

Measuring the Impact of the COVID-19 Pandemic and the Public Health Pandemic Response

Activities on the Local PH Workforce

by

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Abstract

Currently, in the United States, the number of confirmed cases of COVID-19 exceeded 87 million and one million deaths in 2022 (World Health Organization, 2022). The pandemic has been an incredibly hectic time for the public health (PH) workforce. While there has been worldwide recognition of the efforts of PH workers in ensuring that the morbidity and mortality associated with COVID-19 reduced, there has not been enough recognition and acknowledgement about the impact of COVID-19 and COVID-19 response activities on the wellbeing of PH workers. The current study was a cross-sectional analysis measuring the impact of COVID-19 and the PH pandemic response activities on 372 local PH workforce. The study examined if there was a significant level of burnout, comfortability, job burnout, reduced attrition, and stress due to COVID-19 and COVID response activities. In this study, most of the employees reported a higher level of burnout following the COVID-19 pandemic compared to prior to the pandemic. In addition, the study showed that non-supervisory employees were twice as likely as their supervisors to report a negative economic impact from COVID-19. As a result, COVID-19 and COVID-19 response negatively affected local PH workers. Collectively, the study revealed how the pandemic indirectly and directly impacted the wellness and personal lives of the PH workers.

Keywords: public health employees, COVID-19, COVID response.

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Literature Review

Worldwide, leaders and the public have recognized public health workers for their efforts in ensuring that the morbidity and mortality associated with COVID-19 reduced. At the same time, there has not been enough recognition and acknowledgement among leaders, the public, and researchers on the impact of COVID-19 and COVID response activities on the wellbeing of public health workers. A variety of studies noted that in past pandemics, those involved with outbreak or epidemic/pandemic response activities experienced mental health problems (Johannes et al., 2021).

Public Health Worker Challenges

In the United States, the number of confirmed cases of COVID-19 exceeded 87 million and one million deaths in 2022 (World Health Organization [WHO], 2022). At the start of the pandemic, frontline worker and essential sector duties were affected by the sudden increase in cases and deaths. Since the frontline workers and the public health essential sector were considered essential workers, they continued to work as the government made orders to stay home (CDC, 2021)

It was an incredibly stressful time for many of the public health (PH) workforce throughout the pandemic (Mulloy et al., 2022). During the pandemic, PH workers were one of the first groups to respond (SAMHSA, 2021). The levels of public health preparedness across different areas and jurisdictions were greatly influenced by the available materials, equipment, training, and resources (Leão et al., 2022). However, in the case of the novel coronavirus (SARS-CoV-2) pandemic, public health workers did not have much information or knowledge about this new novel virus, and thus, much of the public health workforce preparation was indirectly and

directly impacted (Leão et al., 2022). They faced many challenges in responding to the pandemic and ensuring that the spread of the virus was controlled.

Some of the major job duties PH workers had during the response included assuring that the spread of COVID-19 was contained, emergency protocols were activated, the amount of misinformation was decreased, and cases were reported daily (Ogilvie et al., 2022). COVID-19 did not just affect those infected by the virus but also those who worked to keep the disease from spreading (Stone et al., 2021). Public health workers worked tirelessly throughout the pandemic, and the majority of the public health workers have not had a break for the last two years. From the start of the pandemic, PH workers' schedules have been impacted by COVID-19 response activities (Ollive et al., 2021). Those who worked on the frontlines have been required to wake up early and work for long hours (University of Delaware, 2021). The pandemic caused an increase of extended hours and more responsibilities, along with increase in stress and fatigue as well as becoming more overwhelmed as the case load increased (U.S Department of Health and Human services 2021).

PH workers often work for more than 40 hours a week, but throughout the pandemic, those hours increased greatly (University of Delaware, 2021). Public health workers had more duties than they were accustomed to and had to work in fast-paced environments (Kumar et al., 2022). In addition, PH workers had additional responsibilities added to their roles, and they were also often assigned job duties outside of their specialties (Kumar et al., 2022). Public health workers were forced to adapt quickly to the new normal. Those who were new PH employees did not have extensive amounts of training and they experienced many challenges (Ogilvie et al., 2022). Since many of their jobs were reassigned outside of their scope, the majority of PH workers felt they did not have the right amount of training (Norman et al., 2021).

Many of the public health workforce lacked security in their job and safety (John Hopkins, 2021). The rapid nature of the workplace and the constant changes in job duties might have escalated their emotional stress levels (Stone et al., 2021). Navigating between their new job duties and caring for their family might have brought many new challenges to their personal lives (Stone et al., 2021). The extensive amount of work that was done throughout the pandemic caused many PH workers to have at least one adverse mental health condition (Ollove et al., 2021). The exhaustion and fatigue caused by the immense amount of work is thought to have led to an increase in mental health symptoms and functional difficulties among this professional population (Norman et al., 2021).

Working Conditions

At the start of the pandemic, the public health front line workers dealt with challenging working conditions starting with shortages of personal, protective equipment (PPE), shortages of workers, and lack of vaccines (WHO, 2020). There was a shortage of PPE because of the high demand of the supplies, which meant the price for the PPE increased and as a result, hurt the essential workers (Burki et al, 2020). In addition, the lack of effective actions by the federal government in distributing the PPE inventory caused many problems (Cohen et al., 2020). Not having the proper protection item increases the likelihood of becoming ill, and illness led to an increase in the number of PH essential workers who were forced to quarantine and could not work (Cohen et al., 2020). Having essential employees on sick leave resulted in an even greater shortage of workers (Cohen et al., 2020). In 2020, due to the low of supply of PPE, 50,000 the essential workers in California tested positive for COVID-19 (Cohen et al., 2020). This situation intensified the work demand for those who were not exposed (Cohen et al., 2020). Their duties to keep the virus from spreading also put them and their families at risk (WHO, 2021).

Working Remotely

As a result of the pandemic, the federal government instituted many restrictions and policies, which led to most PH workers being required to work from home. At the same time, schools were closed, and as a result, workers had to juggle their jobs and their children (Toniolo-Barrios et al., 2021). PH workers' daily lives and work were constrained due to the pandemic (Ingusci et al., 2022). Working from home was not easy for many because there were frequently miscommunications between supervisor and employees (Ingusci et al., 2022). Many PH workers experienced difficulties with organizing work tasks within their homes due to the space, internet connection, and presence of other family members (Ingusci et al., 2022). Research has illustrated how working from home did not mean less work and how workloads increased during the pandemic (Ingusci et al., 2022).

Transitioning to working at home greatly impacted the nutrition and exercise of many of the PH workers during the pandemic (Peters et al., 2021). Prolonged screen time on the computer increased the prevalence of eye strain (Gallagher et al., 2021) and Zoom fatigue, or burnout related to frequent videoconferences (Peters et al., 2022). In addition, the time they spent sitting increased tremendously compared to pre-pandemic levels according to the literature (Peters et al., 2021). Many faced presenteeism, which is the inability to function properly at work even if they are working from the comfort of their home, and there was an increase in depression and loneliness (Xiao et al., 2021). PH workers felt that they would fall behind in their work if they took time off (American Medical Association [AMA], 2021).

Mental Health

The pandemic had a detrimental impact on resilience and health risk behaviors and increased the risk of stress and psychiatric disorders in a study conducted from the start of the

pandemic to the spring of 2022 (Willis et al., 2021). The results showed that burnout had increased and many participants were struggling with anxiety. Undeniably the pandemic took a toll on PH workers' physical and mental health. In a short period of time, PH workers were confronted with encountering an increased number of people who were gravely ill and high mortality rates. The Center for Disease Control and Prevention (CDC) found that about half of PH workers who either worked at the state, tribal, local, or territorial positions developed at least one symptom of mental health illness as a result of the pandemic (Ollove et al., 2021). In addition, due to the length of the response to the pandemic the stress levels increased (Ollove et al., 2021). Many PH workers experienced changes in their lives, began to feel overwhelmed with work, developed feelings of ambiguity, worked extensively, and felt unable to control the situation (Aredebili et al., 2021). Due to the increased workloads and overwhelming situations, the incidence of depression, post-traumatic stress disorder (PTSD), burnout, and stress levels, which may have a long-term effect on their personal lives (Aredebili et al., 2021).

In a semi-structured interview, professional workers who responded to COVID response activities felt that they were building an airplane while flying (WAMU, 2020). In other words, some of the PH workers did not feel ready for the task. A cross-sectional study of PH workers showed how many dealt with depression and burnout due to working extra hours throughout the pandemic (Natural Hazard Center, 2021). Shreffler et al. (2020) conducted a study at the University of Louisville and found that stress, fear, anxiety, and symptoms of depression were prevalent among frontline workers. According to Norman et al. (2021), multiple studies demonstrated that PH workers dealt with anxiety regarding infecting their loved ones and themselves. PH workers also experienced ambiguity due to the changes in protocols and

guidelines of the government, which increased their feelings of helplessness in the face of consistently shifting work duties (Aredebili et al., 2021).

Not knowing how bad the pandemic would be also increased their level of anxiety (Aredebili et al., 2021). A research study conducted by Ogilvie et al. (2022) addressed PH workers who had more responsibility during COVID-19 and worked for more hours were more likely to deal with mental illness. Frontline workers also developed high levels of anxiety and stress related to the high death rates and cases (Shreffler et al., 2020). A study conducted by Zhu et al. (2020) pointed out that women PH workers who had a history of mental health problems reported an increase in depression, anxiety, and distress during COVID-19 (as cited by Shreffler et al., 2020). Moreover, during the pandemic, the CDC reported that many PH workers developed PTSD (Wiley et al., 2021). Despite these personal challenges, the PH workforce remained committed and dedicated to performing their jobs well.

Purpose of the Study

COVID-19 was an unprecedented pandemic causing many challenges for public health employees. During the pandemic, public health worker's duties primarily consisted of counting COVID-19 cases in the population, providing guidance and investigating cases, distributing the COVID-19 vaccine, and other high risk responsibilities. These professionals played an essential role during the pandemic. The purpose of this study was to measure the impact of COVID-19 and the PH pandemic response activities on the local PH workforce. Highlighting the common challenges that many in the PH workforce confronted during COVID-19 pandemic and the COVID-19 response is necessary for acquiring and disseminating information that can improve the PH workforce's preparedness for future pandemics.

Research Questions

The following research questions were answered in this study:

1. Is there a statistically significant difference in the level of burnout between employee roles (as measured by levels of supervisory status and level of responsibility in the organization)?
2. Is there a statistically significant difference in self-reported public health workforce confidence in their professional abilities pre and post COVID-19 (as measured by a retrospective pre-post response)?
3. Is there a statistically significant difference in public health employee burnout in the workplace pre and post COVID-19 (as measured by a retrospective pre-post response)?
4. Is there a relationship in self-reported contemplation of leaving employment between employee and supervisor role categories (as measured by supervisory status)?
5. Is there a relationship between employee role (supervisor or not) and economic impact of COVID-19?

Hypotheses

The research hypothesis for the first question was there is a difference in the level of burnout among employees depending on the level of supervisory status. The second hypothesis was that employee confidence has been impacted since the start of the COVID-19 pandemic as measured by confidence in their ability to do their work decreasing over time. The third hypothesis was there is significant change in burnout among public health employees from pre COVID-19 to post COVID-19. The fourth hypothesis was that there is a relationship between self-reported contemplation of leaving employment and employee level of supervisory status.

The fifth hypothesis was that there is a relationship between employee role (supervisor or not) and economic impact of COVID-19.

Method

Design

This study was a cross-sectional study exploring the perspective of public health department employees regarding the impact of COVID-19 and COVID-19 response activities. A survey was disseminated using Qualtrics.

Participants

Those who participated in the survey were all PH professionals currently working for a local health department. The department consisted of 14 administrative divisions and program areas. Staff members for each of these areas worked indirectly or directly with COVID-19 response or were impacted by shifting workforce demands during the pandemic. The PH employees were all encouraged to complete the survey through an email sent by the department's administration.

Procedures

The survey was administered between April and May 2022. Participants were sent email reminders prompting them to participate in the survey prior to the survey closure date. The survey was disseminated by department leadership to the more than 900 employees. The self-administered survey included a total of 43 questions and took, on average, 15 minutes to complete.

At the start of the survey, the participants were provided details addressing the purpose of the study and an invitation to participate. Participants were informed that the primary goal of the study was to capture PH employee perspectives regarding the impacts of the pandemic on their professional and personal lives. The public health workers were informed that their responses were voluntary, would be confidential, and would be analyzed in aggregate.

The self-administered anonymous survey was separated into four sections. At the start of the survey, respondents were asked demographic questions, including gender, age, ethnicity, education, marital status, years of employment, role in the organization (general staff or supervisory position), and years working in public health. The second section involved questions based on their experience and job duties during the pandemic. In the third section, participants were asked to read each statement and choose their level of agreement. These queries asked them to recall their experience before the pandemic surges. In the last section, they were asked to read each statement carefully and select the statement they most agreed with based on their experiences after pandemic surges.

Examples of the opening questions included, *“As of today, where is your current primary work location?”* and *“Did you work the COVID-19 response (the DOC and/or EOC)?”* If a participant responded yes, then it was followed up with this question: *“If yes, how long did you participate in active response (months and years)?”* The survey instrument also included questions regarding their preparedness during the pandemic; *“Do you believe we could have been more prepared to respond to COVID?”* The student researcher included a question where the participant could select multiple responses: *“During the COVID-19 response I was concerned about:(select all that apply: 1. Keep my family safe, 2. Food supply shortages, 3. COVID-19 supply shortages, 4. getting sick with COVID-19).”* In the intermediate section of the survey, participants were asked questions that looked at their work experience before the pandemic surges. These were a statement agreement questions that the student researcher included such as, *“I was confident in my ability to do my work and serve the community”* and *“I felt satisfied in my work.”*

The survey then transitioned from asking respondents to recall their work experience before the COVID-19 surges to their experience after the COVID-19 surges. The survey asked them to rank their level of agreement with items including, *“I am confident in my ability to do my work and serve the community,” “I feel burned out in my job and my duties”* and *“I am satisfied with my job.”* All survey responses were received through Qualtrics and exported for data analysis.

Independent Variable and Dependent Variable

The independent variable for the first question, *“Is there a statistically significant difference in the level of burnout between employee roles (as measured by levels of supervisory status and level of responsibility in the organization)?”*, was the supervisory level of the employee respondent. Supervisory level included: (1) non-supervisor, (2) team lead or supervisor, (3) manager, or (4) executive. The dependent variable for the first question was the employee's level of burnout as reported by their level of agreement with the statement, *“I feel burned out in my job and my duties,”* on a scale of 1 to 5 with 1 being strongly agree and 5 being strongly disagree.

Research question 2 utilized a retrospective pre-post design to evaluate changes in the dependent variable: PH workers' confidence in their work and ability to serve the community. The variable was measured by agreement the statements: *“Before the pandemic, I was confident in my ability to do my work and serve the community”* and *“After the pandemic, I am confident in my ability to do my work and serve the community.”* Response options for both questions ranged from 1 to 5, with 1 indicating strongly agree to 5 indicating strongly disagree.

Research question 3 utilized a retrospective pre-post design to evaluate the dependent variable, public health employee burnout in the workplace. Employee burnout was captured by

indicating agreement with the statements, *“Before the pandemic, I felt burned out in my job and my duties”* and *“After the pandemic, I felt burned out in my job and my duties.”* Response options for both questions ranged from 1 to 5 with 1 indicating strongly agree to 5 indicating strongly disagree.

For research questions 4 and 5, the independent variable, supervisory status, was re-coded into a two-category variable, “supervisor” and “non-supervisor.” The dependent variable in research question 4 was self-reported contemplation of leaving employment. The contemplation of leaving employment variable was captured by each respondent’s “Yes” or “No” response to the question, *“Was there ever a moment that the increase of stress, fear or anxiety rooted from the COVID-19 surge made you think of leaving your job?”* The independent variable for question 5 was economic impact, which was measured by each respondent’s “Yes” or “No” response to the question, *“Did COVID-19 have a negative economic impact on you and your family?”*

Data Analysis

An ANOVA was performed to compare mean levels of burnout (Q38) across types of roles (Q9- supervisor, executive, team lead, non-supervisor) to answer the first research question. To answer the second research question, a paired samples *t*-test was performed to examine differences in workforce confidence pre and post COVID-19 pandemic. To answer the third research question, a paired sample *t*-test was performed comparing levels of retrospective pre and post levels of employee burnout. For research question number four, the relationship between contemplation of leaving position and employee role was investigated using a chi-square test of independence. A chi-square test of independence was utilized to investigate the

relationship between supervisory status and COVID-19 economic impact and answer research question 5.

Results

Demographics

A total of 337 public health employees participated in the survey in the spring of 2022. They reflected back on their experiences as members of the PH workforce during the COVID-19 pandemic. Of those who participated, the majority ($n = 247$, 73.2%) were female, and most were White ($n = 154$, 45.7%) with a large representation of Latino/Hispanic subgroups, including 115 (34.1%) individuals of Mexican, Mexican American, or Chicano origin. The majority of respondents held non-supervisory roles ($n = 198$, 58.7%) followed by team leads or supervisors ($n = 78$, 23.1%).

Major Findings

This research aimed to examine differences in PH workers' burnout and confidence pre- and post-COVID-19 pandemic. The research also analyzed the relationships between supervisory status and employee burnout, contemplation of leaving employment, and negative economic impact on the employee's family. To answer research question 1, "*Is there a statistically significant difference in the level of burnout between employee roles (as measured by levels of supervisory status and level of responsibility in the organization)?*", an ANOVA was performed. There was no statistically significant difference in the level of burnout across all employee roles ($F(3, 281) = 1.889$, $p = .132$), including non-supervisor ($M = 3.10$, $SD = 1.209$), team lead or supervisor ($M = 3.39$, $SD = 1.237$), manager ($M = 3.00$, $SD = 1.225$), or executive ($M = 2.25$, $SD = 1.258$).

To answer research question 2, "*Is there a statistically significant difference in self-reported public health workforce confidence in their professional abilities pre and post COVID-19 (as measured by a retrospective pre-post response)?*", a paired samples t -test was performed.

Higher values on the 1 to 5 scale indicated higher levels of workplace confidence. The result revealed no statistically significant change in confidence in their work ($t(287) = .825, p = .41$) pre-pandemic ($M = 4.23, SD = 1.066$) compared to post-pandemic ($M = 4.16, SD = .882$).

For the third question, “*Is there a statistically significant difference in public health employee burnout in the workplace pre and post COVID-19 (as measured by a retrospective pre-post response)?*”, a paired sample t -test was used. The results from the paired samples t -test revealed a significant difference in levels of employee burnout ($t(287) = -2.625, p = .009$) before ($M = 2.97, SD = 1.212$) and after the pandemic ($M = 3.17, SD = 1.230$). Employees reported higher levels of burnout following the COVID-19 pandemic compared to their experience working in the public health workforce prior to the pandemic.

To answer the fourth question, “*Is there a relationship in self-reported contemplation of leaving employment between employee and supervisor role categories (as measured by supervisory status)?*”, a chi-square test was performed and revealed no relationship between contemplation of leaving position and employee role ($\chi^2(1, N = 291) = .082, p = .774$). To answer the fifth question, “*Is there a relationship between employee role (supervisor or not) and likelihood to self-report COVID-19 having a negative economic impact on your family?*”, a chi-square test of independence was performed. There was a statistically significant relationship between economic impact and an employee’s role ($\chi^2(1, N = 291) = 8.022, p = .005$). Non-supervisory employees are more than twice as likely as supervisors to report a negative economic impact from COVID-19 ($OR = 2.097$).

Discussion

Summary of Major Findings

The purpose of this study was to measure the impact of COVID-19 and COVID-19 response activities on the public health workforce. Although there were no statistically significant differences between non-supervisor and supervisor levels of burnout, the results of statistical analysis do not detract from the influence of the pandemic on PH workforce burnout as a whole. These results are in agreements with a survey performed by Stone et al. (2021) that illustrated how individuals in management positions in the PH workforce had similar or higher levels of symptoms of anxiety, depression, burnout, and lack of physical health as those who worked in frontline roles during the pandemic. PH workers had to quickly adapt to the new norm, shifting their lifestyles completely at the onset of the COVID-19 pandemic (Ogilvie et al., 2022). Compared to the frontline workers and the general public, PH workers had a 20% higher PTSD rate during the COVID-19 pandemic (Ogilvie et al., 2022).

Even though there was no significant change in the level of self-reported confidence among the individuals surveyed in this study, there was still a portion (8% of those surveyed, $n = 23$) who did not feel confident in their ability to do their work and serve their community following the COVID-19 pandemic. Self-report bias and social desirability bias might have impacted reporting of confidence in the workplace given this survey was distributed on behalf of an employer. Many of the PH workers were given new job duties out of their scope of work during the COVID-19 pandemic, which meant that they needed to learn new skills to be able to do their jobs well (Ogilvie et al., 2022).

The analysis to answer the third research question, *“Is there a statistically significant difference in public health employee burnout in the workplace pre and post COVID-19 (as*

measured by a retrospective pre-post response)?”, revealed a significant difference between pre-pandemic and post-pandemic feelings of employee burnout. Public health workers had higher levels of burnout during the COVID-19 pandemic compared to prior to the pandemic. These findings are in agreement with another study by Preti et al. (2021) that revealed that there were increased levels of responder burnout during the pandemic, with 30.4% of the healthcare participants who were impacted with burnout showing long-term effects two years later (Preti et al., 2021). In addition, the PH workers made drastic changes to their personal lives, their stress with work increased, and many worked long hours and at times felt fearful for their futures (Aredebili et al., 2021). The job of a PH worker is to protect the population, giving them a substantially larger load than clinicians (Ogilvie et al., 2022).

In the analysis to answer the fourth question, *“Is there a relationship in self-reported contemplation of leaving employment between employee and supervisor role categories (as measured by supervisory status)?”*, the researcher found no relationship between self-reported contemplation of leaving employment across employee categories. However, evidence from another study showed that COVID-19 did change the career trajectory of those who worked during the pandemic (Stone et al., 2021). In 2020, a large proportion of those who responded to the COVID-19 response planned to retire or leave in one to two years (Stone et al., 2021). In addition, there was a decrease in planning to stay in their profession during the pandemic compared to pre-pandemic (Stone et al., 2021). The PH workforce was decreasing before the pandemic. In 2020, 180 public health officials had either been fired or quit because of the pandemic (The Guardian, 2021). The stress and anxiety that the pandemic caused PH employees might have made them consider leaving their professions. According to the Public Health Workforce Interest and Need Survey, one out of three public health employees have considered

leaving their job because of pandemic stressors (Mulloy et al., 2022). A study conducted by the Pew Research Center survey showed that people tend to quit their job due to low pay, lack of job growth opportunities, and feeling unappreciated (Parker et al., 2022). The shortage in the PH industry decreased the most during COVID-19 surges (Assistant Secretary for Planning and Evaluation, 2022).

The researcher found a significant relationship between the negative economic impact on a respondent's family and their employment status (supervisors and general employees). The test found that non-supervisory employees were more than twice as likely as supervisors to report a negative economic impact from COVID-19. This finding illustrates the socioeconomic strain that face PH workers during the pandemic. The pandemic-related financial challenges among healthcare and PH professionals led to 54 billion in net income losses in 2021 alone (American Hospital Association, 2021). In the United States, hospital and health care facilities lost an estimated 202.6 billion dollars in revenue during the pandemic (Kaye et al., 2021).

While the PH workforce worked tirelessly to keep COVID-19 from spreading, many are paid low wages and are undervalued. The wages for PH workers are lower than other jobs (Harper et al., 2015). As of 2008, there has been a reduction in PH resources, and many PH workforces have lost their jobs (Harper et al., 2015). Hiring new employees for the PH department costs money, which can affect the hiring process (Harper et al., 2015). During the pandemic, those who did not work actively in the COVID-19 response had their hours reduced (Assistant Secretary for Planning and Evaluation, 2022). The healthcare industry reported that during the pandemic, they had to close down for more than four weeks due to the COVID-19 surges, causing employees to have no work hours (Assistant Secretary for Planning and

Evaluation, 2022). Many of the health industry lost money because they lost business due to the pandemic (Assistant Secretary for Planning and Evaluation, 2022)

Public Health Implications

This research provided additional information on and context for the COVID response related barriers and challenges faced by PH workers. The mortality related to and seriousness of the pandemic caused many PH workers to experience burnout. They were affected physically and mentally by frequent exposure to the virus and working to prevent the virus from spreading. These factors led to many detrimental psychological issues among many individuals in the PH workforce (Aredebili et al., 2021; Norman et al., 2021).

In order to address the concerning impact of COVID-19 and the public health pandemic response activities on the local PH workforce, there are a variety of strategies that should be implemented. Research revealed that the pandemic caused an increase in mental health concerns related to burnout, anxiety, and depression (Aredebili et al., 2021; Ollove et al., 2021). Several studies showed multiple factors contributed to pandemic related burnout as well as employees feeling general stress and having tremendous pressure throughout their job duties (Aredebili et al., 2021; Natural Hazard Center, 2021; Shreffler et al., 2020; WAMU, 2020).

As such, an important first step would be creating intervention programs to assist PH workers in their health and wellness during an emergency response period and programs to promote seeking psychological and mental health support when needed. A priority of any intervention and support program should be raising awareness and destigmatizing mental health in the PH profession. We must identify and understand the common psychological challenges that many of our public health professionals faced during the pandemic. By doing so, we can take steps in creating services or programs that will address their needs.

One way a hospital or leader in the public health field can help is to provide self-care support by providing employment resources, including brochures, hotline phone numbers, mental health wellness centers, and even Zoom conferences. Providing these resources will open the conversation and allow employees to feel more comfortable speaking about how they feel. Currently, the Methodist Hospital, University of California-San Francisco (UCSF), and Mount Sinai are hosting peer support video conference meetings, which allows health care professionals, PH professionals, physicians, and care teams to come together and answer questions like how they feel during the week (American Medical Association, 2022).

The PH workforce worked extended hours during the pandemic (Ogilvie et al., 2022) and faced shortages of resources and supplies (Cohen et al., 2020). Public health leaders and government officials should work to ensure that all vital roles in the PH field receive proper appreciation. Many studies showed that PH and health care professionals felt their voice was not heard throughout the pandemic. Having innovative approaches that include employee voices being heard at support group conferences will engage PH employees in advocating for and creating new policies.

At the start of the pandemic, there was insufficient access to PPE, which caused many of the essential workers to be fearful of being infected with COVID-19 (Cohen et al., 2020). It is important to ensure that staff has all the adequate PPE supplies needed for emergency response and infection prevention purposes. The CDC (2020) is working on the process of optimizing the availability and use of PPE in healthcare by looking at the current PPE inventory and supply chain and also standardizing and improving training for healthcare workers on the usage of PPE.

Local public health leadership across the nation should promote and advocate for PH workers to take time off (days off or vacation time) and have a healthy work-life balance.

Research showed that taking time off is beneficial for employees' health and wellbeing. According to a CDC (2022) research study, PH workers who could not take time off from work were more prone to mental health conditions during COVID-19 than those who could take time off. Currently, the American Hospital Association (2022) advocates on behalf of the health care workforce by providing resources and implementing policies that ensure the wellbeing of healthcare workers (American Hospital Association, 2022).

Providing sufficient training and guidance during an emergency response and as it evolves is also crucial to the mental health and well-being of the PH workforce. At this time, there is a Coronavirus Disease 2019 training that is currently available through the TRAIN Learning Network (Public Health Foundation, 2022). This training includes COVID-19 information, Crisis and Emergency Risk Communication, Personal Protective Equipment and many other topics (Public Health Foundation, 2022). Expanding these training opportunities and ensuring equal access to training and support is crucial. Recognizing and enacting structured changes will help create effectiveness and preparedness for future pandemics.

Future Research

While this research represents a meaningful effort to capture PH workers' burnout, satisfaction, and employee experience, there are additional opportunities to further research on burnout, resiliency, and development among workers in this professional field. As the PH workforce continues to confront challenges with pandemic response and emergency preparedness, public health researchers should continue to analyze the experience of their experiences to create informed recommendations for workforce development and resiliency. This study could not fully explore the differences in staff confidence and burnout in relation to the percentage of work time spent engaging in pandemic response related activities. Future research

investigating these differences could allow for public health leadership to better understand the specific impact of pandemic response activities on those in the workforce spending a large share of their time in pandemic response in contrast to the general well-being and satisfaction of all PH workforce employees working across different roles and disciplines.

Study Limitations

The study had several limitations. The first limitation is homogeneity of the sample. The demographics of the survey revealed that the majority of the 372 public health professional participants were female and White, including a large representation of Latino/Hispanic subgroups. Since there were more female participants, other genders may not be fully represented in the survey, which might have created bias. The survey was created by the student researcher who identifies with this majority group and worked as PH professional during the COVID-19 pandemic. As such, the survey may have been informed by the bias of a PH professional working during the COVID-19 pandemic. Since an employee sent the survey, self-selection bias could also have occurred. The introduction indicated the survey results would only be analyzed in aggregate, and that the survey questions focused on the impact of the pandemic in regards to the participants' life and work. The participants who were motivated to complete the survey could have been highly impacted by the COVID-19 and COVID response. The survey only asked questions that the student researcher believed were pertinent to the impact of COVID-19 on the PH workforce and could have inadvertently excluded potentially important topics and factors. Bias could have played a significant role in the survey depending on how the public health employees were currently feeling towards the pandemic. Furthermore, there was a limited amount of literature available from the United States in regard to the impact of COVID-19 on PH workers to inform the creation of the survey.

Conclusion

During the two years of fighting to reduce COVID-19 cases, PH workers were faced with many challenges, which has left many feeling physically and mentally drained and fatigued. When COVID-19 cases were at their peak, PH workers were dealing with insufficient PPE, which was needed to protect themselves from the deadly virus. Many PH workers did not feel safe or protected, causing them to feel stressed and worried about what would come. In addition, the PH workers felt overwhelmed with the constant changes in job location, extensive hours, and workload. We must now call for action to prevent repeating these mistakes and challenges. We must address these issues and invest more time in developing an emergency response plan and ensuring that the PH workers' well-being is considered.

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Appendix A: Demographics Table

Table 1

Demographic Details for Participants (n=337)

Variable	<i>n</i>	%
Gender		
Male	50	14.8
Female	247	73.33
Other	1	0.3
Decline to state or Did not respond	39	11.6
Race/Ethnicity		
American Indian or Alaska Native	6	1.8
Asian	32	9.5
Black or African American	31	9.5
Native Hawaiian or Other Pacific Islander	1	0.3
White/Caucasian	154	45.7
Two or more races	13	3.9
Declined to state Or did not respond	73	21.7
Latino Hispanic Subgroup		
Mexican	115	43.1
American/Chicano		
Puerto Rican	2	6
Columbian	3	9
Multiple Spanish, Hispanic or Latino	23	6.8
Hispanic, Latino Or Spanish origin	11	3.3
Supervisory		
Non-supervisory	198	58.7
Team Lead or Supervisory	78	23.1
Manager	19	5.6
Executives	5	1.4
No response	37	10.9

Appendix B: Survey Questions

Demographics

Q1 What department branch do you work under?

- Administration (1)
- Children medical services/ California children's services (2)
- Disease Control (3)
- Epidemiology and Program Evaluation/Vital Records (4)
- Fiscal (5)
- HIV/STD (6)
- Immunizations/PH Nursing/ Family Planning (7)
- Information Technology (8)
- Injury Prevention/Community Outreach (9)
- Laboratory (10)
- Maternal, Child and Adolescent Health (11)
- Medical Marijuana (12)
- Nutrition and Health Promotion (13)
- Procurement and Logistics (14)

Q2 What is your age?

Q3 Do you think of yourself as:

- A. Male (1)
- B. Female (2)
- C. Transgender man/trans man/female-to-male (FTM)
- D. Transgender woman/trans woman/male-to-female (MTF)
- E. Genderqueer/gender nonconforming neither exclusively male nor female
- F. Additional gender category (or other) – please specify
- G. I do not wish to answer this question

Q4 What is your Marital Status?

- A. Married
- B. Divorced
- C. Widowed
- D. Separated
- E. Never married
- F. Member of unmarried couple
- G. Decline to state

Q5 How many children or adults do you provide care for in your household? (Please provide a number)

Children _____

Adults _____

Q6 Are you of Mexican, Hispanic, Latino, or Spanish Origin?

- A. No, not of Hispanic, Latino, or Spanish Origin
- B. Yes, Mexican, Mexican American, Chicano
- C. Yes, Puerto Rican
- D. Yes, Colombian
- E. Yes, from multiple Spanish, Hispanic, or Latino groups
- F. Another Hispanic, Latino, or Spanish origin – please specify

Q7 What is your race?

- A. American Indian or Alaska Native
- B. Asian
- C. Black or African American
- D. Native Hawaiian or Pacific Islander
- E. White
- F. Two or more races
- G. Other _____
- H. Decline to state

Q8 What is the highest level of education you have completed?

- A. Some high school (1)
- B. High School (2)
- C. Associates Degree or Vocational Training (3)
- D. Some college (4)
- E. Bachelor's Degree (5)
- F. Master's Degree (6)
- G. Doctoral or Professional Degree (e.g., PhD, MD, DO, etc.) (7)

Q9 What is your supervisory status?

- A. Non-supervisor (1)
- B. Team lead or Supervisor (2)
- C. Manager (3)
- D. Executive (4)

Q10 How long have you worked in Public Health? (Please provide a number)

Years (1) _____

Months (2) _____

Q11 How long have you worked for redacted? (Please provide a number)

Years (1) _____

Months (2) _____

Q12 Pandemic Section

Q12 As of today, where is your current primary work location?

A. Work at a business location outside the home (1)

B. Working from home - telecommuting (less than 50% of the time) (2)

C. Working from home - telecommuting (50% of the time or more) (3)

D. Working from home only - telecommuting (100% of the time) (4)

Q13 Did you work the COVID-19 response (the DOC and/or EOC)?

A. Yes

B. No

Q14 If yes, how long did you participate in active response (years and months?)

Years _____

Months _____

Q15 Do you believe we could have been more prepared to respond to COVID?

A. Yes

B. No

Q16 Was there ever a moment that the increase of stress, fear or anxiety rooted from the COVID-19 surge made you think of leaving your job?

A. Yes

B. No

Q17 During the covid-19 response did you ever feel overwhelmed with your job duties?

A. Yes

B. No

Q18 During the covid-19 response did you feel you had support while working?

A. Yes, I had all the support I needed

B. Some of the support I needed

C. No, I did not have the support I needed

Q19 During the COVID-19 response I was concerned about:(select all that apply)

- Keeping my family safe (1)
- Food supply shortages (2)
- COVID-19 supply shortages (3)
- Getting sick with COVID-19 (4)

Q20 During the pandemic did you experience anything listed below: (select all that apply)

- Stress (1)
- Fear of exposure (2)
- Anxiety and depression (3)
- Work overload (4)
- Fatigue (5)
- Job duty drain your energy (6)
- Loneliness (7)

Q21 During the COVID –19 response control over my workload was:

- 1 – Poor
- 2 – Marginal
- 3 – Satisfactory
- 4 – Good
- 5 – Optimal

Q22 Did COVID-19 have a negative economic impact on you and your family?

- A. Yes
- B. No

Q28 For this section, read each statement and choose your level of agreement with the statements, thinking about your time BEFORE pandemic surges.

Q28 I was confident in my ability to do my work and serve the community

- 1 - Strongly Disagree
- 2 - Disagree
- 3 - Neither Agree nor Disagree
- 4 - Agree
- 5 - Strongly Agree

Q29 I knew my role in the department

- 1 - Strongly Disagree
- 2 - Disagree
- 3 - Neither Agree nor Disagree
- 4 - Agree
- 5 - Strongly Agree

Q30 I felt burned out in my job and my duties

- 1 - Strongly Disagree
- 2 - Disagree
- 3 - Neither Agree nor Disagree
- 4 - Agree
- 5 - Strongly Agree

Q31 I had a good relationship with my coworkers

- 1 - Strongly Disagree
- 2 - Disagree
- 3 - Neither Agree nor Disagree
- 4 - Agree
- 5 - Strongly Agree

Q32 I had a good relationship with my supervisor/manager

- 1 - Strongly Disagree
- 2 - Disagree
- 3 - Neither Agree nor Disagree
- 4 - Agree
- 5 - Strongly Agree

Q33 I felt satisfied in my work

- 1 - Strongly Disagree
- 2 - Disagree
- 3 - Neither Agree nor Disagree
- 4 - Agree
- 5 - Strongly Agree

Q34 My professional values were well aligned with my department leaders'

- 1 - Strongly Disagree
- 2 - Disagree
- 3 - Neither Agree nor Disagree
- 4 - Agree
- 5 - Strongly Agree

Q35 I was satisfied with my job

- 1 - Strongly Disagree
- 2 - Disagree
- 3 - Neither Agree nor Disagree
- 4 - Agree
- 5 - Strongly Agree

For this section, read each statement and choose your level of agreement with the statements, thinking about your time AFTER pandemic surges.

Q36 I am confident in my ability to do my work and serve the community

- 1 - Strongly Disagree
- 2 - Disagree
- 3 - Neither Agree nor Disagree
- 4 - Agree
- 5 - Strongly Agree

Q37 I know my role in the department

- 1 - Strongly Disagree
- 2 - Disagree
- 3 - Neither Agree nor Disagree
- 4 - Agree
- 5 - Strongly Agree

Q38 I feel burned out in my job and my duties

- 1 - Strongly Disagree
- 2 - Disagree
- 3 - Neither Agree nor Disagree
- 4 - Agree
- 5 - Strongly Agree

Q39 I have a good relationship with my coworkers

- 1 - Strongly Disagree
- 2 - Disagree
- 3 - Neither Agree nor Disagree
- 4 - Agree
- 5 - Strongly Agree

Q40 I have a good relationship with my supervisor/manager

- 1 - Strongly Disagree
- 2 - Disagree
- 3 - Neither Agree nor Disagree
- 4 - Agree
- 5 - Strongly Agree

Q41 I feel satisfied in my work

- 1 - Strongly Disagree
- 2 - Disagree
- 3 - Neither Agree nor Disagree
- 4 - Agree
- 5 - Strongly Agree

Q42 My professional values are well aligned with my department leaders'

- 1 - Strongly Disagree
- 2 - Disagree
- 3 - Neither Agree nor Disagree
- 4 - Agree
- 5 - Strongly Agree

Q43 I am satisfied with my job

- 1 - Strongly Disagree
- 2 - Disagree
- 3 - Neither Agree nor Disagree
- 4 - Agree
- 5 - Strongly Agree