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Psycho-Social Impact of COVID-2019 on Work-Life Balance of Health Care Workers in India: A Moderation-Mediation Analysis

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Abstract: Innumerable studies related to COVID-19 carried out across the globe have demonstrated that HCWs worked in stressful and difficult socio-economic environments and, therefore, had a disturbed work-life balance. However, negligible efforts have been made to analyze the factors that impacted it. In order to investigate this phenomenon, a cross-sectional study was undertaken utilizing data obtained directly from a sample of 799 healthcare workers (HCWs) employed in eight hospitals who were actively working throughout the period spanning from April 2020 to March 2022 within the COVID-19 pandemic. Five latent variables, namely, Psychological Stress (PS), Socio-Economic Impact (SEI), Interpersonal Relationships (IPRs), Government Intervention (GI) and Work-Life Balance (WLB), have been developed using a self-designed questionnaire with separate sections for each of them. A comprehensive structural model to determine the variables influencing WLB is estimated using PLS-SEM. The mediating role of IPR in the relationship between PS and WLB is investigated, and the moderating effect of two variables on WLB, 'Government intervention' and 'whether a worker is affected by COVID or not', has been examined. T-test and ANOVA techniques are also applied to examine the impact of these variables across different socio-demographic characteristics. Our findings indicate that variables PS and SEI negatively impact WLB whereas IPRs have positively impacted it. Government intervention, however, did not exhibit any significant impact on it. Further, IPRs partially mediated the relationship between PS and WLB. The role of government is completely non-significant in moderating the relationships of PS and SEI with WLB. A healthcare professional affected by COVID significantly moderated the mediating relationship between PS and IPR and the direct relationship between IPR and WLB. Subsequently, it favourably affected the WLB of HCWs. Our study recommends that the government and hospital authorities should strengthen the resilience-building interventions and expand their efforts to provide social support to HCWs at the hospital and community levels. Concerted actions must be taken to preserve HCWs' work-life balance amidst the challenging circumstances they face, especially during the pandemic.

Introduction

COVID-2019, an acute respiratory disease, was initially detected in Wuhan, China, in December 2019. It quickly spread in many countries throughout the world. World Health Organisation officially announced the virus as a pandemic on March 11, 2020 and considered it a global public health emergency (WHO, 2020). Owing to its life-threatening infectious nature and high mortality,

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there was an enormous burden on the health system and Healthcare Workers (HCWs) across the world. Their continuous exposure to affected patients made them face unidentified consequences, pushing them toward stressful times. Many countries took preventive measures by enforcing lockdowns.

Consequently, educational institutions and corporate houses quickly transitioned to work-from-home (WFH). Multiple studies observed that WFH was relaxing due to the flexibility in their working hours, saving on commuting time and having more family time. However, healthcare workers had no such advantage. Instead, enhanced workload, extreme working conditions, lack of safety measures, and increased COVID-19 significantly affected patients' hospital admission, resulting in their work stress (Prasad and Vaidya, 2020). They faced a conflict between their duties as HCWs and their role as a family caregiver. All these factors affected their performance, appallingly disturbing their work-life balance. To keep the patients safe and infection-free, HCWS must be mentally poised and to maintain a balanced professional and personal life. In the wake of this unprecedented crisis, it is crucial to comprehend the intricate interplay of factors influencing the work-life balance of HCWs.

Extensive research during the on-going pandemic revealed that it had affected the psychological health of HCWs (Yildirim and Cicek, 2022), with high levels of anxiety among the doctors (Chatterjee et al., 2021), significantly higher rates in females, primarily nurses (Guo et al., 2020) and in other HCWs (Que et al., 2020). Many factors such as lower age (Chatterjee et al., 2021), higher educational qualification (Gao et al., 2020 ; Mazza et al., 2020), excessive workload (Chatterjee et al., 2021), ineffective infection management (Du et al., 2020), lack of personal protection equipment, PPE (Wang et al., 2020; Du et al., 2020), inadequate support from friends and relatives (Cao et al., 2020; Du et al., 2020), having infected family member/friend (Cao et al., 2020; Du et al., 2020; & Mazza et al., 2020), excessive use of social media (Gao et al., 2020) and exposure to aggression from patients (Okechukwu et al., 2020) have contributed to their mental distress.

Another cause of concern during COVID-2019 for the HCWs has been its uncertainty and financial and economic impact. Worrying about its testing and treatment and consequent loss of job/salary, if hospitalized, envisaged having an overwhelming impact on their lives. However, each country's government played a pivotal role in controlling the infection. The Government of India responded swiftly by allocating funds and human resources to ease the impact of the pandemic by regulating the cost of COVID tests and treatment. A handful of studies in this perspective have discussed the financial impact of COVID-2019 and efforts put forth by the government for the same (Florin et al., 2020; Tran et al., 2020; Pillai et al., 2020; Verma and Mishra, 2020).

Further, previous research has recognized that major traumatic events like these can have opposing impacts on interpersonal relations, resulting in their improvement or deterioration. (Goodwin, 2009; Joseph, 2013). Improved relationships can enhance the level of security and lower distress, whereas stringent relationships may increase anxiety that may spread through social networking. The positive impact of good relations on the mental health of medical workers can improve self-efficacy and sleep quality and lower their anxiety levels since family and co-workers give support and share compassion (Prati, 2010; Kent et al., 2018; & Xiao et al., 2020). Social support has been the most commonly cited factor that favours the psychological health of HCWs (Hou et al., 2020).

The association of social support with mental health has also been researched through mediating and moderating mechanisms. Anxiety, stress and self-efficacy have been found to have mediated the relationship between social support and sleep quality (Hou et al., 2020). Research has also demonstrated that social support mediates the relationship of psychological resilience and mental health with coping (Xu et al., 2023). Empirically, association between the relationship quality and mental health has been a topic of research in several studies conducted during normal periods (Holt-Lunstad, 2008; Carr and Umberson, 2013) and during COVID times (Xiao et al., 2020; Schneider et al., 2020; & Pieh et al., 2020). These studies suggest that favourable IPRs contribute to maintaining an excellent work-life balance as a good relationship is a protective factor. In contrast, a poor relationship is a risk factor for poor mental health. It has also been demonstrated that not only stress but also perceived work stress also negatively impacted family life and activities and relationships with relatives (Pacutova et al., 2023).

The motivation for this research stems from the profound challenges experienced by healthcare workers during the COVID-19 pandemic. As frontline heroes in the battle against the virus, HCWs faced a multitude of stressors, including increased work demands, personal life disruptions, and a heightened risk of infection. Exploring existing research, it became evident that no single study has comprehensively examined these

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compelling factors together to understand their collective impact on HCWs' WLB. Confronting a substantial gap in the existing research, our study takes a comprehensive approach to unravel the complex interplay of factors that collectively influence the work-life balance of HCWs. This research strives to fill this critical gap in the literature by encompassing four independent variables: psychological stress (PS), socio-economic impact (SEI), the effect of interpersonal relationships (IPR), and the role of government intervention (GI) to discern their relationships with WLB. Drawing from the wealth of scholarly work on the significance of social support or IPR, this study additionally investigates the role of IPRs as a mediating variable in the relationship between PS and WLB.

Recognizing the distinct waves of the COVID-19 pandemic and the experiences of HCWs who contracted and subsequently recovered from the virus, our study delves into whether the link between PS and WLB, as well as the mediating role of IPR, was amplified during this period. This novel aspect of our research involves assessing the moderating influence of HCWs affected by COVID-19 on the relationship between PS and WLB and the mediating role of IPRs, using a moderating-mediating model. Furthermore, we explore the moderating impact of GI independently on two critical relationships: PS and WLB, and SEI and WLB. The study uncovers these intricate relationships using structural equation modelling (SEM), providing a holistic understanding of HCWs' challenges. Identifying underlying factors and interactions suggests strategies and policies essential for supporting and sustaining this crucial healthcare workforce.

Material and Methods

This section provides essential details, including sample size, variable construction, hypothesis development, research model, measurement techniques, reliability assessments, and construct validity.

Size of Sample and Data Collection

A cross-sectional survey was conducted between June 2022 and February 2023, using questionnaires and personal interviews, targeting healthcare workers who served during the three waves of COVID-19. The sample selection process involved two stages: selecting hospitals and then identifying respondents within those hospitals. In the first stage, permission was sought from major COVID-19 hospitals in the Delhi National Capital Region (NCR), each having a minimum of 1000 employees, through a combination of emails and personal connections. After extensive paperwork, multiple in-person meetings, persuasive efforts, and leveraging known contacts, permission was granted to survey four public and four private hospitals. To adhere to ethical standards, emails were sent to each selected hospital, assuring strict data confidentiality and emphasizing that the study was solely for academic purposes.

In the second stage, a stratified random sampling technique was employed to select healthcare workers from each hospital. Data was collected from four distinct categories of HCWs: doctors, nurses, technicians, and support staff. The support staff category, encompassing administrative personnel, ambulance drivers, custodial staff, and other hospital helpers, constituted the largest segment. Their respective representation within the hospital determined the number of respondents surveyed from each category. In total, our study participants comprised of 799 HCWs.

Construction of Variables and Development of Hypotheses

This sub-section outlines the construction of latent variables and the formulation of hypotheses using data gathered from a comprehensive, structured questionnaire with six sections. The initial section covers socio-demographic details, such as gender, age, hospital type, employment status, marital status, and COVID-19 exposure. The subsequent five sections were designed to measure five constructs:

Work-life Balance: It is a term that describes the integration of work and personal life responsibilities. During COVID time, work from home became a norm. With no outside support, operational discomfort, increased responsibilities, and a stressed state of mind (Prasad and Vaidya, 2020), it became difficult for HCWs to balance their personal and professional lives. Hence, their productivity and performance were adversely affected (Kumar et al., 2021), resulting in poor WLB. Several studies have assessed the impact of COVID on WLB defined in varied ways, such as quality of work-life satisfaction (Kara et al., 2020) and job performance (Bernales et al., 2022; Kumar et al., 2021), work motivation, work performance and work engagement (Jeong et al., 2022) and job satisfaction. Likewise, assessment of this has been based on different scales such as 'Nine-item Utrecht Work Engagement Scale' and Korean Occupational Stress Scale (KOSS-SF) used by Jeong (2022).

In our study, we have used a 6-item questionnaire to assess WLB. The first three items gauged the effect of excessive pandemic-related work duties on personal life, while the remaining three focused on how additional family responsibilities affected work life. We employed a

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5-point Likert scale (Strongly Agree =1 to Strongly Disagree =5) for participant responses. WLB has been calculated as an average of these scores, where a higher score signifies better balance. Our study examines factors influencing WLB which is the dependent variable.

Psychological Stress: It refers to a state of mind that influences a person's capacity to work and cope with the given circumstances (Kumar et al., 2021). Voluminous studies have revealed the presence of stress, anxiety, insomnia and fatigue during COVID-2019 (Lee et al., 2020; Chew et al., 2020 ; Roy et al., 2020). A few studies have measured insomnia/sleep quality as a measure of stress (Rahman et al., 2023; Xiao et al., 2020) and suggested that job-related stresses and uncertainty during COVID-19 pandemic has affected the mental health and sleep pattern of HCWs. Keeping in view the consequences of psychological stress on health and well-being of HCWs, it is essential to measure this construct, which has been extensively taken up in many studies. Empirically, various scales have been used to measure it, such as an internationally recognized 21-item scale called DASS 21(Chew et al., 2020; Verma and Mishra, 2020), Self-Rating Anxiety Scale-SAS; General Self-Efficacy Scale-GSES; and Pittsburgh Sleep Quality Index- PSQI (Xiao et al., 2020). Further, another 12-item GHQ-12 scale has also been commonly used to measure general mental health problems (Xu et al., 2023).

Our study gauges psychological stress by considering the overall mental well-being of healthcare workers without distinguishing between depression, anxiety, stress, or insomnia, as taken up in previous studies. Instead, we've devised eight statements derived from existing scales to assess HCWs' stress levels. These statements focus on how their sleeping patterns, decision-making abilities, concentration levels, and confidence have been adversely affected. We employed a 5-point Likert scale, ranging from Never (1) to Always (5), for respondents to rate these items. A higher score indicates an increased stress level. Based on prior research, our study hypothesizes (H_1) a negative association between psychological stress and work-life balance, suggesting that increased psychological stress will lead to decreased WLB.

Interpersonal Relationships: It describes the effective relationships developed and maintained with family, at work place/with friends, and at the community level, more commonly referred as social support. These kinds of relations show understanding, empathy and concern and are important for the physical and mental health. This variable has been discussed extensively in the existing research. Social support from friends or family members to medical staff during the pandemic has been found to reduce their anxiety and stress and improve self-efficacy and resilience, which helps improve WLB (Zhang et al., 2020; Xiao et al., 2020). Xu (2023) measured personal self-perception and social support at three levels, family, friends and others. Zou et al. (2021) considered it in the form of 'organizational support' and showed in their study that it could have a shielding effect on mental stress problems. Varying scales, such as the Social Support Rate Scale (Xiao et al., 2020) and the Perceived Social Support Scale (Xu et al., 2023), have been used to measure support from society in general.

Our study measured IPR using 10 statements categorized at three levels; 'family', 'co-workers' and 'friends/community'. All items have been rated on a 5-point scale (1= Very Adversely Affected to 5 = Very Happily Affected), with higher scores representing happy or favourable IPRs. Based on existing research, our study hypothesizes (H_2) that there is a positive relationship between IPR and WLB, implying improved IPR will increase the levels of WLB.

Socio-Economic Impact: Using seven statements, this variable aimed to identify factors that could have affected the HCWs socially or financially. All items are rated on a 5-point scale (5 = Strongly worried to 1 = Not worried at all). The higher score indicates a more adverse socio-economic impact on HCWs. We hypothesize (H_3) that there is a negative relationship between SEI and WLB, implying that the worse the impact of SEI on HCWs, the poorer their WLB.

Role of Government Intervention: It is essential to assess how the government policies at this time of health crisis impacted the WLB of HCWs. Various studies have discussed the government's contribution to controlling the disease (Cai et al., 2020a; Pillai et al., 2020; Shukla et al., 2021). However, its impact has not been analyzed deeply. The government of India adopted several measures, such as timely announcements of restrictions, making tests and PPE kits available at reduced costs, and appreciating and recognising the efforts of HCWs, among others.

In order to assess the influence of government intervention in addressing stressful circumstances, this part has six assertions that are evaluated using a five-point scale (ranging from 5= Very Effective to 1= Very Ineffective).

Accordingly, increased scores in this section indicate a positive impact of the government's intervention in containing the crisis. We hypothesize (H_4) that there is a positive relation between GI and WLB.

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In summary, our study examines these constructs to understand their relationships with Work-Life Balance of healthcare workers during the COVID-19 pandemic.

Non-parametric structural equation modelling (SEM) using SMARTPLS (3.3.3) has assessed interrelated mediation and moderation hypotheses. We choose Partial

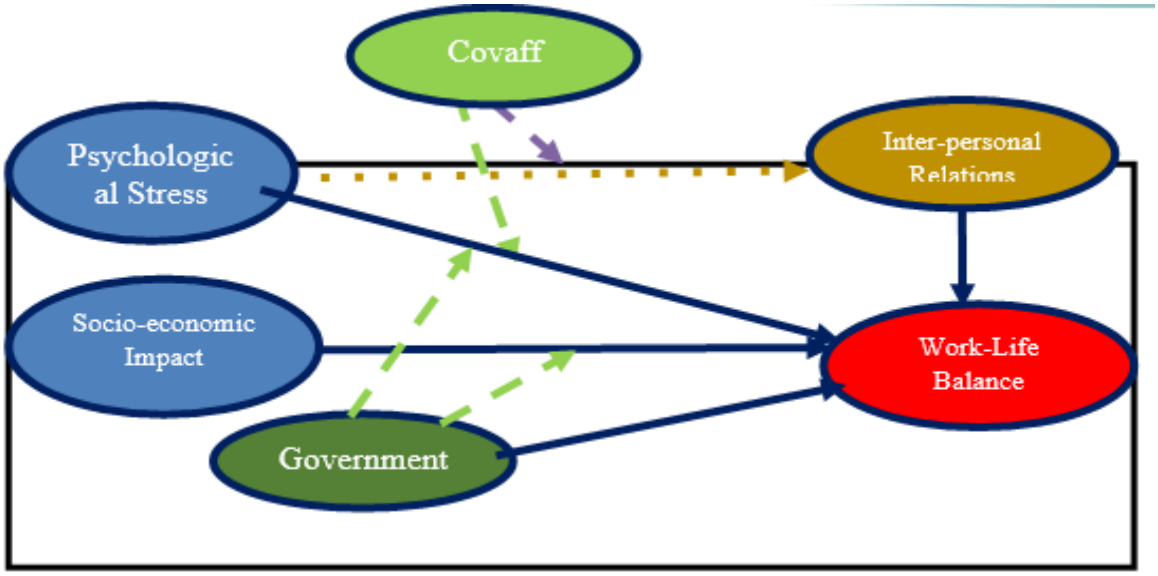

Figure 1. The Conceptual Model (Authors' compilation)

Research Techniques and Model Development

The statistical analysis is carried out in two parts. In the first part, univariate demographic analysis was conducted using appropriate t-tests (with equal or unequal variance) to assess the differences in study variables across socio-demographic attributes with dichotomous outcomes. For that, 'Levene's test of equality of variance' was applied to examine the homogeneity of variances of different groups. For demographic variables having more than two groups, one-way ANOVA was applied. In instances where the F-statistic was significant, Post-hoc analysis was carried out to facilitate multiple comparisons between the groups. Wherever homogeneity of variance was not rejected (p-value <0.05), the Tukey test was used, and for the rest of the cases, Welch test and Games-Howell were used. This was carried out using SPSS (version 25) software.

In the second part, a comprehensive model was developed to explore how far WLB was influenced by four independent variables: PS, IPRs, SEI and the role of government intervention. Further, to enrich our model, we constructed three models to analyze different variables' mediating and moderating roles. In the first model, we hypothesized that IPR is mediating between PS and WLB. The second model hypothesises that government intervention could moderate the relationship between SEI, WLB, and PS and WLB. Lastly, moderation-mediation model is developed to investigate the impact of a binary variable, 'covaff', i.e., whether COVID infected a worker or not, on two relationships, a direct one between PS and WLB, and on the meditating one between PS and IPR (Figure 1).

Least Squares-SEM (PLS-SEM) because it accommodates both formative and reflective indicators, doesn't require multivariate normality, and has no strict sample size limitations. PLS-SEM is also robust against multicollinearity among independent variables (Chin, 1998; Chin and Newsted, 1999; Hair et al., 2019; Mittal et al., 2021).

The SEM analysis has two stages; the *measurement model* assesses reliability and validity, while the *structural model* explores relationships between constructs. We use bootstrapping to test the significance of mediation and moderation hypotheses (Hair et al., 2019). This approach allows us to investigate complex variable interactions efficiently.

Measurement Model: Testing of Reliability and Construct Validity

To progress for path analysis and to ensure an acceptable measurement model, we tested for item reliability (called factor loading), construct reliability, convergent and discriminant validity. The factor loadings for each item, Cronbach alpha (α) (to check internal consistency), composite reliability and average variance explained (AVE) (to check convergent validity) for all five constructs are shown in Table 1. The uni-dimensionality of the constructs has been ensured by including only those items with factor loadings more than 0.6 (Hair et al., 2013). Hence, the items PS1, SEI1, IPR1, GE1, and GE2 having factor loadings less than 0.6 have been dropped for subsequent analysis. We observe that the Cronbach alpha coefficient is higher than 0.87 for all the constructs, confirming high internal consistency (Hair et al., 2010). The average variance supports the evidence

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for convergent validity explained figures, which are greater than the minimum threshold values of 0.50 for all the constructs (Fornell and Larcker, 1981).

Table 1. Reliability and Convergent Validity of Five Constructs

Construct	Item	Factor Loadings	Cronbach's Alpha (α)	Composite Reliability (CR) (rho_a)	Composite Reliability (CR) (rho_c)	Average Variance Extracted (AVE)
Work Life Balance	WLB1	0.791	0.862	0.872	0.896	0.590
	WLB2	0.798				
	WLB3	0.822				
	WLB4	0.748				
	WLB5	0.765				
	WLB6	0.676				
Measure of Level of Psychological Stress Distress [1-8]	SEI2	0.629	0.821	0.823	0.870	0.528
	SEI3	0.694				
	SEI4	0.643				
	SEI5	0.781				
	SEI6	0.761				
	SEI7	0.737				
Measure of Socio-Economic Impact Impact [1–7]	SEI2	0.629	0.802	0.811	0.858	0.504
	SEI3	0.694				
	SEI4	0.643				
	SEI5	0.781				
	SEI6	0.761				
	SEI7	0.737				
Measure of Interpersonal Relationships	IPR2	0.753	0.875	0.879	0.900	0.500
	IPR3	0.685				
	IPR4	0.746				
	IPR5	0.727				
	IPR6	0.705				
	IPR7	0.758				
	IPR8	0.702				
	IPR9	0.680				
	IPR10	0.597				
Measure of Influence of Govt. Intervention	GI3	0.617	0.751	0.871	0.830	0.556
	GI4	0.826				
	GI5	0.871				
	GI6	0.635				

Note: Authors' Calculation

Further, to measure the discriminant validity of the constructs, Fornell-Larcker criterion results are calculated by comparing the square root of AVE values (shown in the above Table) of each of the five constructs (diagonal values of the matrix), which are greater than the correlation between that construct and the rest of the other constructs. Table 2 provides satisfactory discriminant validity evidence (Fornell and Larcker, 1981; Hair et al., 2010; Sankaran & Chakraborty, 2022). The discriminant validity is established from the fact that the items of each latent variable have greater loading to its construct vis-à-vis the loadings on the other constructed variables. Hence, the results in both tables indicate that all the five constructs in our measurement model are different from each other and also substantiate their reliability and validity.

Table 2. Correlation Matrix for Assessment of Discriminant Validity (Fornell-Larcker criterion)

	GI	IPR	PS	SEI	WLB
GI	0.746				
IPR	0.112	0.707			
PS	-0.134	-0.192	0.727		
SEI	-0.093	-0.266	0.302	0.710	
WLB	0.095	0.321	-0.327	-0.400	0.768

Results and Discussion

Sample Demographic Analysis

The demographic characteristics of our sample have been summarised in Table 3. Our sample of 799 HCWs comprises an equal representation of private (49.8%) and public hospitals (50.2%). The percentage of males (56%) is higher than their female counterparts (44%). In terms of their occupational roles, the maximum representation is of support staff (33%), followed by nurses (27%), doctors (22%) and technicians (18%), as shown in Figure 2. This is in consonance with their presence in most hospitals, as on average, every hospital has the highest

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number of employees in the 'support staff' and least in the 'technician' category.

Table 3. Distribution of Total HCWs Surveyed According to their Demographic Characteristics

Characteristics	Category	Number	Percent (%)
Type of Hospital	Private	398	49.8
	Public	401	50.2
Gender of Respondent	Male	440	55.8
	Female	349	44.2
Occupation of Respondent Redefined in two categories	Medically Trained	392	49
	Non-medically Trained	406	51
Age of the Respondent	<25	106	13.3
	26-40	533	66.8
	">40"	159	19.9
Nature of Employment	Permanent	337	42.4
	Temporary	156	19.6
	Contractual	301	37.9
Marriage Status	Married	248	31.6
	Unmarried	308	39.3
	With children and/or elderlies	228	29.1
	Total	784	100
Total Work Experience	< 2 years	108	13.6
	2-5 year	278	35.0
	> 5 years	408	51.4

Note: Authors' compilation

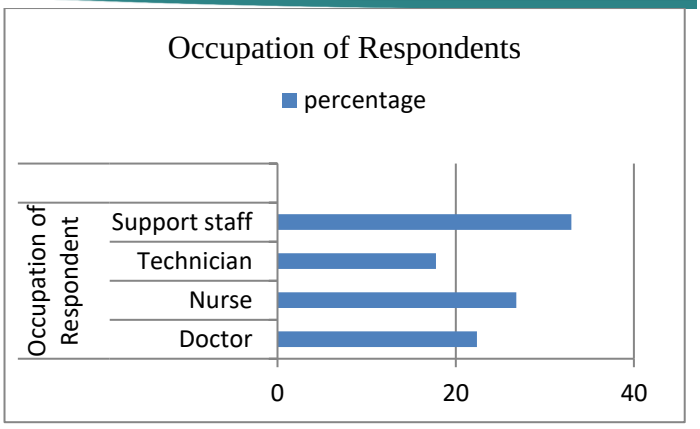

Figure 2. Occupation of Respondent (in %)

In terms of age, 67% of HCWs are aged 26-40, mostly permanent employees (42%) with over 5 years of experience (half), and a fairly even split between unmarried (40%), married (31%), and those with children and/or elderlies (29%). Over 93% worked in COVID-19 zones, but less than 50% contracted the virus (Figure 3).

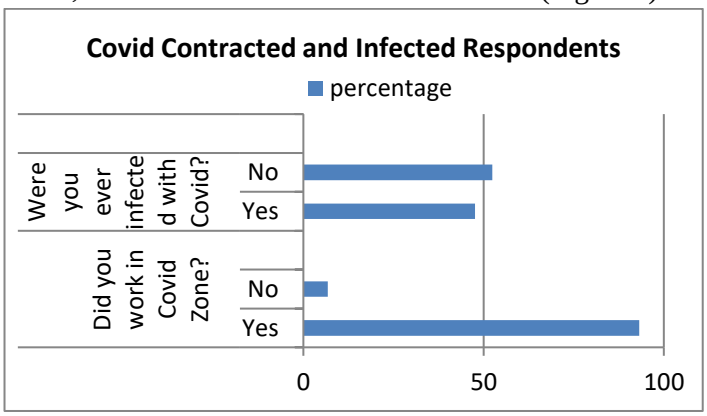

Figure 3. COVID Contracted and Infected Respondents (in %)

Comparative Analysis of Constructs across Demographic Variables

Demographic Variables having two categories

All five variables have been analyzed using t-test (Table 4). Our findings across gender suggest that female HCWs are significantly more stressed than their male counterparts and they also have decreased levels of WLB. A significantly higher prevalence of PS and adverse impact on WLB is found in HCWs employed in public hospitals compared to private hospitals. Further, our study also compares the stress level between HCWs affected by COVID-19 and those unaffected. It is observed that the 'COVID-infected' workers were much more stressed than the others. It could be owing to their unpleasant experiences during the sickness and fear of re-infection.

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Table 4. Comparison of the HCWs Scores of WLB, PST, SEI, IPR, GI by their Five Demographic Characteristics Using t-Test.

Characteristic/ Attribute	Categories/ Groups	Work_Life_ Bal	Psy_Stress	Socio_Eco_ Imp	Interper_R elation	Govt_Inter
		Mean ± SD	Mean ± SD	Mean ± SD	Mean ±SD	Mean ± SD
Gender of Respondent	Male	2.77 ± 0.93	2.24 ± 0.81	3.22 ± 0.98	2.81 ±0.59	3.79 ± 0.75
	Female	2.61 ± 0.85	2.50 ± 0.78	3.23 ± 0.94	2.85 ± 0.61	3.83 ± 0.73
t-ratio		2.53	-4.456	-0.148	-0.744	-0.589
p-value		0.011	0.00	0.882	0.457	0.556
Type of Hospital	Private	2.77 ± 0.92	2.25 ± 0.73	3.16 ± 0.98	2.86 ± 0.65	3.78 ±0.78
	Public	2.64 ± 0.89	2.45 ± 0.85	3.29 ± 0.94	2.80 ±0.57	3.83 ± 0.69
t-ratio		1.94	-3.643	-1.844	-1.493	-0.939
p-value		0.052	0.00	0.066	0.136	0.348
Medically Trained[@] or Non-medically Trained[@@]	Medically Trained	2.55 ± 0.90	2.47 ± 0.77	3.21 ± 0.92	2.73 ±0.66	3.70±0.73
	Non-medically Trained	2.85 ± 0.90	2.24 ± 0.82	3.24 ± 0.99	2.93 ± 0.52	3.91 ± 0.72
t-ratio		-4.796	3.93	-0.486	-4.745	-4.831
p-value		0.000	0.000	0.627	0.000	0.000
Did you work in COVID Zone?	Yes	2.70 ± 0.92	2.35 ± 0.80	3.23 ± 0.96	2.84 ± 0.61	3.82 ±0.73
	No	2.74 ± 0.72	2.34 ± 0.79	3.21 ± 0.95	2.63 ± 0.51	3.65 ±0.75
t-ratio		-0.329	0.128	0.156	2.52	1.58
p-value		0.743	0.899	0.876	0.01	0.114
Were you ever infected with COVID?	Yes	2.50 ± 0.87	2.53 ± 0.80	3.43 ± 0.85	2.72 ± 0.62	3.69 ± 0.76
	No	2.89 ± 0.91	2.19 ± 0.77	3.04 ± 1.01	2.93 ± 0.57	3.91 ± 0.70
t-ratio		-6.159	6.019	5.819	-4.774	-4.356
p-value		0.000	0.000	0.000	0.000	0.000

Note: Authors' compilation[@] It includes Doctors & Nurses; [@@] It includes Technicians and Support Staff

Further, PS, WLB, GI and SEI of HCWs who worked in COVID-zones were not significantly different from those who worked in non-COVID zones (Liang et al., 2020). Interestingly, the results also reveal that these

HCWs had improved IPRs probably due to their getting sympathetic social support from society at large.

Classifying all doctors and nurses as 'medically-trained' (MT) and technicians and support staff as 'non-medically trained' (NMT), we observe a significant difference between the two categories concerning PS, WLB, IPR and the role of GI. The MT workers are more stressed (Lu et al., 2020; Zhang et al., 2020) and experience significantly poorer WLB as well as IPR than the non-medical staff. Government intervention has a more positive impact on NMT workers. Previous studies also observed doctors and nurses to be the worst sufferers of sleep disorders among all categories of HCWs (Rahman et al., 2023).

Demographic variables having more than two categories

Comparing HCWs across their occupational roles (Table 5), doctors experience the highest stress, followed by nurses and support staff. In terms of IPR and WLB also, it is found that doctors are significantly adversely affected as compared to nurses and support staff.

No significant differences are observed in the socio-economic impact among these groups. Government intervention has significantly more favourable impact on support staff and technicians due to their lower-income status. There's no significant difference between technicians and support staff across the five constructs.

Regarding *age*, older HCWs manage their relationships and WLB significantly better than their younger counterparts, while no significant differences are observed in psychological stress, SEI, and effectiveness of government's role (Kang et al., 2020; Badahdah et al., 2020). However, increased stress for older staff (Cai et al., 2020a) and higher stress for young professionals (Halms, 2022) has also been reported.

Work experience in the hospital follows a similar pattern as age, with junior HCWs experiencing poorer WLB and IPR than senior counterparts. No significant difference is found in their mental stress. Government interventions favour experienced HCWs, aligning with Ekingen's findings (2023), although Cai (2020b) found the previous experience to be protective.

Regarding *employment* type, permanent, temporary, and contractual HCWs exhibit no significant difference in mental stress, government role, or socio-economic impact. However, IPR and WLB are significantly better for contractual employees compared to permanent and temporary ones.

Regarding marital status, HCWs with families consisting of children and elders have significantly better IPR and WLB. There's no significant difference in stress levels among these groups. Government intervention has a more favourable impact on HCWs with families. However, when marital status is classified as married (including those with children and elders) and unmarried, the former group experiences significantly higher stress. Fear of infecting family members contributes to this stress. In terms of other variables, no significant differences are observed.

Findings concerning four levels of 'income group' are similar to those of four categories of HCWs based on their professional roles as the higher-income HCWs, plausibly comprising doctors and very senior nurses, and lower-income consisted of SS and technicians. Higher-income HCWs are more stressed, and their IPRs and WLB are significantly adversely affected compared to the other income categories.

Structural Model with Mediation and Moderation Analysis

The outcomes of the analysis of the structural model encompass several vital parameters, including the coefficients associated with the independent variables, the coefficient of determination (indicating the model's explanatory power), effect size measures, t-statistics, and p-values (signifying the statistical significance of the coefficients).

Structural Model Analysis

Exploring the factors that contribute to WLB, from our results (Table 6), we observe that the three independent variables have significant effects and GI has non-significant impact on WLB. Both the variables, PS and SEI have an adverse impact on the WLB of HCWs with their respective coefficients being, -0.257 and -0.279, while IPR has a positive influence with its coefficients equal to 0.20. HCWs who have good relations with their friends, family members and co-workers also have better WLB (Schneider et al., 2020). The R^2 of the model is 26% and the effect size ($\mathbf{f^2}$) is highest for SEI followed by IPRs and PS.

Mediation Analysis

For our study, we conceptualize that the impact of PS on WLB is mediated through IPR. Results from the mediation analysis (Table 7) highlight that psychological stress per second significantly negatively impacts WLB. However, a noteworthy finding emerges when we observe the mediation through Interpersonal relationships (IPR). This mediating factor further exacerbates the negative impact, leading to a more substantial negative effect on WLB.

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Table 5. Distribution of the HCWs Scores of WLB, PST, SEI, IPR, GI by their Professional and Various Socio-demographic Characteristics using One-Way ANOVA and Post-hoc Analysis[@]

Characteristic / Variable	Categories / Groups	Work_Life_Bal	Psy_Stress	Socio_Eco_Imp	Interper_Relation	Govt_Inter
		Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
1. Occupation of Respondent	Doctor (D)	2.62 ± 0.95	2.47 ± 0.81	3.26 ± 0.96	2.79 ± 0.63	3.58 ± 0.80
	Nurse (N)	2.51 ± 0.85	2.46 ± 0.74	3.16 ± 0.90	2.68 ± 0.68	3.79 ± 0.65
	Technician (T)	2.78 ± 0.91	2.26 ± 0.77	3.32 ± 1.00	2.89 ± 0.57	3.96 ± 0.61
	Support Staff (SS)	2.89 ± 0.89	2.24 ± 0.84	3.20 ± 0.99	2.95 ± 0.50	3.89 ± 0.78
Post-hoc Analysis *[p-value]*		(D)<(SS) *[0.009]* (N) < (SS) *[0.000]* (N) < (T) *[0.016]*	(D) > (N) *[0.013]* (N) > (SS) *[0.012]*	(D) = (N) = (T) = (SS) *[No-SD]*	(D) < (SS) *[0.027]* (N) < (SS) *[0.00]* (N) < (T) *[0.006]*	(T) > (D) *[0.00]* (SS) > (D) *[0.00]* (N) > (D) *[0.025]*
2. Age of the Respondent	<25 (1)	2.57 ± 0.90	2.50 ± 0.80	3.33 ± 0.87	2.67 ± 0.57	3.91 ± 0.81
	26-40 (2)	2.69 ± 0.89	2.31 ± 0.80	3.26 ± 0.96	2.83 ± 0.61	3.76 ± 0.73
	">40" (3)	2.87 ± 0.92	2.39 ± 0.81	3.06 ± 0.99	2.93 ± 0.58	3.90 ± 0.69
Post-hoc Analysis *[p-value]*		(1) < (3) *[0.023]* (2) = (3) *[No-SD]*	(1) = (2) = (3)] *[No-SD]*	(1) = (2) = (3) *[No-SD]*	(1) < (2) [0.024] (1) < (3) [0.002], (2) = (3) *[No-SD]*	(1) = (2) = (3) *[No-SD]*
3. Nature of Employment	Permanent (P)	2.66 ± 0.82	2.32 ± 0.75	3.14 ± 0.99	2.76 ± 0.61	3.80 ± 0.73
	Temporary (T)	2.55 ± 0.95	2.46 ± 0.77	3.31 ± 0.90	2.75 ± 0.59	3.71 ± 0.72
	Contractual (C)	2.83 ± 0.96	2.33 ± 0.87	3.26 ± 0.95	2.95 ± 0.57	3.86 ± 0.75
Post-hoc Analysis [p-value]		(P) < (C) *[0.039]* (T) < (C) *[0.006]* (P) = (T) *[No-SD]*	(P)= (T) = (C) *[No-SD]*	(P) = (T) = (C) *[No-SD]*	(P) < (C) *[0.000]* (T) < (C) *[0.002]* (P) = (T) *[No-SD]*	(P) =(T)= (C) *[No-SD]*
4. Marriage Status	Married(M)	2.55 ± 0.85	2.41 ± 0.80	3.36 ± 0.92	2.77 ± 0.59	3.73 ± 0.71
	Unmarried(U)	2.71 ± 0.87	2.29 ± 0.77	3.24 ± 0.93	2.79 ± 0.64	3.74 ± 0.73
	With children and elderlies (C&E)	2.85 ± 1.00	2.38 ± 0.85	3.06 ± 1.01	2.93 ± 0.55	3.93 ± 0.74
Post-hoc Analysis *[p-value]*		(M) < (C&E) *[0.001]* (M) < (U) *[0.09]*	(M) = (U) = (C&E) *[No-SD]*	(M) > (C&E) *[0.002]* (U) > (C&E) *[0.09]*	(M) < (C&E) *[0.012]* (U) < (C&E) *[0.023]*	(C&E)> (M) *[0.005]* (C&E)> (U) *[0.006]*
5. Monthly Income level	<15K (1)	2.69 ± 0.96	2.25 ± 0.94	3.34 ± 0.92	2.81 ± 0.59	3.74 ± 0.78
	15K-30K (2)	2.77 ± 0.87	2.26 ± 0.77	3.29 ± 0.98	2.90 ± 0.59	3.94 ± 0.70
	30K-50K (3)	2.88 ± 0.94	2.42 ± 0.79	2.99 ± 0.94	2.86 ± 0.53	3.86 ± 0.61
	> 50K (4)	2.52± 0.90	2.50 ± 0.78	3.21 ± 0.97	2.73 ± 0.65	3.61 ± 0.79

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Post-hoc Analysis *[p-value]*		(4) < (2) *[0.012]* (4) > (3) *[0.002]* (1) = (2) = (3) *[No-SD]*	(4) > (1) *[0.038]* (4) > (2) *[0.045]* (1)= (2) = (3) *[No-SD]*	(1) > (3) *[0.023]* (2) > (3) *[0.015]* (1), (2), (3) w.r.t (4) *[No-SD]*	(4) < (2) *[0.008]* ((1) =(2) = (3) *[No-SD]*	(2) > (4) [0.000] (3) > (4) [0.008] (1) = (2)= 3) [No-SD]
6. Total Work Experience	< 2 years (1)	2.52 ± 0.83	2.43 ± 0.84	3.35 ± 0.95	2.70 ± 0.64	3.61 ± 0.85
	2-5 years (2)	2.69 ± 0.92	2.36 ± 0.82	3.31 ± 0.97	2.82 ± 0.56	3.82 ± 0.68
	> 5 years (3)	2.75 ± 0.91	2.33 ± 0.78	3.14 ± 0.96	2.87 ± 0.61	3.85 ± 0.73
Post-hoc Analysis *[p-value]*		(1) < (3) *[0.05]* (1) = (2) & (2) = (3) *[No-SD]*	Across any category *[No-SD]*	(2) > (3) *[0.022]* (1)=(2)& (1)= (3) [*No-SD]*	(1) < (3) *[0.008]* (1) = (2) & (2) = (3) [*No-SD]*	(2) > (1) *[0.028]* (3) > (1) *[0.008]* (2)= (3)
Note: @ only significant pairwise p-values are reported here; [*No-SD]:*-No significant difference at 5%						

Table 6. Path Coefficients of Independent Variables and their Significances

Hypothesis	Relationship (direct path)	β value	f^2	t-value	p-value	Inference
H_{01}: The four IVs have non-significant impact on WLB. **Conclusion:** The NH concerning three variables (PS, SEI, IPRs) is rejected. The NH with regard to GI is not rejected.	PS -> WLB	-0.257	0.040	5.46***	0.00	PS has a significant and negative impact on the WLB
	SEI -> WLB	-0.279	0.086	8.11***	0.00	SEI has a significant and negative impact on WLB
	IPR -> WLB	0.200	0.048	5.39***	0.00	IPRs have a significant and positive impact on WLB
	GI -> WLB	0.007	0.000	0.191	0.85	GI has non-significant impact on WLB
Note: R^2 = 0.260 and R^2 adjusted = 0.253; ***: p-value is significant at 1%						

Utilizing the robust bootstrapping resampling technique to assess the significance of mediation relations (Shrout and Bolger, 2002), we find that the direct effect of PS on WLB (β = -0.257, p < 0.001) is statistically significant. Significantly, it is worth noting that even when the connection is influenced by intellectual property rights (IPR), the particular indirect impact with a β value of -0.046 remains statistically significant at the 1% level. This is indicated by the confidence interval, which does not encompass a value of zero. Notably, the absolute β value of the total effect[1] of PS on WLB, after considering mediation, increases from 0.257 to 0.303. This indicates that the mediation effect of IPR amplifies the negative impact of PS on the WLB of healthcare workers, showcasing a scenario of partial mediation. Hence, we conclude IPR does indeed partially mediate the relationship between PS and WLB.

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Table 7. Mediating Impact of IPR in the Relationship between PS and WLB: Direct, Indirect and Total Effects

Hypothesis	Relationship	Direct Effect (DE)	Specific Indirect Effect (SIE)	t-value of SIE (p-value)	Total Effect (TE)	Result
H_{02}: The IPR does not mediate the relationship between PS and WLB.	PS→ IPR→ WLB	PS → WLB -0.257 ***	(PS → IPR) × (IPR→WLB) = (-0.23) (0.20) = -0.046***	3.76 (0.00)	(-0.257) + (-0.046) = -0.303	Partial Mediation
Note: *** significant at 1%; Authors' compilation						

Table 8. Moderating Impact of a Latent Variable- 'Government Interference' on two Relationships; between PS and WLB and SEI and WLB.

Null Hypothesis (NH)	Relationship	Beta value	t-value	p-value	Decision	Inference
H_{03}: Govt has no moderating impact on relationship PS→WLB	GI →WLB (Direct Effect)	0.007	0.191	0.848	NH is not rejected.	GI has no significant moderating effect on the relationship PS→WLB
	GI x(PS→WLB) (Interaction Effect)	-0.012	0.340	0.734		
H_{04}: Government has no significant impact on the relationship between SEI and WLB	GI x(SEI→WLB) (Interaction Effect)	0.055	1.375	0.169	NH is not rejected.	GI has no significant moderating effect on the relationship SEI→ WLB
Note: Authors' Compilation						

Moderation Analysis

A moderating variable is used to examine the changes in the magnitude or direction of the relationship between an independent and dependent variable, termed a*n interaction effect*. However, owing to its complex nature, only a handful of Indian studies (Sankaran, 2022; Dhingra and Dhingra, 2020; Kumar, 2021) have analyzed the impact of moderating variables to explore the strength of structural relationships. Our paper considered the interaction effect of two moderating variables, (i) a latent variable, 'Government intervention' and (ii) a binary variable (0/1) - 'Covaff' (with 'Covaff=1' for the HCW infected with COVID and 'Covaff=0' for those not infected, during the two years of the spread of COVID infection) on WLB through various structural relationships.

Analysis of 'Government Intervention' as Moderating Variable

It was crucial to investigate if the existence of government intervention affected the relationship between PS and WLB and between SEI and WLB, given the plethora of financial incentives the government provided to lessen the sufferings experienced by HCWs during COVID-19.

Results in Table 8 show that neither the government intervention directly nor through interaction with PS had any impact on the WLB of HCWs. Likewise, it was also demonstrated that the government was completely ineffective in moderating the impact on WLB through SEI. Interpreting the direction of impact, it is pertinent to note here that the interaction between GI and PS worsened the impact on WLB while it improved through SEI. Nevertheless, it is unambiguously demonstrated that

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Table 9. Moderating Impact of a Dichotomous variable-COVID infected or not ('covaff'), on Relationships between PS and WLB and PS and IPR

Hypothesis	Relationship	Direct Effect (DE)/ Interaction Effect (InE)	t-value of DE/InE	p-value	Decision	Inference
H_{05}: HCW being 'COVID infected or not' has no moderating effect on the relationship PS→ WLB	COVIDaff → WLB	-0.163 (DE)	2.59	0.009***	NH is rejected.	There is a significant positive moderating effect of 'covaff' on the relationship PS→ WLB
	COVIDaff x (PS→ WLB)	0.145 (InE)	2.10	0.035**		
H_{06}: HCW being 'COVID infected or not' has no moderating effect on the mediating relationship PS→IPR	COVIDaff → IPR	-0.263 (DE)	3.63	0.00***	NH is rejected.	There is significant positive moderating effect of 'covaff' on the relationship PS→IPR.
	COVIDaff x (PS → IPR)	0.138 (InE)	1.98	0.048**		
Note: Authors' compilation; *** significant at 1%; ** significant at 5%;						

there was no significant interaction effect of the role of government on the WLB. In other words, GI neither changed the strength nor direction for both the relationships.

Analysis with 'Covaff' as Moderating Variable

From our demographic analysis, we observed that 97 percent of the respondents worked in COVID-zone, however, 50 percent were infected with COVID. So, it was important to investigate if the HCWs who re-joined their work after recovering from the COVID infection, moderated the impact on WLB through the changed stress levels and IPRs. Hence, the study examines the moderation effect of a binary variable, 'covaff' to examine two important relationships: the direct relationship between PS and WLB and the mediating relationship between PS and IPRs. As we conceptualize that 'covaff' HCWs would only moderate the first stage of the mediation path, it would be called 'a first stage moderation model' (Hou et al., 2020).

The results show that the direct effect of 'covaff' on both the variables, WLB and IPR is negative and significant at less than 1 % (Table 9). However, it is noted that the interaction effect with regard to both the relationships, that is PS and WLB (with coefficient =0.145) and the first stage of mediation between PS and IPRs (with coefficient = 0.138), is positive and significant at 5%. Notably, the signs of these interaction effects are positive, which contrasts with the signs of the direct impacts on WLB and IPRs. Given that the value 1 is assigned to COVID-infected HCW and 0 to others, it is interpreted that the COVID-infected person's impact on WLB improved through moderation effect on both PS and IPR variables. This indicates that HCWs who experienced COVID-19 infection showed better interpersonal relationships (IPRs) and improved work-life balances (WLBs) upon returning to work.

Conclusion

The WHO recognized healthcare workers as "the most valuable resource for human health" in 2006 (WHO, 2006). Despite this recognition, HCWs remain vulnerable to pandemics on account of their continuing exposure to virus-infected patients. Their mental health, socio-economic challenges and impact on work-life balance have been understudied. This paper conducts a multivariate study to understand the relationships among variables (work-life balance, psychological stress, interpersonal relationships, socio-economic impact, and government intervention) in the context of HCWs during COVID-19.

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Our demographic analysis results are from the previous studies. It is observed that female HCWs experience more stress and worse WLB. Female nurses, in particular, suffer higher mental problems. Empirically, these findings are consistent with several studies (Huang et al., 2021; Qi et al., 2020; Da Silva et al., 2021; Guo et al., 2020, Lai et al., 2020; Giusti et al., 2020; Vanhaecht et al., 2021; Halms, 2022). These results are also corroborated with Indian research studies (Chatterjee et al., 2021; Wilson et al., 2020).

Owing to significantly lower stress on non-medically trained HCWs (Lu et al., 2020; Zhang et al., 2020), their IPRs and WLB are better maintained than those of medically trained workers. (Alnazly et al., 2021; Tan et al., 2020) With regard to variables, WLB, PS, SEI, no significant difference was found between HCWs who worked during COVID-zone and those who did not (Liang et al., 2020). However, it was found in some earlier studies that HCWs working in COVID-zone were at a higher risk of developing stress (Liu et al., 2020; Lu et al., 2020). Sahin (2020) found that in Turkey, HCWs in direct contact with COVID-19 patients were prone to insomnia vis-à-vis those working in non-COVID zones. It is observed that working in COVID-zone made them better manage their IPRs. Giusti (2020) observed that being in contact with patients with COVID-19 was identified as the determinant of stressed mental being. Many studies showed that nurses who work in the emergency and intensive care units and are in close contact with patients suffer higher levels of work stress (Ilczak et al., 2021; Huerta-Gonz´alez et al., 2021; Leng et al., 2021; Guo et al., 2020; Badahdah et al., 2020).

Making comparisons about the different occupational roles of HCWs, we found that both doctors and nurses exhibited significantly higher levels of stress than the support staff. Consequently, regarding IPRs and WLB, support staff and technicians are better placed. About all variables, no significant difference was found between nurses and doctors. Many studies (Zhan et al., 2020; Mulyadi et al., 2021; Shen et al., 2021; Bilgiç et al., 2021) have shown that nurses are more stressed than doctors, but most of these studies had a smaller sample size and limited data coverage, as they did not consider support staff and technicians separately in their samples.

Further, the results of our study revealed increased stress, poor IPRs, and WLB for young and inexperienced HCWs compared to their mature counterparts. These findings align with previous research works (Ekingen et al., 2023; Peiro´et al., 2020). It has been demonstrated that younger HCWs are more fearful and anxious due to lack of professional experience. Further, it is also confirmed that years of employment are negatively associated with depression, though the degree of the association was small (Jeong, 2022).

Comparing concerning marital status, it is found that across all three categories of HCWs, the level of stress is not statistically different. This is not consistent with the results reported in the literature which showed higher level of anxiety for the unmarried, childless younger respondents (Liu et al., 2020; Moreno, et al., 2020; Akyol et al., 2021) since they tend to undertake more workload and frontline duties. Vanhaecht (2021) found that the association between COVID-19 and negative mental health symptoms was higher for HCWs with additional responsibilities of their children and family, thus a higher workload leading to higher stress (Li et al., 2020). However, a noteworthy point is that the families with children and elderlies experienced significantly better IPRs, and their work lives were more balanced than those of unmarried HCWs. A study conducted by Ahmad (2020) on the Indian population during lockdown also showed that married participants had 40% lower odds of developing anxiety than unmarried participants.

The results for socio-economic impact of COVID on the HCWs are noteworthy. No significant difference was found with regard to gender, medically trained or not, whether worked in COVID zone or not, nature of employment, age, and the occupational role performed by HCWs. However, a significant difference was observed only with respect to income level and for COVID-infected workers. The SEI of COVID-19 on HCWs belonging to the two lowest levels of income groups and who got infected during the COVID period were significantly adversely affected compared to their respective counterparts. This highlights the fact that the cost of testing and hospitalization during COVID took a toll on poor and infected workers.

Upon conducting an analysis of the efficacy of government intervention in mitigating the spread of COVID-19 and ensuring timely access to essential personal protective equipment for healthcare workers, our findings indicate that there was no statistically significant variation in the influence of government intervention across the majority of demographic categories. However, it was noted that those in lower income brackets who work in the healthcare sector, lack medical training, have dependents such as children and elderly family members, and have not contracted COVID-19, perceived the government's measures more effective than other groups. Multiple studies have shown evidence that the recognition and support received from both the government and the wider society have played a crucial

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role in mitigating the anxiety and stress experienced by healthcare workers (Cai et al., 2020a; Sun et al., 2020; Xiao et al., 2020). According to Zhang et al. (2022), current research indicates that a substantial level of contentment with governmental activities has been linked to an enhanced sense of trust among the public. Consequently, this heightened trust catalyses individuals to exhibit more dedication towards both personal and public service endeavors.

Transitioning to our structural model, we analyze the influence of four distinct independent variables, namely PS, IPR, SEI, and GI, on the work-life balance (WLB) construct. Per our hypotheses, the study's findings confirm that the variables PS and SEI have a significant and negative impact on work-life balance (WLB). According to Jeong (2022), there is a correlation between elevated levels of work-related stress and a detrimental impact on job engagement, leading to decreased motivation and worse work performance. Conversely, healthcare workers (HCWs) who possess favorable interpersonal relationships (IPRs) tend to maintain a more favorable work-life balance (WLB). This discovery enhances the findings of several previous studies, which indicate a positive correlation between enhanced work performance and increased social support (Zhu et al., 2016; Segrin et al., 2010; Glozah et al., 2015).

Similarly, our findings suggest that IPRs partially mediate the relationship between PS and WLB. With the stressed mental state of HCWs, their IPR deteriorates, which in turn worsens the balance of their work life. This suggests that even if HCWs are psychologically stressed but have peaceful and conducive IPRs with family and colleagues, they perceive an optimistic organizational culture which contributes to their better WLB.

Finally, assessing the moderation effects, our study reveals that the variable ‘covaff' has significant and positive interactive impact through both IPRs and PS. However, the moderation effect of GI on WLB, is completely negligible through PS as well as SEI. This clearly indicates that the government's measures taken up and announced were ineffective in impacting the SEI or reducing the stress level of HCWs. This suggests that if the government had played a pivotal role in containing the infection, probably HCWs would have worked more effectively. Also, a higher level of motivation to work is expected during a pandemic period only when the government successfully builds confidence, particularly amongst the HCWs through the announcement of various measures.

HCWs' well-being, especially during pandemics, requires attention. Supportive policies, open communication, and tailored interventions are crucial. Acknowledging the efforts of HCWs can boost their confidence and motivation.

Contributions of the Study and Policy implications

Our study stands out due to its data collection via in-person methods, offering higher reliability compared to common online surveys. Led by non-medical professionals, it introduces novel variables like interpersonal relations, socio-economic impact, and healthcare workers' work-life balance, enriching the literature with mediation and moderation relationships.

A key finding is the mediating role of interpersonal relationships between PS and WLB, contributing to new insights. Our study innovatively explores the moderating impact of a binary variable "covaff" on these relationships. These findings emphasize the urgency of prioritizing HCWs' mental and physical well-being and providing comprehensive training and counselling to prepare them for pandemics. A balanced mindset is crucial for safeguarding both HCWs and patients.

The study highlights the vital contribution of social support from co-workers, family, and the community in strengthening the mental health of HCW. Open communication, group discussions, and supportive leadership is essential. Mobile technology and e-learning tools can mitigate stress, improve interpersonal relationships and enhance work-life balance for HCWs. Government intervention is crucial for strengthening healthcare systems, increasing infrastructure investment, and providing financial aid to economically vulnerable HCWs. Tailored policies to support female workers and educational initiatives on maintaining a balanced life are beneficial.

In moving forward, safeguarding HCWs' well-being is paramount. The adage "physicians protect thyselves" takes on greater significance as we recognize the challenges they face as caregivers and as individuals navigating unprecedented circumstances.

Limitations and Future Scope of the Study

The study, while informative, faces several limitations that should be acknowledged. Firstly, the research predominantly focused on healthcare workers (HCWs) within the Delhi National Capital Region (NCR) region. The narrow geographical scope raises concerns about the generalizability of the findings to HCWs in different regions, states or countries. Variations in healthcare infrastructure, governmental responses and cultural factors can significantly influence the well-being of HCWs.

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Another limitation pertains to the challenges of obtaining hospital permission to conduct the study with HCWs, which can result in selection bias. The stringent regulations and administrative processes in seeking these permissions limited our sample to eight hospitals.

While valuable for capturing a snapshot of HCWs' experiences during a specific period, the study's cross-sectional design may not fully account for the evolving nature of a pandemic that unfolds over time. A pandemic is characterized by various phases, each with unique challenges. To comprehensively understand how the challenges and mental health impacts evolve during different stages of a pandemic, future research should employ longitudinal or cohort studies that track HCWs' well-being over an extended period.

To build upon the current study and address its limitations, several avenues for future research can be considered. Expanding the geographical scope is essential. Research should aim to include HCWs from diverse regions, states, and countries to obtain a more representative sample of HCWs across different settings and enhance the external validity of the findings. This broader perspective would offer a more comprehensive understanding of the challenges faced by HCWs in various healthcare systems, cultural contexts and pandemic scenarios.

In addition, future research can delve into in-depth policy analysis to evaluate the effectiveness of specific government policies and interventions aimed at supporting HCWs during healthcare crises. Understanding which policies have the most significant positive impact can help form evidence-based decision-making during similar crises in the future.

Moreover, future studies should explore the coping mechanisms adopted by HCWs and investigate the availability and utilization of mental health resources. This can provide a deeper understanding of the strategies that help HCWs maintain their well-being during challenging times. In conclusion, while this study offers valuable insights into the mental health of HCWs during healthcare crises, the acknowledged limitations highlight the need for further research. Future studies should strive to address these limitations and contribute to a more comprehensive understanding of the needs of HCWs.

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Conflict of Interest

The authors declare no conflict of interest.

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