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The determinants of mental well-being of healthcare professionals during the COVID-19 pandemic

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In this study, the objective is to understand the causal factors that influence the mental well-being of healthcare workers during the COVID-19 pandemic, using Karasek's Job Demand Control Social Model (JDCS) as the research framework. For this purpose the database Eurofound's Living Working and COVID-19 survey is used; it was carried out using sampling design techniques in all 27 countries of the European Union. A sample of 4626 employees in the health sector is used, and structural equation models are specified to analyze causality. The analysis revealed significant associations between several factors: physical and mental work demands ($p < 0.001$), availability of personal protective equipment ($p = 0.035$), support from supervisors ($p < 0.001$), support from peers ($p < 0.001$), and age ($p < 0.007$). These findings, offering valuable insights into understanding and improving the management of health institutions, can serve as a foundation for developing strategies to support and enhance the mental health of healthcare professionals. Ultimately, this benefits both the workforce and the quality of healthcare services provided, particularly in preparing for potential future crises.

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Introduction

The disruption brought about by the COVID-19 is serious and especially the dedicated workforce in the health sector within Europe is affected. As rigorous containment measures and mass vaccination campaigns have worked to stem the tide of the pandemic, healthcare workers have undergone a tremendous shift in the work environment due to the urgencies associated with this unforeseen crisis. This has been shown in the increased workloads, obligatory use of personal protective wear, and strict compliance with safety measures (Bakhai et al., 2022). In the healthcare landscape which is known for its challenge and dynamic setting, these requirements have led to increasing stress, emotional exhaustion, and possible mental stress, among others (Fofana et al., 2020; Sahashi et al., 2021).

Although the pandemic impacts globally, across different occupations and sectors, responses and adaptability have been so different among themselves. The mental resilience of the professionals has been highly affected by the nature of healthcare roles, calling for adequate job resources that can ease out these adverse circumstances. These issues have resulted in professional burnout, mental fatigue, and a striking lack of the necessary resources among healthcare providers. The changing conditions brought by the pandemic require healthcare workers to adjust fast, and thus they end up working more than they expected. Some of these alterations include the use of personal protection equipment, observing distancing measures, and higher sanitation standards. Healthcare workers encounter enormous challenges during extended and strenuous shifts that often lead to stress and burn-out (De Kock et al., 2021; Santabarbara et al., 2021; Toh et al., 2021).

On the other hand, within the health framework which is marked by high work demands, reduced autonomy in decision-making, and perceived lack or inadequate support, there is a potential high exposure to psychosocial risk factors compromising the welfare status of the healthcare givers (Delgado Espino In a way, constant interactions with patients within this environment usually leave emotional marks, leading to problems like emotional exhaustion and burnout (Cevik and Kasapoglu, 2022).

Investigation into the mental health of healthcare workers especially during the COVID-19 pandemic has attracted a lot of attention in both the academic and professional worlds. Although there is a significant amount of literature concerning labor and psychological issues encountered by healthcare professionals, some significant gaps still remain which should be filled for a proper insight into hidden complexities, as well as viable treatment modalities.

Progress has been achieved in comprehending how job demands and available resources impact on mental health of employees. Nevertheless, there is a dearth of studies targeting the European scenario that employ the Karasek Demand-Control-Support (JDCS) model on this topic. This model has adapted and proven to be effective, particularly in healthcare crises such as the pandemic, but not completely within the European hospital settings. In addition, research into the mental health of healthcare workers has focused on the work-related factors that may contribute to their mental health. Some studies have looked at stress, workload, and resource availability. There is, however, limited understanding of demographic factors that may moderate the relationship between mental health. It is essential to understand how factors like gender and age may impact the linkage between job demands and mental health so that better strategies can be created for staff support and management to take place in the healthcare sector.

This approach paves the way for further research, highlighting the requirement for more targeted and focused studies that can capture the nuances of mental health in the workplace among European healthcare professionals. In particular, it emphasizes the importance of using the JDCS model and exploring the impact of demographic variables in these working environments with regard to highlighting more efficient approaches to promote the mental health of healthcare personnel in Europe, especially during health emergencies.

Literature review

The JDCS Model. The JDCS model has greatly influenced our understanding of occupational health through the years. Influenced by studies of Cox and Howard (1990), Johnson and Hall (1988), and Karasek (1979), this model presents a causality linkage between job-demands, control, and support and workers' well-being. The Demand-Control model was introduced by Theorell et al. (1990), which emphasizes the interwoven nature of work characteristics and worker health. With reference to Johnson and Hall (1988), they underscored the model's relevance for an elucidation of the psychosocial implications of workplace demands and control. Cox and Howard (1990) highlighted the importance of social support in mitigating the adverse impacts resulting from excessive demands and low control in organizations. Theyorell and Karsek's classical work (1979) stressed the relationship between job demands, control, and social support in order for the employees to get welfare, involvement, and high performance at the workplace. Furthermore, Siegrist (1996) developed the Effort-Reward Imbalance model, expanding our knowledge of employee's well-being and motivation by highlighting the interdependence between work effort and rewards. Taken together, the works of these scholars have greatly helped understand relations of job characteristics, balance among job demands, control, and support on workplace health and work productivity.

JDCS model is a basic theoretical tool commonly used for understanding the intricacies involved in work-related stress and the health of employees. It suggests that a person's overall health is considerably affected because of the interaction between inherent job demands, control on the job, and available social support in the professional area. The components of workload, such as stressing one's body and mind and control over the working conditions, can cause such effects as physical and psychological strains; depending on the extent of the support system provided, they can be mitigated.

Generally, 'job demands' include different elements including workload, time pressure, and also the emotional or psychological strains associated with the characteristics of the job that are influenced by the organizational requirements and inherent task requirements. The expression 'job control' denotes the degree of decision-making authority, autonomy, and discretion exercised in tasks, schedules, and responsibility fulfillment. This consideration makes a big impact on how people see their job demands and the ways in which they cope with them. 'Social support' finally is the assistance, guidance, and encouragement, of colleague, supervisor, and organizational structure, which play an important role in reducing the stressor, resilience, and total wellness.

The JDCS model delineates scenarios illustrating how the interplay between job demands and control influences employees' psychological well-being: (1) High Demands with High Control: Environments with significant demands yet offering substantial control empower individuals to make decisions, fostering creativity and wellbeing; (2) Low Demands with High Control: While this scenario may enhance wellbeing, it may lead to reduced productivity due to a perceived lack of challenge; (3) High Demands with Low Control: Such situations result in increased stress, prevalent in demanding occupations, where

responsibilities are substantial, but decision-making control is limited; (4) Low Demands with Low Control: Environments characterized by minimal demands and limited control might lead to monotony, underutilization of skills, and demotivation among employees.

A powerful theoretical basis for investigating the complex connection between organizational features and employee health. This highlights the importance of job demands balance, control, and social support promoting a work environment supportive of employees' welfare, engagement, and productivity (Böckerman et al., 2020; Temam et al., 2019).

Organization factors and well-being in the health sector. The interaction between organizational attributes and employees' health is a crucial domain in exploring work contexts and their relationship with job performance. Resource management, support structures, and other elements form a crucial basis for medical care workers' working conditions. The well-being of healthcare workers plays a pivotal role in societal function. The World Health Organization projects robust growth in the health sector workforce, estimating it to reach 84 million employees by 2030 (Boniol et al., 2019). Ensuring the sound mental health of these professionals becomes imperative to uphold patient care quality, especially amid the escalating care demands of aging populations and the potential for future crises.

The issue with regards to workload management is one of the determinants of healthcare workers' well-being within the health sector. The exposure to high work demands accompanied by no control over work contributes to an extremely high level of stress and burnout. In addition, the amount of resources, both from a staffing position as well as medical and logistic support are critical factors for perceptions of effectiveness and control of the work environment. Besides, social support not only among a colleague but also from higher hierarchic levels becomes a protective factor that softens the effects of work pressures, decreasing harm to the mental and emotional health of workers. Supporting a conducive workplace culture for all healthcare players in relation to patient care quality (Nielsen et al. 2009). The incidence of sub-optimal care and violence toward patients is aggravated by the poor well-being of healthcare workers (Han et al., 2022). Healthcare as a sector is well known for demanding psychosocial and physical strains. Emotional strain that approaches exhaustion can come from a lack of resources such as personnel and equipment (Sever et al., 2021). Lastly, healthcare workers are prone to occupational injuries and illnesses, which in turn result in more cases of sickness leaves (Peters et al., 2022). Such things as stress, compromised health, and depression adversely affect health workers' wellbeing. Workers in this sector are exposed to traumatic events due to the need to make critical decisions within short timeframes, hence various specific and multi-faceted skills are required to perform optimally (Al-Dabbagh, Moreover, long shifts in the healthcare industry, round the clock, including holidays and overtime create difficulties for worker wellness and work-life balance (Stephens et al., 2020; Navajas-Romero et al., 2020).

This sector operates within well-defined action protocols, often limiting professionals' autonomy and decision-making capacities (Ataguba and Ataguba, 2020). Nonetheless, studies indicate that professionals with higher autonomy tend to exhibit higher performance, satisfaction, and commitment (van Dorssen-Boog et al., 2020). A lack of work control heightens the likelihood of healthcare personnel exiting their profession (Sheeran and Conner, 2019). Training programs significantly enhance the quality of life for nursing professionals by fostering perceptions of social support from supervisors and co-workers (Gao et al., 2019).

Rewards, decision-making skills, and discretion mitigate depression and anxiety among these professionals (Flick et al., 2020). The third pivotal aspect of this model is social support due to its profound influence on professionals' well-being within this sector. The complex network of interpersonal relationships among healthcare workers emphasizes the significance of these factors and the detrimental impact of work pressures, limited control, and complex social systems. These factors often create poor work environments leading to absenteeism, high turnover rates, depression, and even suicide (Padula et al., 2019).

The link between organizational factors and healthcare well-being is critical to developing effective strategies to promote healthier work environments. It is critical to implement policies that appropriately balance work demands and decision-making autonomy and promote a supportive and collaborative culture. An integrated approach that takes these organizational factors into account can not only improve the well-being and mental health of healthcare workers but also improve the quality of care provided to patients, thereby contributing to the optimal functioning of the entire healthcare system. The role conflict and work climate prevalent in this health sector diminish wellbeing (Bhatti et al., 2022). Fu et al. (2022) provide crucial evidence concerning the pathways to well-being for healthcare workers in general hospitals. Other researchers focus on pivotal aspects of the psychosocial well-being of healthcare workers (Moreno Martínez et al., 2022). Empowerment and social support act as protective factors against burnout (Fanelli et al., 2022).

Regarding aging and work, while initial research emphasized the challenges faced by older workers such as discrimination and limited development opportunities (Burn et al., 2020; Gonzales et al., 2021), recent evidence suggests that older workers contribute significantly to workplaces, demonstrating resilience and adaptability (Allen et al., 2020; Ang et al., 2018). Studies show that older workers do not exhibit higher sick leave rates, emotional exhaustion, or associated illnesses compared to their younger counterparts (Santavirta et al., 2005). Additionally, older workers display higher workplace resilience (Ang et al., 2018) and have showcased adaptability during the COVID-19 pandemic (Scheibe et al., 2022). The focus has shifted towards safeguarding and supporting older workers, emphasizing adequate workplace safety measures and remote work options for those at increased vulnerability (Monahan et al., 2020; Ogolodom et al., 2020).

Regarding gender, early work, and health research primarily focused on men due to women's late entry into the workforce. Presently, a gender comparative approach becomes essential as men's and women's roles differ, impacting their health in distinct ways (Artazcoz et al., 2007). Gender-based differences in labor division affect workplace positioning, where poor working conditions, irregular schedules, temporary contracts, and demanding tasks correlate with poor mental health (Barnay, 2016). The division of labor generates inequality, with women often facing more precarious employment conditions than men (Peckham et al., 2022). The feminization of specific activities, traditionally associated with low wages and limited professional development, further aggravates the situation for women (Campos-Serna et al., 2013). Combining employment and family responsibilities, which predominantly fall on women, leads to work-family conflicts impacting women's mental health (Artazcoz et al., 2004; Viertiö et al., 2021). Nevertheless, many women effectively mitigate this conflict using various coping strategies, whether through personal networks or organizational support (Adisa et al., 2016). High levels of self-efficacy in women act as moderating factors in role conflict (Levy and Myers, 2023). Workplace support moderates work-family conflicts and mitigates associated issues like depression, enhancing worker well-being (Li et al., 2022).

Hypothesis. The proposed approach seeks to ascertain the mental well-being levels among healthcare workers in the European health sector by scrutinizing the determinants outlined in the Karasek model. It aims to unravel their implications within the intense work milieu precipitated by the pandemic scenario affecting health workers.

Hypothesis 1: Elevated job demands encountered by healthcare professionals will exhibit an adverse relation with mental well-being.

Hypothesis 2: Job resources will augment the impact of job demands on mental well-being.

Hypothesis 3: Job resources will act as moderators, mitigating the effects of job demands on mental well-being.

Hypothesis 4: Gender will serve as a moderator, influencing the effects of job demands on mental well-being.

Hypothesis 5: Age will also function as a moderator, influencing the effects of job demands on mental well-being.

Methodology and data

As indicated, the study is based on the analysis of data from Eurofound's Living, Working, and Covid-19 database, carried out from an online survey, from Round1 (9 April 2020 and 11 June 2020), Round 2 (June 2020 and 27 July 2020) and Round 3 (February and March 2021).

The EWCS surveyed a total of 34571 employees, of which 13.3% ($n = 4626$) worked in the Health Sector, the group under investigation. Of the total health workers sampled, 31.7% are men, compared to 67.3% women. The average age is 46.4 years and it is observed that during the pandemic they had to combine their work with caring for children or grandchildren or caring for elderly or disabled relatives, devoting an average of hours per week close to 10.5 for the former, and 3.15 for the later. In order to contextualize them in the situation generated by the pandemic and in relation to the study, aspects related to the risk of contagion during this period are incorporated. Thus, in relation to the possibility of contagion in their work environment during the pandemic, they manifest themselves as enduring high risk, 0.62 (0: no risk -1 high risk) and a high level of physical contact during their workday 1.62 (1: always 5: never)), which were Informed about Covid-19 prevention measures 1.35 (1 Very well informed-4 not at all informed) and required to wear PPE to prevent Covid-19 0.79 (0 no, 1 yes).

The variables considered as explanatory to test the research hypotheses, respond to the Karasek model and are configured according to the following constructs and information incorporated (Table 1).

Table 1 Factors.

Factors	Questions codes and text	
JOB DEMANDS (JD)	JD1	You have the feeling you are doing useful work
	JD2	You feel physically exhausted at the end of the working day
	JD3	You feel emotionally drained by work
	JD4	You feel isolated when working
	JD5	You have enough time to get the job done
	JD6	With the equipment I have at home, I can do my work properly
JOB RESOURCES (JR)	JR1	Employer provides PPE
	JR2	Your manager helps and supports you
	JR3	Your colleagues or peers help and support you

Resource: Own elaboration.

Job Demand (JD): the Job Demand construct will be related to three observable variables linked to physical and psychological demand. From the first dimension, quantitative aspects such as the workload or the number of hours worked during the pandemic have been considered. For the analysis of psychological demands, aspects such as the perception of useful work (You feel physically exhausted or emotionally drained and feel isolated, so important during the pandemic situation) are incorporated.

Job Resources (JR): the Job Resources construct has been built from three observable variables, which aim to measure the employer's ability to provide PPE in hospital settings to reduce the risk of contagion and generate safe environments, and the emotional support of bosses and work colleagues to motivate and support workers in a complex and difficult scenario.

The endogenous variable considered, the Mental well-being construct, has been estimated from a set of original and known variables that take into account aspects related to occupational well-being and provide multidimensional consideration for the determination of the aforementioned construct as shown in Table 2.

Results

Coanova models. Coanova or analysis of covariance models is employed in this study to test the relationship between the possible predictor variables of Mental well-being, such as the job demand JD (JD1-JD6) and Job Resources (JR1-JR3) variables measured on a discrete scale. For this, prior information is obtained on whether the type of models to be proposed later is appropriate, while allowing us to contextualize the group analyzed according to aspects such as gender, employment status, and age, in addition to those considered in the hypotheses (Fig. 1).

There are 4583 cases in the sample recorded, although when evaluating models with several variables this number is considerably reduced for men (902, 19.7%) and women (3681, 80.3%) due to missing data in some of the variables introduced. The age variable is complete in almost all cases.

Regarding gender, Fig. 2 illustrates the similarity in the distributions of the JRi variables between both sexes. However, when evaluating models with multiple variables, this number notably decreases. The dependent variable, Well-being (WB), is derived from the aggregation and mean calculation of five variables: MWB1 through MWB5. The mean and standard deviation values for WB are presented within each respective cell. The overall average for men is 3.9217, whereas for women, it is 3.7107. The Well-being Index displays a mean of 51.4 and a standard deviation of 21.357. The distribution of the Well-being Index is detailed in the following table.

According to the model obtained, the Levene homoscedasticity test originates a p-value of 0.23, so it is accepted that the variability is not heterogeneous in the cells. For the Breusch-

Table 2 Mental well-being.

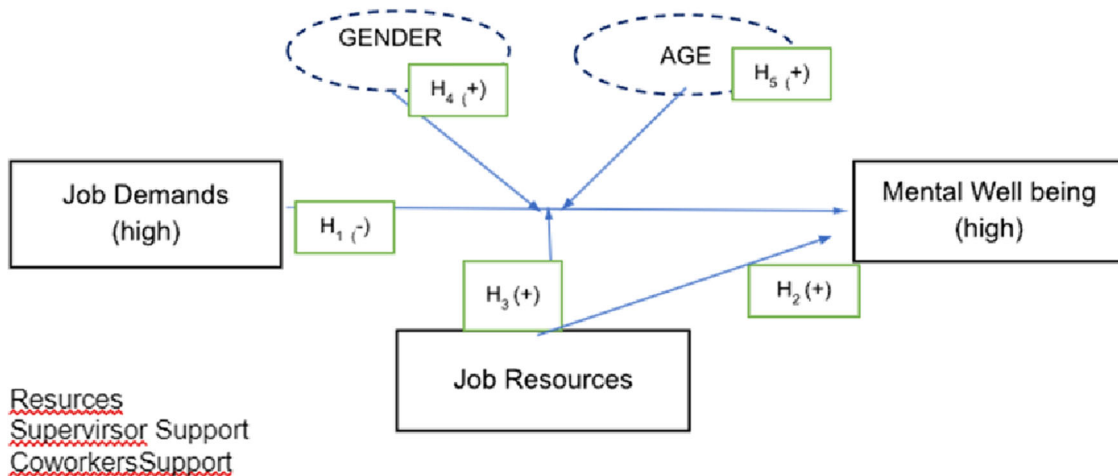| Factors	Questions codes and text	
MENTAL WELL-BEING (MWB)	MWB1	I have felt cheerful and in good spirits
	MWB2	I have felt calm and relaxed
	MWB3	I have felt active and vigorous
	MWB4	I woke up feeling fresh and rested
	MWB5	My daily life has been filled with things that interest me

Resource: Own elaboration.

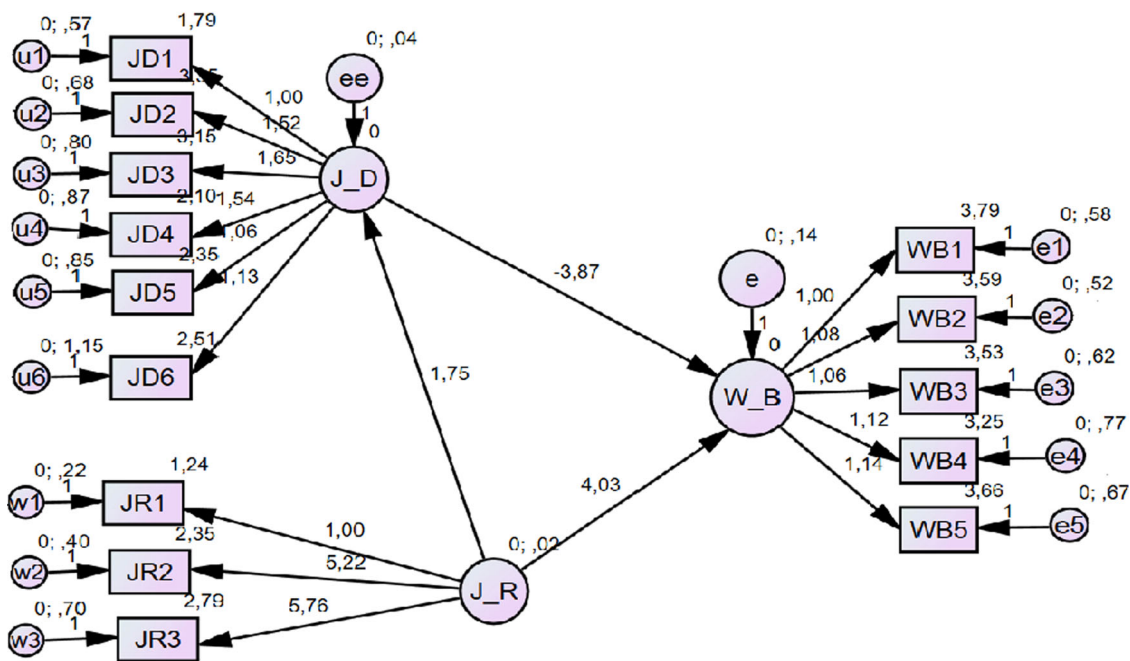**Fig. 1 Hypothesis.** Resource: Own elaboration.

Fig. 2 Structural equation model. Resource: Own elaboration.

Pagan test, it is $p = 0.655$, confirming the above. Table 3 shows the result of the analysis of covariance obtained.

The marginal effects of each factor and covariate are significant with very low p-values (all lower than 0.01, except for the one corresponding to gender, which is 0.015; it is therefore concluded that these factors are significant. Some interactions have been tested, but they were not significant, and are, thus, omitted in the final model.

A significant influence of age is detected, with a positive coefficient (0.07), and of JD with a coefficient of 0.11. In gender 1 (male) a deviation of 0.189 is detected with respect to gender 2 (female). Among the factors, the influence of levels 1 and 2 of JR1 is negative, in JR2 level 1 has an influence of 0.949 and decreases

until level 5, in which it is considered null. In JR3, the influence decreases from 0.369 as its level increases. The estimates of the effects through the marginal means for each sex are 3.661 for men and 3.472 for women (for the mean values of the covariates age (48.45) and JD (13.53).

Structural equations models (sem). To approach the objectives in testing the research hypothesis, and therefore determining the relationship between mental well-being and the factors related to its determination, a structural equations model is proposed for the group of health workers, to later contrast the impact of each of the factors. related to Job Demands and Job Resources. For

Table 3 Coanova decomposition of well-being variability.

Source	Sum of squares	df	Mean square	F	p	Partial Eta squared
Age	6.087	1	6.087	7.532	0.006	0.007
Gender	4.763	1	4.763	5.893	0.015	0.005
Job Demands	58.176	1	58.176	71,982	0.000	0.061
JR1[a]	11.521	2	5.760	7, 127	0.001	0.013
JR2[a]	35.192	4	8.798	10,886	0.000	0.038
JR3[a]	13.346	4	3.337	4, 128	0.003	0.015
Error	897.105	1110	0.808			
TOTAL	1137.473	1123				

[a]Determinant variable of job resources.
Resource: Own elaboration.

this, a structural model is built that tries to explain the Well-Being (WB) construct, based on the latent variables Job Demand (JD) and Job Resources (JR). Additionally, to analyze the moderating effect, indirect effects on well-being through job demands have been estimated.

In relation to the observable models, the three-factor analysis models relate the three latent variables with two groups of observable variables, namely: WB1 to WB5, JR1 to JR3, and JD1 to JD6. The random disturbances of the endogenous latent variables are represented by e1-e5 and ee, and those of the measurable models by u1-u6, w1-w3, and e1-e5.

In relation to the reliability of the model, and consequently the degree of consistency of the measures associated with each construct (latent variable), which must have a certain degree of multicollinearity, Cronbach's α is a measure used when the observable variables treated to indirectly measure the construct associated with them. In this model, for the six variables, consistent α values have been obtained, namely: JD: 0.648, for the three JR variables: 0.582, and for the five WB variables: 0.893. The values in the first two are associated with the fact that the observable variables are derived from the latent ones, but they are not all an indirect measure of the latter.

The estimates of the parameters obtained in the structural model are presented in Table 4.

All coefficients are significant. A growing influence of JR on JD is detected, as a decreasing influence of JD on WB, and a growing influence of JR on WB.

The adjustment measures of the proposed model all take values close to the optimum, which is defined by the saturated model, and far from the most unfavorable value associated with the independence model. These are presented in Table 5 (Fruet-Cardozo et al., 2022, Caridad Ocerin, 2016). For example, the comparisons to a baseline model such as the Normed Fit Index, NFI = 0.994, is very close to the optimum value (1), the relative fir index, RFI = 0.985, or the inclemental fit index, IFI = 0.996. F0, obtained from the chi-square statistic of fit, is close to zero, the optimum corresponding to the saturated model, as well as FMIN obtained from the statistic divided by its degrees of freedom. Come additional measures, such as the Non-Centrality Parameter, NCP, and the Comparative Fit Index (CFI) are also provided, as well as the theoretical information indices, Akaike (AIC) and Bayesian (BCC), that show values near their desired minimum. The root mean square error of approximation is RMSEA = 0.017, well below the recommended upper threshold of 0.08 (Caridad Ocerin, 2016). The coefficient of determination for the WB equation is $R^2 = 0.839$.

The relationship between work demands and the availability of resources (physical and human) on mental well-being has been

contrasted. According to the estimation obtained with the structural equations, the following variables have been considered predictors of well-being, as shown in Table 6.

The first construct considered, Job Demands (JD), has been obtained from the information of the six original variables (JD1-JD6). As can be seen, all of them are significant and express the following aspects: self-efficacy (1.000), exhausted (1.523), drained (1.646), isolated (1.056), and equipment (1.130). All of them have been incorporated into the latent variable in the same direction, in terms of the required level of labor demands to facilitate their interpretation and, where appropriate, the possible testing of the hypotheses raised.

Regarding the second construct, Job Resources (JR) has been obtained from the information of the three original variables (JR1-JR3). As can be seen, all of them are significant, expressing the following aspects: PPE Protection (1.000), Support Managers (5.761), and Support colleagues (5.222). Like the previous construct, all of them have been incorporated into the latent variable in the same direction to address the importance of support at work and thus contrast the hypotheses.

In the construction of the endogenous latent variable, Mental well-being, the original variables of the survey related to the construct, Felt Cheerful (1.00), Felt Calm (1.083), Felt Active (1.063), Felt Fresh (1.122) and Daily Life interested (1.142).

In relation to the hypotheses raised in the study, the relationship between Work Demands (poor) and Mental well-being (high) (H1) is confirmed. All coefficients are significant with the usual T-tests. It is observed that the associated coefficient is negative (-3.866, $p < 0.001$) which implies that an increase in labor demands is decisive for wellbeing for health workers in the period of the pandemic.

In the case of the influence of Job Resources with Job Demands as the moderator of Well-being (H3), the hypothesis raised in the study is also confirmed (1.753, $p < 0.001$).

The other modulating variables of Mental well-being, age, and gender, are observed according to Coaonova's model to be influential in determining well-being according to the associated coefficients Age (6.087, $p < 0.007$) and Gender (4.763, $p < 0.005$).

Discussion

The main objectives proposed were to test the efficacy of the JDCS model in predicting mental well-being among health professionals. Health workers have their own particularities and are fundamental to maintaining the welfare state in Europe; however, healthcare workers have one of the most stressful work environments in existence (Azizkhani et al., 2022). As Karatepe and Uludag (2007) pointed out, the healthcare sector is unique due to its high level of stress and its intense physical, psychological, and emotional demands (Karatepe and Uludag, 2007).

Previously, we found the research carried out by Pisantí (2012) in which he tries to predict the degree of exhaustion and well-being of a group of Italian nurses based on the JCDS model in relation to three coping strategies as moderators: task-oriented coping, emotion-oriented, and avoidance-oriented (Pisanti, 2012). The results validated the JDCS model, with coping strategies not moderating the impact of job characteristics on burnout and well-being. Likewise, the study by Pisantí et al. (2015) tries to find out, based on the JDCS model, the moderating role of self-efficacy for occupational coping with work demands and two work resources: work control and social support from the superior and from co-workers to predict psychological distress and wellbeing in a sample of nurses. The results validated the model, indicating that high demands, low job control, and low social support additionally predicted distress/well-being outcomes, with self-efficacy acting as a moderator in the case of low

Table 4 SEM's model parameters.

Relations	Estimate	SE	Standardized coeff	C.R.	p
W_B ← J_D	−3.866	0.934	0.646	−4.138	<0.001
W_B ← J_R	4.029	1.910	0.804	2.110	0.035
J_D ← J_R	1.753	0. 268	−1.351	6.543	<0.001
WB1 ← W_B	1.000		0.772		
WB2 ← W_B	1.083	0.018	0.811	60.862	<0.001
WB3 ← W_B	1.063	0.021	0.779	51.849	<0.001
WB4 ← W_B	1.122	0.036	0.764	31.388	<0.001
WB5 ← W_B	1.142	0.036	0.791	32.016	<0.001
JD1 ← J_D	1.000		0.393		
JD2 ← J_D	1.523	0.134	0. 512	11.384	<0.001
JD3 ← J_D	1.646	0.134	0.510	1.2.315	<0.001
JD4 ← J_D	1.537	0.122	0.470	1 2.618	<0.001
JD5 ← J_D	1.056	0.107	0.347	9.907	<0.001
JD6 ← J_D	1.130	0.174	0.321	6.500	<0.001
JR 1 ← J_R	1.000		0. 299		
JR2 ← J_R	5.761	0.826	0.713	6.973	<0.001
JR3 ← J_R	5.222	0.684	0.772	7.630	<0.001

Resource: Own elaboration.

Table 5 Goodness of fit measures.

Model	NFI delta1	RFI rho1	IFI delta2	TLI rho2	NCP	FMIN	F0
Proponed	0.994	0.985	0.996	0.992	60.889	0.023	0.013
Saturated	1.000		1.000		0.000	0.000	0.000
Independence	0.000	0.000	0.000	0.000	16,411.9	3.584	3.561

Model	RMSEA	CFI	AIC	BCC
Proposed	0.017	0.996	252.889	253.366
Saturated		1.000	238.000	238.777
Independence	0.184	0.000	16,544.9	16,545.0

Resource: Own elaboration.

Table 6 Total, direct, and indirect effects.

	Total effects			Direct effects			Indirect effects	
	J_R	J_D	W_B	J_R	J_D	W_B	J_R	J_D
J_D	1.753			1.753				
W_B	−2.747	−3.866		4.029	−3.866		−6.776	
JR3	5.761			5.761				
JR2	5.222			5.222				
JR1	1.000			1.000				
JD6	1.980	1.130			1.130		1.980	
JD5	1.850	1.056			1.056		1.850	
JD4	2.694	1.537			1.537		2.694	
JD3	2.886	1.646			1.646		2.886	
JD2	2.669	1.523			1.523		2.669	
JD1	1.753	1.000			1.000		1.753	
WB5	−3.137	−4.416	1.142			1.142	−3.137	−4.416
WB4	−3.082	−4.338	1.122			1.122	−3.082	−4.338
WB3	−2.920	−4.110	1.063			1.063	−2.920	−4.110
WB2	−2.975	−4.187	1.083			1.083	−2.975	−4.187
WB1	−2.747	−3.866	1.000			1.000	−2.747	−3.866

Resource: Own elaboration.

job control with respect to the dimensions. of anguish, emotional exhaustion, depersonalization, and psychological distress (Pisanti et al., 2015).

In relation to hypothesis 1 (H1), it was found that work demands have a significant effect on the mental health of health professionals. Zhou et al. (2022), examined the effects of epidemic-related work stressors, the perceived social support, and organizational support on burnout and well-being of Chinese healthcare workers during the period of prevention and control of the disease during the regular part of the epidemic of COVID-19,

showing that epidemic-related work stressors positively predicted burnout, anxiety, and depression among healthcare workers (Zhou et al., 2022). Frontline healthcare workers who had the opportunity to learn more about the virus and the disease, and who worked with better teams, may have experienced greater effectiveness in their work and greater respect from society as a whole. Furthermore, the value of the work that these frontline health workers do may have been recognized and appreciated by the community (Shand et al., 2022). In contrast, second-line health workers may have experienced a lower level of organizational support, which could have contributed to psychological symptoms, such as anxiety and depression (Karaliuniene et al., 2022). These healthcare workers may not have had the same opportunity to learn about the virus and disease, and may not have worked with the best teams or received the same level of recognition and appreciation from society (Deussom et al., 2022).

In relation to hypothesis 2 (H2), this research aimed to show the effect of resources on mental well-being. The results of this study confirm the effect of resources, suggesting that the provision of personal protective equipment (PPE) is an important measure to reduce the risk of contagion and create a safe environment for health workers (Paterson et al., 2023). The availability of adequate and sufficient PPE can increase the confidence and safety of workers when performing their daily tasks and decrease their concern about the risk of contagion (Robins-Browne et al., 2022; Smallwood et al., 2022). In addition, emotional support from bosses and co-workers can also have a significant impact on the mental health of health workers. In a complex and difficult work environment such as the one faced during a pandemic, it is essential to have the support and motivation of co-workers and superiors to maintain the motivation and resilience of workers (Saleh et al., 2022). Therefore, this research empirically confirms that having adequate resources to reduce the risk of contagion in hospitals affects the work itself, increasing mental health.

All of the above reinforces hypothesis 3 (H3), which shows that resources can moderate high work demands in relation to mental well-being. McVicar (2016) indicates that there is an important relationship in health workers between work stress and certain work resources such as interpersonal and social relationships or management and supervision, relating the latter to aspects derived from support and leadership styles (McVicar, 2016). In this sense, the perception of support from colleagues and superiors can act as a moderator of the negative effect that the high work demands suffered by these personnel can entail (Stenson and Arfanis, 2022). The pandemic meant an intensification of work, as well as greater difficulty in carrying out the tasks of the position derived from the high possibility of contagion by COVID-19, so that personal and work resources, such as PPE, could act as moderators of these changes in the way of providing the service (Scheel et al., 2023).

As already considered, it is difficult to test hypothesis 4 (H4), because the health sector is feminized due to a combination of historical, cultural, economic, and social factors. Although there are some signs of change in the gender composition of the sector, there is still a lot of work to be done to address gender inequalities in healthcare and other fields. The health sector is feminized for several reasons, including factors such as the historical tradition of being a profession dominated by women, such as elderly care and home care (Abdou et al., 2019); cultural perceptions cause women to assume care roles and healthcare is often perceived as a "female" job; job opportunities, women may have entered the healthcare sector because it was one of the few job opportunities available to them because job options for women were more limited (Kfouri et al., 2019) and women may face barriers in other fields, such as engineering or technology, which do not occur in healthcare (Knaul et al., 2022).

Hypothesis 5 (H5) reinforces the fact that age influences the well-being of health workers. Some factors that may explain these results are consistent with the literature. Exposure to Covid and other diseases increases the risk of contracting diseases and getting sick (Huo et al., 2021). This work presents high physical and emotional loads that can cause a decrease in well-being by perceiving that efficiency decreases due to age (Lin et al., 2009; Ryan et al., 2017). On the other hand, younger healthcare workers may be more familiar with technology and medical advances, which can make it more difficult for older workers to keep up with and adapt to changes (Chen, 2020). Furthermore, as in other sectors, older healthcare workers may also face age discrimination in the workplace, which can affect their emotional and mental well-being (Peisah et al., 2020).

Conclusions and limitations
This study has important theoretical and practical implications for healthcare workers in Europe. On a theoretical level, the JDCS model provides a deeper understanding of how job demands, control, and resources influence the mental well-being of healthcare workers. This can help develop new policies and practices that promote a healthier and more fulfilling work environment for healthcare workers. On a practical level, the results of this study suggest that employers in the healthcare sector should pay attention to workplace factors that affect the mental well-being of workers.

Managers should provide healthcare workers with more control over their daily activities and promote a cooperative work environment based on a supportive organizational culture, flexible work policies and practices should be implemented that allow workers better work-life balance and personal, such as flexible hours or the option to work from home and promote training and professional development to improve the skills and knowledge of workers, offering opportunities for growth and promotion as well as offering training programs and continuing education on security and health at work In relation to the organization of work, clear and open communication channels must be established between management and workers, allowing a constructive and respectful dialogue to solve problems and improve the quality of the services provided and promote teamwork and finally, ensure access to adequate and sufficient personal protective equipment and supplies to reduce the risk of infection. In relation to social support, adequate resources and social support should be provided to help workers deal with stress and job demands promoting a culture of teamwork and collaboration rather than competition between workers and departments can improve the organization of the climate. In summary, employers in the healthcare sector can take practical steps to improve the mental wellbeing of workers, which can have a positive impact on the quality of healthcare services provided and patient satisfaction.

It is important to highlight that research in the field of Social Sciences should always be interpreted with caution and the results obtained should not be taken as absolute truths. This particular study has limitations, such as the lack of variable control and the self-assessed measure of the JDCS model variables. Furthermore, the study was carried out in a specific context, the healthcare sector in Europe, and the results may not be applied to other cultural and work contexts. Therefore, future studies are needed that address these limitations and allow for a broader and more accurate comparison between different cultural and work settings. These studies could include different groups of health workers, such as physicians or hospital managers, and could use more objective measures of the JDCS model variables to reduce self-report bias. In addition, it is important to take into account that hospital management and the improvement of the well-being of

health workers is a continuous and complex process that requires the implementation of multiple strategies and the collaboration of different actors. Factors such as workload, quality of resources, and organizational culture need to be addressed to improve the well-being of healthcare workers and, ultimately, the quality of healthcare for patients.

Data availability

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Author contributions

Conceptualization, VN-R and MJV-G; Methodology, LCyLdR and NC-V; Software, LCyLdR. Validation, VN-R and NC-V; Formal analysis, VN-R; MJV-G, and NC-V; Investigation, VN-R, LCyLdR, and NC-V; Resources, LCyLdR and NC-V; Data curation, LCyLdR. Writing—original draft preparation, VN-R and LCyLdR; Writing—review & editing, VN-R, MJV-G, and LCyLdR; Visualization, LCyLdR and NC-V; Supervision, MJV-G and NC-V; Project administration, VN-R. All authors have read and agreed to the published version of the manuscript.

Competing interests

The authors declare no competing interests.

Ethical approval

Our study is based on data obtained from the European database "Working Living and COVID" (WLC). Here is the link for it: https://www.eurofound.europa.eu/publications/report/2020/living-working-and-covid-19. In the following link Eurofound details how it collects the data and follows the necessary criteria to safeguard the identity of the interviewees https://www.eurofound.europa.eu/about-eurofound/who-we-are/data-protection.

Informed consent

Informed consent was not required for the study because the data used were obtained from the European Social Survey.

Additional information

Supplementary information The online version contains supplementary material available at https://doi.org/10.1057/s41599-024-02884-y.

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