

A post-COVID-19 assessment of resilience of nurses and paramedical workers in municipal hospitals of urban Pune, India

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ABSTRACT

Objectives: To assess the resilience of primary healthcare workers (HCWs) by determining the factors associated with developing resilience post-coronavirus disease 2019 (COVID-19). **Study Design:** A cross-sectional study in selected municipal hospitals. **Methods:** Connor-Davidson Resilience Scale was used to assess the resilience of the 245 HCWs, including the nurses and paramedics working in Pune Municipal Corporation (PMC) hospitals in Pune City. Data were analysed using the Chi-square test, one-way analysis of variance (ANOVA), independent-samples *t*-test and correlational analysis using the Statistical Package for the Social Sciences (SPSS) version 28. **Results:** The mean resilience score of the HCWs in PMC hospitals post-COVID-19 was 75.09 (± 9.25). The score for hardiness, optimism, resourcefulness and purpose was 20.15 (± 3.87), 21.22 (± 3.39), 17.24 (± 2.76) and 16.40 (± 2.17), respectively. Seven factors were significantly associated with the resilience of nurses and paramedics, namely age ($P < 0.001$), work experience ($P < 0.001$), monthly income ($P < 0.001$), having faced financial problems during COVID-19 ($P < 0.001$), hospital setting ($P < 0.05$), marital status ($P < 0.01$) and professional category ($P < 0.001$). In addition, 60% of the participants reported mental health issues due to routine workloads such as irritation/anger, frustration and tension/worry, fatigue and work-related stress, and sadness and anxiety. Suggestions for improvement were mainly increasing human resources, proper management, skilled staff, improved facilities and funding, and cooperation among staff. **Conclusion:** The resilience of primary HCWs in Pune post-COVID-19 was higher than HCWs in other countries assessed during COVID-19. Further, resilience was found more among nurses than paramedics. Modifiable factors affecting resilience must be addressed to improve the resilience of HCWs to build everyday resilience and strengthen health systems for public health emergencies.

Keywords: Everyday resilience, healthcare workers, India, nurses, paramedics, resilience

Introduction

Evidence from infectious disease epidemics has shown that primary care physicians as well as primary healthcare workers (HCWs) risk developing mental health problems, with up to one-third of

frontline HCWs experiencing high levels of distress. Globally, 23–46% of primary HCWs reported anxiety during the coronavirus disease 2019 (COVID-19) pandemic and 20–37% experienced depressive symptoms. Burnout among primary HCWs during the pandemic was around 41–52%.^[1] The burden of psychological problems due to workload stress during the pandemic on HCWs has been similar in developing and developed countries as the COVID-19 pandemic has affected both the developed and developing world.^[2] Studies worldwide show the negative psychological impact of the pandemic on the populations.^[2] Many frontline healthcare professionals (HCPs—healthcare physicians

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and healthcare workers) face high adversity, workload and stress, making them vulnerable to burnout, which is known to detract from optional working capacities. Recent studies regarding HCPs' mental health in response to COVID-19 demonstrated that HCPs may experience depression, anxiety and post-traumatic stress disorder (PTSD).^[3-6]

There is also documentation regarding the HCWs with better resilience-managed workload stress effectively during the pandemic.^[7,8] The current discussion of resilience in the health sector is focused on sudden shocks, such as disease outbreaks,^[9,10] and the pandemic revealed the need to give due attention to the resilience of HCWs, which was done by many studies during the pandemic. As of May 2023, even though the World Health Organization (WHO) has declared an end to the global public health emergency, the importance of studying the resilience of primary HCWs still prevails in this post-pandemic era, specifically in the context of the health system's capacity and capabilities to demonstrate everyday resilience. Everyday resilience is the health systems' ability to continue service delivery during constant challenges/strains, and it combines absorptive, adaptive and transformative strategies that the HCWs implement to respond to strain.^[11] Research has shown that primary HCWs routinely face structural/policy instability, such as changes in governance, payment delays and abruptly imposed policy directives. They also work with unstable authority delegations, manage unpredictable staff and address changing patient/community expectations.^[12]

These issues highlight the importance of studying primary HCWs' resilience to know how efficiently they manage routine workload stress and contribute to the everyday resilience of the health system. Moreover, to develop the resilience of the HCWs, factors influencing it need to be determined and targeted. Although various factors affect an individual's resilience, these modifiable factors can help improve stress management and strengthen the capacity and capabilities of health systems. Therefore, our study aims to assess the resilience of primary HCWs in Pune and determine the factors influencing it.

Methodology

Study design

A cross-sectional study design was applied to assess resilience and determine associated factors.

Study setting

Pune Municipal Corporation's (PMC) health department runs various public hospitals. PMC hospitals are an essential medium of healthcare delivery and provide the most affordable option for health care to the people. Hence, these hospitals face a lot of patient burden daily. We conducted this study in five selected hospitals, where we got permission from the PMC health department. Ethical approval for this study was given by Savitribai Phule Pune University's Institutional Ethics Committee.

Study sample

Initially, the total number of nurses and paramedics in selected five PMC hospitals was obtained from the PMC health department. As per data, 187 nurses and 184 paramedics worked in five selected PMC hospitals. To consider the COVID-19 context during and after the pandemic in the study, we included only nurses and paramedics who worked during the COVID-19 pandemic in these selected five hospitals.

Sample size

The total sample size of nurses and paramedics working in the selected five hospitals was 371. Limited time, meagre budget and limited human resources compelled us to sample. The sample size of 180 HCWs was determined using simple random sampling. Then, considering the 10% no response and multiplying it by 1.25 to ensure design effect, we determined our sample of 247 nurses and paramedics. However, due to the staff's busy schedule, we could only achieve 245 sample size (66% of the total HCWs) during the scheduled conduct of the study.

Inclusion and exclusion criteria

Those registered as a nurse or paramedics in public hospitals in Pune City and who worked during the COVID-19 pandemic and gave their unambiguous, informed consent to participate in the survey were included in the study as participants, while the doctors and the interns working in the same hospital and the nurses/paramedics that did not fulfil other inclusion criteria were excluded from the study.

Study tool

A structured interview questionnaire was used for sociodemographic, occupational and COVID-19-related factors. In addition, an internally validated self-administered Connor–Davidson Resilience Scale (CDRISC)^[13] was used to assess resilience. The internal validity of the locally adapted scale using Cronbach's alpha was 0.75.

Data collection

Before the start of the study, a pre-test evaluation of the study tool was conducted to test the internal validity of the locally adapted scale. Data were collected from February 2023 to March 2023 from the PMC hospitals using the study tool, including the CDRISC. Apart from sociodemographic, occupational and pandemic-related questions, each participant was asked 25 questions of the CDRISC, which were divided into four domains/factors: hardiness, optimism, resourcefulness and purpose. For each question, the participant responded in the form of a 0–4 rating (0 – not at all; 1 – rarely; 2 – sometimes; 3 – often; and 4 – nearly all of the time), and the scale's total score, of 100, depicted individual resilience.

Statistical analysis

All quantitative and qualitative data were entered into and analysed using the Statistical Package for the Social

Sciences (SPSS) version 28 and MAXQDA 2022, respectively. Resilience score, a continuous variable, was analysed against various categorical/continuous variables. One-way analysis of variance (ANOVA) was used for multi-categorical variables, independent-samples *t*-test for variables having two categories and the Chi-square test for cross-tabulated variables. In continuous variables, bivariate correlational tests were performed.

Results

Sociodemographic information

Sociodemographic variables include age, gender, marital status, hospital name/type, education, income and experience. Table 1 shows the data for these variables.

Mental health issues

More than half (60%, n = 148) of the staff reported some mental/psychological issue after daily work. Among nurses, a similar pattern was observed (69%, n = 114 said yes), whereas less than half (42.5%, n = 34) of the paramedics suffered from mental/psychological issues. This difference was statistically significant when a Chi-square test with a *P* value < 0.05 was tested.

Four types of mental health issues were reported, as shown in Figure 1.

Irritation/anger

More than one-fourth (27%, n = 44) of nurses and almost one-fifth (16%, n = 13) of paramedics reported irritation/anger due to workload. For example, a paramedic stated, 'Yes, due to excessive workload or overtime, we face problems at home as workload stress often results in irritation and anger at home'.

Frustration, tension/worry

A little over one-fifth (21.81%, n = 36) of the nurses and more than one-tenth (15%, n = 12) of paramedics reported frustration, tension/worry during/after work. For example, a 28-year-old nurse said, 'Feel frustrated when pressure increases from a higher level, sometimes due to overthinking and tension, I do not eat properly'.

Fatigue, mental stress

Almost one-fifth (16%, n = 27) of nurses and more than one-third (37.5%, n = 30) of paramedics experienced fatigue and work-related mental stress. For example, a 42-year-old nurse opined, 'Yes, many times when the number of patients increases, it puts psychological stress on us and sometimes irritation. Because of this, we get tired'.

Sadness, anxiety

Only 4.24% (n = 7) of nurses and 5% (n = 4) of paramedics reported sadness/anxiety after daily work. However, as said by one paramedic, 'I feel depressed, stressed, and sometimes frustrated after daily work'.

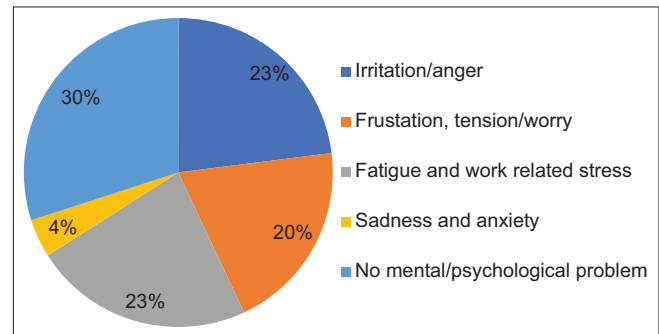


Figure 1: Mental/psychological problems

Table 1: Sociodemographic characters of nurses and paramedics

Variables	Categories	Nurses (n=165)	Paramedics (n=80)	Total (n=245)
Age-group	18–32	66 (54.5%)	55 (45.5%)	121
	>32	99 (79.8%)	25 (20.2%)	124
Gender	Male	10 (18.9%)	43 (81.1%)	53
	Female	155 (80.7%)	37 (19.3%)	192
Marital status	Married	138 (75.8%)	44 (24.2%)	182
	Unmarried	27 (42.9%)	36 (57.1%)	63
Hospital name	Rajiv Gandhi Hospital, Yerawada	10 (50%)	10 (50%)	20
	Kamla Nehru Hospital, Mangalwar Peth	104 (80.6%)	25 (19.4%)	129
	Sonawane Hospital, Bhavani Peth	27 (71.1%)	11 (28.9%)	38
	Naidu Hospital	5 (38.5%)	8 (61.5%)	13
Hospital type	Jayabai Sutar Hospital, Kothrud	19 (42.2%)	26 (57.8%)	45
	General	109 (76.8%)	33 (23.2%)	142
No. of education years	Maternity care	56 (54.4%)	47 (45.6%)	103
	≤14 years	4	47	51
Income (monthly)	≥15 years	161	33	194
	0–22000	64 (54.7%)	53 (45.3%)	117
Years of experience	≥22000	101 (78.9%)	27 (21.1%)	128
	<9 years	64 (53.8%)	55 (46.2%)	119
	≥9 years	101 (80.2%)	25 (19.8%)	126

Emotional well-being

The participants were enquired about their emotional well-being during the changing work conditions that the pandemic brought. More than a quarter (26%) said yes to getting emotionally drained, 42% agreed on feeling fatigued when asked ‘if working all day with patients puts a strain on them?’ and 36% said yes. Of the total respondents, half (48%, n = 117) of the respondents said yes to burnout from work; specifically, more than half (53%, n = 87) of the nurses, and only one-third (37.5%, n = 30) of paramedics, reported burnout due to work. Also, 21% of respondents said yes to ‘feeling frustrated from the job’ among nurses; less than one-fifth (17%, n = 28) and one-third (29%, n = 23) of paramedics felt frustrated. The differences between reporting burnout and frustration from the job between nurses and paramedics were significant when analysed with a Chi-square test with a P value of 0.029 and 0.044, respectively.

Resilience

The participants’ mean (± sd) resilience score was 75.02(±9.25), with a maximum score of 96 and a minimum score of 24. The mean (±sd) for individual domains is presented in Table 2.

Resilience-associated factors

Ten independent factors were statistically analysed against the resilience scores, of which seven significantly affected the individual’s resilience. Table 3 shows the results of the statistical analyses.

Age

Participants’ age was categorized into four quartiles: 19–26, 27–32, 33–40 and 41–58. The resilience score was lowest in the first age-group, gradually increasing with age, and the oldest age-group’s resilience was highest [Figure 2]. The differences between the mean resilience scores among different age-groups were analysed using one-way ANOVA, which was highly significant at <0.001 [Table 3].

Designation

The difference between the mean resilience scores of nurses and paramedics was statistically significant at < 0.001 level when

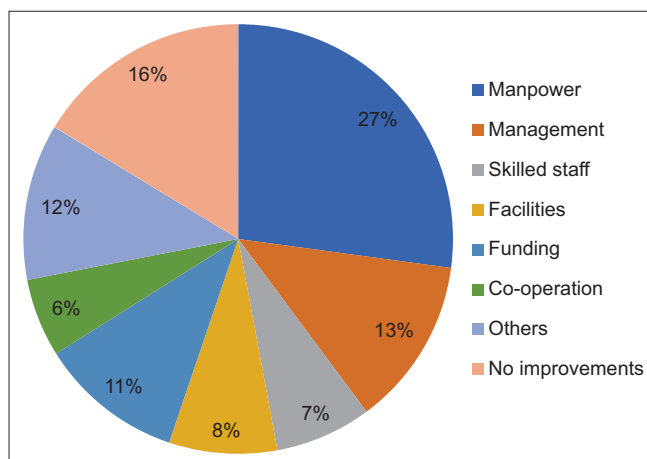


Figure 2: Improvement inputs

analysed with independent-samples t-test [Table 3]. Among the two, nurses had better resilience than paramedics.

Experience

The median work experience for the total study population was 9 years. The mean resilience score of the staff with <9 years of experience was lower than those with ≥9 years of experience. Independent-samples t-test was applied to test these differences, and this difference was statistically significant with a P value <0.001. Similar results were observed among nurses/paramedics when tested separately using Spearman’s correlation with a P value <0.01 in both groups.

Income

The difference between the mean resilience score of the staff earning <Rs. 22,000/month and that earning ≥Rs. 22,000/month was analysed using an independent-samples t-test, and this difference proved significant at <0.001 level [Table 3]. Similarly, when analysed among nurses/paramedics separately using Spearman’s correlation, resilience was associated with income. For nurses, the association was significant at <0.01,

Table 2: Resilience scores

Domain (maximum score possible)	Nurses mean (±sd)	Paramedics mean (±sd)	Total mean (±sd)
Hardiness (28)	20.45 (±3.63)	19.53 (±4.27)	20.15 (±3.87)
Optimism (28)	21.69 (2.97)	20.25 (±3.97)	21.22 (±3.39)
Resourcefulness (24)	17.51 (±2.73)	16.69 (±2.75)	17.24 (±2.76)
Purpose (20)	16.56 (±1.68)	16.10 (±2.50)	16.40 (±2.17)
Resilience (100)	76.21 (±8.30)	72.56 (±10.60)	75.02 (±9.25)

Table 3: Resilience-associated factors

Factor	Resilience mean	P
Age ^A		
19-26	71.27	0.000***
27-32	73.20	
33-40	75.40	
41-58	80.56	
Designation ^B		
Nurses	76.21	0.000***
Paramedics	72.56	
Experience ^B		
<9 years	71.74	0.000***
≥9 years	78.12	
Monthly income ^B		
0–22000	72.88	0.000***
≥22000	76.98	
Financial problem during COVID ^B		
Yes	70.68	0.000***
No	76.59	
Hospital setting ^C		
General	75.94	0.038*
Maternity care	73.75	
Marital status ^B		
Married	70.68	0.002**
Unmarried	76.59	

*A=one-way ANOVA; B=independent-samples t-test; C=Chi-square test

and for paramedics, it was at <0.05 . Those with higher incomes reported better resilience scores.

Financial problem

Independent-samples *t*-test was used to analyse the relationship between resilience and having faced any financial problems during the COVID-19 pandemic. The difference was significant at <0.001 level [Table 3], and facing financial problems was negatively associated with resilience.

Marital status

The resilience scores were analysed against the marital status of staff using the independent-samples *t*-test. The mean resilience score of married staff was significantly lower than that of the never-married staff at <0.001 level [Table 3]. This finding indicates a negative association between marital status and resilience.

Hospital setting

Broadly, the participants were occupied in maternity care hospitals ($n = 103$) and generalized hospitals ($n = 142$). These two categories were cross-tabulated with <75 and ≥ 75 resilience scores. The Chi-square test gave a significant association, with a *P* value of 0.038. The staff working in a generalized hospital developed better resilience than those working in maternity care.

Health system improvements

When the staff was asked for improvements at the workplace for better preparedness, there were suggestions with multiple improvements or a single improvement, and 16% said no improvement was needed. The responses that we received are as follows:

Human resources

One-third (31.5%, $n = 52$) of nurses and more than quarter (26%, $n = 21$) of paramedics reported staff should be increased. For example, a 25-year-old paramedic said, *'Only the staff needs to be increased, rest everything is fine'*.

Management

Close to one-fifth (17%, $n = 28$) of nurses and one-tenth (9%, $n = 7$) of paramedics suggested proper staff duty management and patient and crowd management. As a 25-year-old nurse said, *'Time-to-time break for staff, proper management of staff and working hours are needed'*.

Skilled staff

One-tenth (9%, $n = 15$) of nurses and only 5% ($n = 4$) of paramedics reported regular skill training is needed, as a 42-year-old nurse elaborated, *'staff needs to be increased for emergency response. New staff must be trained, and time to time inspection is needed'*.

Facilities

Another tenth (10%, $n = 16$) of the nurses and less than one-tenth (7.5%, $n = 6$) of paramedics reported facilities such

as adequate beds, washroom hygiene and diagnostic facilities should be increased for staff and patient service. For example, one 46-year-old paramedic explained, *'Patients should get necessary facilities like water, canteen, medicines, and testing should be available inside the hospital so that patients do not need to go out for reports'*.

Funding

Tenth (10%, $n = 16$) of nurses and almost a fifth (17.5, $n = 14$) of the paramedics reported adequate resources and equipment for routine hospital work should be supplied. For example, one nurse said, *'Instruments required for emergency conditions should be serviced regularly'*.

Cooperation

Only 6.66% ($n = 11$) of nurses and 6.25% ($n = 5$) of paramedics said that teamwork and cooperation among staff and better understanding from seniors would strengthen the healthcare delivery. As mentioned by one nurse, *'There should always be good communication between management and staff. Staff should be increased'*.

Other responses

Apart from the above-mentioned significant responses, we also received some other inputs from a comparatively smaller fraction of nurses and paramedics, which included an increase in payment, regular monitoring by authorities, adequate space for the wards and laboratories, staff security and cooperative patient relatives and transport facilities.

Discussion

The recent COVID-19 pandemic introduced vast amounts of stress on health systems globally. It resulted in a tremendous patient load, challenging the health system's preparedness and testing their sustainability and proper functionality amidst the increased workload stress. It brought the importance of the resilience of health systems to the limelight, as countries with resilient health systems managed the outbreak efficiently, while many of the non-resilient health systems collapsed during the pandemic.^[14] The pandemic also worked many administrative/policy changes in the health sector of various countries. In this post-pandemic era, the importance of resilient health systems still prevails, adapting to these changes and local health emergencies. Health systems must develop everyday resilience to face everyday challenges and uninterrupted functioning. Everyday resilience combines absorptive, adaptive and transformative strategies that the health workforce implements to respond to strain.^[11] Therefore, primary HCWs are the main drivers in developing the everyday resilience of health systems. Also, primary HCWs are the basic health system unit responsible for delivering health care to the community. Hence, it becomes imperative that primary HCWs develop resilience for efficient healthcare delivery and the strengthening of health systems by developing everyday resilience.

The resilience score of HCWs (nurses and paramedics) in the public hospitals of Pune City was 75.02, which was higher than

the resilience of HCWs in China^[15], and moreover, far better than that of nurses in Iran (56.93).^[16] However, when compared to a similar study conducted on clinical and preclinical doctors in a tertiary care hospital in Pune, the resilience of nurses and paramedics in our study was less than that of preclinical doctors in Pune (88.9) but better than the resilience of clinical doctors (55.47).^[17] We found seven factors significantly associated with the resilience of the nurses and paramedics. Age and years of experience in health care positively affected resilience; this was in contrast with a finding of a similar study from China, where age and work seniority were not affecting resilience.^[15] In the same study, gender was a significant factor, with men being more resilient than women. A meta-analysis also reported lower female resilience.^[18] In our study, even though there was not a comparable gender group (majority of women participants), one of our novel findings that being married negatively affected resilience supports these previous findings, and also the finding that marital status is a predictor of burnout,^[19] probably because married female HCWs are also at risk of stress at work and home. Therefore, health administrators/policymakers should focus on reducing the workload on married female HCWs to improve their resilience. Lower monthly income was also a risk factor for poor resilience, and very little literature studied the financial factors affecting resilience; we found one study with similar findings regarding income as a predictor of resilience.^[20]

As a risk factor, lower income was supported by one more finding that the participants facing financial problems during COVID-19 had lower resilience than those who did not. Facing a financial problem during COVID-19 and lower monthly income, both interrelated factors, were significantly associated with resilience. We analysed the resilience of the two occupational groups of our study population and found a significant association between being a paramedic and lower resilience. Another new finding of our study is that the hospital setting in which HCWs work also affects their resilience. Among our study population, those working in general hospitals had much better resilience than those in maternity care hospitals. The patient load is much higher in a general hospital, exposing the staff to more challenges. Furthermore, possibly over time, general hospital staff developed better resilience.

This study has provided seven modifiable risk factors for the lower resilience of nurses and paramedics, and health policymakers could target these factors to improve HCWs' resilience, eventually building the everyday resilience of health systems. Apart from the few suggestions mentioned above, health administrators should prioritize those working in maternity care. The risk of less experience and being young HCWs can be tackled by recruiting better-skilled staff and organizing regular skill improvement/training sessions. If possible, the healthcare staff should get better allowances and remuneration, which will modify the factor of lower monthly income and reduce their financial problems resulting in improved resilience and better healthcare delivery in adverse conditions. To strengthen the resilience of paramedics, authorities should improve their

working conditions and provide recognition, similar to nurses. We found that paramedics are facing the issue of poorly maintained laboratories, inadequate space and poor funding for laboratories, addressing which could improve their conditions and build a resilient paramedical workforce. Finally, the burden of work should be appropriately managed for the HCWs with the risk factors for lower resilience. The limitations of our study are that there was no comparable gender group, and we did not collect data on work hours, which could have been a significant factor for resilience.

Ethical approval

The Institutional Ethics Committee of Savitribai Phule Pune University approved the study. Ethical approval for this study was given by Savitribai Phule Pune University's Institutional Ethics Committee with reference number SPPU/IEC/2023/49.

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Conflicts of interest

There are no conflicts of interest.

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