Research article

Work engagement and sense of coherence as predictors of psychological distress during the first phase of the COVID-19 pandemic in Chile

Juan Gómez-Salgado [a,b,*], Diemen Delgado-García [c,d], Mónica Ortega-Moreno [e], Javier Fagundo-Rivera [f], Luis El Khoury-Moreno [g], Ángel Vilches-Arenas [h,i], Carlos Ruiz-Frutos [a,b]

[a] Department of Sociology, Social Work and Public Health, Faculty of Labour Sciences, University of Huelva, Huelva, Spain
[b] Safety and Health Postgraduate Programme, Universidad Espíritu Santo, Guayaquil, Ecuador
[c] Universidad de Aconcagua, Los Andes, Chile
[d] School of Medicine, Neurology and Psychiatry, Universidad de Texas Rio Grande Valley, Edinburg, USA
[e] Department of Economy, University of Huelva, Huelva, Spain
[f] Centro Universitario de Enfermería Cruz Roja, Seville, Spain
[g] Department of Stomatology, University of Seville, Seville, Spain
[h] Department of Preventive Medicine and Public Health, University of Seville, Seville, Spain
[i] Department of Preventive Medicine, Hospital Universitario Virgen Macarena, Seville, Spain

ARTICLE INFO

ABSTRACT

Objectives: The aim of this study was to analyse the relationship between sense of coherence, work engagement, and work environment variables as predictors of the level of psychological distress during the first phase of the COVID-19 pandemic in Chile.

Methods: Cross-sectional descriptive study collected between April 22 and December 16, 2020, using non-probabilistic snowball sampling. The study variables and instruments were socio-demographic variables, work engagement (UWES-9 scale), sense of coherence (Antonovsky SOC-13 scale), and psychological distress (GHQ-12 scale). Multivariate analysis and binary logistic regression were performed including the scores of the three questionnaires and other variables such as effectiveness, safety, stress, health perception, and sex. Finally, the CHAID technique was applied to create a segmentation tree.

Results: 72.7 % of participants had high levels of psychological distress, more predominantly among women, with work stress and low sense of coherence acting as the most influential mediators in generating psychological distress, and even more so when both were combined. Low work engagement and the availability of safe and effective means to prevent infection were predictors of psychological distress among workers.

Conclusion: During the first phase of the COVID-19 pandemic, factors that contributed to psychological distress in the Chilean population were identified. These included a fair or poor perception of health, being a woman, work-related stress, availability of safety measures, low

---

level of work engagement, and low level of sense of coherence. Identifying these factors may help prevent similar effects in future phases of the current pandemic or in future pandemics.

1. Introduction

The new social context derived from the COVID-19 pandemic has had a significant impact on various areas of human development [1,2]. Within the context of the first phase of the pandemic, the resulting confinement measures led to an increase in depression, anxiety, and anger; and it is important to note that these effects have been observed to become more prevalent as the period of confinement increased [3,4]. This generated worldwide alarm and caused governments to focus their resources on mitigating the socioeconomic effects of the pandemic, including an expected large emotional impact [5]. In this regard, it should be noted that during the first phase of the pandemic, some workers had to adapt to teleworking while others had to work away from home. The latter group showed a worse mental health state, presumably due to the fear of contagion and transmission of COVID-19 to their families and relatives upon returning home [6]. However, the sudden implementation of work restrictions and new models of real-time connection had an immediate and unforeseen impact on the mental health of teleworkers, partly due to changes in the psychosocial perception of the work environment. This fact also led to an increase in psychological distress and work overload for those who worked from home [7,8].

All in all, it can be affirmed that COVID-19 has transformed the work environment of most occupational groups, changing the work demands of workers in accordance with the new conditions imposed by the pandemic. For example, those working away from home experienced work interruptions and reduced working hours, resulting in an intensified workload and increased work strain due to stress, absence of shift peers, and multitasking. Likewise, due to the implementation of health and safety measures in the workplace, personal contacts were reduced, and social distancing increased due to the risk of getting infected with COVID-19. This led to a reduction in direct and social peer support and the reinforcement of virtual teamwork, leadership, and management resources. Similarly, those who worked from home also saw their work demands altered as a result of remote working conditions. In this regard, technological stress and strict control of working hours and virtual tasks increased the psychological impact of the pandemic on employees, families and organisations, leading to competing care responsibilities, the problem of absenteeism, and work-family conflicts [8–10].

Following this, the Job Demands-Resources model states that workers' mental well-being can be negatively affected by job demands, such as intense or difficult work. To counteract these demands, employees and organisations can provide resources such as self-efficacy, adaptability, creativity, or social support from colleagues to moderate the stressor–strain relationship [8,10]. The use of the Job Demands-Resources model in studies has steadily increased over the last decade to predict burnout, organisational commitment, and work engagement [11]. However, after the pandemic, recent research suggests that job demands can affect work engagement and job burnout through job insecurity [12]. This is evidenced by the workload and risk of contagion from COVID-19 in health care workers, the economic and accommodation uncertainty in the hospitality sector, and the increased work-to-family conflicts for those forced to work from home, among others [10,13]. Consequently, the psychological distress associated to job demands, changes in the working conditions, insecurity, and lack of coping resources during the COVID-19 pandemic could lead to more serious impairments such as psychosomatic complaints and depression [8].

In May 2020, Chile, and particularly the capital city, Santiago, had the third highest incidence and mortality of COVID-19 in Latin America, after Brazil and Peru, despite the fact that the national government had introduced strong physical distancing measures, case tracking systems, and severe restrictions on movement following the first wave [14–16]. As a result, by summer 2020, the national unemployment rate had reached 13.5 %, causing significant economic difficulties for the Chilean population [17]. Historically, Chile has been revealed as a developing country characterised by high-income and sex inequalities [17,18], mainly due to a relatively collectivistic culture that places great importance on family [17] and a so-called structural violence as the state policies tolerate a society in which women are disadvantaged [19]. These stereotypes resulted in an increased presence of Chilean women in the non-formal sector, and they are also primarily responsible for homecare [19,20], thus fronting more impediments than men to access to the labour market due to organisational factors, family ties and lack of access to higher education [17]. Consequently, this pre-pandemic social vulnerability made that being female, perceiving loneliness, and having job insecurity were significantly related to psychological distress in the Chilean population during the first months of the COVID-19 pandemic [15]. In the case of this country, the large percentage of people who suffered from a psychological disorder before the pandemic stands out, with a prevalence of depressive symptoms of 15.8 % nationwide [21]. In this regard, many publications have corroborated the severe consequences of the pandemic on the mental health of the Chilean population during and after the first waves [15,18,22–24].

Psychological distress can trigger widespread changes in regular routines and social and labour relations; therefore, it is necessary to identify its consequences and detect the protective factors affecting it [25]. The efficient application of coping strategies, including sense of coherence, can help people manage psychologically demanding events and may play a key role in preventing mental illnesses [6,25]. Alternatively, psychological distress can negatively affect work engagement [26], which is a psychological reaction that arises when individual characteristics interact with the work environment, and which is based on the Job Demands-Resources Model [10,11].

Sense of coherence (SOC) is defined as a global, non-specific orientation that reflects an individual's perception of life. This concept is measured on three dimensions: comprehensibility, manageability, and meaningfulness [27]. According to the salutogenic model, SOC is considered to be the origin of health [28]. It is one's capability to comprehend circumstances, identify it as manageable, and

have the ability to mobilise resources to effectively respond to it [29]. SOC appears to behave as an intermediating and predicting indicator of health status, where stress, burnout, and post-traumatic stress are negatively correlated with SOC, while job gratification, welfare, and quality of life are certainly correlated with this concept [30]. Indeed, the negative association of SOC with post-traumatic stress could be corresponded to the strain produced by the COVID-19 context [31]. On the other hand, work engagement integrates three dimensions, dedication, absorption and vigour, and it is defined as a positive and satisfying attitude towards work and its successful accomplishment [32]. Both, work engagement and SOC are positively correlated [33] and negatively correlated with psychological distress [34]. According to prior research [9,31–33], SOC and work engagement are expected to play a differential role in workplace adaptation to the COVID-19 pandemic. However, pre-pandemic evidence stated that SOC and work engagement should be jointly analysed in different healthcare settings to demonstrate their relationship [33]. And, in fact, only a few pieces of evidence have already investigated these variables in Chile, and always independently, so the role of these two variables in the joint prediction of psychological distress has never been tested in this country and is now of particular interest in view of the outbreak of the pandemic.

Following on from the aforementioned relationship between the work environment and workers' mental health as a consequence of the pandemic [8], the research question of this study asks how the changes in job demands and job resources (working conditions) that occurred during the first phase of the COVID-19 pandemic in Chile have led to these alterations in the mental well-being of the population. We also question the capacity of SOC and work engagement to act jointly as modulators of psychological distress at work in this context of health crisis in Chile.

With all this, the aim of this study was to analyse the labour-related variables associated with the sense of coherence and work engagement, as predictors of the level of psychological distress during the first phase of the COVID-19 pandemic in Chile. This study has a twofold significance. Firstly, Chile has a relatively high prevalence of mental illness and limited access to quality care due to insufficient coverage and high treatment costs [35]. Secondly, this study contributes to a better understanding of the relationship between work engagement, sense of coherence, and mental health and its modulating factors in the work environment by conducting this research using a population that has not been previously studied within the context of this topic.

2. Materials and methods

2.1. Design

Cross-sectional, descriptive observational study.

2.2. Participants

A sample of 1466 participants was obtained using a convenience sampling method, with voluntary participation and provided they had given their informed consent. Adult people (18 years of age or older) who were actively working, and residing in Chile during the COVID-19 pandemic were included.

2.3. Variables and instruments

Questions from previous studies [36] were included, which were adapted and completed as required, including socio-demographic variables: sex, age, last completed studies, marital status, having children, current employment, work experience, and actively working during the lockdown, among others. Health perception during the last two weeks and previous to the pandemic, collected by means of an item with five possible responses from 'very bad' to 'very good', was also assessed. This is a well-known predictor of health [37] and it has been used in a large number of previous health surveys and pandemics [38], and in the current one [36].

Work environment was assessed by 17 multiple-choice questions using a Likert-type scale ranging from 1 to 10. The value of 1 meant 'Strongly disagree' and a value of 10 meant 'Strongly agree'. The study variables included: social awareness; job satisfaction; job stress; increased workload due to the pandemic; general psychological support for direct workers and families affected by COVID-19; accepting the risk of infection as part of the job; risky profession; work disputes; sources of risk; close contact; and preventive measures.

Work engagement was assessed using the UWES 9-item scale (Cronbach's alpha 0.937) [39]. This scale uses a Likert-type response

Table 1
Psychological stress and sense of coherence threshold values.

		Cases	%
UWES 9			
Low	[0, 28]	375	25.58 %
Intermediate	(28, 46]	739	50.41 %
High	(46, 54]	352	24.01 %
Total overall		1466	100.00 %
SOC-13			
Low	[13, 56]	398	27.15 %
Intermediate	(56, 75]	713	48.64 %
High	(75, 91]	355	24.22 %
Total overall		1466	100.00 %

(1 = never to 7 = always) and includes 3 dimensions: vigour (i.e. *I am strong and vigorous in my work*), dedication (i.e., *When I get up in the morning, I feel eager to go to work*), and absorption (i.e., *I am happy when I am absorbed in my work*). Higher scores mean a higher commitment with work. The overall scores were categorised into: low (from minimum to the 25th percentile), intermediate (50 % of the cases), or high (from the 75th percentile to the maximum value) (Table 1).

The Spanish version of the Antonovsky's 13-item questionnaire (SOC-13) [40] was used to assess the sense of coherence. Scores could range from 13 to 91 points, and the responses were categorised in the same three categories as UWES-9. A Cronbach's alpha of 0.849 was obtained. Three dimensions were evaluated: Meaningfulness (i.e., *Do you have the feeling that you really don't care about what is going on around you?*); Comprehensibility (i.e., *Do you have very mixed-up feelings and ideas?*); and Manageability (i.e., *Has it happened that people whom you counted on disappointed you?*).

Goldberg's GHQ-12, General Health Questionnaire [41], assessed mental health and psychological adjustment by addressing variables related to coping with problems, daily routines, sustained stress, loss of sleep, or unhappiness, among others. This questionnaire has been used for the screening of non-psychotic psychiatric syndromes and measured the influence of previous epidemics such as SARS [42]. Scores of less than 3 are marked as no psychological distress and $\geq$3 is treated as psychological distress. Cronbach's alpha of 0.895.

A pilot study was initially performed on 20 individuals to assess clarity and comprehension of the text. These participants met the inclusion criteria and were selected by convenience sampling. No comprehension problems nor digital failures were reported by the participants.

2.4. Procedure

Participants completed their questionnaire online, using the Qualtrics® (Provo, UT, USA) survey platform. Anonymous and confidential answers were recorded by the authors. Its dissemination involved the collaboration of universities and scientific societies, as well as social networks and interviews conducted in the media. Participants were encouraged to spread the questionnaire among their colleagues and friends to trigger a snowball effect. The questionnaires were collected between April 21 and December 24, 2020.

2.5. Data analysis

A descriptive analysis of the socio-demographic variables was carried out and the number of cases, mean, standard deviation, skewness and kurtosis coefficients, quartiles and extreme values of the variables of interest were presented. The quartiles allowed to classify the variables into three groups, from the minimum to the first quartile, from the first to the third quartile, and from the third to the maximum quartile, in order to subsequently construct a segmentation tree. Missing data were addressed by eliminating questionnaires with a high percentage of absent data.

Binary logistic regression allowed the construction of a model to assess the presence or absence of psychological distress and its related variables. The goodness-of-fit measures included the Hosmer-Lemeshow test, sensitivity and specificity, and the percentage of correctly classified values. To avoid multicollinearity, a stepwise regression technique was used to select the most relevant variables. The inclusion of variables was carried out based on statistical significance tests; also, ORs were estimated, and confidence intervals were provided for this measure of association.

Finally, the Chi-squared Automatic Interaction Detection (CHAID) method allowed to detect the independent variables with the highest interaction with the psychological distress measured by GHQ. The CHAID method is a statistical technique used to build segmentation trees. These trees identify groups of data with similar characteristics, instead of classifying or predicting a target value. The goodness of fit of the structure was assessed by cross-validation when generalized to a larger population. Finally, a segmentation tree was built to illustrate this process.

The SPSS 26.0 statistical software (IBM, Armonk, NY, USA) was used was the analyses.

2.6. Ethical considerations

Participants were asked to read the objectives of the study, and they were informed that it was voluntary and that they could drop out at any time. The data were recorded anonymously and treated confidentially. The Ethics Committee of the University of Aconcagua in Chile (Santiago, UAC-22 April 2020) and the Research Ethics Committee of Huelva, belonging to the Regional Ministry of Health of Andalusia, Spain (PI 036/20), approved this study protocol.

3. Results

In the analysed sample, there was a majority of women (61.5 %), living without a partner (53.2 %), with a high level of education (89.2 % university), with children (59.0 %), without a pet (66.4 %), and with a mean age of 40.48 (SD = 12.02). The highest percentage worked for private companies (46.3 %), 38.1 % in public companies, and 15.6 % were self-employed. More than 75 % of the sample claimed to have had an optimal health perception during the last two weeks.

3.1. Descriptive analysis of SOC, work engagement, and psychological distress

In Table 2, it can be seen that the mean value of the sense of coherence (SOC) variable was 64.79 (SD = 13.63 %). For the

'comprehensibility' dimension, it was M = 23.24 (SD = 6.33), for the 'meaningfulness' dimension, it was M = 21.82 (SD = 4.58), and for the 'manageability' dimension, M = 19.72 (SD = 4.70).

In the analysed sample, the mean value of work engagement was (M = 38.91; SD = 11.31). The 'dedication' dimension had the highest mean value (M = 13.16; SD = 4.11), followed by the 'absorption' dimension (M = 12.80; SD = 3.84) and the 'vigour' dimension (M = 10.95; SD = 4.34) (Table 2).

Psychological distress (PD), according to the general health level of the Goldberg questionnaire (GHQ-12), had a mean value of (M = 5.19; SD = 3.58). The percentage considered as high PD (GHQ-12 cut-off point $\geq$3) was 72.7 % (Table 2).

3.2. Work environment

Among the surveyed variables of the work environment, with a rating range of 1–10, those that exceeded 7 were: 'Do you think your department, service, unit or company has provided you with the necessary means and material to safely carry out your job?' M = 7.63 (SD = 2. 69); 'Do you consider there has been an increase in the workload after the onset of the health crisis?' M = 7.63 (SD = 3.07); 'Do you feel more stressed at work' M = 7.42 (SD = 3.00); and 'Do you think your department, service, unit or company has provided you with the necessary means and material to effectively carry out your job?' M = 7.33 (SD = 2.74). Values below 5 were given to 'Have you observed any increase in labour conflict in your job?' M = 4.77 (SD = 3.23) and 'Do you accept the risk of getting infected as part of your job?' M = 4.77 (SD = 3.68) (Table 2).

3.3. Prediction of psychological distress

As can be seen in Table 3, PD is predicted on the basis of a fair or poor perception of health during the previous 14 days (OR = 3.736; 95 % CI = 1.959–7.126); being a woman (OR = 1.952; 95 % CI = 1.454–2.621); the degree of stress at work (OR = 1.345; 95 % CI = 1.279–1.413); that the company has failed to provide with safety measures against the pandemic (OR = 1.191; 95 % CI = 1.057); having had the equipment and means necessary to carry out work effectively (OR = 0.887; 95 % CI = 0.787–0.998); a low level of work engagement (UWES score) (OR = 0.961; 95 % CI = 0.944–0.978); and a low level of sense of coherence (SOC-13 score) (OR = 0.924; 95 % CI = 0.910–0.938).

3.4. Decision tree

Fig. 1 shows that 72.7 % of the individuals in the sample had psychological distress (GHQ $\geq$3), with this percentage varying according to the different branches of the segmentation tree. Stress is the variable with the strongest interaction with psychological distress, and the sense of coherence (SOC) variable is placed at a second level.

The higher percentages of psychological distress were shown in the case of low scores on SOC-13: psychological distress was present in 97.8 % of individuals with high stress and in 91.1 % of individuals with intermediate stress. When SOC was intermediate, this percentage was 92.2 % of cases with high stress and 75.5 % in cases with intermediate stress. The percentage of high stress was reduced

Table 2
Description of quantitative variables.

	N	Mean	SD	Asymmetry	Kurtosis	Minimum	P_{25}	P_{50}	P_{75}	Maximum
SOC-13	1466	64.79	13.63	−0.49	−0.09	13	56	66	75	91
Comprehensibility	1466	23.24	6.33	−0.38	−0.42	5	19	24	28	35
Manageability	1466	19.72	4.70	−0.56	0.09	4	17	20	13	28
Meaningfulness	1466	21.82	4.58	−0.73	0.26	4	19	22	25	28
UWES-9	1466	38.91	11.31	−0.50	−0.52	0	28	38.5	46	54
Vigour	1466	10.95	4.34	−0.24	−0.93	0	8	11	15	18
Dedication	1466	13.16	4.11	−0.72	−0.27	0	10	14	17	18
Absorption	1466	12.80	3.84	−0.66	−0.19	0	10	14	16	18
GHQ-12	1466	5.19	3.58	0.24	−1.04	0	2	5	8	12
EFFECTIVENESS	1466	7.33	2.74	−0.93	−0.21	1	6	8	10	10
SAFETY	1466	7.63	2.69	−1.08	0.125	1	6	9	10	10
CONFLICT	1466	4.77	3.23	0.27	−1.34	1	1	5	8	10
RISK	1466	6.13	3.71	−0.31	−1.58	1	2	7	10	10
ACCEPTANCE	1466	4.77	3.68	0.29	−1.59	1	1	4	9	10
WORKLOAD	1466	7.63	3.07	−1.06	−0.27	1	6	9	10	10
STRESS	1466	7.42	3.00	−0.95	−0.38	1	5	8	10	10
SATISFACTION	1466	6.70	2.50	−0.55	−0.46	1	5	7	9	10

SOC-13: Sense of coherence. UWES-9: Work engagement. EFFECTIVENESS: Do you think your department, service, unit or company has provided you with the necessary means and material to EFFECTIVELY carry out your job?; SAFETY: Do you think your department, service, unit or company has provided you with the necessary means and material to SAFELY carry out your job?; CONFLICT: Have you observed any increase in labour conflict in your job?; RISK: Do you think your profession or workplace put you at risk of getting infected?; ACCEPTANCE: Do you accept the risk of getting infected as part of your job?; WORKLOAD: Do you consider there has been an increase in the workload after the onset of the health crisis?; STRESS: Do you feel more stressed at work?; SATISFACTION: How would you score your job satisfaction during the present COVID-19 situation?; P25: Percentile 25; P50: Percentile 50; P75: Percentile 75.

Table 3
Prediction of psychological distress.

	TOTAL ($N = 1466$)
	Odds Ratio (Confidence Interval at the 95 level)
SOC-13	0.924** (0.910,0.938)
UWES-9	0.961** (0.944, 0.978)
Effectivity	0.887* (0.787, 0.998)
Safety	1.191** (1.057, 1.343)
Stress	1.345** (1.279, 1.413)
Health perception (ref. fair or poor)	3.736** (1.959, 7.126)
Sex (ref. Female)	1.952** (1.454, 2.621)
Sensitivity/Specificity	56.6/91.9
Correctly classified percentage	82.3
Nagelkerke's R2	0.479
Hosmer-Lemoshov test	$\chi^2 = 4.106$ ($p = 0.847$)
Omnibus test	$\chi^2 = 587.344$ ($p < 0.001$)

SOC-13: Sense of coherence. **UWES-9:** Work engagement. **EFFECTIVENESS:** Do you think your department, service, unit or company has provided you with the necessary means and material to EFFECTIVELY carry out your job?; **SAFETY:** Do you think your department, service, unit or company has provided you with the necessary means and material to SAFELY carry out your job?; **STRESS:** Do you feel more stressed at work?. **$p < 0.01$; *$p < 0.05$.
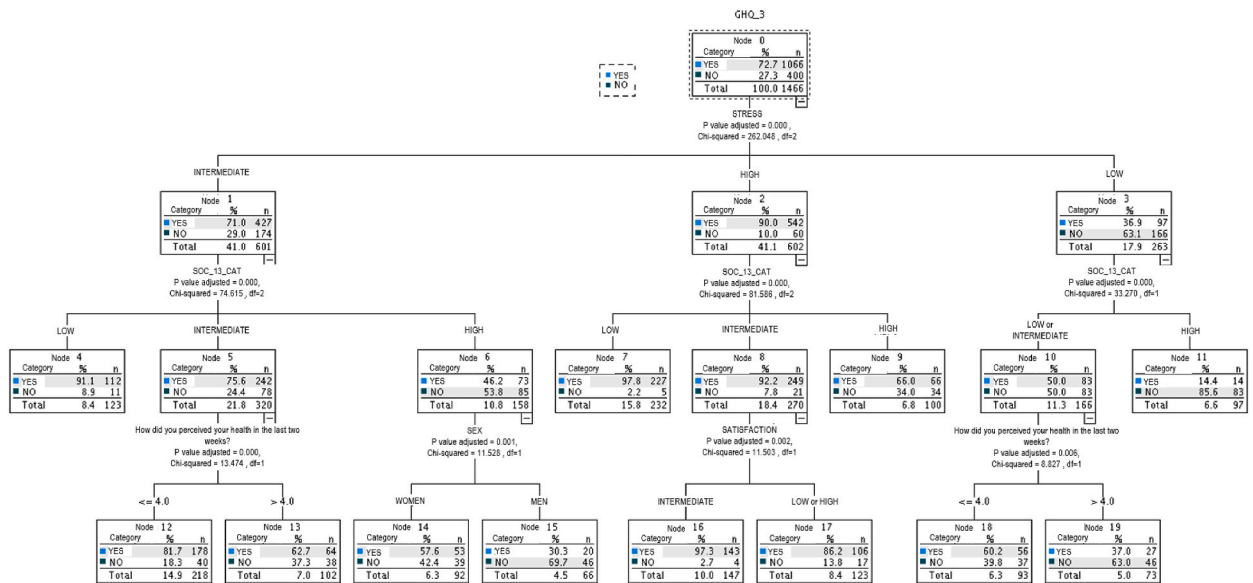Note: which favours distress is taken as reference.

Fig. 1. Segmentation tree for psychological distress.

to 66 % when the SOC was high.

In the case of individuals with intermediate levels of stress, it was mediated by sex when the SOC was high: 57.6 % of the women and 30.3 % of the men had psychological distress.

Finally, with high stress and intermediate SOC, the cases of psychological distress were mediated by job satisfaction. 97.3 % of the cases had intermediate satisfaction and the 86.2 % had low or high satisfaction.

4. Discussion

This article showed that, in the first phase of the pandemic, 72.7 % of the studied population presented a high level of psychological distress (GHQ $\geq$3). During the first phase of the COVID-19 pandemic, factors that contributed to psychological distress in the Chilean population were identified. These included a fair or poor perception of health, being a woman, work-related stress, availability of safety measures, low level of work engagement, and low level of sense of coherence. Identifying these factors may help prevent similar effects in future phases of the current pandemic or in future pandemics.

Chile has had high COVID-19 mortality rates [43] and this might be thought to justify the percentage of psychological distress

found in the study. On the other hand, disparities in mortality rates in Chile, rooted in pre-existing socio-economic factors prior to the pandemic, worsened with the onset of the pandemic, although this contradicts official data [44]. Contrasting with other neighbouring countries, Chile was one of the countries with the highest number of diagnostic tests, case tracing, and containment measures [45], although this did not avoid high COVID-19 mortality rates [43], especially in males over 70 years of age [46]. However, in Japan, COVID-19 mortality rates were low, but this did not prevent significant mental health problems. In the latter country, it has been suggested that this effect on mental health could be due to fear of the collapse of the health system, with an increased workload that affected even areas outside those directly caring for the infected, and especially women because of the gender imbalance [47]. The higher percentage of PD among women is consistent with the findings of the present study and many others [26].

Factors associated with the high level of stress found among healthcare workers in four Latin American countries during the pandemic, including Chile, were working in intensive care and fear of infection or of infecting family members [48]. As might be expected, health professionals appear to have their mental health affected to a greater extent than other professionals [49,50], although the special preventive measures available to health professionals, compared to other workers, may compensate for their special risk of becoming infected, noting in Austria that the prevalence of the virus in health professionals was not higher than in the general population [51]. It has even been observed that healthcare professionals caring for COVID-19 patients may have also experienced positive changes in coping resources and job satisfaction in addition to adverse psychological effects [52].

In this pandemic context, the Job Demands-Resources model has proven its reliability in assessing stress and job satisfaction, even under highly stressful scenarios [53]. In this study, the importance of workers perceiving that the company provides them with efficient materials and means that enable them to be sufficiently safe to prevent illness, in order to maintain a low level of PD, has been found to be in line with previous studies that have associated PD with perceived safety and self-efficacy [54]. Although workers believe that their workload increased during the pandemic, they did not see an increase in labour conflict, nor did they seem willing to accept the risk of infection as part of their job. Both variables are not consistent in predicting PD, contrary to what has been observed in other studies, where an association was found between an increase in workload and PD [55], as well as in the association between labour conflict and PD [13]. This can be explained by their expected interaction with other variables.

The variable with the strongest association with PD is the level of work-related stress, as in previous studies, particularly those from the COVID-19 pandemic frontline [56]. This was followed by SOC, an association also described in previous studies [57] as a mediating and predictive variable [30]. The synergy of both, i.e. high stress and low SOC, produced high PD in the vast majority of the population studied (97.8 %) in that first phase of the pandemic. It is known that the improvement of the work environment generates an increase in SOC and, with it, an improvement in the level of health is achieved [58]. A somewhat smaller association between work engagement and the level of PD has been found, which has also been reported in many other previous studies [26].

This study has contributed to the evidence on factors influencing psychological distress in the work environment, taking into consideration a country both in the pre-pandemic situation and during the first wave of the COVID-19 pandemic. The conceptual framework of this study has been related to the Job Demands and Resources model to determine how working conditions influenced the occupational health of the Chilean population during the COVID-19 pandemic. In this manner, the balance between mental wellness and workload has been discussed. Concerning job demands, this study confirmed that job insecurity, featured as unsafe environment and poor self-efficacy, positively influence psychological distress, and affects job satisfaction. Regarding job resources, this study has showed that work engagement and sense of coherence negatively affect psychological distress, resulting essential in moderating the effect of stress and job uncertainty. These results reinforce the importance of the need for organisations to maintain a safe work environment and to promote healthy relationships among peers in order to avoid psychological distress.

This study also highlights the need to address sex heterogeneity in terms of psychological distress associated with COVID-19, as it is a key factor in the onset of stress and a mediator of the sense of coherence. This is not only crucial not only as regards organisational, but also in terms of public policies focused on sex equality and access to work, which can develop differentiated interventions to address the precise requirements of women with different degrees of vulnerability and at risk of developing occupational health issues. This approach might include exploring the impact of sex differences on different demographic groups (such as people of different ages, occupations, or educational backgrounds).

It should be emphasised that this study enhances further understanding of the relationship between work engagement, sense of coherence, and mental health. It is suggested that the promotion of healthy behaviours is closely related to personal resources and work engagement. Therefore, the SOC construct could perform as a mediator of mental health issues, by mobilising coping strategies, and as a predictor of engagement and healthy behaviours at work [30]. Employees become engaged in their work (high level of WE) when the work environment is perceived as organised and structured. Thus, they show a high level of participation in their work, are able to cope with their tasks, and find their work meaningful (overall high SOC) [59].

As it has been mentioned, Chile had the highest rates of COVID-19 testing and the lowest mortality rates in Latin America. Therefore, once the pandemic is under control, it is important to address the mental health issues of its population [45]. Mental health effects are likely to persist for quite an extended period of time in a good proportion of the population [60], thus long-term effects of COVID-19 are still to be determined [61]. In this sense, the present research can be used to devise longitudinal study designs aimed at tracking changes in psychological distress, and also to evaluate the effectiveness of interventions to reduce psychological distress, i.e., intervention programmes that promote mental well-being, reduce stress at work, and create healthier working conditions.

4.1. Limitations

One limitation of the study is that the analysed sample may not be representative of the entire Chilean population due to the high proportion of individuals with a high level of education (89.2 % university) compared to the national mean. It should be noted that in

other neighbouring countries, such as Peru, the less educated population experienced higher levels of psychological distress during the first phase of the pandemic [62]. Additionally, the sample included individuals with physical or mental illnesses, whose exclusion may have limited the representativeness of the sample and therefore affect the generalisability of the results. Another potential limitation of the study could be related to the sampling method; its use is justified by the need to have access to the Internet and the means to disseminate the questionnaire under the lockdown conditions. However, the 'snowball' model employed in this study does not consider randomisation in participation and could be related to response and selection bias, as the recruited participants may be similar in characteristics and are more likely to recruit people from their environment, who share their same views or characteristics. Nonetheless, the use of this method was motivated by the urgency of obtaining information during the early stages of the pandemic, as it had also been applied in the project coordinated by Eurofund: Living, Working and COVID-19 [63]. Finally, it is important to note the possibility of common method bias is highlighted when self-reported questionnaires are used to measure multiple variables. To address this issue, this study adopted a balanced Likert scale, controlled for the effects of confounding variables, and also explored the sensitivity of the proposed model.

5. Conclusions

In the Chilean population, a high percentage of psychological distress was found during the first phase of the COVID-19 pandemic (72.7 % - GHQ $\geq$3) despite having lower mortality rates than neighbouring countries. Job stress and low sense of coherence were the variables with the greatest influence in generating PD, especially when both were combined. Other measures of interest to reduce PD include enhancing work engagement (UWES) or improving the work environment, noting the importance of companies providing effective and safe means to prevent infection. As in most previous studies, being a woman predicted higher PD, as did poor health perception.

Funding

Data availability statement

Data associated with this study has not been deposited into a publicly available repository, therefore, it will be made available on request to the corresponding author.

CRediT authorship contribution statement

Juan Gómez-Salgado: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Diemen Delgado-García:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Mónica Ortega-Moreno:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Javier Fagundo-Rivera:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Luis El Khoury-Moreno:** Writing – review & editing, Writing – original draft, Visualization, Supervision, Resources, Methodology, Investigation, Formal analysis, Conceptualization. **Ángel Vilches-Arenas:** Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Resources, Methodology, Investigation, Formal analysis, Conceptualization. **Carlos Ruiz-Frutos:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: The author Juan Gómez-Salgado, PhD, is an Associate Editor of the Public Health section of this journal (Heliyon). If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.heliyon.2024.e31327.

References

[1] M. Giovanetti, D. Benvenuto, S. Angeletti, M. Ciccozzi, The first two cases of 2019-NCoV in Italy: where they Come from? J. Med. Virol. 92 (2020) 518–521, https://doi.org/10.1002/jmv.25699.

[2] J. Watkins, Preventing a Covid-19 pandemic, BMJ 368 (2020) m810, https://doi.org/10.1136/bmj.m810.

[3] G. Grebe, J.A. Vélez, A. Tiutiunnyk, D. Aragón-Caqueo, J. Fernández-Salinas, M. Navarrete, D. Laroze, Dynamic quarantine: a comparative analysis of the Chilean public health response to COVID-19, Epidemiol. Infect. 148 (2020) e270, https://doi.org/10.1017/S0950268820002678.

[4] S.K. Brooks, R.K. Webster, L.E. Smith, L. Woodland, S. Wessely, N. Greenberg, G.J. Rubin, The psychological impact of quarantine and how to reduce it: rapid review of the evidence, Lancet 395 (10227) (2020) 912–920, https://doi.org/10.1016/S0140-6736(20)30460-8.

[5] C.K.T. Lima, P.M. de Medeiros Carvalho, I.D.A.A.S. Lima, J.V.A. de Oliveira Nunes, J.S. Saraiva, R.I. de Souza, C.G.L. da Silva, M.L.R. Neto, The emotional impact of coronavirus 2019-NCoV (new Coronavirus Disease), Psychiatr. Res. 287 (2020) 112915, https://doi.org/10.1016/j.psychres.2020.112915.

[6] C. Ruiz-Frutos, M. Ortega-Moreno, A. Dias, J.M. Bernardes, J.J. García-Iglesias, J. Gómez-Salgado, Information on COVID-19 and psychological distress in a sample of non-health workers during the pandemic period, Int. J. Environ. Res. Publ. Health 17 (19) (2020) 6982, https://doi.org/10.3390/ijerph17196982.

[7] J. Yeves, M. Bargsted, C. Torres-Ochoa, Work schedule flexibility and teleworking were not good together during COVID-19 when testing their effects on work overload and mental health, Front. Psychol. 13 (2022) 998977, https://doi.org/10.3389/fpsyg.2022.998977. Oct 28.

[8] T.E. Scheel, L. Bendixen, J. Procházka, D. Acquadro Maran, Working during the COVID-19 pandemic: demands, resources, and mental wellbeing, Front. Psychol. 13 (2023) 1037866, https://doi.org/10.3389/fpsyg.2022.1037866.

[9] K.M. Kniffin, J. Narayanan, F. Anseel, J. Antonakis, S.P. Ashford, A.B. Bakker, et al., COVID-19 and the workplace: implications, issues, and insights for future research and action, Am. Psychol. 76 (1) (2021) 63–77, https://doi.org/10.1037/amp0000716.

[10] E. Demerouti, A.B. Bakker, Job demands-resources theory in times of crises: new propositions, Organizational Psychology Review 13 (3) (2023) 209–236, https://doi.org/10.1177/20413866221135022.

[11] A.B. Bakker, E. Demerouti, Job demands-resources theory: taking stock and looking forward, J. Occup. Health Psychol. 22 (3) (2017) 273–285, https://doi.org/10.1037/ocp0000056.

[12] J. Cao, J. Liu, J.W.C. Wong, JD-R model on job insecurity and the moderating effect of COVID-19 perceived susceptibility, Curr. Psychol. (2023), https://doi.org/10.1007/s12144-023-04646-6.

[13] N.S. Elahi, G. Abid, F. Contreras, I.A. Fernández, Work-family and family-work conflict and stress in times of COVID-19, Front. Psychol. 13 (2022) 951149, https://doi.org/10.3389/fpsyg.2022.951149.

[14] M. González Tovar, S. Hernández Rodríguez, COVID-19 y afrontamiento flexible en chilenos: papel del estrés percibido y la ansiedad, Cuaderno de Neuropsicología 14 (3) (2021) 10–19, https://doi.org/10.7714/CNPS/14.3.201.

[15] F. Duarte, Á. Jiménez-Molina, Psychological distress during the COVID-19 epidemic in Chile: the role of economic uncertainty, PLoS One 16 (11) (2021) e0251683, https://doi.org/10.1371/journal.pone.0251683.

[16] M.A. Benítez, C. Velasco, A.R. Sequeira, J. Henríquez, F.M. Menezes, F. Paolucci, Responses to COVID-19 in five Latin American countries, Health Policy Technol 9 (4) (2020) 525–559, https://doi.org/10.1016/j.hlpt.2020.08.014.

[17] E. Ansoleaga, M. Ahumada, A. González-Santa Cruz, Association of workplace bullying and workplace vulnerability in the psychological distress of Chilean workers, Int. J. Environ. Res. Publ. Health 16 (20) (2019) 4039, https://doi.org/10.3390/ijerph16204039. Oct 22.

[18] F. Duarte, Á. Jiménez-Molina, A longitudinal nationwide study of psychological distress during the COVID-19 pandemic in Chile, Front. Psychiatr. 13 (2022) 744204, https://doi.org/10.3389/fpsyt.2022.744204. Feb 24.

[19] B. Schnettler, E. Miranda-Zapata, L. Orellana, M. Saracostti, H. Poblete, G. Lobos, C. Adasme-Berríos, M. Lapo, K. Beroiza, A. Concha-Salgado, L. Riquelme-Segura, J.A. Sepúlveda, K. Reutter, Intra- and inter-individual associations of family-to-work conflict, psychological distress, and job satisfaction: gender differences in dual-earner parents during the COVID-19 pandemic, Behav. Sci. 14 (1) (2024 Jan 16) 56, https://doi.org/10.3390/bs14010056.

[20] Programa de Naciones Unidas para el Desarrollo (PNUD) Principales Resultados de la Primera Medición del Bienestar Social en Chile, 2021. https://www.estudiospnud.cl/informes-desarrollo/principales-resultados-de-la-primera-medicion-del-bienestar-social-en-chile/. (Accessed 6 April 2024).

[21] M.C. Saavedra Soto, Efectos de la pandemia en la salud mental: el caso de Chile, Universidad de Chile, 2023. Doctoral Thesis, https://repositorio.uchile.cl/handle/2250/193032.

[22] P. Dagnino, V. Anguita, K. Escobar, S. Cifuentes, Psychological effects of social isolation due to quarantine in Chile: an exploratory study, Front. Psychiatr. 11 (2020) 591142, https://doi.org/10.3389/fpsyt.2020.591142.

[23] C. Ruiz-Frutos, D. Delgado-García, M. Ortega-Moreno, D. Duclos-Bastías, D. Escobar-Gómez, J.J. García-Iglesias, J. Gómez-Salgado, Factors related to psychological distress during the first stage of the COVID-19 pandemic on the Chilean population, J. Clin. Med. 10 (21) (2021) 5137, https://doi.org/10.3390/jcm10215137.

[24] M. Landa-Blanco, C.J. Mejía, A.L. Landa-Blanco, C.A. Martínez-Martínez, D. Vásquez, G. Vásquez, P. Moraga-Vargas, Y. Echenique, G.M. Del Cid, B.D. Montoya, Coronavirus awareness, confinement stress, and mental health: evidence from Honduras, Chile, Costa Rica, Mexico and Spain, Soc. Sci. Med. 277 (2021) 113933, https://doi.org/10.1016/j.socscimed.2021.113933.

[25] L. Hasimi, M. Ahmadi, S.A. Hovyzian, A. Ahmadi, Sense of Coherence or resilience as predictors of psychological distress in nursing students during the COVID-19 pandemic, Front. Public Health 11 (2023 Aug 17) 1233298, https://doi.org/10.3389/fpubh.2023.1233298.

[26] I. Adanaqué-Bravo, K. Escobar-Segovia, J. Gómez-Salgado, J.J. García-Iglesias, J. Fagundo-Rivera, C. Ruiz-Frutos, Relationship between psychological distress, burnout and work engagement in workers during the COVID-19 pandemic: a systematic review, Int. J. Publ. Health 67 (2023) 1605605, https://doi.org/10.3389/ijph.2022.1605605.

[27] A. Antonovsky, The structure and properties of the sense of coherence scale, Soc. Sci. Med. 36 (6) (1993) 725–733, https://doi.org/10.1016/0277-9536(93)90033-z.

[28] M.B. Mittelmark, S. Sagy, M. Eriksson, G.F. Bauer, J.M. Pelikan, B. Lindström, G.A. Espnes, The Handbook of Salutogenesis, Springer Nature, Berlin, 2017.

[29] K. Kretowicz, L. Bieniaszewski, Determinants of sense of coherence among managerial nursing Staff, Ann. Agric. Environ. Med. 22 (4) (2015) 713–717, https://doi.org/10.5604/12321966.1185782.

[30] P. González-Siles, M. Martí-Vilar, F. González-Sala, C. Merino-Soto, F. Toledano-Toledano, Sense of coherence and work stress or well-being in care professionals: a systematic review, Healthcare (Basel) 10 (7) (2022) 1347, https://doi.org/10.3390/healthcare10071347.

[31] C. Ruiz-Frutos, M. Ortega-Moreno, R. Allande-Cussó, D. Ayuso-Murillo, S. Domínguez-Salas, J. Gómez-Salgado, Sense of coherence, engagement, and work environment as precursors of psychological distress among non-health workers during the COVID-19 pandemic in Spain, Saf. Sci. 133 (2021 Jan) 105033, https://doi.org/10.1016/j.ssci.2020.105033.

[32] G. Mazzetti, E. Robledo, M. Vignoli, G. Topa, D. Guglielmi, W.B. Schaufeli, Work engagement: a meta-analysis using the job demands-resources model, Psychol. Rep. (2021) 332941211051988, https://doi.org/10.1177/00332941211051988.

[33] M.C. Malagon-Aguilera, R. Suñer-Soler, A. Bonmatí-Tomas, C. Bosch-Farré, S. Gelabert-Vilella, D. Juvinyà-Canal, Relationship between sense of coherence, health and work engagement among nurses, J. Nurs. Manag. 27 (8) (2019) 1620–1630, https://doi.org/10.1111/jonm.12848.

[34] S. Domínguez-Salas, J. Gómez-Salgado, C. Guillén-Gestoso, M. Romero-Martín, M. Ortega-Moreno, C. Ruiz-Frutos, Health care workers' protection and psychological safety during the COVID-19 pandemic in Spain, J. Nurs. Manag. 29 (7) (2021) 1924–1933, https://doi.org/10.1111/jonm.13331.

[35] P.D. Le, K. Choe, M.S. Burrone, I. Bello, P. Velasco, T. Arratia, D. Tal, F. Mascayano, M.J. Jorquera, S. Schilling, J. Ramírez, D. Arancibia, K. Fader, S. Conover, E. Susser, L. Dixon, R. Alvarado, L.H. Yang, L.J. Cabassa, Initial adaptation of the OnTrack coordinated specialty care model in Chile: an application of the Dynamic Adaptation Process, Front Health Serv 2 (2022 Nov 4) 958743, https://doi.org/10.3389/frhs.2022.958743. Erratum in: Front Health Serv. 2023 May 16;3:1194709.

[36] W. Wang, L. Lu, M.M. Kelifa, Y. Yu, A. He, N. Cao, S. Zheng, W. Yan, Y. Yang, Mental health problems in Chinese healthcare workers exposed to workplace violence during the COVID-19 outbreak: a cross-sectional study using propensity score matching analysis, Risk Manag. Healthc. Pol. 13 (2020) 2827–2833, https://doi.org/10.2147/RMHP.S279170.

[37] I. Eriksson, A.L. Undén, S. Elofsson, Self-rated health. Comparisons between three different measures. Results from a population study, Int. J. Epidemiol. 30 (2) (2001) 326–333, https://doi.org/10.1093/ije/30.2.326.

[38] A. Main, Q. Zhou, Y. Ma, L.J. Luecken, X. Liu, Relations of SARS-related stressors and coping to Chinese college students' psychological adjustment during the 2003 Beijing SARS epidemic, J. Counsel. Psychol. 58 (2011) 410–423, https://doi.org/10.1037/a0023632.

[39] W.B. Schaufeli, A.B. Bakker, M. Salanova, The measurement of work engagement with a short questionnaire: a cross-national study, Educ. Psychol. Meas. 66 (4) (2006) 701–716, https://doi.org/10.1177/0013164405282471.

[40] J. Virues-Ortega, P. Martinez-Martin, J.L. Del Barrio, L.M. Lozano, Cross-Cultural validation of Antonovsky's Sense of Coherence Scale (OLQ-13) in Spanish elders aged 70 years or more, Med. Clínica 128 (13) (2007) 486–492, https://doi.org/10.1157/13100935.

[41] D.P. Goldberg, R. Gater, N. Sartorius, T.B. Ustun, M. Piccinelli, O. Gureje, C. Rutter, The validity of two versions of the GHQ in the WHO study of mental illness in general health care, Psychol. Med. 27 (1) (1997) 191–197, https://doi.org/10.1017/s0033291796004242.

[42] C.W. Tam, E.P. Pang, L.C. Lam, H.F. Chiu, Severe acute respiratory syndrome (SARS) in Hong Kong in 2003: stress and psychological impact among frontline healthcare workers, Psychol. Med. 34 (7) (2004) 1197–1204, https://doi.org/10.1017/s0033291704002247.

[43] P. Villalobos Dintrans, C. Castillo, F. de la Fuente, M. Maddaleno, COVID-19 incidence and mortality in the Metropolitan Region, Chile: time, space, and structural factors, PLoS One 16 (5) (2021) e0250707, https://doi.org/10.1371/journal.pone.0250707.

[44] U. Bilal, T. Alfaro, A. Vives, COVID-19 and the worsening of health inequities in Santiago, Chile, Int. J. Epidemiol. 50 (3) (2021) 1038–1040, https://doi.org/10.1093/ije/dyab007.

[45] A. Caqueo-Urízar, A. Urzúa, D. Aragón-Caqueo, C.H. Charles, Z. El-Khatib, A. Otu, S. Yaya, Mental health and the COVID-19 pandemic in Chile, Psychol Trauma 12 (5) (2020) 521–523, https://doi.org/10.1037/tra0000753.

[46] E.A. Undurraga, G. Chowell, K. Mizumoto, COVID-19 case fatality risk by age and gender in a high testing setting in Latin America: Chile, March-August 2020, Infect Dis Poverty 10 (1) (2021) 11, https://doi.org/10.1186/s40249-020-00785-1.

[47] M. Makino, A. Kanie, A. Nakajima, Y. Takebayashi, Mental health crisis of Japanese health care workers under COVID-19, Psychological Trauma: Theory, Research, Practice, and Policy 12 (S1) (2020) S136–S137, https://doi.org/10.1037/tra0000819.

[48] J. Martin-Delgado, R. Poblete, P. Serpa, A. Mula, I. Carrillo, C. Fernández, J.J. Mirá, Contributing factors for acute stress in healthcare workers caring for COVID-19 patients in Argentina, Chile, Colombia, and Ecuador, Sci. Rep. 12 (8496) (2022) 1–10, https://doi.org/10.1038/s41598-022-12626-2.

[49] F. Bekele, M. Hajure, Magnitude and determinants of the psychological impact of COVID-19 among health care workers: a systematic review, SAGE Open Med 25 (9) (2021) 20503121211012512, https://doi.org/10.1177/20503121211012512.

[50] I.D. Saragih, S.I. Tonapa, I.S. Saragih, S. Advani, S.O. Batubara, I. Suarilah, C.J. Lin, Global prevalence of mental health problems among healthcare workers during the Covid-19 pandemic: a systematic review and meta-analysis, Int. J. Nurs. Stud. 121 (2021) 104002, https://doi.org/10.1016/j.ijnurstu.2021.104002.

[51] J. Bartko, S. Zehetmayer, L. Weseslindtner, K. Stiasny, A. Schloegl, E. Forjan, E. Zwettler, A. Krauter, F. Keil, N. Sédille-Mostafaie, Screening and confirmatory testing for SARS-CoV-2 antibodies: comparison of health and non-health workers in a nationwide healthcare organization in central Europe, J. Clin. Med. 10 (9) (2021) 1909, https://doi.org/10.3390/jcm10091909.

[52] N.C. Yeung, E.L. Wong, A.W. Cheung, C.S. Leung, E.K. Yeoh, S.Y. Wong, Finding the positives from the COVID-19 pandemic: factors associated with posttraumatic growth among nurses in Hong Kong, Eur. J. Psychotraumatol. 13 (1) (2022) 2005346, https://doi.org/10.1080/20008198.2021.2005346.

[53] O. Llanos-Contreras, M.J. Ibáñez, V.J. Prado-Gascó, Job-demand and family business resources in pandemic context: how they influence burnout and job satisfaction, Front. Psychol. 13 (2023 Jan 5) 1061612, https://doi.org/10.3389/fpsyg.2022.1061612.

[54] D. Nissan, G. Weiss, M. Siman-Tov, A. Spitz, M. Bodas, G. Shenhar, B. Adini, Differences in levels of psychological distress, perceived safety, trust, and efficacy amongst hospital personnel during the COVID-19 pandemic, Res. Nurs. Health 44 (5) (2021) 776–786, https://doi.org/10.1002/nur.22165.

[55] Q. Huang, A.A. Bodla, C. Chen, An exploratory study of police officers' perceptions of health risk, work stress, and psychological distress during the COVID-19 outbreak in China, Front. Psychol. 12 (2021) 632970, https://doi.org/10.3389/fpsyg.2021.632970.

[56] L. Xia, Y. Yan, D. Wu, Protective predictors associated with posttraumatic stress and psychological distress in Chinese nurses during the outbreak of COVID-19, Front. Psychol. 12 (2021) 684222, https://doi.org/10.3389/fpsyg.2021.684222.

[57] O. Braun-Lewensohn, S. Abu-Kaf, T. Kalagy, Hope and resilience during a pandemic among three cultural groups in Israel: the second wave of covid-19, Front. Psychol. 12 (2021) 637349, https://doi.org/10.3389/fpsyg.2021.637349.

[58] Y. Ogata, K. Sato, M. Sasaki, K. Fujinami, T. Togari, Rest of the WENS-J (part II) project team. Association between nursing practice environment and sense of coherence among staff nurses: a cross-sectional study in Japan, J. Nurs. Manag. 30 (7) (2022) 3149–3159, https://doi.org/10.1111/jonm.13733.

[59] J. Mitonga-Monga, C.H. Mayer, Sense of coherence, burnout, and work engagement: the moderating effect of coping in the democratic republic of Congo, Int. J. Environ. Res. Publ. Health 17 (11) (2020) 4127, https://doi.org/10.3390/ijerph17114127. Jun 10.

[60] E. Righi, M. Mirandola, F. Mazzaferri, G. Dossi, E. Razzaboni, A. Zaffagnini, F. Ivaldi, A. Visentin, L. Lambertenghi, C. Arena, C. Micheletto, D. Gibellini, E. Tacconelli, Determinants of persistence of symptoms and impact on physical and mental wellbeing in Long COVID: a prospective cohort study, J. Infect. 84 (4) (2022) 566–572, https://doi.org/10.1016/j.jinf.2022.02.003.

[61] S. Wang, L. Quan, J.E. Chavarro, N. Slopen, L.D. Kubzansky, K.C. Koenen, J.H. Kang, M.G. Weisskopf, W. Branch-Elliman, A.L. Roberts, Associations of depression, anxiety, worry, perceived stress, and loneliness prior to infection with risk of post-COVID-19 conditions, JAMA Psychiatr. 79 (11) (2022) 1081–1091, https://doi.org/10.1001/jamapsychiatry.2022.2640.

[62] C. Ruiz-Frutos, J.C. Palomino-Baldeón, M. Ortega-Moreno, M.D.C. Villavicencio-Guardia, A. Dias, J.M. Bernardes, J. Gómez-Salgado, Effects of the COVID-19 pandemic on mental health in Peru: psychological distress, Healthcare (Basel) 9 (6) (2021) 691, https://doi.org/10.3390/healthcare9060691.

[63] Eurofound, Living, Working and COVID-19, COVID-19 Series, Publications Office of the European Union, Luxembourg, 2020.