughout the world and has infected over 158,551,526 people in 219 countries and regions worldwide, with Spain having 3,915,313 confirmed cases as of July 13, 2021 [1].

In order to combat the expansion of coronavirus COVID-19 in Spain, the Government decreed a state of alarm calling for social isolation and confinement at home and in the immediate neighbourhood in March

2020 [2]. These state-imposed restrictions regarding physical distancing generated an unavoidable and substantial impact on the population with different consequences in peoples' everyday life [3, 4]. The reduction of social relationships and changes to the working environment have led to a range of consequences on mental health and the economy of the general population [5, 6, 7, 8, 9, 10].

In Spain, as with other countries during the lockdown, only essential jobs or those that could be performed remotely remained active. In the case of the latter, it led to individuals from some occupational groups, such as University workers having to adapt their work to the new reality

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[11]. Most universities provided virtual classes and other remote services to students. Working from home required not only suitable work equipment and internet connection, but also an adequate place to work in order to maintain a balance between work, personal and family life. This abrupt change to the daily working habits produced by the pandemic, along with all other social, psychological and physical threats, may have an impact on the community of University workers, as has been shown in other countries, such as Brazil or Italy [12, 13].

In the general population, it has been shown that the factors related to a worse lockdown impact include being female and/or younger, having a lower socio-economic position, and living in more overcrowded houses [10, 14, 15, 16]. On the contrary, the people who had maintained a healthy lifestyle behaviour during the pandemic, such as a varied diet and regular physical activity, coped better in reducing the psychological distress caused by the isolation and confinement [9, 17, 18]. However, lifestyle also depends on socio-economic-related variables, such as employment status, level of income and educational level, that determine inequalities and lead to a negative effect on health status in vulnerable populations [19].

Contrary to what one might think, the University is an entity that brings together many workers of diverse nature, position, status, labour sector, income, and working conditions, as well as different social realities. Thus, the impact of the pandemic and lockdown could be different among them. Despite this, little is known about whether these factors are the same in the University workers.

This study was set within the theoretical framework on social determinants of health from the World Health Organization [20]. This framework explains the underlying processes of “causation” that underpin health inequities. This model describes how the socioeconomic and political context creates a social hierarchy due to the unequal distribution of power and resources among social groups, according to several axes of inequity such as age, gender, social class, and other factors. These axes of inequities lead people to occupy different social positions and access to resources such as housing, employment, residential environment, and income which are closely interrelated in explaining the mechanisms that generate inequalities in COVID-19 impact. Moreover, as we have previously described, a worse lockdown impact has been described in the general population according to these social determinants. Thus, this theoretical framework was used to describe the social mechanisms that explain the differences in the lockdown impact on University workers and to frame the results of this study with previous evidence.

In view of the above, this paper sets out to identify groups of individuals among University workers based on the differences in the impact of the COVID-19-related lockdown on health status, work conditions, lifestyle and social dimension and analyse the factors related to each group.

## 2. Methods

### 2.1. Study design

We carried out a cross-sectional study in 677 individuals working at a University in the south of Spain. Participants were contacted through their institutional e-mail. We collected data via Google Form from April 8 to April 22, 2020, three-and-a-half weeks after confinement due to COVID-19 in Spain. A flowchart with the design, data collection, measures and analyses can be found in Figure 1.

### 2.2. Data collection and measures

Information was collected about sociodemographic data, including gender, age, marital status, labour sector (RTP: Research and Teaching Personnel; ASP: Administration and Services Personnel), professional category (for RTP: Predoctoral contract, Postdoctoral Research Assistantship/Fellowship, Assistant or Associate Lecturer, Lecturer, Senior

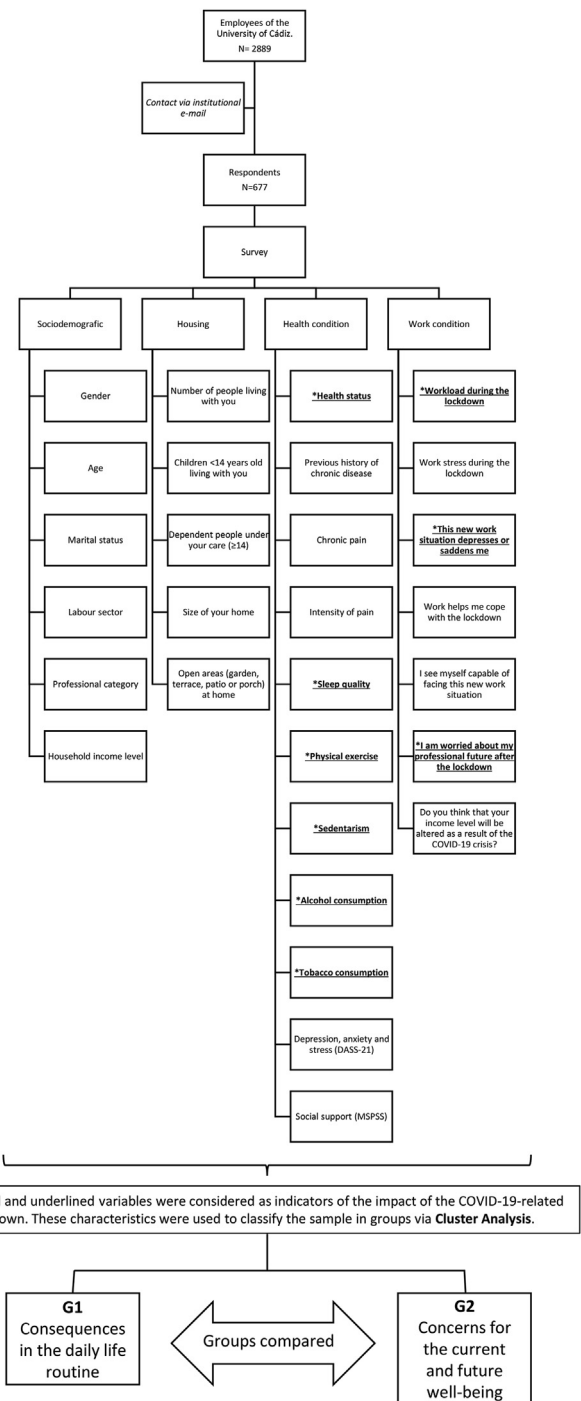


Figure 1. Flowchart with the design, data collection, measures and analyses.

Lecturer or Reader, Associate Professor, Professor or other; for ASP: official hierarchy established from Group I (best working conditions) to Group IV (worst working conditions)), and household income level (euros per month).

Housing data was also collected, such as the number of people living at home, being a caregiver for children and dependent adults, size of the house, and open spaces at home.

Work conditions during the lockdown, including workload, work stress, alteration of income level as a result of the COVID-19 crisis, and issues such as “this new work situation depresses or saddens me”, “work helps me cope with the lockdown”, “I see myself capable of facing this new work situation”, “I am worried about my professional future after the lockdown”,

were assessed using 5-level Likert scales from “strongly disagree” to “strongly agree”.

Health conditions, including health status at the time of the survey (“worse”, “same as”, or “better” than before the lockdown), previous history of chronic disease, presence of chronic pain, intensity of pain during the lockdown (5-level Likert scale from “much worse than before the lockdown” to “much better than before the lockdown”), sleep quality during the lockdown (5-level Likert scale from “very good” to “very bad”), and lifestyle, such as, frequency of physical exercise, being sitting or lying down, and alcohol and tobacco consumption during the lockdown were collected. It is worth mentioning that access to alcohol and tobacco was guaranteed in Spain during the lockdown.

Additionally, we measured the level of anxiety, stress and depression using the Depression Anxiety Stress Scale-21 (DASS-21). This scale consists of 21 items grouped into 3 dimensions (depression, anxiety and stress) with 7 items each. The participants respond to the degree to which they have experienced various symptoms during the previous week, rating it on a Likert scale ranging from 0 (never) to 3 (almost always). The score for each dimension is the sum of its items rescaled from 0 to 42, where 42 is the worst state for that dimension. Its good psychometric properties have been proven, and it has been validated in Spanish by Daza et al. [21].

Finally, the Multidimensional Scale of Perceived Social Support (MSPSS), validated in Spanish by Landeta and Calvete [22], was used to measure the level of social support perceived by the participants. This scale includes 12 items, each of them scored from 1 (totally disagree) to 7 (totally agree). The sum of the scores of the items provides an overall score (12–84 points) for perceived social support. Three dimensions (4–28 points each) measuring perceived social support from friends, family and a significant other can be obtained by adding the scores of their specific items [23]. In all cases, higher scores indicate greater support perceived [24].

### 2.3. Statistical analysis

Relative frequencies to describe qualitative variables, and the mean and the standard deviation for quantitative variables were calculated. The Kolmogorov-Smirnov test was used to check the normality in the distribution.

The reliability of the instruments used in the study (DASS-21 and MSPSS) were assessed by the Cronbach’s alpha coefficient.

A cluster analysis was carried out to identify groups of participants according to the impact of the lockdown among the University workers. We considered the following variables as indicators of the impact of the COVID-19-related lockdown: health status at the time of the survey, sleep quality during the lockdown, frequency of physical exercise, being sitting or lying down, alcohol and tobacco consumption during the lockdown, workload, and the affirmations “*this new work situation depresses or saddens me*” and “*I am worried about my professional future after the lockdown*”. These characteristics were used to classify the sample in groups (Figure 1). Given the nature of the variables, including several Likert scales, the Ward method with the squared Euclidean distance were used. The number of clusters was determined according to the dendrogram in Figure 2.

Excluding the variables used as indicators of the impact of the COVID-19-related lockdown, the differences in terms of the rest of the characteristics between the two groups obtained from the cluster analysis were tested. Chi-square tests were used in the case of categorical variables, with the Pearson’s Chi-square statistics if no more than 20% of the cells showed an expected frequency lower than 5. Otherwise, the likelihood ratio was used. The Mann-Whitney U test was used in the case of quantitative variables.

Finally, the factors associated with the clusters identified in University workers (dependent variable) were assessed using a Binary Logistic Regression Model. The rest of the variables (excluding those that had

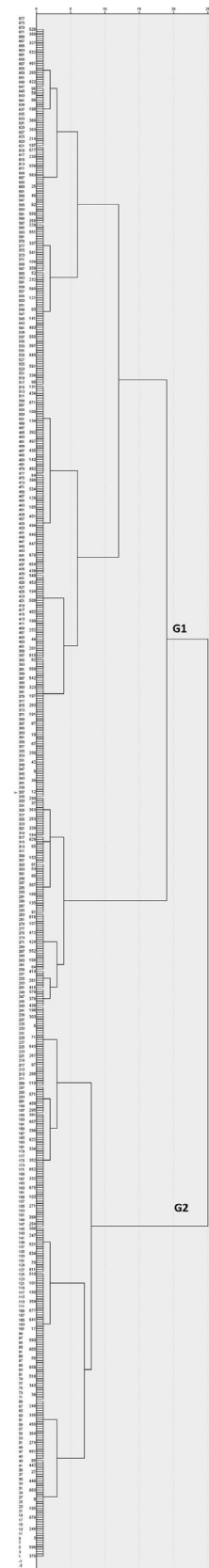


Figure 2. Dendrogram of the cluster analysis. G1: Group 1 (Consequences in the daily life routine). G2: Group 2 (Concerns for the current and future well-being).

been used to determine the groups) were included as independent variables and tested as potential confounders during the stepwise process of fit. The goodness of fit was assessed with the Hosmer-Lemeshow test. We present the odds ratios (OR) with 95% confidence interval (CI), as well as the statistical significance of each variable in the model, according to the Wald test.

All the analyses were carried out in SPSS v.24.

### 3. Results

#### 3.1. General characteristics of the university workers

A total of 677 workers answered the survey. The characteristics of the sample are shown in Table 1. Approximately the same number of women and men participated in the survey. The average age was around 49 years. They were mostly married or in a relationship (72.6%) and were RTP (62.5%). The most frequent professional categories were Senior Lecturer or Reader (33.6%) and Assistant or Associate Lecturer (23.8%) among RTF. As for ASP, groups III and IV were the most frequent (64.6%). Only 12.4% had a household income level lower than 1,500 euros per month (Table 1).

We observed that 26.5% had at least one child under 14, and 20.4% had a dependent person (over 14) at home. Most of the sample had houses between 50 and 129 m<sup>2</sup> (73%) and a little over half (58.6%) had open areas at home (Table 1).

Regarding the health conditions, 80.5% declared to have more or less the same health status as before the lockdown. A total of 33.1% had previous history of chronic disease and 13.9% had chronic pain, with 41.9% reporting greater pain intensity than before the lockdown. Almost a quarter of the sample had bad or very bad sleep quality during this period. It is of note that 24.8% performed more or much more physical exercise than before the lockdown, although 46.8% reported performing less or much less. A more sedentary lifestyle (being sitting or lying down) during the lockdown was reported by 63.6% of the respondents, while alcohol and tobacco consumption did not change very much during the lockdown (Table 1).

The results of the mental health conditions showed that the participants were generally stressed, rather than depressed or anxious. Thus, the mean score for depression according to the DASS-21 scale was 4.77; for anxiety, 3.2; and for stress, 8.01. The participants also show high levels of perceived social support, particularly from a significant other (Table 1). The reliability of these instruments were assessed with our data. The total scale of the DASS-21 had a Cronbach's alpha coefficient of 0.926, and the subscale coefficient alphas also were high (depression = 0.85; anxiety = 0.8; stress = 0.848). The total scale of the MSPSS had a Cronbach's alpha coefficient of 0.962, and the subscales coefficient alphas were 0.946 for friends, 0.966 for family and 0.944 for significant others.

As for the work conditions, 40.8% considered that their workload during the lockdown was higher than before, with 44.6% feeling stressed due to work during this period. In addition, 45.2% reported that the new work situation depressed or saddened them; 48.9% were concerned that their income level would be reduced as a result of the COVID-19 crisis; and 38.4% were worried about their professional future. On the other hand, 61.8% declared that work helped them cope with the lockdown, and most of the sample (83.9%) saw themselves capable of facing this new work situation (Table 1).

#### 3.2. Characterization of the groups

Two groups were obtained from the cluster analysis where the variables measuring the impact of the lockdown were included. The first group, with 363 participants, was characterized by a better health status and better sleep quality, although they reported more workload and work stress. They also consumed alcohol more frequently. This group might be named as "G1: Consequences in the daily life routine". On the other hand, the second group

**Table 1. Characteristics of the sample.**

Variable	Category/Unit	n	%
<b>Sociodemographic</b>			
Gender (N = 676)	Male	337	49.9
	Female	339	50.1
Age (N = 666)	Years (Mean (SD))	48.75 (10.52)	
Marital status (N = 676)	Married or in a relationship	491	72.6
	Divorced or separated	52	7.7
	Single	126	18.6
	Widow(er)	7	1
Labour sector	RTP	423	62.5
	ASP	254	37.5
Professional category (RTP) (N = 411)	Predoctoral contract	21	5.1
	Postdoctoral Research Assistantship/Fellowship	12	2.9
	Assistant or Associate Lecturer	98	23.8
	Lecturer	23	5.6
	Senior Lecturer or Reader	138	33.6
	Associate Professor	38	9.2
	Professor	64	15.6
	Other	17	4.1
	Professional category (ASP)	Group I	33
Group II		40	19.4
Group III		85	41.3
Group IV		48	23.3
Household income level (per month) (N = 669)	€500-1499	83	12.4
	€1500-2999	294	43.9
	€3000-4999	219	32.7
	€5000 or more	73	10.9
<b>Housing</b>			
Number of people living with you (including yourself) (N = 672)	1	77	11.5
	2	214	31.8
	3	154	22.9
	4	175	26
	5 or more	52	7.7
Children under 14 years old living with you. (N = 669)	0	490	73.5
	1	89	13.3
	2	72	10.8
	3 or more	16	2.4
Number of dependent people under your care (over 14 years old) (N = 659)	0	525	79.7
	1-2	121	18.4
	3 or more	13	2
Size of your home (N = 674)	Up to 49 m <sup>2</sup>	20	3
	50-89 m <sup>2</sup>	242	35.9
	90-129 m <sup>2</sup>	250	37.1
	130 m <sup>2</sup> or more.	162	24
Does your home have open areas like a garden, terrace, patio or porch? (N = 674)	No	279	41.4
	Yes	395	58.6
<b>Health conditions</b>			
Health status at the time of the survey	Much worse than before the lockdown	6	0.9
	Worse than before the lockdown	96	14.2
	Same as before the lockdown	545	80.5
	Better than before the lockdown	30	4.4
		0	0

(continued on next page)

**Table 1 (continued)**

Variable	Category/Unit	n	%
	Much better than before the lockdown		
Previous history of chronic disease	No	453	66.9
	Yes	224	33.1
Presence of chronic pain	No	583	86.1
	Yes	94	13.9
Intensity of pain during the lockdown (N = 584)	Much worse than before the lockdown	8	8.6
	Worse than before the lockdown	31	33.3
	Same as before the lockdown	46	49.5
	Better than before the lockdown	8	8.6
	Much better than before the lockdown	0	0
Sleep quality during the lockdown (N = 675)	Very good	79	11.7
	Good	229	33.9
	Not good and not bad	210	31.1
	Bad	134	19.9
	Very bad	23	3.4
Physical exercise during the lockdown	Never	75	11.1
	Much less than before the lockdown	149	22
	Less than before the lockdown	168	24.8
	Same as before the lockdown	117	17.3
	More than before the lockdown	132	19.5
	Much more than before the lockdown	36	5.3
Being sitting or lying down during the lockdown	Never	6	0.9
	Much less than before the lockdown	9	1.3
	Less than before the lockdown	28	4.1
	Same as before the lockdown	203	30.0
	More than before the lockdown	313	46.2
	Much more than before the lockdown	118	17.4
Alcohol consumption during the lockdown	Never	196	29.0
	Much less than before the lockdown	67	9.9
	Less than before the lockdown	81	12.0
	Same as before the lockdown	261	38.6
	More than before the lockdown	61	9.0
	Much more than before the lockdown	11	1.6
Tobacco consumption during the lockdown	Never	559	82.6
	Much less than before the lockdown	13	1.9
	Less than before the lockdown	10	1.5
	Same as before the lockdown	71	10.5
	More than before the lockdown	19	2.8
	Much more than before the lockdown	5	0.7

**Table 1 (continued)**

Variable	Category/Unit	n	%
DASS-21 Depression score	Scale 0–42 (Mean (SD))	4.77 (5.776)	
DASS-21 Anxiety score	Scale 0–42 (Mean (SD))	3.20 (4.669)	
DASS-21 Stress score	Scale 0–42 (Mean (SD))	8.01 (7.024)	
MSPSS Social support (Global)	Scale 12–84 (Mean (SD))	70.53 (15.06)	
MSPSS Social support (Friends)	Scale 4–28 (Mean (SD))	22.60 (5.74)	
MSPSS Social support (Family)	Scale 4–28 (Mean (SD))	23.90 (5.33)	
MSPSS Social support (Relevant person)	Scale 4–28 (Mean (SD))	24.03 (5.70)	
<b>Work conditions</b>			
Consider their workload during the lockdown to be	Lower than the workload they had before	144	21.4
	More or less equal to the workload they had before	255	37.8
	Higher than the workload they had before	275	40.8
I felt work stress during the start of lockdown	Strongly disagree	106	15.7
	Disagree	130	19.2
	Neither agree nor disagree	139	20.5
	Agree	195	28.8
	Strongly agree	107	15.8
This new work situation depresses or saddens me.	Strongly disagree	79	11.7
	Disagree	116	17.1
	Neither agree nor disagree	176	26.0
	Agree	222	32.8
	Strongly agree	84	12.4
Work helps me cope with the lockdown.	Strongly disagree	32	4.7
	Disagree	62	9.2
	Neither agree nor disagree	165	24.4
	Agree	291	43.0
	Strongly agree	127	18.8
I see myself capable of facing this new work situation.	Strongly disagree	12	1.8
	Disagree	23	3.4
	Neither agree nor disagree	74	10.9
	Agree	337	49.8
	Strongly agree	231	34.1
I am worried about my professional future after the lockdown.	Strongly disagree	175	25.8
	Disagree	125	18.5
	Neither agree nor disagree	117	17.3
	Agree	141	20.8
	Strongly agree	119	17.6
Do you think that your income level will be altered as a result of the COVID-19 crisis?	Yes, it will decrease	331	48.9
	No, it will remain the same	186	27.5
	Yes, it will increase	4	0.6
	Do not know	156	23

SD: Standard deviation; RTP: Research and Teaching Personnel; ASP: Administration and Services Personnel; n: Absolute frequency; %: Relative frequency expressed in percentage; N: total number of respondents to a specific question when the number does not equal to the sample size.

(N = 216) reported more depression and concerns about their professional future, and consumed more tobacco. This group might be named as “G2: Concerns for the current and future well-being” (Figure 3).

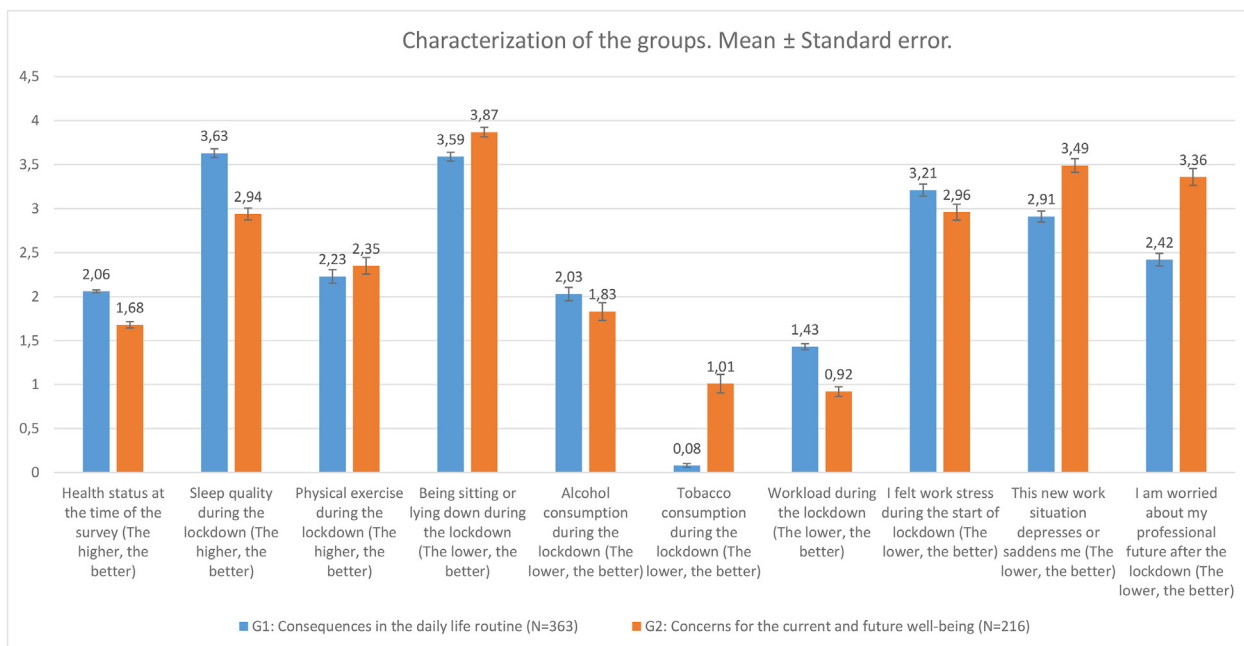


Figure 3. Characterization of the groups. Mean ± Standard error.

3.3. Differences between the groups and factors related

Regarding the differences between groups, we found that “G1: Consequences in the daily life routine” was mainly composed of men (55.2% vs. 43.4% in G2), RTP (73.3% vs. 49.8% in G2) with more stable professional categories (70% were lecturers or higher, vs. 53.2% in G2), higher income level (51.7% above 3000 euros per month, compared to 34.54% in G2) and bigger houses (only 33.2% over 90 square meters, vs. 45.5% in G2). In “G2: Concerns for the current and future well-being”, 63.6% presented worse or much worse intensity of pain than before the lockdown (compared to 25.5% in G1), more anxiety (DASS-21 mean of 4.55 vs. 2.07 in G1), more depression (DASS-21 mean of 6.5 vs. 3.29 in G1), more stress (DASS-21 mean of 10.06 vs. 6.28 in G1) and less social support (MSPSS mean of 69.18 vs. 71.92 in G1). Moreover, in G2, the social support was lower in the three subscales: friends, family and significant other (Table 2 and Figure 4). We note that Mann-Whitney U tests were used to check the differences in Table 2, and Chi-square tests in Figure 4.

Finally, the factors associated with the impact of the lockdown in University workers according to the results of the binary logistic regression model included labour sector, number of people at home, intensity of pain during the lockdown and social support from friends. Gender remained in the model as an important adjustment variable. More specifically, ASP had almost 6 times the risk of belonging to G2

(Concerns for the current and future well-being) than RTP. A higher number of people living at home (including themselves) decreased the risk of being in G2 (OR = 0.439). People whose intensity of pain was lower (better status) had less risk of being in G2 (OR = 0.014), and this risk also decreased as the social support from friends increased (OR = 0.833). The reference group in this model was G1 (Consequences in the daily life routine) (Table 3).

4. Discussion

To our knowledge, this is the first study carried out in Spain identifying groups of University workers with a clearly different impact due to the COVID-19-related lockdown, and specific factors associated with each of these groups. The results obtained reveal two groups where the first group, “G1: consequences in the daily life routine” is formed essentially by research and teaching personnel and is characterized by having a better self-perceived health status and a better sleep quality. However, they considered having a higher workload, and felt work stress during the lockdown. On the other hand, the second group, “G2: concerns for the current and future well-being”, was made up of women, administration and services personnel who increased smoking, were more depressed and sad because of the situation, as well as more concerned about their professional future after the lockdown. Furthermore, this group includes participants with a higher intensity of pain and less social support.

Table 2. Differences in mood and social support between the groups.

Variable	Category/Unit	G1: Consequences in the daily life routine	G2: Concerns for the current and future well-being	p <sup>a</sup>
DASS-21 Depression score	Scale 0–42 (Mean (SD))	3.29 (4.09)	6.5 (6.92)	<0.001
DASS-21 Anxiety score	Scale 0–42 (Mean (SD))	2.07 (3.19)	4.55 (5.7)	<0.001
DASS-21 Stress score	Scale 0–42 (Mean (SD))	6.28 (5.83)	10.06 (7.77)	<0.001
MSPSS Social support (Global)	Scale 12–84 (Mean (SD))	71.92 (14.51)	69.18 (15.31)	0.004
MSPSS Social support (Friends)	Scale 4–28 (Mean (SD))	23.17 (5.56)	22.04 (5.79)	0.003
MSPSS Social support (Family)	Scale 4–28 (Mean (SD))	24.36 (5.03)	23.45 (5.54)	0.028
MSPSS Social support (Significant other)	Scale 4–28 (Mean (SD))	24.39 (5.53)	23.7 (5.8)	0.054

G1: Group 1 (Cluster); G2: Group 2 (Cluster); SD: Standard deviation.

<sup>a</sup> Mann-Whitney U.

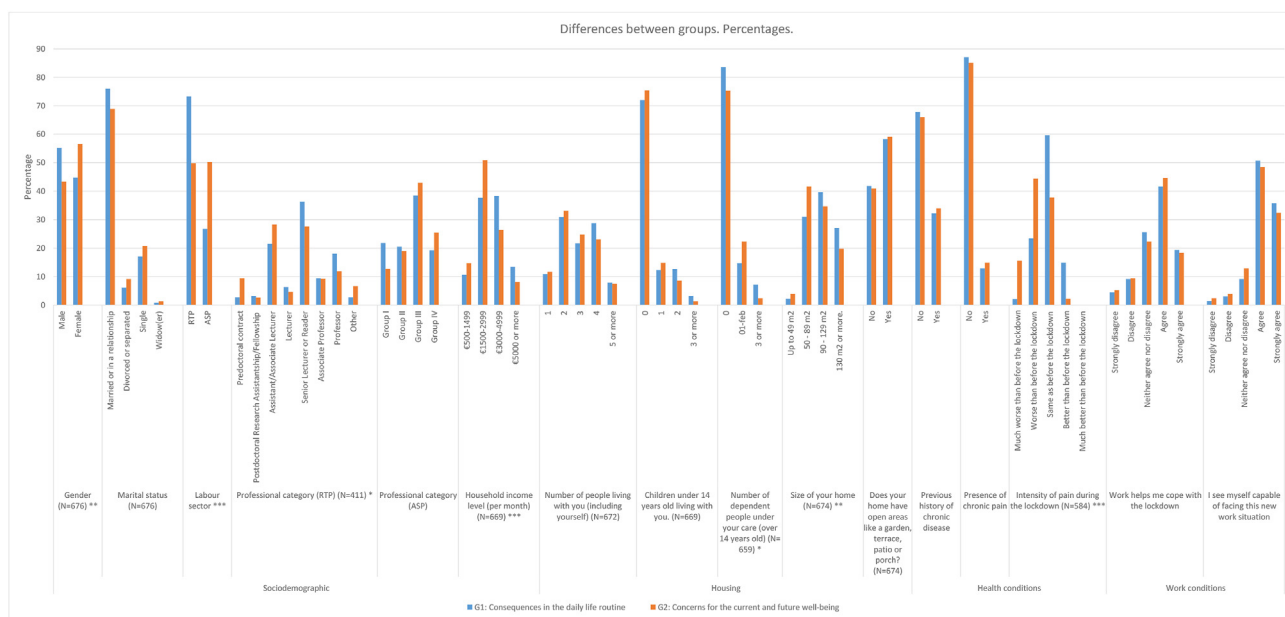


Figure 4. Differences between groups. Percentages. Differences checked via Chi-square tests. \*p-value<0.05; \*\*p-value<0.01; \*\*\*p-value<0.001.

It is not surprising that the factors related to participants included in G1 (“consequences in the daily life routine”) are a higher professional category, higher income, and higher level of education, since historically, higher socioeconomic status has been associated with better access to resources and health conditions [25, 26, 27], as shown in our results and according with the social determinant of health [20]. However, during the COVID-19-related lockdown, people in G1 were those who suffered more work stress. Some authors [28] have shown a strong positive relationship between the level of education and the capacity for working from home under lockdown in all European countries. Remote workers have been exposed to a stressful situation with a significant emotional involvement, with no clear separation between home and work tasks, seeing the working schedule prolonged on some occasions [29]. As referred by the participants included in G1, they assumed a higher workload during the lockdown, which led to stress, affected their well-being, and on some occasions, led to burnout [30].

However, despite the conditions previously described in G1 (Consequences in the daily life routine), it was G2 (Concerns for the current and future well-being) that showed more concerns about their professional future after the lockdown, and higher levels of anxiety and depression. These concerns are reasonable if we consider that most of this group were

ASP whose work requires being on-site to be performed, which was impossible during the lockdown. In addition, the differences observed in the study between groups could reveal underlying differences by gender, since being a woman was one of the factors associated with belonging to the group who suffered a worse impact. Based on the theoretical framework on social determinants of health [20], this overrepresentation of women with lower socio-economic position in G2 could be argued as follows. Although women make up nearly 60% of undergraduate and Master’s students, the situation is reversed when the job positions are more stable and of greater responsibility, thus the underrepresentation of women in the more qualified group (RTP sector) continues to be a national concern. The Spanish Institute for Women and for Equal Opportunities [31] has observed that the coronavirus pandemic is having a devastating effect on gender equality. Women are bearing the brunt of extra childcare and housework and are losing jobs in greater numbers than men. This perceived job strain and economic instability are associated with poor mental health, such as depression and anxiety [32, 33], which is also shown in our results. Additionally, some authors stated that the main concern of Spaniards during the lockdown was the economic recession that will very likely follow the current health crisis, rather than the health issue itself [14]. Finally, some authors have shown that

Table 3. Factors associated with the impact of the lockdown in University workers. Binary logistic regression model.

Variable	Category	B(SE)	OR	95CI%(OR)	p
Gender	Male*				
	Female	0.699(0.58)	2.012	(0.641; 6.318)	0.231
Labour sector	RTP*				
	ASP	1.769(0.69)	5.863	(1.508; 22.799)	0.011
Number of people living with you (including yourself)		-0.823(0.27)	0.439	(0.261; 0.740)	0.002
Intensity of pain during the lockdown	Much worse*				
	Worse	-0.645(1.32)	0.525	(0.040; 6.963)	0.625
	As before	-2.278(1.307)	0.103	(0.008; 1.330)	0.081
	Better	-4.275(1.76)	0.014	(0.000; 0.441)	0.015
MSPSS Social support (Friends)	Scale 4-28	-0.183(0.06)	0.833	(0.740; 0.937)	0.002

OR: ODDS Ratio; CI: Confidence interval. RTP; Research and Teaching Personnel; ASP: Administration and Services Personnel.

Dependent variable: Cluster group (G2 (Concerns for the current and future well-being) vs. G1 (Consequences in the daily life routine)\*).

Hosmer-Lemeshow test: Chi-square = 7.764; df = 8; p = 0.457.

\* Reference category.

"Interpersonal Trust", defined as "a willingness to accept vulnerability or risk based on expectations regarding another person's behaviour", has profound effects to contrast the detrimental effects of financial hardship on mental health during an economic crisis [34].

Furthermore, the higher anxiety and depression levels found in G2 (Concerns for the current and future well-being) could be explained not only by the concerns shown about the professional future, but also by the presence and intensity of pain, which got worse during the lockdown in this group. The experience of living with this pandemic has disrupted daily life among all individuals, especially those living with a previous illness like chronic pain (CP) [35]. In line with the characteristics of this group, CP is known to be higher among women and related to anxiety and depression as the most common mental problems [36, 37, 38, 39]. Following social determinants of health [20], the co-occurrence of two or more medical conditions has been proven to be more prevalent in the participants with low socio-economic status [40, 41], which was another characteristic of the group G2, composed by workers with a lower income level and professional category. The COVID-19 pandemic might have triggered an exacerbation of symptoms resulting from CP due to both public health and personal issues. Regular medical care may be less accessible or closed, healthcare professionals may be diverted to COVID-19-related activities, and waiting times may be prolonged, especially for medical illnesses such as CP that many consider non-urgent [42, 43] which could have had consequences on the mental health and on the control of the intensity of pain of these people.

Another factor associated with G2 (Concerns for the current and future well-being) was having less social support from friends. In line with this result, Costanza A. et al [44] showed that among patients admitted to a psychiatric ED, the major fears were related to loneliness and isolation during different time periods of the COVID-19 pandemic, regardless of changes in social sanitary measures. On the other hand, some authors [45] have reported an increase in community spirit or neighbourhood cohesion during the first wave. However, for some vulnerable groups, including people with low socioeconomic status or with pre-existing mental and physical health conditions, social support was persistently lower (around 10–15%) than for those from wealthier backgrounds or without physical or mental health conditions [45]. Andrews et al. also found that the deterioration of physical functioning and pain-related mental health are the aspects that contribute most to hindering social integration capacities [46], which could explain the results observed in G2 in our study.

Some limitations must be taken into account in this study. First, it was carried out in just one University from Spain, which makes generalization difficult. It would have been desirable to expand the sample to other Universities, but we believe that the volatility of the situation would have led to a different impact if we had expanded the data collection later in time. The results, however, are in line with the job-related findings shown in other scientific articles regarding differences in the impact of the lockdown due to the COVID-19 [47–49]. The information was gathered via email, which may contribute to some bias. However, this data collection method allowed us to make a longer questionnaire than in telephone interviews, in which we could not have used validated scales such as DASS-21. Nevertheless, some constructs (such as the sleep quality or work stress) were measured with a Likert scale in a single item in order to enshort the questionnaire, and it has been argued that it could lead to bias, since they can be seen as multidimensional constructs. Finally, the data was collected after three-and-a-half weeks of lockdown, and there is a possibility that the impact would be different at the end of the lockdown. However, the uncertainty of its duration and the lack of control could also have had an important impact. It is important to note that, at the time of the survey, the lockdown was supposed to last much less than it finally did. The survey was administered when supposedly the situation was close to its end. As a strength, as mentioned before, we add to the current knowledge important information focused on the identification of groups of University workers with a clearly different impact due to the COVID-19-related lockdown, and specific factors associated with each of these groups.

In conclusion, this study shows that during COVID-19-related lockdown, many features related to health status, work conditions, lifestyle, and social support, were different among the two groups of University workers identified. On the one hand, in the group composed mostly by men, with a higher socioeconomic level and more stable jobs, the consequences were immediately reflected in the stress due to the change in their daily work routine. However, on the other hand, in the group composed by mostly by women, with more unstable and less qualified jobs, the concerns were more related to their professional situation in the future, with worse mental health, greater intensity of pain and less social support during the lockdown.

Due to the lockdown's effects on university employees, it is crucial to assess and keep track of the workers' psychological and physical health. Related to the G1 ("consequences in the daily life routine"), it is important to implement a variety of strategies that improve the quality of the jobs in case of future problems, such as implementing equipment and adequate tools for working from home, and impose a routine with strict schedules and habits to differentiate between work hours and leisure time. The impact of the lockdown on G2 ("Concerns for the current and future well-being"), is better explained by the axes of inequities of the framework on social determinants of health from the World Health Organization, that explains mechanisms that generate health inequities. Thus, the impact of Covid-19 lockdown on this population is not just an isolated phenomenon, but it must be studied in his context. Public health measures should be taken into consideration to minimize the impact that COVID-19 and other phenomena such as work and employment conditions, income, and housing, have on the health of vulnerable populations in order to minimize health inequities.

### Statements of ethical approval

The study was conducted in accordance with the international ethical standards contained in the Declaration of Helsinki. The workers were informed of the nature and objective of the study, and were asked to voluntarily sign the informed consent, guaranteeing their anonymity during the whole process. The University of Cádiz gave us consent to carry out this survey, ensuring adherence to ethical standards.

### Declarations

#### Author contribution statement

H. de Sola; A. Salazar: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

J. Palomo-Osuna; M. Dueñas; I. Failde; J. A. Moral-Munoz: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data.

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#### Data availability statement

The data that has been used is confidential.

#### Declaration of interest's statement

The authors declare no competing interests.

#### Additional information

No additional information is available for this paper.



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