

The Mental Health of Essential Medical and Non-Medical Frontline Workers amidst the COVID-19 Pandemic: A Quantitative Comparative Study

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How to cite this paper: Hester, B., Johnson, P. and Padgett Jr., J.H. (2025) The Mental Health of Essential Medical and Non-Medical Frontline Workers amidst the COVID-19 Pandemic: A Quantitative Comparative Study. *Open Journal of Medical Psychology*, 14, 97-119.

<https://doi.org/10.4236/ojmp.2025.142006>

Received: January 8, 2025

Accepted: March 28, 2025

Published: March 31, 2025

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Abstract

The COVID-19 pandemic underscored the link between workplace conditions, mental health, and employee well-being. This study examined whether perceived supervisor support and fear of infection predicted depression scores among 339 participants using the Depression, Anxiety, and Stress Scale (DASS). Hierarchical and multiple regression analyses revealed that supervisor support and fear of infection collectively explained 10.1% of the variance in depression scores ($p < 0.01$), with individual contributions of 2.1% ($p < 0.05$) and 3.3% ($p < 0.01$), respectively. Depression, anxiety, and stress collectively accounted for 4.2% of the variance in fear of infection ($p < 0.01$), with stress emerging as the strongest predictor (4.0%, $p < 0.01$). The sample predominantly comprised healthcare workers, highlighting their vulnerability during public health crises. While the variance explained was modest, all relationships were statistically significant, emphasizing the importance of workplace support systems. Practical implications include fostering supervisor support and implementing proactive mental health initiatives to reduce fear and depression, particularly in healthcare settings during emergencies.

Keywords

Mental Health, COVID-19, Employee Well-Being, Workplace Support, Healthcare Workers

1. Introduction

The COVID-19 pandemic, declared a global crisis by the World Health Organization (WHO) in March 2020, brought unprecedented challenges to healthcare

systems worldwide. The virus spread rapidly, causing over 6.5 million deaths globally by January 2023 [1]. Healthcare professionals and paraprofessionals emerged as the backbone of the pandemic response [2] [3], shouldering immense professional and personal risks [4]. The dual burdens of physical virus exposure and significant psychological stress underscored the urgent need to address their mental health and well-being [4]-[6].

Research consistently demonstrates the profound psychological toll experienced by healthcare professionals during the pandemic [7]. Studies report elevated levels of anxiety, depression, and post-traumatic stress disorder (PTSD) among medical staff [7] [8]. Contributing factors include extended work hours, isolation from family and loved ones, and moral dilemmas surrounding resource allocation [9]. Essential non-medical workers (ENMWs), such as custodians and technicians, faced similarly heightened risks and stress but often received less recognition and support. Their critical role in maintaining hospital operations highlighted the importance of equitable support across all tiers of essential workers [10].

The theoretical foundation of this study rests on the Job Demands-Resources (JD-R) Theory [11], which categorizes workplace conditions into demands and resources. In healthcare settings, demands such as infection fear and psychological stress can exacerbate mental health challenges. Conversely, resources like perceived supervisor support may buffer these demands, reducing burnout and improving mental health outcomes. Previous studies have utilized JD-R theory to explore the interplay between workplace conditions and well-being, demonstrating its relevance in understanding the pandemic's impact on healthcare workers [12] [13].

This research examines two critical questions: the extent to which perceived supervisor support and fear of infection predict depression and how stress, depression, and anxiety predict fear of infection. Using the Depression, Anxiety, and Stress Scale (DASS) [14], the study employs a quantitative correlational design to analyze these relationships. Hierarchical and linear regression analyses provide a robust framework for understanding the complex interactions among these variables.

The findings contribute to understanding the mental health challenges faced by healthcare employees during the COVID-19 pandemic. By identifying pivotal predictors of depression and fear of infection, this study aims to assist organizations in developing and revising policies and creating interventions that enhance supervisor support and address the psychological demands of healthcare environments. Ultimately, this research underscores the need for comprehensive strategies to support the resilience and well-being of all healthcare workers, ensuring their ability to navigate future public health crises effectively.

2. Literature Review

The purpose of the study was to examine the mental health of essential workers in

healthcare, specifically in a hospital setting during the COVID-19 pandemic. Studies have consistently reported mental health [15] [16] and physical consequences [17] [18] of prolonged exposure in high-risk occupations where workers were consistently in contact with infected individuals. The COVID-19 pandemic significantly impacted mental health worldwide, with numerous studies documenting increased psychological distress [19]-[22]. Contributing factors included heightened loneliness, isolation from social/physical distancing and quarantine, chronic stress from fear of virus transmission, and economic uncertainty related to job losses and business closures [23].

Empirical research on mental health during pandemics is well established, showing elevated anxiety and depressive symptoms among general populations, healthcare workers, and vulnerable groups such as the elderly and medically compromised individuals [24]-[26]. Research indicates that higher Corona Virus Anxiety Scale (CAS) scores correlate with COVID-19 diagnosis, accompanied by increased rates of impairment, alcohol/drug coping, negative religious coping, extreme hopelessness, and suicidal ideation [27]. These findings are congruent with experiences from past pandemics and epidemics, such as SARS in 2003 and the H1N1 virus of 2009, which demonstrated increased anxiety, depression, stress, and occurrences of post-traumatic stress disorder (PTSD) [27].

2.1. Mental Health and Healthcare Professionals

Healthcare professionals working during the COVID-19 pandemic experienced documented clinical distress, anxiety, depressive symptoms, and sleep disturbances [7] [8], along with profound experiences of loss and grief [28]. Their mental health declined due to extended working hours, contamination risks, family separation and isolation, and the burden of making difficult moral decisions regarding medical resource allocation [9] [29].

Another study [30] found that among healthcare workers regularly treating COVID-19 cases, 32.9% reported unusual anxiety and 27.9% experienced depression. Additionally, 24.5% and 72.8% of participants reported mild and moderate stress levels, respectively. Key risk factors included insufficient infection control training and pre-existing stress-inducing medical conditions. Additionally, healthcare workers were seven times more likely to experience severe COVID-19 compared to non-essential workers [31].

2.2. COVID-19 and Essential Medical Workers

Healthcare professionals faced unprecedented challenges in treating patients while maintaining high levels of care. Stress in these situations increases the risk of physical and mental health disorders [32]. Similar patterns of elevated stress, anxiety, depression, and post-traumatic stress disorder symptoms were observed during previous epidemics, including H1N1 influenza and SARS.

Studies of frontline health workers in Bangladesh using the Patient Health Questionnaire-4 (PHQ-4) revealed anxiety prevalence at 17.6%, depression at

15.5%, PTSD at 7.6%, and insomnia at 5.9% [33]. Comparative research has consistently shown higher rates of psychological concerns, particularly insomnia, among healthcare workers versus non-healthcare workers [34].

2.3. COVID-19 and Essential Non-Medical Workers

When the crisis began, the United States healthcare system was inadequately prepared to protect and support both medical and non-medical hospital staff, including essential frontline non-medical workers (ENMWs). During the COVID-19 pandemic, non-medical essential workers were found to be more at risk for mental health issues due to a lack of protective equipment, training, and organizational support [10] [35], higher mortality rates [36], and other functional impairments [37] [38]. These issues were compounded by workers reporting fear of contracting the virus, lack of organizational support, work disruption, and financial insecurity [16].

Despite ranking among the lowest-paid hospital staff, ENMWs such as custodians require equivalent protection and support as frontline medical workers [10]. Within organizational hierarchies, custodians are often considered “invisible” workers [39]. This invisibility stems from their association with “dirty work” or tasks that carry social stigma or degradation [40]. Other positions considered essential non-medical workers include food transporters, supply chain workers, transportation workers, security personnel, and maintenance workers. These lower-ranked workers often came from marginalized backgrounds, experienced higher rates of COVID-19 [41] and lacked access to safety and health measures [31].

2.4. Perceived Supervisor Support and Fear of Infection

Supervisor support reflects the quality of supervisor-subordinate relationships, and the degree of support employees receive [42] [43]. Enhanced workplace support from supervisors correlates with improved mental health outcomes among healthcare workers [44]. Notably, medical staff who felt valued at work experienced 40% less burnout compared to those feeling undervalued [45]. Fear of COVID-19 transmission and concerns about personal and family health became pervasive among frontline healthcare workers [45] [46]. This fear significantly impacted mental health, manifesting in elevated rates of post-traumatic stress symptoms (11% - 73.4%), depression (27.5% - 50.7%), anxiety (45%), and insomnia (34% - 36.1%) [47].

COVID-19’s impact on healthcare workers’ physical and psychological well-being has been substantial [48]. Among essential medical staff, 34.3% of inpatient physicians and 53.4% of inpatient nurses expressed intent to leave their positions within two years. Interestingly, essential non-medical workers demonstrated higher job acceptance rates (62.7%) compared to nurses (60.4%) and physicians (50%) [10].

Essential non-medical workers merit equal consideration to their medical

counterparts, as they face similar risks when entering patient rooms. Their contributions are vital—without essential non-medical workers cleaning and sanitizing COVID-19-infected rooms, medical professionals cannot perform their duties effectively [49].

3. Theoretical Foundation

The Job Demands-Resources (JD-R) Theory [11] provides the theoretical foundation for this study. The theory posits that all work environments can be categorized into two main components: job demands (physical, psychological, social, or organizational aspects) and job resources (factors that facilitate work goals, reduce job demands, or promote personal growth). In healthcare settings, a critical psychological demand is the fear of COVID-19 infection, as healthcare workers regularly experience psychological stress, sustained vigilance, and emotional labor while caring for patients [45] [50] [51]. Conversely, job resources such as perceived supervisor support can serve as buffers [42] [52] against these demands by ensuring access to protective equipment and providing practical and emotional support, potentially mitigating mental health issues, including stress, anxiety, and depression.

This theoretical framework directly supports our first research question by explaining the interactions between fear of infection, supervisor support, and depression. Regarding our second research question, the theory suggests that psychological strain can intensify the perception of job demands [53], creating a feedback loop between workers and supervisors. The theory also helps explain the cumulative effects of multiple psychological strains [54]-[58] experienced by healthcare workers [59].

The JD-R framework provides a robust foundation for measuring both positive (resources) and negative (demands) aspects of healthcare workers' experiences, supporting the use of assessment tools such as the Depression, Anxiety, Stress Scale (DASS-21) [14]. Previous research has successfully applied this theory to study burnout in healthcare workers [13], examine supervisor support as a buffer against emotional exhaustion, and explore relationships between workplace conditions and nurses' well-being [12].

4. Research Questions & Hypotheses

Two research questions and seven hypotheses guided this study:

RQ1: If, or to what extent, does perceived supervisor support and fear of infection combined and separately predict depression scores on the DASS?

H1o: Perceived supervisor support and fear of infection combined do not significantly predict depression scores on the DASS.

H1a: Perceived supervisor support and fear of infection combined significantly predict depression scores on the DASS.

H2o: Perceived supervisor support does not significantly predict depression scores on the DASS.

H2a: Perceived supervisor support does significantly predict depression scores on the DASS.

H3o: Fear of infection does not significantly predict depression scores on the DASS.

H3a: Fear of infection does significantly predict depression scores on the DASS.

RQ2: If, or to what extent do stress, depression, and anxiety combined and separately predict fear of infection?

H1o: Stress, depression, and anxiety scores on the DASS combined do not significantly predict fear of infection.

H1a: Stress, depression, and anxiety scores on the DASS, combined, do significantly predict fear of infection.

H2o: Stress scores on the DASS do not significantly predict fear of infection.

H2a: Stress scores on the DASS do significantly predict fear of infection.

H3o: Depression scores on the DASS do not significantly predict fear of infection.

H3a: Depression scores on the DASS do significantly predict fear of infection.

H4o: Anxiety scores on the DASS do not significantly predict fear of infection.

H4a: Anxiety scores on the DASS do significantly predict fear of infection.

5. Method

The study collected data from healthcare workers at a hospital in Southern California during 2023. Participants completed an online survey comprising a demographic questionnaire and the Depression, Anxiety, and Stress Scale-21 (DASS-21) [14]. The demographic questionnaire gathered information about participants' gender, age, marital status, occupation, employment status, fear of infection, and perceived management support during the pandemic. After data cleaning, the final sample consisted of 339 respondents.

6. Measures

The DASS-21 [14] was used to assess participants' levels of stress, anxiety, and depression. This validated instrument provides separate scores for each of these three psychological constructs. Additionally, the demographic questionnaire included measures of fear of infection and perceived supervisor support during the pandemic.

7. Data Analysis

The study employed a quantitative correlational design to address two primary research questions:

- 1) The relationship between supervisor support, fear of infection, and depression:
 - A linear regression analyzed whether perceived supervisor support and fear of infection collectively predicted DASS depression scores.
 - Two hierarchical regression analyses examined whether perceived supervisor

support and fear of infection independently predicted DASS depression scores.

2) The relationship between psychological states and fear of infection:

- A linear regression examined whether DASS anxiety, depression, and stress scores collectively predicted fear of infection.
- Three hierarchical regression analyses assessed whether each DASS component (anxiety, depression, and stress) independently predicted fear of infection.

8. Results

8.1. Participant Characteristics

The final sample consisted of $N = 339$ participants from a Southern California hospital. The majority of participants were male ($n = 237$, 69.9%), aged 36 - 50 years ($n = 142$, 41.9%), and single ($n = 195$, 57.5%). The sample was fairly evenly split between medical personnel ($n = 158$, 46.6%) and non-medical hospital employees ($n = 181$, 53.4%). Most participants worked full-time ($n = 290$, 85.5%), with smaller proportions working part-time ($n = 33$, 9.7%), per diem ($n = 11$, 3.2%), or temporary positions ($n = 5$, 1.5%). Regarding COVID-19 concerns, 38.6% ($n = 131$) reported fear of infection, 33.3% ($n = 113$) reported no fear, and 28.0% ($n = 95$) expressed neutral feelings. Notably, a substantial majority ($n = 259$, 76.4%) reported feeling unsupported by management during the pandemic, with only 23.6% ($n = 80$) indicating adequate support (see [Table 1](#)).

Table 1. Participant demographic and employment characteristics ($N = 339$).

Characteristic	<i>n</i>	%
Gender		
Male	237	69.9
Female	101	29.8
Prefer Not to Say	1	0.3
Age		
18 - 25 ($n = 15$)	15	4.4
26 - 35 ($n = 85$)	85	25.1
36 - 50 ($n = 142$)	142	41.9
Over 50 ($n = 97$)	97	28.6
Marital Status		
Married	144	42.5
Single	195	57.5
Occupation		
Medical	158	46.6
Non-Medical	181	53.4
Employment Status		
FT	290	85.5
PT	33	9.7

Continued

Per Diem	11	3.2
Temporary	5	1.5
Fear of Becoming Infected		
Yes	131	38.6
No	113	33.3
Neutral	95	28.0
Support from Management		
Yes	80	23.6
No	259	76.4

Note. Participant (N = 339) demographic data in aggregate, including gender, age, marital status, occupation, employment status, fearfulness of contracting COVID-19, and feeling supported by management. Percentages may not total 100 due to rounding.

The demographic data revealed several notable patterns. The high percentage of respondents reporting no managerial support contextualizes findings related to stress and job satisfaction. The predominantly male sample and older age distribution limit generalizability, with findings potentially more applicable to experienced workers. The high proportion of full-time employees suggests results may not reflect the experiences of part-time, per diem, or temporary workers. Additionally, control variables were omitted to maintain survey brevity and maximize response rates. Questions about pre-existing mental health conditions could have raised ethical concerns, while socioeconomic questions might have decreased participation due to their sensitive nature.

8.2. Research Question 1: Predictors of Depression

The first research question and corresponding hypotheses examined if or to what extent perceived supervisor support and fear of infection combined and separately predicted depression scores on the Depression, Anxiety, and Stress Scale (DASS) [14].

A linear multiple regression was used to analyze the first research question. Perceived supervisor support and fear of infection were the predictor variables and the DASS depression scores were the criterion variable. The analysis aimed to determine how well the predictor variables, combined, explained the variance in the depression scores.

8.2.1. Perceived Supervisor Support and Fear of Infection in Combination as Predictor of DASS Depression Scores

The model summary was statistically significant, $F(2, 336) = 18.82$, $p < 0.001$, where the two predictor variables, perceived supervisor support and fear of infection, explained 10.1% ($R^2 = 0.101$) of the variance of the criterion variable, depression scores from the DASS, with an adjusted $R^2 = 0.095$, indicating a slight adjustment for the number of predictors in the model. Overall, the model explains that the predictor variables, when combined, significantly predicted a meaningful and

modest proportion of the variance in the dependent variable (See **Table 2**).

Table 2. Model summary for combined predictors (fear of infection and supervisor support) on predicting DASS depression scores.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Df1	Df2	Sig. F Change
1	0.317 ^a	0.101	0.095	7.148	0.101	2	336	<0.001

Note. a. Predictors: (Constant), I fear I might become infected with COVID19, my direct supervisor has provided me with adequate support during the COVID-19 pandemic.

Both the model summary and the ANOVA (below) results indicate that supervisor support and fear of becoming infected with COVID-19 significantly predict depression scores of the respondents. The model only explains 10.1% of the variance, the combined impact of both variables. The significant F-value and the low p-value (<0.001) in the ANOVA table suggest that the relationship between the predictor variables and the criterion variable is meaningful (See **Table 3**).

Table 3. ANOVA analysis for combined predictors (fear of infection and supervisor support).

Model	Sum of Squares	df	Mean Square	F	Sig
Regression	1923.388	2	961.694	18.822	<0.001 ^b
Residual	17167.326	336	51.093		
Total	19090.714	338			

Note: a. Dependent Variable: Total score for depression on the DASS. b. Predictors: (Constant), I fear I might become infected with COVID-19, my direct supervisor has provided me with adequate support during the COVID-19 pandemic.

8.2.2. Supervisor Support as Lone Predictor of Fear of DASS Depression Scores

After conducting multiple regression for combining the predictor variables, a hierarchical regression analysis was conducted to determine how much variance was accounted for by the fear of contracting COVID and supervisor support of the depression scores from the DASS, separately. The first hierarchical regression was performed while holding the fear of infection constant and examining only supervisor support (See **Table 4**).

Table 4. Model summary for supervisor support while holding fear of infection constant.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	Df1	Df2	Sig. F Change
1	0.144 ^a	0.021	0.018	0.804	0.21	7.095	1	337	0.008

Note: a. Predictors: (Constant), Support.

The analysis revealed a weak but statistically significant relationship between supervisor support and depression scores from the DASS, $F(1, 337) = 7.095$, $p < 0.008$. The R value (0.144) indicates a weak positive correlation, and the R-squared value (0.021) indicates that approximately 2.1% of the variance in depression scores was explained by the level of supervisor support during the pandemic. In

contrast, the adjusted R-squared result indicates that only 1.8% of the variance in depression scores was explained by the level of supervisor support. Despite the small variance, the ANOVA analysis confirmed the statistically significant finding that supervisor support does significantly contribute to the model in predicting depression scores (See **Table 5**).

Table 5. ANOVA analysis for supervisor support while holding fear of infection constant.

Model	Sum of Squares	df	Mean Square	F	Sig
Regression	4.581	1	4.581	7.095	0.008 ^b
Residual	217.596	337	0.646		
Total	222.177	338			

Note: a. Dependent Variable: Fear. b. Predictors: (Constant), Support.

8.2.3. Perceived Fear of Infection as Lone Predictor DASS Depression Scores

To complete the analysis for the first research question, the second hierarchical regression was performed while holding supervisor support constant and examining only fear of infection. The results revealed another weak but statistically significant relationship between supervisor support and depression scores from the DASS, $F(1, 337) = 11.342$, $p < 0.001$. The R value (0.180) indicates a weak positive correlation, and the R-squared value (0.021) indicates that approximately 3.3% of the variance in depression scores was explained by the fear of infection during the pandemic. In contrast, the adjusted R-squared result indicates that only 3.0% of the variance in depression scores was explained by the fear of infection (See **Table 6**).

Table 6. Model summary for fear of infection while holding supervisor support constant.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	Df1	Df2	Sig. F Change
1	0.180 ^a	0.033	0.030	7.403	0.33	11.342	1	337	<0.001

Note: a. Predictors: (Constant), Fear.

The ANOVA from the second hierarchical regression again confirmed a statistically significant finding ($p < 0.001$), which explains only a small portion of the variance in depression scores when accounting only for fear of infection. While the F-statistic (11.342) shows that the fear of being infected variable has an impact on the overall model, there is a large portion of the variance that cannot be explained by the fear of infection predictor alone (See **Table 7**).

Table 7. ANOVA analysis for fear of infection while holding supervisor support constant.

Model	Sum of Squares	df	Mean Square	F	Sig
Regression	621.611	1	621.611	11.342	<0.001 ^b
Residual	18469.103	337	54.804		
Total	19090.714	338			

Note: a. Dependent Variable: Depression score b. Predictors: (Constant), Fear.

8.3. Research Question 2: Predictors of Fear of Infection

The second research question and corresponding hypotheses examined if stress, depression, and anxiety scores from the DASS, combined and separately, predicted fear of infection.

8.3.1. Depression, Anxiety, and Stress in Combination as Predictor of Fear of Infection

The model summary was statistically significant but weak relationship, $F(3, 335) = 4.927, p < 0.002$, where the three predictor variables, stress, anxiety, and depression scores on the DASS explained 4.2% ($R^2 = 0.042$) of the variance of the criterion variable, depression scores from the DASS, with an adjusted $R^2 = 0.034$, indicating a slight adjustment for the number of predictors in the model and the complexity of the model. Overall, the model indicates that depression, anxiety, and stress scores together have a significant relationship with the dependent variable, albeit a weak relationship (See **Table 8**).

Table 8. Model summary for combined predictors (depression, anxiety, and stress scores from the DASS) on predicting fear of infection.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	Df1	Df2	Sig. F Change
1	0.206 ^a	0.042	0.034	0.797	0.042	4.927	3	335	0.002

Note: a. Predictors: (Constant), Depression score, Total score for anxiety on the DASS, Total score for stress on the DASS

Despite the small variance, as seen in the ANOVA table, this analysis confirmed the statistically significant finding that when the predictors are combined, it does significantly contribute to the model in predicting fear of infection (See **Table 9**). The overall variance is still rather low (4.2%) according to the model summary, but this model explains more variance than the previous model, where the predictor variable was supervisor support alone (4.2%).

Table 9. ANOVA analysis for the combined predictors (depression, anxiety, and stress scores from the DASS) on predicting fear of infection.

Model	Sum of Squares	df	Mean Square	F	Sig
Regression	9.389	3	3.130	4.927	0.002 ^b
Residual	212.788	335	0.635		
Total	222.177	338			

Note: a. Dependent Variable: Fear. b. Predictors: (Constant), Depression score, Total score for anxiety on the DASS, Total score for stress on the DASS.

To complete the analysis for the second research question, three hierarchical regressions were performed, where each of the predictor variables was, in turn, held constant to determine which (if any) of the DASS scores on anxiety, depression, or stress predicted fear of infection. The first hierarchical regression was performed to determine if anxiety scores while holding depression and stress con-

stant were a significant predictor of fear of infection.

8.3.2. Anxiety as Lone Predictor of Fear of Infection

The model summary was statistically significant but had a weak relationship, $F(1, 337) = 9.603$, $p < 0.002$, where the anxiety scores on the DASS explained 2.8% ($R^2 = 0.028$) of the variance of the criterion variable, anxiety scores from the DASS, with an adjusted $R^2 = 0.025$, indicating a slight adjustment for the number of predictors in the model and the complexity of the model. Overall, the model indicates that anxiety scores have a statistically significant relationship with the dependent variable (See **Table 10**).

Table 10. Model summary for anxiety scores on predicting fear of infection.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	Df1	Df2	Sig. F Change
1	0.166 ^a	0.028	0.025	0.801	0.028	9.603	1	337	0.002
2	0.002 ^b	0.042	0.034	0.797	0.015	2.545	2	335	0.080

Note: a. Predictors: (Constant), Total score for anxiety on the DASS. b. Predictors: (Constant), Depression score, Total score for stress on the DASS.

The corresponding ANOVA table for the first model indicates a significant finding. Taken together, the F-value (9.603) and the p-value ($p = 0.002$) both indicate that anxiety is a statistically significant predictor of fear of infection. This is a notable portion of variance from fear of being infected (see **Table 11**).

Table 11. ANOVA analysis for anxiety on predicting fear of infection.

Model	Sum of Squares	df	Mean Square	F	Sig
Regression	6.156	1	6.156	9.603	0.002 ^b
Residual	216.021	337	0.641		
Total	222.177	338			
Regression	9.389	3	3.130	4.927	0.002 ^b
Residual	212.788	335	0.635		
Total	222.177	338			

Note: a. Dependent Variable: Fear. b. Predictors: (Constant), Total score for anxiety on the DASS, Depression score, Total score for stress on the DASS.

8.3.3. Depression as Lone Predictor of Fear of Infection

The second hierarchical regression was performed to determine if depression scores were a significant predictor of fear of infection while holding anxiety and stress constant. The model summary was statistically significant, $F(1, 337) = 11.342$, $p < 0.001$, where the depression scores on the DASS explained 3.3% ($R^2 = 0.033$) of the variance of the criterion variable, depression scores from the DASS alone, with an adjusted $R^2 = 0.030$, indicating depression scores have a statistically significant relationship with the dependent variable (See **Table 12**). It should be

noted here that the relatively low R Square value indicates that depression accounts only for a small part of the overall variance in fear of infection.

Table 12. Model summary for depression as the sole predictor of fear of infection.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	Df1	Df2	Sig. F Change
1	0.180 ^a	0.033	0.030	0.799	0.338	11.342	1	337	<0.001
2	0.206 ^b	0.042	0.034	0.797	0.010	1.696	2	335	0.185

Note: a. Predictors: (Constant), Depression score, b. Predictors: (Constant), Total score for anxiety on the DASS, Total score for stress on the DASS.

The corresponding ANOVA table for the first model indicates a significant finding. Taken together, the F-value (11.342) and the *p*-value ($p < 0.001$) both indicate that depression is a statistically significant predictor of fear of infection. This is a notable portion of variance from fear of being infected (see **Table 13**).

Table 13. ANOVA analysis for depression on predicting fear of infection.

Model	Sum of Squares	df	Mean Square	F	Sig
Regression	7.234	1	7.234	11.342	0.001 ^b
Residual	214.943	337	0.638		
Total	222.177	338			
Regression	9.389	3	3.130	4.927	0.002 ^c
Residual	212.788	335	0.635		
Total	222.177	338			

Note: a. Dependent Variable: Fear, b. Predictors: (Constant), Depression score, c. Predictors: (Constant), Total score for anxiety on the DASS, Total score for stress on the DASS.

8.3.4. Stress as Lone Predictor of Fear of Infection

The third hierarchical regression was performed to determine if stress scores while holding anxiety and depression constant were a significant predictor of fear of infection. The model summary was statistically significant, $F(1, 337) = 14.034$, $p < 0.001$, where the stress scores on the DASS explained 4.0% ($R^2 = 0.040$) of the variance of the criterion variable, stress scores from the DASS alone, with an adjusted $R^2 = 0.037$, indicating depression scores have a statistically significant relationship with the dependent variable (See **Table 14**).

Table 14. Model summary for stress as the sole predictor of fear of infection.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	Df1	Df2	Sig. F Change
1	0.200 ^a	0.040	0.037	0.796	0.040	14.034	1	337	<0.001
2	0.206 ^b	0.042	0.034	0.797	0.002	0.399	2	335	0.671

Note: a. Predictors: (Constant), Total score for stress on the DASS, b. Predictors: (Constant), Total score for stress on the DASS, Total score for anxiety on the DASS, Depression score.

The corresponding ANOVA table for the model indicates a significant finding. Taken together, the F-value (14.034) and the p -value ($p < 0.001$) both indicate that stress is a statistically significant predictor of fear of infection (see **Table 15**).

Table 15. ANOVA analysis for stress on predicting fear of infection.

Model	Sum of Squares	df	Mean Square	F	Sig
Regression	8.882	1	8.882	14.034	0.001 ^b
Residual	213.295	337	0.633		
Total	222.177	338			
Regression	9.389	3	3.130	4.927	0.002 ^c
Residual	212.788	335	0.635		
Total	222.177	338			

Note: a. Dependent Variable: Fear, b. Predictors: (Constant), Total score for stress on the DASS, c. Predictors: (Constant), Total score for stress on the DASS, Total score for anxiety on the DASS, Depression score.

9. Summary of Key Findings

The analysis revealed two key sets of findings. First, supervisor support and fear of infection collectively explained 10.1% of depression variance ($p < 0.001$), with individual contributions of 2.1% from supervisor support ($p = 0.008$) and 3.3% from fear of infection ($p < 0.001$). Second, the combined effects of depression, anxiety, and stress explained 4.2% of fear of infection variance ($p = 0.002$), with individual contributions of 3.3% from depression ($p < 0.001$), 2.8% from anxiety ($p = 0.002$), and 4.0% from stress ($p < 0.001$). While anxiety played a role in predicting fear of COVID-19, depression and stress scores provided more robust predictive value, suggesting an interactive effect among these mental health variables.

The findings were significant, but the variance explained by the predictors is rather small. Even so, 76.4% of the respondents reported no management support, when explaining the variance in depression by supervisor support, this 2.1% becomes meaningful. Additionally, small effects in the findings are still of importance for practical recommendations given the large population of full time workers (85.5%), the proportion of experienced workers in the sample (70.5%), and the fairly even split of medical and non-medical personnel. The findings are consistent across several variables, and bilateral relationships might indicate the need for practical interventions at the organizational and individual levels. Furthermore, given the demographic context, it indicates that even small changes may be significant to hospital operations.

10. Implications

Exploring relationships between supervisory support, fear of infection, and mental health outcomes in healthcare settings during crises remains crucial, as future epidemics or pandemics are likely. Our findings highlight the importance of workplace support and mental health resources in healthcare to enhance worker well-being. The results suggest that healthcare organizations, policymakers, and

practitioners should support workers through the development of comprehensive support programs and foster a culture that encourages workers to seek help with workplace-related mental health issues.

The implications for healthcare organizations, hospital administrators, human resource departments, and direct supervisors could benefit both employees and patients. Specific interventions could include providing dedicated mental health units for staff, implementing mental health screening programs, creating flexible leave policies for mental health needs, and fostering team cohesion. By addressing these issues, employees may experience reduced burnout, better work-life balance, and increased job satisfaction. Subsequently, patients treated by these healthcare professionals may receive safer, higher-quality care with more consistent standards. These improvements could create a positive feedback loop where healthier staff provide better care, leading to increased organizational profitability, improved employee and patient outcomes, and enhanced job satisfaction.

Healthcare policymakers should also consider implications related to employee training, crisis communication skills, regular policy updates, mandated mental health support, and crisis preparedness standards. While these are only initial considerations, implementing various interventions—such as comprehensive training programs, mental health support systems, and multiple communication channels—may effectively reduce turnover, improve staff well-being, and decrease overall organizational expenditures.

10.1. Strengths and Weaknesses

This study presents both strengths and limitations. Key strengths include the methodological design, theoretical framework, and practical relevance, which collectively provided a thorough understanding and enabled the examination of bi-directional relationships (*i.e.*, depression as both a predictor and an outcome). The theoretical foundation is built upon existing literature using the Job Demands-Resources (JD-R) Theory [11]. Furthermore, the study's practical relevance and findings illuminate critical issues affecting healthcare workers both during and beyond pandemic situations. Healthcare administrators can potentially utilize these findings to implement workplace support and intervention strategies, identify at-risk workers, and develop organizational policies and support systems.

Regarding limitations, the cross-sectional design restricts our ability to establish causality [60] [61] and captures only a snapshot in time. Additional limitations include potential response variance due to self-report measures, social desirability bias, possible incomplete relationship capture through multiple regression analysis, and lack of control for pre-existing mental health conditions. The demographic composition of the sample presented several limitations. The predominantly male sample, older age distribution, and high proportion of full-time workers limited our ability to understand the experiences of women, younger employees, and those in part-time, per diem, or temporary positions.

The study's generalizability is also constrained by its single-site sampling at one Southern California hospital. This study utilized personnel from a single hospital in California. This choice offered practical advantages: easier administrative access, lower resource requirements, and enhanced response rates due to one author's prior employment and maintained relationship with the site. Methodologically, using one site eliminated hospital policy variations as confounding variables and enabled deeper contextual understanding. However, this approach limited our ability to account for regional differences among healthcare centers.

10.2. Recommendations for Future Research & Practice

Research on hospital management highlights the crucial role of effective leadership in supporting both professional and non-professional staff. Evidence suggests that human resource (HR) functions often prioritize non-professional staff, leaving a gap in the management and support of core professionals [62]. Leadership practices in hospitals are frequently integrated into clinical work and shared across organizational boundaries, with their configurations varying depending on the specific healthcare setting [63].

During the COVID-19 pandemic, nurses emphasized the importance of visible and accessible leadership, transparent communication, resilient supply chains, equitable policies, and psychological support from trusted sources [64]. The successful implementation of Total Quality Management (TQM) in healthcare depends on several key practices, including top-management commitment, teamwork, process management, customer focus, resource management, organizational culture, continuous improvement, and training [65]. These findings underline the necessity of integrated and context-specific leadership approaches to effectively support hospital staff, especially during crisis periods.

Socio-emotional support, particularly direct support from supervisors, has been shown to have a significant positive impact on the affective commitment of nurses and nurse aides [66]. Factors influencing human resource management (HRM) in hospital settings involve both quantitative and qualitative performance dimensions [67]. Future research should also focus on the integration of nursing assistants to mitigate staffing shortages and the design of HRM strategies tailored to the specific demands of healthcare providers [67].

Future research should examine differences in supervisory styles and support levels across departments (e.g., emergency, ICU, administration). Our study did not account for variations in management structures, which could reveal important contextual differences within healthcare settings. For example, emergency and intensive care units face distinct high-stress situations and unpredictable stressors. The low percentage (23.6%) of workers reporting management support might reflect departmental variations in hierarchical structure, as clinical departments typically have multiple management layers while administrative units have more traditional hierarchies.

To address healthcare workers' mental health and improve workplace support

systems, several recommendations are proposed: conducting longitudinal studies to examine mental health trajectories throughout crisis periods, implementing comparative studies evaluating different types of supervisor support, investigating interactions between employees' personal and organizational resources during crises, and replicating this study using more robust tools to measure fear of infection, such as the Workplace Safety Questionnaire (WSQ) [68] [69]. A longitudinal study may prove useful in that it would allow researchers to track measurements at multiple points to see how relationships between variables evolve, and would provide the ability for researchers to determine if the reciprocal /bi-directional relationships amplify over time, diminish as workers become more adept at dealing with a crisis such as COVID-19, or if external circumstance of the pandemic (or any other such emergency) may result in fluctuations in the data; any of these things are not possible to evaluate without temporal data.

Future research should extend beyond quantitative methods to explore healthcare workers' perceptions of mental health support systems, workplace environments, and professional development in response to the COVID-19 pandemic. Collecting rich qualitative data about workers' lived experiences during the pandemic could offer valuable insights into their views on the effectiveness of supervisor support and its impact on mental health [70].

10.3. Future Practice

Supervisors play a pivotal role in enhancing the performance and well-being of non-essential medical staff within hospital settings. The implementation of structured supervision models has been shown to improve the skills, confidence, and teamwork of non-physician clinicians, resulting in increased surgical capacity and a reduction in unnecessary referrals [71]. Acknowledging the significant contributions of non-clinical staff to the healthcare environment is also essential, as their involvement profoundly influences institutional culture and patient care outcomes [72].

Hospital management plays a critical role in supporting non-essential medical staff, particularly during periods of crisis. Research highlights the importance of implementing policies that ensure all staff, including non-clinical workers, are provided with the necessary information, equipment, and support to maintain their safety and well-being during emergencies such as the COVID-19 pandemic [73]. This delegation allows medical professionals to focus on patient care while non-medical staff handle ancillary functions. Overall, strategic management approaches aimed at supporting non-essential staff can significantly improve hospital operations and foster a healthier, more resilient workforce [73].

Healthcare administrators should consider these findings when addressing barriers to support service implementation, policy development, and supervisor support in workplace dynamics. Practical recommendations include implementing crisis-specific supervisor training, establishing standardized mental health screenings, mandating regular mental health check-ins for both employees and supervi-

sors, tracking intervention effectiveness, monitoring staff well-being, and assessing the cost-benefit outcomes of implemented programs.

The overarching focus should remain on improving employee well-being, regardless of the specific research or practical recommendations implemented. Additionally, addressing peer support needs during epidemics or pandemics and exploring different mental health support models could provide valuable insights for both scholars and professionals in the field.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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