



Exploring Psychological and Socio-Economic Impact of Covid 2019 on Healthcare Workers in India: Evidence from Delhi-NCR Hospitals

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Abstract

The prevalence and severity of Covid 2019 has brought to light new vulnerabilities of Health Care Workers (HCWs) in their working conditions, social protection, and occupational safety and mental health. In view of this, our paper aimed to provide comprehensive analysis of psychological stress, socio-economic impact, government intervention, interpersonal relations, work-life balance, and coping strategies of HCWs during the pandemic time in India. Based on data collected physically from 606 HCWs working in seven hospitals located in Delhi-NCR using structured questionnaires, six latent variables were constructed. *T-test* and *ANOVA* technique along with *Post-hoc* analysis was used to make comparisons and identify groups across which significant differences existed. Further, a *two-group discriminant analysis* was performed to find the variables that best discriminated between HCWs from private or public hospitals and medically or not-medically trained. Lastly, *chi-squared* (χ^2) test was performed to examine the statistical association between coping strategies and few demographic characteristics. The results revealed that females and medically-trained HCWs were more psychologically stressed than their counterparts. Work-life-balance and interpersonal relations were found to be more disturbed among the medically-trained HCWs. Government regulations favourably affected the non-medically trained and HCWs with children and elderly. Additionally, the impact of interpersonal relationships and work-life-balance was found to be adverse on permanent HCWs. Discriminant analysis showed that interpersonal relationships, followed by government intervention, work-life balance and socio-economic impact were the most important predictors between medically and non-medically trained HCWs. However, none of these factors discriminated between HCWs from private or public hospitals. Further, the preference patterns of coping strategies suggested that HCWs worked with an optimistic state of mind and adopted positive techniques. To make the healthcare system more resilient, it is strongly suggested that the government should play a key role during the times of pandemic, especially-encompassing females and financially stressed categories of HCWs.

Keywords: Coping Strategies, Healthcare Workers, Private and Public Hospital, Psychological Stress, Socio-Economic Impact, Work-Life Balance

1. Introduction

The outbreak of SARS in 2003, swine flu pandemic in 2009 and now Coronavirus in 2019, has made the world realise not only how vulnerable we are to these infectious threats but also our slowness to recognise and respond to them. The spread of COVID-19 across the globe and the associated morbidity and mortality have challenged the nations manifold. It is an ongoing pandemic which is breaking in phases with different

variants and it has already claimed millions of lives worldwide. Its contagious nature and subsequent lockdown, home isolation, restriction on movements and necessary adherence to pandemic-related measures (wearing face masks and frequent use of disinfectant) has resulted in many hardships to all.

According to the WHO, while HCWs constitute two to three per cent of the population around the globe, they initially accounted for around fourteen per cent of the total COVID-

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19 cases. HCWs are more prone to any kind of epidemic or pandemic that spreads despite all possible precautions and their high vulnerability is due to their high risk of exposure to the virus-affected patients. However, the impact on HCWs has been worse on account of many interrelated factors, such as high risk of catching infection resulting in escalated mental stress, the necessity of following safety protocols, lack of hospital beds, lack of staff, increased work load and subsequent work stress. Accumulated levels of work stress have also impacted the interpersonal relationships amongst HCWs¹⁻⁴.

Multiple studies confirmed that significant anxiety has been faced by the HCWs while caring for patients, in addition to fear of giving the infection to their own families^{12,13}. Moreover, it has also been found that front-line HCWs having children, tend to suffer from higher rates of anxiety, depression and burnout. This may lead to their not reporting to work, which may adversely affect the health of patients in the hospitals. Extensive research performed by medical professionals during this time revealed that a substantial number of the HCWs during the ongoing pandemic have suffered from health and other problems with significantly higher rates in females, primarily nurses^{3,5-7}. A study reported loss of jobs, loss of income and difficulty in accessing medical and other health care facilities, which has been apparent and involuntary fallout of the pandemic¹⁴. Another study from China reported prevalence of anxiety and depression among about 50% of front-line workers, which has been significantly higher among the nurses (74.55%) vis-a-vis the physicians (66.9%)⁸. It has been revealed that workers treating COVID-19 patients in intensive care units, developed post-traumatic stress disorder and suicidal thoughts⁹. Further, women healthcare workers involved in COVID-19, particularly with caring responsibilities, have developed greater mental health issues than their counterparts¹⁰. It is also suggested in the available literature that HCWs may have to endure a role-conflict between their role as health workers and as a parent or family member. They frequently have feared being contagious for their family members¹¹.

In addition to facing intensified mental health problems, HCWs have also faced many inadvertent issues related to socio-economic impacts (SEI), interpersonal relationships (IPR) and work-life balance (WLB). These issues are largely underrecognized and unaddressed in literature, especially in India. Our study encompasses all these aspects of HCWs and endeavours to contribute significantly to fill this gap.

The paper is divided into six sections. The present section gives the introduction of the topic, followed by a review of the literature in the next section. Description of data and methodology, research questions and hypotheses to be tested and research techniques adopted in the study are given in the third section. Section four presents the findings of the study followed by discussion, conclusion and policy implications

in the fifth section. The last section gives limitations and the future scope of the study.

2. Review of Existing Research

The psychological stress and overall wellbeing of HCWs has received increased awareness in news and research publications around the globe, since the outset of the covid-2019 pandemic. Studies dealing with pandemics experienced before covid-19, such as severe acute respiratory syndrome coronavirus, Ebola, swine flu, SARS-CoV-2003 and Middle East respiratory syndrome coronavirus, MERS-CoV-2012¹⁵ also highlighted the mental health issues of the HCWs¹⁶⁻¹⁹.

The existing literature on Covid-2019 reveals that substantial proportion of HCWs suffered from mental health issues ranging from psychological distress, burnout, anxiety disorders, depression and other issues such as poorly perceived self-health, occupational stress, troubled sleep and insomnia, lack of interpersonal communication and social support, role conflict and lack of control over their lives especially during the period of quarantine^{12,20-27}. Many biological (mood disorder and age), psychological (avoidant personality traits, facing conflict between the familial and professional roles and escaping coping mechanism), and socio-environmental factors (insufficient communication and unsatisfactory information, high risk of exposure to infection to family members, social distancing leading to lack of emotional support, inadequate supply of personal protective equipment) that contributed to the mental health problems of the HCWs have been underlined by multiple studies^{8,15,28-33}.

Mounting evidence from wide-ranging research reveals that the extent of mental health issues faced during such pandemics varied across various cohorts of HCWs, such as gender, marital status, whether working in covid zone, whether medically trained or not³²⁻³⁵. Female nurses working in critical care units experienced severe psychological and physical stress as a result of caring for affected patients in a challenging environment³⁶⁻³⁹. The stress levels of single female HCWs and those who came in contact with covid patients have been found to be much higher than other HCWs. Furthermore, the results reveal that HCWs who are non-medically trained or are with the presence of physical symptoms and/or are suffering from some prior medical conditions are comparatively more prone to mental health issues than others²¹. Women and HCWs with infected family members and individuals with a history of mental disorders are more vulnerable to these adverse health consequences than others^{34,40}. It has been observed that the WLB of HCWs was disappointingly disturbed due to excessive workload with erratic timings accentuated by the long duration of usage of inconvenient Personal Protection Equipment (PPE), periods of quarantine and separation from their

families⁴¹. Stigma from friends and community instilled by fear of infection was found to be embodied through avoidance and rejection⁴². Additionally, it is also widely documented that HCWs faced discrimination and exclusion from society and conflicting public opinions, hostility, violence and aggression against them⁴³⁻⁴⁵.

Strategies adopted to cope with stress being a crucial factor caught the attention of many researchers. Emotional reactions and use of coping mechanisms varied by professional roles of HCWs, however, on average, factors such as social status, positive attitude towards stressful situations, seeking social support, avoidance strategies and working with covid patients, abilities to solve problems and turning to religion are not found to be associated with stress levels⁴⁶⁻⁵⁰.

Certain studies have suggested various measures to maintain resilience in HCWs such as giving HCWs therapeutic treatment, training in stress management and problem-solving, arranging for confidential telephonic calls, fostering coping skills and social support in them through supportive leadership, providing online counselling with the mental health expert, to safeguard the mental health needs of the front-line HCWs. It is also recommended that involving frontline HCWs in planning for the pandemic can be very fulfilling for them^{34,42,51}. To face COVID-19 psychological challenges, a few authors, in their review work, have summarised the interventions specifically designed for enhancing the mental health care of HCWs^{52,53}. The authors evidenced that despite the WHO's urgent call for tailored and culturally sensitive mental health intervention, only a few countries published specific psychological support intervention programs for HCWs. Also, a mismatch was observed between the guidelines for interventions that assigned greater emphasis on HCWs' mental health and psychological support, and HCWs requirements that emphasised their working conditions, responsibilities at home and societal support.

Numerous Indian studies have also covered issues faced by both healthcare and non-healthcare workers^{14,25,38,54,55}. An inter-country study based on five countries (Singapore, Malaysia, Vietnam, Indonesia and India) of the Asia-Pacific region demonstrated that the occurrence of psychological distress among HCWs was independent of the volume of Covid cases found in a country²². Interestingly, India, despite being large and densely populated, displayed the lowest cases of depression (0.8%), anxiety (0.8%) and stress (0%). However, out of the total 1146 healthcare workers who participated in this study, only 384 were from India.

Indian studies largely support that people with chronic conditions, particularly rural and marginalised populations, experienced difficulties in accessing healthcare facilities and are severely affected, both socially and financially by the Covid-19 pandemic. The results also reveal a significant psychological impact of this pandemic on HCWs^{14,25,56,57}. Lack of effective

communications, tangible support from the concerned authority, misinformation, unavailability of PPEs, poor WLB and other job-related stress are some of the major contributory factors for the development of mental health problems among the HCWs in India^{8,38}.

To combat this crisis situation, the Government of India did take some steps to communicate the risk of Covid 2019 to the masses through advertisements, online information portals and smart applications (Aarogya Setu Mobile App). Additionally, the healthcare professionals also tried to address the mental health requirements of the patients and the public by bringing the resource materials into the public domain, conducting webinars and setting up help-line numbers. All these steps motivated the HCWs and they did not feel neglected by the government. Several studies have confirmed that recognition from the government and the wider community has been a protective factor for HCWs in reducing their anxiety and stress^{41,58,59}.

Bearing in mind that HCWs are the backbone of the healthcare system of any nation and they play an indispensable role in the smooth functioning of healthcare delivery in terms of prevention, treatment and care of patients. Therefore, to voice the support programmes required to reduce the amplified negative effects of mental wellbeing and whether these programmes should be uniformly adopted for all, we must understand how different cohorts of HCWs' are affected in terms of their stress levels, work-life balance (WLB), socio-economic impact (SEI), interpersonal relationships (IPR) and role of government interference (GI) in totality. Thus, apart from investigating the psychological stress factors experienced by HCWs during the pandemic, our comprehensive study, being carried out by non-medico professionals, has extended the scope of previous research by synthesising all these variables. We also explore the coping strategies adopted by various cohorts of HCWs during the stressful period of a pandemic. Further, most of the literary works on Covid-2019, are based on online surveys, that too covering a limited period of pandemic experience. It is noteworthy that our study is based on data collected physically, using a comprehensive questionnaire, that too from the HCWs who worked during all three waves of Covid experienced in India.

Due to differences in the organisational structure, economic model and exposure to patients with COVID-19, in public and private hospitals, the study also tries to analyse whether the impact of covid differed across HCWs working in these two types of hospitals. It has been revealed that working in a public hospital was a protective factor against all kinds of psychological problems namely, insomnia, anxiety, depression and socio-economic impact⁶⁰. To strengthen the healthcare systems to face such pandemics, it was suggested that collaborative efforts were required between both public

and private health sectors⁶¹. In view of this, our study also investigates the variables that best discriminate across two important categories, namely, HCWs working in private and public hospitals and whether HCWs are medically trained or not. By analysing the responses of HCWs, submitted in their different professional roles, our study hopes to provide a better and more elaborate understanding of the mental well-being and other aspects of their life that would enable the policy makers to provide enhanced and targeted psychological support in future waves of such pandemics.

3. Research Design

This section is divided into three sub-sections, the first provides details of data collection, size of sample and construction of variables used in the study. The second sub-section defines the research questions along with the development of the respective hypotheses. The last section gives details of the research techniques used for analysis.

3.1 Size of Sample, Data Collection and Construction of Variables

3.1.1 Size of Sample and Data Collection

The paper is cross-sectional research based on primary data collection. Our sample consists of 606 HCWs from three private and four public hospitals based on purposive random sampling. For the choice of respondents, we have followed stratified random sampling, such that from each of the stratum, viz., doctors, nurses, support staff (ambulance drivers, administrative staff, and helpers) and technicians, respondents have been selected randomly. Data has been collected through personal interviews and questionnaire methods from the HCWs who worked in these hospitals from April 2020 to March 2022.

The questionnaire has seven sections. Section 1 covers information on demographic variables such as type of hospital, gender, age, category of worker, nature of employment, salary, years of experience, and composition of the family. The next 6 sections aim at measuring six latent variables constructed for the study, namely, (1) Level of psychological distress, (2) Socio-economic impact on HCWs, (3) Influence of government intervention, (4) Work-life balance, (5) Interpersonal relationships, (6) Coping mechanisms adopted. In each section, 6-9 statements are provided for which respondents had to submit their response on a five-point Likert Scale for each statement. The scales varied for each section such as 'Never' to 'Always'; 'Strongly Worried' to 'Not Worried at All' and 'Very Effective' to 'Very Ineffective'.

Subsequently, 6 latent variables, Psy_str, Socio_eco_imp, Govt_int, Int_per_rel, Work_life_bal, and Cop_str, (Table 1)

are constructed by computing the average of the responses submitted by each respondent for all statements from each of the respective sections provided in the questionnaire. While collecting and analysing the data, a demarcation has been made between the HCWs who worked in covid and non-covid zones.

3.1.2 Construction of Latent Variables

Six latent variables were constructed (a complete description of items included for the construction of each variable is given in Table 1) which are defined as follows:

3.1.2.1 Psychological Stress

The available literature is replete in the area of measurement of stress during a pandemic. A lot of previous research has reported a high-stress level during past epidemics such as SARS and MERS⁶²⁻⁶⁴. This variable has been defined in different ways such as depression, anxiety, stress, sleep quality, well-being and quality of life and has been measured through a variety of available indices¹. Empirically, a generalized anxiety disorder-GAD (31), a health status score calculated from this is used to measure four levels of anxiety; with (0-4 score) no anxiety, (5-9) mild, (10-14) moderate and (15-21) severe^{1,14,65}. Perceived Stress Scale (PSS 10) is a widely used 10-item questionnaire (six negatively stated and four positively stated), with its score ranging from 0 to 40 with higher scores indicating higher levels of perceived stress^{1,47,66}. A few studies assessed psychological consequences using Depression Anxiety Stress Scales (DASS-21). It is an internationally recognised 21-item instrument having seven questions each on depression, anxiety and stress for examining mental health in the general population^{21,22,66,67}.

With the objective to understand the general mental health conditions of HCWs during covid, our study framed eight statements (Table 1) suitable for Indian HCWs, adapted from the empirically used scales in previous studies. The statements focused on physical and/or emotional discomfort, pain, and anguish arising on account of a negative emotional state. Accepting that the covid conditions were nerve-racking for all, our study compares the levels of stress measured through an average of responses of HCWs submitted for all eight statements, rated on a five-point scale (5 = Always to 1 = Never), with higher scores indicating greater stress.

3.1.2.2 Work-Life Balance (WLB)

Having a work-life balance is often described as the equilibrium between responsibilities at work and responsibilities outside work. It is considered a state where a person is able to fulfil his duties towards both, his workplace and family members⁶⁸. Our questionnaire segregated the questions on WLB in two

Table 1. Description of variables and summary statistics

Item Number	Item Description	Mean	Standard Deviation
Section 1: Measuring Level of Psychological Distress [A1 - A8]			
A1	Able to concentrate in your work*	1.90	1.20
A2	Loss of sleep over worry (felt symptoms like headaches and sleep disturbance)	2.60	1.25
A3	Not capable of making decisions and Losing confidence	2.10	1.16
A4	Felt constantly under pressure	2.72	1.34
A5	Was not able to enjoy normal day to day activities	2.87	1.31
A6	Thinking of self as worthless (often getting upset without much reason)	2.15	1.18
A7	Facing a Role conflict (as HCW or a parent-challenges from the family)	2.43	1.28
A8	Experienced negative emotions, such as fear, anxiety, helplessness, and fatigue	2.56	1.29
Section 2: Measure of Socio-Economic Impact [B1 - B7]			
B1	Worried about your family not being taken care of if something happens to you?	3.86	1.28
B2	Worried about losing your job if you are not able to do your duties properly?	2.94	1.46
B3	Worried about the medical violence from patients or their relatives?	3.12	1.33
B4	Worried about pandemic-induced societal changes and divergent public perceptions towards them?	3.19	1.23
B5	Worried about not getting paid according to the heavy duties that you performed	3.16	1.47
B6	Worried about not getting compensation for treatment if you or your family member gets sick	3.29	1.38
B7	Worried about not getting a salary if you get sick?	3.11	1.49
Section 3: Measure of Influence of Government Intervention [C1-C6]			
C1	Implementing/Regulating Lockdowns	4.00	.997
C2	Financial Stimulus announced by the Govt.	3.27	1.24
C3	Reduction in the Cost of RTPCR test over a period of time.	4.02	.965
C4	Regulation in the hospitalisation of covid-patients' treatment	3.88	1.00
C5	Availability of PPE and other equipments required (safety or risk cover)	4.12	1.01
C6	Legal Measures to prevent violence/ill treatment with HCWs	3.52	1.17
Section 4: Measuring Impact on Interpersonal Relationships [D1-D10]			
	Hospital level		
D1	The burden caused by a crisis situation affected relationships with co-workers?	3.13	.880
D2	The burden caused by a crisis situation affected your relationship with your seniors?	3.10	.867
D3	The burden caused by a crisis situation affected the ability to empathise with patients?	3.07	.862
D4	The burden caused by a crisis situation affected your relationship with your juniors?	3.01	.770
D5	Changes in the functioning of the hospital system affect your relationship with team workers.	3.02	.812
	(B) Family Level		
D6	The burden caused by the crisis situation affected relationships with family members.	3.16	.933
D7	The burden caused by the crisis situation affected communication with family members.	3.20	.933
	(C) Friends/Community Level		
D8	The burden caused by the crisis situation affected relationships with friends/neighbours.	3.30	.913
D9	Disagreement (if there) on covid protocols affected the relationship with friends/ neighbours.	3.36	.829
D10	Fear of infection on account of being HCWs affected the relationship with friends/ neighbours.	3.48	.882
Section 5: Measuring Impact on Work-Life Balance [E1-E6]			
Work-interference with personal life			
E 1	My personal life (caring responsibilities towards family) suffered due to excessive work at the hospital	3.60	1.075
E2	I neglected my personal needs due to work (e.g., adequate amount of rest, sleep)	3.64	1.052
E3	I struggled to juggle b/w work and non-work.	3.51	1.096

Table 1 Continued...

Item Number	Item Description	Mean	Standard Deviation
	(B)Personal Life Interference with Work		
E4	My personal life drained me of energy for work.	3.32	1.196
E5	I used to be too tired to be effective for work.	3.25	1.226
E6	My work suffered due to my personal life.	2.86	1.281
Section 6: Adoption of Coping Strategies [F1-F6]			
F1	Acceptance of situation and planning accordingly	4.18	.848
F2	Turn to religion for peace of mind	3.70	1.085
F3	Seeking emotional support from friends/relatives outside the hospital (co-worker support, or family support)	3.82	1.024
F4	Absenteeism from Work Place*	3.44	1.414
F5	Yoga, Breathing Exercises, Meditation	3.41	1.329
F6	Self-care coping strategies or Self counselling (signifying self-transformation)	3.59	1.220
<i>Note: * Depending upon the measurement of variables in a particular section, the scores were reversed for the negatively/positively stated items.</i>			

parts; the first part consisted of statements relating to work interference with personal life and the second part included statements relating to personal life interference with work, with three items in each part. All six items were rated on a five-point scale, (5 = Strongly Agree to 1 = Strongly Disagree), with a higher score implying poor WLB.

3.1.2.3 Interpersonal Relations (IPRs)

Interpersonal relationship is the strong bond between two or more people whether belonging to the same family or friends or working together in the same or ganisation. It has an important bearing on the mental well-being and consequentially on the WLB of any HCW. Empirically, individuals with good relationship quality showed better mental health than individuals with poor relationship quality¹.

Our questionnaire tried measuring the impact on IPR of HCWs at three levels, namely; Hospital, Family and Friends/community levels having five, two and three questions respectively. All ten questions were rated on a 5-point scale (5= Very Adversely Affected to 1 = Very Happily Affected) with higher scores representing worsened IPRs.

3.1.2.4 Socio-Economic Impact (SEI)

This section included seven items. The aim was to identify factors that could have influenced or made HCWs apprehensive about their financial position. All questions were rated on a 5-point scale (Strongly worried = 5 to Not worried at all = 1) with higher scores indicating higher adverse socio-economic impact on HCWs.

3.1.2.5 Government Intervention (GI)

Given the uncertainty of the situation, the role of government was of utmost importance in making timely announcements to reduce the stress level of the public in general and of HCWs in particular. Many studies have examined the role of government in containing the infection^{41,48,69}. The section tries to measure how effective the impact of government interventions is in controlling the spread of infection and thereby, reducing the impact on the stress level of HCWs. Timely announcements of strict infection control guidelines, making available specialized equipment for the safety of HCWs, recognition of their efforts by hospital management, measures to prevent violence against HCWs, and reduction in the cost of covid testing are a few of the measures adopted by our government. This section included 6 items rated on a five-point scale (5= Very Effective to 1= Very Ineffective) with a higher score indicative of the favourable impact of the government's role in dealing with stressful situations for HCWs.

3.1.2.6 Coping Strategies

Coping plays a key role in maintaining composed mental health while dealing with a crisis situation. It is defined as "constantly changing cognitive, and behavioural efforts to handle specific external, and/or internal requirements assessed as taxing or exceeding the person's resources"⁷⁰. Every person has a unique and different way of handling a situation. The relationship between the adoption of coping strategies to handle a stressful situation has been a topic of many previous studies^{41,47,49,71}. Coping strategies refer to specific efforts made

by any individual to reduce the pressure of a disturbing situation. It is reported that during any stressful situation, religion and social support are the most common strategies that have been adopted to reduce levels of stress^{46,51,58,72,73}. Many studies have categorised coping mechanisms into two types; *problem-focused* (active coping, planning, and use of instrumental support) and *emotion-focused* (use of emotional support, acceptance, positive reframing, religion, humour, substance use, self-distraction, self-blame, denial, behaviour disengagement, and venting)^{46,50,74}.

With the purpose to identify the adoption of a particular coping strategy in response to the stress of the outbreak during Covid-2019, the section on coping strategies in our study included six items, with responses that ranged from 'fully adopted' = 5 to 'never adopted' =1. Here, higher scores signified the adoption of positive coping strategies.

3.2 Hypotheses Development

The study covers an in-depth analysis of the variables constructed from the responses of HCWs. In particular, it focuses on the following research questions:

1. Does the impact on various psychosocial variables, such as Psy_str, Socio_eco_imp, Govt_int, Work_life_bal and Int_per_rel, statistically significantly differ across socio-demographic variables namely, type of hospitals, gender, age, level of employment, income, composition of family, marital status and nature of employment Thus, the Null Hypothesis being tested here is;
 H_0 : *There is no statistically significant difference in each of these five constructs across the eight demographic variables for which the test is being performed.*
2. It is understood that doctors and nurses are relatively more equipped to handle any pandemic-like situation than the other workers associated with hospitals. In order to get further insights into the difference in psychological stress across various categories of HCWs, all respondents are further classified into two major categories of HCWs, viz; medically trained HCWs and non-medically trained HCWs. The former category included doctors and nurses, whereas lab technicians, admin staff, ambulance drivers, cleaning staff, and ward boys were included in the latter category. The research question being examined here is, do the five constructed variables statistically differ across these two broad groups of HCWs? Hence, the Null hypothesis tested here is;
 H_0 : *There is no statistically significant difference in these constructs across the medically trained and non-medically trained categories of HCWs.*

3. As the data is collected from various categories of HCWS, we have also tried to investigate, if there are any variables based on which HCWs working in 'private and public hospitals' or 'medically and non-medically trained' can be discriminated?

So, the two null hypotheses to be tested are;

- (1) H_0 : *The means of all discriminant variables are equal between 'private and public' hospitals.*
 - (2) H_0 : *The means of all discriminant variables are equal between 'medically and non-medically trained' HCWs.*
4. Lastly, to deepen our understanding regarding the perceptions of HCWs for different coping strategies outlined in Table 1, the paper tries to investigate if there is any statistical association in responses across a few selected socio-demographic categories, using chi-squared test^{41,46}. Accordingly, the null hypothesis to be tested here is:

H_0 : *There are no differences in the adoption of any of the coping strategies across different groups of HCWs.*

The testing was done separately for each coping strategy across three demographic variables namely; gender, marital status and all four categories of HCWs.

3.3 Research Techniques

For the purpose of preliminary data analysis and testing the research hypotheses, SPSS statistical software (version-20) has been used. However, for construct and composite validity, AVE and discriminant validity of the latent variables were calculated using SmartPLS 3.2.8 version.

Six latent variables were constructed based on the average rankings given by the respondents to the statements given in each of the six sections of the questionnaire. Comparisons were made across various categorical variables using a t-test, wherever the variable was divided into two groups. For categories such as gender, medically (doctors and nurses) and non-medically trained workers (lab technicians, admin staff, ambulance drivers, cleaning staff, and ward boys) and HCWs working in public and private hospitals, t-test was used to find if there was any significant difference in the average of the constructs that were measured from the respective sections of our questionnaire. ANOVA technique was used wherever the variable had more than two categories, such as level of employment, income, and composition of the family. Post-Hoc analysis was further conducted to identify those categories for which the difference existed.

Further, a two-group discriminant analysis was performed to find the constructs that best discriminate between the categories of the dependent variable. For this, we considered two criterion variables, HCWs working in private or public

hospitals and HCWs who were medically or non-medically trained.

Lastly, we have carried out a chi-squared (χ^2) test to examine the statistical association between demographic characteristics and six coping strategies, across different types of occupational groups (doctors, nurses, technicians and support staff), marital status (married, unmarried and with children and elderlies), and gender (male and female).

4. Findings and Analysis

This section is further divided into two sub-sections, with the first providing descriptive statistics of our sample, based on socio-demographic characteristics and the second sub-section devoted to various types of research analysis undertaken in the study.

4.1 Socio-demographic Analysis

Our sample is collected from seven hospitals in Delhi that comprise 606 HCWs, which is further subdivided between respondents from private (205, 34%) and public (401, 66%) hospitals. The demographic statistics of our sample have been summarised in Table 2.

Firstly, the majority of HCWs are males (57%), and 33% out of them are unmarried. Out of the total married respondents, about 50% have either children and/or elderlies living with them.

Secondly, all the respondents belong to four categories, namely, doctors (23%), nurses (28%), technicians (15%) and support staff (34%). There is equal representation of medically trained (doctors and nurses) and non-medically trained (technicians and support staff) categories in the total respondents surveyed. In terms of the nature of employment, around 20% are working in hospitals on a temporary basis and the rest 80% are equally distributed between permanent and contractual types of employment.

Thirdly, out of the total HCWs surveyed, 93% worked in covid zone, 50% were infected with covid and 11% of them were hospitalised. The expenditure incurred on their hospitalisation was borne by their respective family. Only five HCWs reported that the hospital or government authorities paid for their hospitalisation. Regarding the spread of infection among the family members of the surveyed HCWs, about two-thirds had experienced suffering of their family members also. It is important to note that 15% of the HCWs declined to answer the question concerning the infection suffered by themselves or their family members. About 50% of the HCWs surveyed were working for more than 5 years and 40% for 2-5 years with their respective hospitals. With regard to age groups, more than two-third belong to 26-40 years of age group and the rest

are from less than 26 years (13%) or more than 40 years (19%) of age.

4.2 Research Analysis

4.2.1 Reliability and Construct Validity

First of all, *reliability* tests of the 6 constructs adopted in the study were measured using Cronbach's Alpha. Any construct having a reliability of more than 0.6 shows that there is internal consistency within the scale. From Table 3 it was observed that all constructs in this study except coping strategies had high Cronbach's alpha coefficient ≥ 0.80 , indicating high internal consistency⁷⁵. Hence, the variable coping strategy was dropped from this analysis. Subsequently, convergent validity for the rest of the five constructs was tested using composite reliability and Average Variance Extracted (AVE). Evidence for convergent validity was also supported. It was found that composite reliability for all latent variables is ≥ 0.8 and the AVE of all constructs were higher than the suggested minimum estimate of 0.50⁷⁶.

Further, for verifying Discriminant Validity, we require a correlation matrix which is assessed by comparing the square root of AVE for each construct with the correlation between that construct and other constructs (It is the same as comparing AVE for each construct with the squared correlation between that construct and other constructs). From Table 4, it is observed that the square root of AVE (given in Table 3) for the five latent variables constructed (the diagonal values of the matrix in Table 4) was greater than the correlation of each construct with all other constructs exhibiting sufficient support of Discriminant Validity^{75,76}.

4.2.2 Testing Statistical Significance of these Constructs Across Various Demographic Variables: Using T-Test and Univariate ANOVA Technique

In order to investigate whether the five latent variables mentioned above have statistically significant differences across various subgroups, we performed a series of t-tests or univariate analysis of variance (one way-ANOVA). T-test was performed wherever the comparison was between two categories, and for three or more categories, the ANOVA technique was used. For this purpose, we computed the construct by averaging the rankings given by each respondent for respective statements included in the formation of each construct.

For testing of hypotheses with regard to each of the five latent variables, namely; *Psy_str*, *Socio_eco_imp*, *Govt_int*, *Work_life_bal*, and *Int_per_rel.*, firstly, Levene's Test for Equality of Variances was performed and then appropriate t-test (with equality or inequality of variances) was used. In general, the Null Hypothesis for sections (a) to (f), is

Table 2. Characteristics of HCWs by demographics and socio-economic status; categorised by type of hospital; private and public

		Type of the Hospital					
		Private		Public		Total	
		Count	Row N (in %)	Count	Row N (in %)	Count	% of Total
Gender of Respondents	Male	103	30.1	239	69.9	342	56.4
	Female	102	38.6	162	61.4	264	43.6
Total		205		401		606	
Occupation of Respondents	Doctor	45	32.8	92	67.2	137	22.6
	Nurse	86	49.1	89	50.9	175	28.9
	Technician	23	26.1	65	73.9	88	14.5
	Support staff	51	24.8	155	75.2	206	34.0
Total					606		
Categories Redefined	Medically trained	131	41.8	181	58.2	312	51.5
	Non-medically trained	74	25.2	220	74.8	294	48.5
						606	
Age of the Respondents	<26	33	41.3	47	58.8	80	13.2
	26-40	143	34.6	270	65.4	413	68.2
	>40	29	26.4	83	73.6	113	18.6
						606	
Nature of Employment	Permanent	101	40.4	149	59.6	250	41.4
	Temporary	46	41.8	64	58.2	110	18.2
	Contractual	57	23.4	187	76.6	244	40.4
						604	
Monthly Income level	<15K	15	15.6	81	84.4	96	16.0
	15K-30K	95	44.4	119	55.6	214	35.7
	30K-50K	37	36.3	65	63.7	102	17.0
	> 50K	53	28.3	134	71.7	187	31.2
						599	1
Family/Marital life	Unmarried	84	42.6	113	57.4	197	33.1
	Married	86	37.4	144	62.6	230	38.7
	With Children and/or Elderlies	34	20.2	134	79.8	168	28.2
						595	
Total Work Experience	< 2 years	36	46.2	42	53.8	78	12.9
	2-5 year	55	24.2	172	75.8	227	37.5
	> 5 years	113	37.7	187	62.3	300	49.6
						605	
Did you work in Covid Zone?	Yes	184	32.7	378	67.3	562	92.7
	No	21	47.7	23	52.3	44	7.3
						606	
Were you ever infected with Covid?	Yes	95	32.0	202	68.0	297	49.0
	No	110	35.6	199	64.4	309	51.0
						606	

Table 3. Reliability results for scales: Cronbach's Alpha, AVE and composite reliability

S. No.	Constructs	Mean	Standard Deviation	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
1	Level of Psychological distress	2.418	0.816	0.819	0.872	0.542
2	Socio-Economic Impact on HCWs	3.241	0.931	0.926	0.944	0.739
3	Influence of Government Intervention	3.802	0.703	0.946	0.961	0.862
4	Interpersonal Relationships	3.184	0.591	0.915	0.938	0.754
5	Work-life balance	3.364	0.890	0.948	0.967	0.907
6	Coping Strategy Adopted	3.68	0.600	0.446	—	—

Table 4. Correlation matrix for the assessment of discriminant validity

Construct	Level of Psychological distress	Socio-Economic Impact on HCWs	Influence of Government Intervention	Interpersonal Relationships	Work-life-balance
Level of Psychological distress	0.736				
Socio-Economic Impact on HCWs	0.635	0.860			
Influence of Government Intervention	0.545	0.776	0.928		
Interpersonal Relationships	0.513	0.717	0.762	0.868	
Work-life Balance	0.480	0.693	0.654	0.846	0.953

H_0 : There is no statistically significant difference in each of these five latent variables across the six demographic variables for which the test is being performed.

In particular for the first comparison, the Null Hypothesis (H_0) being tested here is that there is no significant difference in the average of each of the five constructed latent variables across the private and public hospitals' HCWs.

4.2.2.1 Comparison Across Private and Public Hospitals

The results indicate that there is no statistically significant difference with regard to any of the constructs across the HCWs working in private or public hospitals (Table 5.1).

4.2.2.2 Comparison across Gender; Male and Female

Psychological stress was found to be significantly higher among female workers. No other construct was found to be statistically significantly different across gender (Table 5.2). The female HCWs were found to be more burdened due to their additional household and caregiving responsibilities along with the work duties, this is corroborated through findings of many other studies^{38,42,57,67,77}.

4.2.2.3 Comparison across HCWs who worked in Covid/ Non-Covid Zone

For this categorical variable, only the government intervention was found to be having a significantly favourable impact on the HCWs who worked in the Covid zone (Table

5.3). This is undoubtedly owing to the greater risk of their catching an infection and thus, a higher need for testing and hospitalisation. We doubt the reliability of these results since these two groups are not equally represented. Rather data is very skewed, with 93% of HCWs working in covid zone out of the 606 surveyed. For the rest of the comparisons, ANOVA with one factor and Post-Hoc analysis has been carried out.

4.2.2.4 Comparison Across Three Categories of Marital Status; Unmarried, Married and Married with Children and/or Elderlies

Regarding marital status, from ANOVA (Table 6), it was found that with respect to only one construct, Govt_int there is a significant difference across three categories. An important result that emerges from Post-Hoc analysis is that families with children and/or elderlies felt a significantly higher favourable influence of the government regulations than the other two categories of unmarried or married without children or elderlies. On account of a higher financial burden on these families, government regulations, such as reduction in the cost of RTPCR tests, and regulation in the hospitalisation of covid-patients' treatment were welcomed by these families.

4.2.2.5 Comparing Across Three Categories of Nature of Employment; Permanent, Temporary and Contractual

ANOVA results in Table 7 display that except for the two constructs 'psychological stress', and socio-economic

Table 5.1 Independent sample t-test across private vs public hospital

Construct	T-value	p-value
Psy_str	-1.423	0.155
Socio_eco_imp	-1.462	0.144
Govt_int	-1.643	.101
Work_life_bal	-.158	.875
Int_per_rel	-1.602	.110

Table 5.2 Independent sample t-test across gender: Male and female HCWs

Construct	T-value	p-value
Psy_str	-4.805	0.000***
Socio_eco_imp	.072	0.943
Govt_int	.024	0.981
Work_life_bal	-1.531	0.126
Int_per_rel	.660	0.510

Note: Authors' calculations; *** shows the mean difference is significant at the 1% level.

Table 5.3 Independent sample t-test across HCWs who worked in covid or non-covid zone

Construct	T-value	p-value
Psy_str	.176	0.860
Socio_eco_imp	1.068	0.286
Govt_int	2.660	0.008***
Work_life_bal	1.116	0.265
Int_per_rel	-.604	0.546

Note: Authors' calculations; *** shows the mean difference is significant at the 1% level.

Table 6. Post-Hoc analysis (dependent variable: govt_int)

Marriage Status (1)	Marriage Status (2)	Mean Difference (1-2)	Std. Error	p-value
Married	Unmarried	-.08516	.41092	.977
	With children and/or elderlies	-1.60322*	.44417	.001***
Unmarried	Married	.08516	.41092	.977
	With children and/or elderlies	-1.51807*	.42909	.001***
With children and/or elderlies	Married	1.60322*	.44417	.001***
	Unmarried	1.51807*	.42909	.001***

Note: Authors' calculations; *** shows the mean difference is significant at the 1% level.

impact, for all other three variables, there is a significant difference in the HCWs across the three categories based on the nature of employment. With regard to government intervention also, a significant difference was found between contractual and temporary workers. The new regulations introduced by the government during that period exerted a greater and more favourable impact on the former group of HCWs as compared to the latter one. It could be on account

of contractual workers being relatively earning less than their counterparts, government regulation mattered more to them.

Regarding interpersonal relationships and work-life balance, a significant difference was found between permanent and contractual workers. Both the variables, interpersonal relationships (at the hospital, family or friends' level) and work-life balance are found to have adversely and significantly

Table 7. ANOVA across three categories of employment; permanent, temporary and contractual

		Sum of Squares	df	Mean Square	F	p-value
Psy_str	Between Groups	121.945	2	60.972	1.422	.242
	Within Groups	25732.085	600	42.887		
	Total	25854.030	602			
Socio_eco_imp	Between Groups	232.469	2	116.234	2.702	.068
	Within Groups	25767.925	599	43.018		
	Total	26000.394	601			
Govt_int	Between Groups	199.981	2	99.990	5.519	.004***
	Within Groups	10779.800	595	18.117		
	Total	10979.781	597			
Work_life_bal	Between Groups	193.963	2	96.982	3.387	.034**
	Within Groups	17067.536	596	28.637		
	Total	17261.499	598			
Int_per_rel	Between Groups	658.381	2	329.191	8.984	.000***
	Within Groups	21875.617	597	36.643		
	Total	22533.998	599			

Note: Authors' calculations; *** & ** show the mean difference is significant at the 1% and 5% level respectively.

impacted the permanent HCWs as compared to the contractual workers. This could be because permanent HCWs were under greater pressure to do their duties than the contractual workers. With regard to temporary HCWs, no significant effect was observed in comparison to the other two categories.

4.2.2.6 Comparing Across Four Categories of Monthly Income Level (measured in thousand); < 15; 15 to 30; 30 to 50 and > 50

Three variables, government regulations, work-life balance and interpersonal relations have been found to be significantly affecting respondents with different categories of income level (Table 8). Govt intervention significantly and favourably affected the 15-30K and 30-50K income categories as compared to the HCWs in the >50K category. This can be attributed to the fact the latter category belongs to the doctors whereas the former two categories to either nurses or technicians for whom the govt announcement regarding cost reduction in the RTPCR test or regulation relating to hospitalisation were of greater consequence than to the other group. On account of the high cost, the lowest income group probably were not even getting their covid and other tests done.

So far as the impact on work-life balance on income is concerned, it is found that there was a significant difference between the 30-50K and >50K categories, with the latter group experiencing the greater adverse effect. Interpersonal relationships have been found to be significantly and adversely affected for >50K category vis-a-vis 15-30K category. For other income categories, the difference is not significant.

4.2.3 Testing Statistical Significance of these Constructs Across Medically Trained/Non-Medically trained HCWs

H_0 : There is no statistically significant difference in these constructs across the medically trained and non-medically trained categories of HCWs.

The four constructs Psy_str, Govt_int, work_life_bal, and Int_per_rel have been found to be statistically significantly different across the two categories (Table 9). The psychological stress and the adverse impact of the covid on work-life balance and interpersonal relations are found to be significantly higher among the medically trained HCWs⁶⁶, while the favourable influence of the government regulation is significantly higher among the non-medically trained HCWs. This can be attributed to the fact, owing to the nature of their work, medically trained workers had to be directly in touch with the covid patients. The disease is contagious in nature, these workers were at greater risk of contracting it, and thus, greater stress and worsen work-life balance and interpersonal relations for them.

This observation is not in agreement with studies on healthcare workers in Malaysia and Singapore that demonstrated that non-medically trained HCWs were at a higher risk of adverse psychological outcomes vis-à-vis their medically-trained counterparts⁷⁸. This was attributed to lack of training and confidence and information on control measures. For India, no significant difference was found between the two categories of HCWs²¹.

Table 8. ANOVA across four categories of income; <15K, 15-30K, 30-50K and >50K

		Sum of Squares	df	Mean Square	F	Sig.
Work_life_bal	Between Groups	347.664	3	115.888	4.059	0.007***
	Within Groups	16845.501	590	28.552		
	Total	17193.165	593			
Psy_str	Between Groups	270.646	3	90.215	2.097	0.100
	Within Groups	25558.045	594	43.027		
	Total	25828.691	597			
Socio_eco_imp	Between Groups	285.499	3	95.166	2.182	0.089
	Within Groups	25867.871	593	43.622		
	Total	26153.370	596			
Govt_int	Between Groups	365.608	3	121.869	6.835	0.000***
	Within Groups	10537.541	591	17.830		
	Total	10903.150	594			
Int_per_rel	Between Groups	450.494	3	150.165	4.214	0.006***
	Within Groups	21060.279	591	35.635		
	Total	21510.773	594			

Note: Authors' calculations; *** shows the mean difference is significant at the 1%.

Table 9. Independent sample t-test across medically trained vs non-medically trained HCWs

Construct	T-value	p-value
Psy_str	3.140	0.02**
Socio_eco_imp	0.225	0.822
Govt_int	-4.181	0.00***
work_life_bal	3.305	0.001***
Int_per_rel	4.371	0.00***

Note: Authors' calculations; *** shows the mean difference is significant at the 1% level.

4.2.4 Two-Group Discriminant Analysis

With the objective to further understand whether the different categories of HCWs attach different relative importance to the five variables that we constructed for the analysis, Psy_str, Socio_eco_imp, Govt_int, Work_life_bal, Int_per_rel, we used two-group discriminant analysis.

The analysis is performed only for two groups having two categories each, (1) HCWs working in Private and Public Hospitals; and (2) Medically and Non-medically trained HCWs. Essentially, we are trying to answer,

(a) What are the variables on which Private and Public Hospitals HCWs can be differentiated?

(b) What are the variables on which the two categories of HCWs; Medically and Non-medically trained are differentiated?

For both the cases, since there are two categories, only one discriminant function is estimated;

$$D = a_1X_1 + a_2X_2 + a_3X_3 + \dots + a_5X_5$$

where D = discriminant score,

a_i = discriminant coefficients or weights and X_i 's are 5 latent variables

The coefficients or weights (a_i 's) are estimated such that the two groups under consideration differ as much as possible based on the values of the discriminant function. This occurs when the between-group sum-of-squares divided by the within-group sum-of-squares for the discriminant scores is at a maximum. Any other linear combination of the predictors will result in a smaller discriminant score.

4.2.4.1 Dependent Variable: HCWs working in Private and Public Hospitals

The Null hypothesis here is, H_0 : The means of all discriminant variables are equal between 'private and public' hospitals.

The eigenvalue (defined as the ratio of between-group to within-group sums of squares) associated with this function is .011, and it accounts for 100% of the explained variance (Table 10). The canonical correlation associated with this function is 0.103 which is quite low. It indicates that only 1.1% of the variance in the dependent variable (HCWs working in

Table 10. Summary of canonical discriminant functions

Dependent Variable: HCWs from Private and Public Hospitals				
Eigenvalues				
Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
	.011	100.0	100.0	.103
Wilks' Lambda				
Test of Function	Wilks' Lambda	Chi-square	df	Sig.
	.989	6.28	5	.280

Private or Public hospitals) is accounted for by this model. Wilks' λ test statistic, defined as the ratio of the within-group sum of squares to the total sum of squares, is used to check the statistical significance of the discriminant function. The significance level is estimated based on a chi-square transformation of the statistic. It takes a value between 0 and 1 and the lower the value of Wilks' lambda, the higher is the significance of the discriminant function. Large values of λ (near 1) indicate that group means do not seem to be different, whereas small values of λ (near 0) indicate that the group means seem to be different. A zero value is the most preferred one.

Our results show Wilks' λ associated (Table 10) with the function is 0.989, which transforms to a chi-square of 6.28 with 5 degrees of freedom. This is not significant at any conventionally used α level of significance. Thus, the null hypothesis is not rejected, indicating that there is no significant discrimination between HCWs from private and public hospitals.

However, examining the absolute magnitude of the Standardised Canonical Discriminant Function Coefficients (Table 11), we observe that the most important predictor in discriminating between HCWs from private and public hospitals is the influence of socio-economic impact, followed by government intervention and interpersonal relationships. This implies that apart from socio-economic factors, the influence of government intervention by bringing in new instructions from time to time was a crucial decisive factor in discriminating between HCWs from the two types of hospitals. The estimated discriminant function to distinguish between private and public hospitals can be written as:

$$D = 0.391X_1 + 0.609X_2 + 0.547X_3 + 0.449X_4 - 0.505X_5$$

4.2.4.2 Dependent Variable: Medically Trained and Non-medically Trained HCWs

Here, the Null hypothesis is, H_0 : The means of all discriminant variables are equal between the 'medically and non-medically trained' HCWs

Here the former group consists of doctors and nurses and the latter group consists of technicians and other support staff. The eigenvalue associated with this function is 0.094, and it accounts

Table 11. Standardised canonical discriminant function coefficients[@]

Constructs	Function
Psy_str (X_1)	0.391
Socio_eco (X_2)	0.609
Govt_int (X_3)	0.547
Int_per_rel (X_4)	0.449
Work_life_bal (X_5)	-0.505

[@] Coefficients of standardised discriminant function are independent of the units of measurements. The absolute values of the coefficients in standardised discriminant function indicate the relative contribution of the variables in discriminating between the two groups

for 100% of the explained variance (Table 12). The canonical correlation associated indicates that 8.6 % of the variance in the dependent variable is accounted for by this model. The associated Wilks' λ is significant, therefore, the null hypothesis is rejected, indicating that there is significant discrimination among group means of the independent variables across medically and non-medically trained categories of HCWs. It is inferred that the discriminant function is significant and can be used for further interpretation of the result.

From Table 13 on Standardised Canonical Discriminant Function Coefficients, we observe that the most important predictor in discriminating the HCWs between Medically trained and non-medically trained is interpersonal relationships, followed by Government intervention, socioeconomic impact and work-life balance.

The estimated discriminant function to distinguish between Medically Trained and Non-medically trained HCWs can be written as:

$$D = 0.351X_1 - 0.502X_2 - 0.555X_3 + 0.571X_4 - 0.422X_5$$

4.2.5 Responses Towards Various Coping Strategies

Coping strategies data seems to be following a trend. Arranging the different coping strategies, in accordance with the mean; higher means being suggestive of higher usage of that particular item (Table 14), it is clearly discernible that HCWs took complete responsibility for their duties and

Table 12. Summary of canonical discriminant functions

Dependent Variable: Medically Trained and Non-medically Trained HCWs				
Eigenvalues				
Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
	0.094	100.0	100.0	.293
Wilks' Lambda				
Test of Function	Wilks' Lambda	Chi-square	df	Sig.
0.914		53.300	5	.000

Table 13. Standardised canonical discriminant function coefficients

Constructs	Function
Psy_str	0.351
Socio_eco_imp	-0.502
Govt_int,	-0.555
Int_per_rel	0.571
work_life_bal	0.422

accepted the situation and dealt accordingly. Self-care or self-counselling and yoga or meditation were not preferred for dealing with the situation. It is due to the additional burden; increased working hours that workers did not have time to resort to these items of coping mechanism. Out of the five options given (the higher number being given to fully adopting a positive coping strategy), the median being number 4 clearly implies that HCWs worked with an optimistic mindset. Further, the negative sign of skewness indicates that there is less concentration at the lower end, again signalling that a large number of HCWs worked with a constructive state of mind and adopted positive techniques. These findings are consistent with many earlier studies that observed that acceptance and working with positive frame of mind were frequently adopted coping strategies^{41,49,50,61}.

To further get more insights into the adoption of coping strategies within various categories of HCWs, the chi-squared (χ^2) test^{41,46} was used to compare the responses across different types of occupational groups (doctors, nurses, technicians and support staff), marital status (married, unmarried and with children and elderlies), and gender (male and female). Tables 15 to 17 exhibit only results which are statistically significant. The statements regarding each coping strategy are given in Table 1.

The null hypothesis being tested here is that there is no difference in the response to adoption of any of the coping strategies across the categories of HCWs under consideration. This was done separately for each of the six coping strategies.

Table 15 gives the responses of HCWs on the basis of their professional roles in the adoption of different coping strategies.

The chi-squared (χ^2) test showed statistically significant differences in responses regarding three strategies, namely; turning to religion, yoga and meditation and self-counselling. Nurses, technicians and support staff de-stressed themselves by turning to religion whereas doctors adopted self-counselling as their most preferred coping strategy. Yoga and meditation were least preferred by support staff.

With regard to the gender of respondents, a statistically significant difference was found only with respect to 'acceptance of situation' and 'absenteeism from work'. From Table 16, we see that while, approximately 50% of male HCWs either fully or sometimes accepted the covid situation and worked accordingly, only 30% of female workers responded in this manner. Regarding 'absenteeism from work', out of the total HCWs who 'never adopted' this strategy, two-thirds are male workers. The absenteeism being more adopted by females could be on account of their greater psychological stress and higher household responsibilities.

Regarding the difference across three sub-groups of marital status (Table 17), leaving aside 'emotional support from friends and relatives', a statistically significant difference was found with regard to all the other five coping strategies. 'Acceptance of the situation' was more preferred among unmarried workers, than the married ones and those with children. Out of the total unmarried workers (225), only 16% (37) adopted (fully or sometimes) absenteeism from work whereas approximately one-third of the married and with children HCWs responded positively to these options. This also implies that unmarried HCWs took the covid situation more optimistically than their counterparts in the other two categories. 'Turning to religion' as a preferred technique was more adopted by HCWs who were married and with children while unmarried workers showed their preference for 'self-counselling' to cope with the uncertainties of covid pandemic. Lastly, 'yoga and breathing exercises was the least preferred technique by HCWs with children or elderlies as compared with the other two categories. This could also be owing to their obligatory duties towards children and elderlies, they had less time for such activities.

Table 14. Preference for coping strategy®

Coping Strategy	Mean	Median	Skewness
F1- Acceptance of situation and planning accordingly	4.17	4	-0.86
F3- Seeking emotional support from friends/relatives outside the hospital	3.82	4	-0.703
F2- Turn to religion for peace of mind	3.69	4	-0.505
F6- Self-care coping strategies or Self counselling (signifying self-transformation)	3.59	4	-.615
F4- Absenteeism from Work Place	3.44	4	-0.406
F5-Yoga, Breathing Exercises, Meditation	3.4	4	-0.391

® the coping strategies have been written in the descending order of their mean value.

Table 15. Responses in adoption of coping strategies across different professional roles of HCWs

		Doctor (136)	Nurse (171)	Technician (86)	Support staff (202)	Total (595)	χ^2 (p-value)
F2	Never Adopted	10	4	5	9	28	24.25** (0.019)
	Not Adopted	10	17	8	16	51	
	Neutral	46	49	23	55	173	
	Sometimes Adopted	43	58	28	48	177	
	Fully Adopted	27	43	22	74	166	
Mean \pm SD		3.49 \pm 1.12	3.70 \pm 1.03	3.79 \pm .95	3.80 \pm 1.15		
		Doctor (137)	Nurse (169)	Technician (85)	Support staff (202)	Total (593)	χ^2 (p-value)
F5	Never Adopted	16	8	6	43	73	51.8*** (0.000)
	Not Adopted	12	20	11	30	73	
	Neutral	32	49	23	42	146	
	Sometimes Adopted	48	50	18	26	142	
	Fully Adopted	29	42	27	61	159	
Mean \pm SD		3.45 \pm 1.25	3.58 \pm 1.13	3.58 \pm 1.26	3.16 \pm 1.52		
		Doctor (137)	Nurse (170)	Technician (86)	Support staff (202)	Total (595)	χ^2 (p-value)
F6	Never Adopted	6	13	11	19	49	32.34*** (0.001)
	Not Adopted	7	17	9	30	63	
	Neutral	24	44	20	45	133	
	Sometimes Adopted	61	58	27	44	190	
	Fully Adopted	39	38	19	64	160	
Mean \pm SD		3.88 \pm 1.03	3.54 \pm 1.17	3.40 \pm 1.30	3.51 \pm 1.32		

Note: Figures in the parenthesis are the total count of responses for each category.

*** & ** indicate that the mean difference is significant at the 1% and 5% respectively.

5. Discussion, Conclusion and Policy Suggestions

The HCWs are disproportionately at greater risk of developing mental health and other related problems, as they have to be at the forefront of the fight against any pandemic. Taking

into consideration that future pandemics may be occurring more frequently than now, it is of crucial importance that concerned authorities must plan support programmes which are specifically dedicated to healthcare workers. For that, their mental and physical health must be understood during the pandemic time. Our cross-sectional research study based

Table 16. Difference in responses in adoption of coping strategies across gender

		Gender of Respondent		Total (597)	χ^2 (p-value)
		Male (337)	Female (260)		
F1	Never Adopted	3	0	3	12.2** (0.016)
	Not Adopted	8	11	19	
	Neutral	44	52	96	
	Sometimes Adopted	127	104	231	
	Fully Adopted	155	93	248	
Mean \pm SD		4.26 \pm .84	4.07 \pm .85		
		Gender of Respondent		Total (589)	χ^2 (p-value)
		Male (334)	Female (255)		
F4	Fully Adopted	56	27	83	17.3*** (0.002)
	Sometimes Adopted	35	37	72	
	Neutral	79	54	133	
	Not Adopted	45	62	107	
	Never Adopted	119	75	194	
Total		334	255	589	
Mean \pm SD		3.41 \pm 1.48	3.47 \pm 1.33		

Note: Figures in the parenthesis are the total count of responses for each category.

*** & ** show the mean difference is significant at the 1% and 5% respectively.

Table 17. Difference in responses in adoption of coping strategies across marital status

		Marital Status			Total (587)	χ^2 (p-value)
		Married (194)	Unmarried (228)	With children and/or elderlies (165)		
F1	Never Adopted	1	0	2	3	19.9** (0.011)
	Not Adopted	3	5	11	19	
	Neutral	32	38	25	95	
	Sometimes Adopted	90	78	57	225	
	Fully Adopted	68	107	70	245	
Total		194	228	165	587	
Mean \pm SD		4.14 \pm .78	4.26 \pm .81	4.10 \pm .97		
		Married (194)	Unmarried (226)	With children and/or elderlies (165)	Total (585)	χ^2 (p-value)
F2	Never Adopted	7	9	7	23	17.3** (0.027)
	Not Adopted	20	17	13	50	
	Neutral	73	57	42	172	
	Sometimes Adopted	57	74	46	177	
	Fully Adopted	37	69	57	163	
Mean \pm SD		3.50 \pm 1.03	3.78 \pm 1.08	3.81 \pm 1.13		

Table 17 to be continued...

		Married (189)	Unmarried (225)	With children and/or elderlies (165)	Total (579)	χ^2 (p-value)
F4	Fully Adopted	34	20	21	75	28.2*** (0.000)
	Sometimes Adopted	27	17	28	72	
	Neutral	51	56	24	131	
	Not Adopted	29	47	31	107	
	Never Adopted	48	85	61	194	
Mean \pm SD		3.16 \pm 1.42	3.71 \pm 1.29	3.50 \pm 1.45		
		Married (191)	Unmarried (227)	With children and/or elderlies (165)	Total (583)	χ^2 (p-value)
F5	Never Adopted	13	30	30	73	16.6** (0.035)
	Not Adopted	25	23	24	72	
	Neutral	55	50	37	142	
	Sometimes Adopted	52	57	33	142	
	Fully Adopted	46	67	41	154	
Mean \pm SD		3.49 \pm 1.19	3.48 \pm 1.36	3.19 \pm 1.43		
		Married (193)	Unmarried (227)	With children and/or elderlies (165)	Total (585)	χ^2 (p-value)
F6	Never Adopted	14	18	17	49	18.9** (0.016)
	Not Adopted	19	18	25	62	
	Neutral	46	40	42	128	
	Sometimes Adopted	71	74	44	189	
	Fully Adopted	43	77	37	157	
Mean \pm SD		3.57 \pm 1.15	3.77 \pm 1.22	3.36 \pm 1.27		

Note: Figures in the parenthesis are the total count of responses for each category.

*** & ** show the mean difference is significant at the 1% and 5% respectively.

on primary data is a step in this direction. In this endeavour, our study tries to reflect on the psycho-social and economic impacts of Covid-2019 along with the role of government intervention, on HCWs across various categories based on their demographic and other characteristics.

Our findings suggest that male HCWs are better able to handle stress than their female counterparts. Empirically also, women were found to be more prone to getting stress, anxiety and depression during Covid 2019^{6,28,40}. Similar results were reported in a study in India that the risk factor for psychological distress was higher in female gender⁷⁹. The 'doctors and nurses' together categorised as 'medically trained' HCWs, are found to be more stressed. It is also corroborated by many studies conducted in China^{80,81}. Further, the adverse impact on their IPR and WLB is also significantly more on 'medically trained' but the favourable impact of government intervention is significantly more on 'non-medically trained' HCWs, which comprises 'technicians and support staff'. Also, it is observed that the government intervention in terms of announcing new regulations contributed more favourably

to non-medically trained HCWs. This is owing to the fact that the latter category of workers is from relatively a lower-income group, as a result, any regulation of govt intervention in the form of reduced cost of hospitalisation and other tests, had a greater bearing on them. Regarding the nature of employment, it is observed that the variables WLB and IPR were significantly unfavourable for the permanent employees than the contractual workers. Analysis by three categories of income level, government intervention beneficially affected the lower-income groups, however, WLB and IPR were unfavourably affected for higher-income groups than the HCWs from middle-income groups. Investigating the impact on the basis of the three categories of marital status, it is found that significant differences existed only with respect to the role of government intervention. An earlier study also revealed that factors like these do not make any difference in the level of psychological distress⁸². The HCWs with children and families were significantly favourably affected by the government intervention as compared to the other two categories of married and unmarried people.

Regarding coping mechanisms, 'acceptance of situations', 'seeking emotional support' from friends outside the hospital and 'turning to religion' for peace of mind have been found to be the most preferred coping strategies used by the HCWs. Evidence from previous studies also revealed that 'acceptance of the critical situation' was one of the most common coping strategies⁶² and the use of a positive outlook while working and social support have a constructive influence on the mental health of HCWs⁸³. Exploring further into the response of HCWs to the adoption of coping strategies, it is observed that they differed across gender and marital status. Adoption of 'Absenteeism from work' was more common among female and married workers while 'acceptance of situation' was more often adopted by male and unmarried workers. Response toward 'self-counselling' was more frequently used by doctors.

Due to the severity of the disease, the HCWs are most vulnerable to the risk of psychological stress, adverse socio-economic and other related effects, our findings clearly demonstrate that these effects varied across different groups. It is recommended that policy makers must take insights from the analysis and policies should be specifically and accordingly designed. To uplift the self-confidence and self-esteem of HCWs, committed counselling sessions may be arranged to dissipate their stress and anxiety levels.

It is strongly suggested that the hospital authorities must plan special support programmes that primarily focus on female workers that could reduce their stress level such as reducing their working hours and/or providing them conveyance or conveyance allowance. Policies framed by hospital authorities must pay greater attention to the disturbances being experienced by permanent employees at their workplace and personal front, either by arranging special lecture series or showing documentary/short films focussing on the importance of leading a balanced life. Further, hospital authorities must pay greater attention to the needs of those HCWs who have children and elderlies with them. Many studies have also suggested that schemes must be developed for HCWs who are female, unmarried and HCWs who worked in Covid zone³⁴.

As the impact on WLB and IPR has been found to have adversely affected for HCWs either classified as 'permanent employees', 'medically trained' or from a 'higher income group'; here social networking, role played by family members and friends, community and colleagues is of utmost importance. Media must play an active role to encourage the community at large to interact with each other to boost the confidence of HCWs.

To make the healthcare system more resilient, it is strongly suggested that the government should play a proactive role during times of such a pandemic, especially through announcing measures that encompass those categories of HCWs who are more financially stressed. Provision and announcement of government aid can certainly help HCWs

to focus more on their work and thereby, assist in containing the pandemic before it goes out of control. Additionally, to strengthen the health system to respond more effectively to such disease-induced shocks, the government should increase investment in the healthcare system that improves access to healthcare facilities. Cost-effective preventive measures will also reduce the burden of primary healthcare givers⁶⁹. To avoid panic reactions among people, the Government strictly and responsibly needs to control the spread of misinformation and negative news through print and electronic media. A supportive work environment could be a motivating factor to encourage medical staff to continue working during the pandemic. Media must start some motivational and morale-boosting programmes to dissipate the anxiety of HCWs.

Appreciation of the efforts of medical and non-medical staff by the hospital management and timely provision of proper protective equipment may motivate medical staff to work tirelessly during future pandemics⁴¹. The applause by our government for the HCWs during the pandemic was the right step in this direction.

6. Limitations of the Study and Scope for Future Research

The extensive research on the impact of COVID-19 on HCWs, especially physicians' and nurses' wellness, has been continuing since its outbreak. One of the purposes of this study has been to fill the research gap of all previous studies that primarily relied on online data due to the prevalence of the disease. Since the focus of this study was to approach healthcare workers physically to obtain more reliable results, the collection of data had to be restricted to the geographical location of Delhi NCR which is a major limitation of this study. Though the data pertains to major covid hospitals of Delhi NCR, it cannot be construed as definitively representative of all Indian covid hospitals and conclusions can be restrictive and not generalised over other states. Also, it is a cross-sectional study, so limits causal inferences between variables. However, despite these limitations, findings would be useful for theory and research. The scope of the work can be extended to cover more geographical boundaries, other vulnerable populations, such as children and adolescents, rural populations who face barriers in accessing health care, and those belonging to lower income groups. Future research can cover extended time periods to compare the mental health issues during normal times and can also do a follow-up on the progression of psychological impact on HCWs in post-covid time.

The available literature has emerged from only a few of the affected countries, thus, may not reflect the experience of persons living in other parts of the world. There is a need for

more representative research from other affected countries, particularly in vulnerable populations. Furthermore, governments of many countries announced a large number of support programmes, on which our study is silent. For future purposes, there is a need to evaluate the ground-level implementation and the extent to which they allayed the fear, anxiety and stress levels of HCWs. Further research is vital to find out the best ways to maintain the resilience and mental well-being of different cohorts of HCWs.

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