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PANDEMIC-RELATED CAREGIVER BURDEN AMONG PUBLIC HEALTH WORKFORCE: A MIXED-METHOD ANALYSIS

Tony Lee

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PANDEMIC-RELATED CAREGIVER BURDEN AMONG PUBLIC HEALTH
WORKFORCE: A MIXED-METHOD ANALYSIS

A Thesis
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Public Health

by
Tony J. Lee
May 2022

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Approved by:

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ABSTRACT

Coronavirus Disease 2019 (COVID-19), caused by a highly contagious novel virus called SARS-CoV-2, has led to significant global morbidity and mortality. The healthcare workforce (HCW) is disproportionately impacted by the COVID-19 pandemic and is more likely to report depression, burnout, moral injury, compassion fatigue, and post-traumatic stress. However, research among the public health workforce (PHW) remains limited. Given the burden of COVID-19 itself, coupled with the work-related pressure of rapid pandemic management strategies, risk of exposure, potential fatigue, etc., understanding the mental health needs of PHW and related professionals is critical. As such, the purpose of this study is to assess the mental health outcomes of public health and the related workforce due to the ongoing COVID-19 pandemic. This study used a convergent parallel mixed-methods approach. The study used a mix of convenience sampling followed by snowball sampling. All data were collected virtually and kept anonymous. All statistical analyses were conducted using SPSS version 28, and all qualitative results were thematically analyzed for emergent themes. A total of 17 participants were studied. Of the study participants, nearly sixty-five percent (64.7%) reported that their personal lives were impacted due to providing COVID-19 related services. Approximately eighty-eight percent (88.2%) of the study participants felt tired or fatigued after their sleep at least 1-2 times a week to nearly every day. Additionally, about eighty-eight percent (88.2%) of the participants felt tired, fatigued, or not up to

par during their wake time at least 1-2 times a week to nearly every day. The overarching theme that emerged from this study is a paradigm shift in capacity building for public health emergency preparedness. Results highlight the importance of addressing the caregiver burden experienced by public health and related workforces. Future research on changes to the public health landscape is indicated.

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CHAPTER ONE

LITERATURE REVIEW

Overview

In December 2019, a highly contagious novel virus, SARS-CoV-2, was discovered in China and rapidly spread throughout the world (Centers for Disease Control and Prevention [CDC], 2021). The World Health Organization (WHO) termed Coronavirus Disease 2019 (COVID-19) and declared a pandemic state in March 2020 (Cucinotta & Vanelli, 2020). Despite the global attention to eradicating COVID-19, it continues to be a widespread problem worldwide. By April 2022, nearly 500 million confirmed cases were reported worldwide. COVID-19 also resulted in over 6 million deaths worldwide (World Health Organization, 2022). COVID-19 was first detected in the United States in January 2020 (CDC, 2020). Since, over 80 million confirmed cases have been reported and resulted in almost 1 million deaths in the U.S. as of April 2022 (CDC, 2022b). In 2020, COVID-19 was the third leading cause of death in the U.S. (Murphy et al., 2021).

The healthcare workforce (HCW) is at increased risk for COVID-19. About 18% of COVID-19 cases in the U.S. were identified as the HCW, and HCW is one of the top five occupations of COVID-19 related deaths in some states (Chen et al., 2021; Hawkins et al., 2021; Hughes, 2020; Oda et al., 2021; Self, 2020; Zhang, 2020). With high demand on the healthcare system and concerns about their own safety attributed to COVID-19 disease, HCW's psychological distress and mental health symptoms and the impact on the quality of care they provide

to patients will be discussed (Haas et al., 2000; Moitra et al., 2021; Raudenská et al., 2020; Sagherian et al., 2020; Vahey et al., 2004). Comparatively, the public health workforce (PHW) has increased demands in COVID-19 management, and there is about a 90% increase in the Case Investigators and Contact Tracers workforce (Taylor et al., 2021). Due to the increased stress of the pandemic, psychological distress and mental health symptoms among the PHW will also be discussed to understand the mental health needs of the HCW and the PHW.

Problem Statement

COVID-19 is a highly contagious infectious disease caused by a novel virus, SARS-CoV-2, that spreads through direct contact exposure. An infected individual can spread the small particles of the virus from their mouth or nose when they breathe, speak, cough, sneeze, or sing. For most who are infected with COVID-19, symptoms can be mild to moderate respiratory symptoms or even no symptoms at all. However, symptoms may be severe enough for some individuals to require medical intervention. Older people and individuals with chronic medical conditions have an elevated risk of developing serious illnesses from COVID-19 disease (CDC, 2021; World Health Organization, 2020).

While the initial outbreak of COVID-19 occurred in December 2019 in Wuhan, China (CDC, 2021), by March 2020, COVID-19 was declared a pandemic by the WHO (Cucinotta & Vanelli, 2020). Subsequently, by April 2022, approximately 500 million confirmed cases and over 6 million deaths worldwide had been attributed to COVID-19 (World Health Organization, 2022). In the U.S.,

retrospective case analysis confirmed the first COVID-19 case on January 21, 2020 (CDC, 2020). As of April 2022, over 80 million COVID-19 cases and nearly 1 million resulting deaths have been reported in the U.S. (CDC, 2022b). In 2020, COVID-19 was the third leading cause of death in the U.S. (Murphy et al., 2021). Undoubtedly, such a rising burden of disease and associated outcomes further demonstrated an increased demand for healthcare services and thus on the HCW.

The HCW consists of physicians, nurses, emergency medical personnel, laboratory technicians, dentist, pharmacist, rehabilitation therapists, and other frontline staff. Particularly professionals who work in patient care settings have an increased risk of COVID-19 infection due to direct exposure to and prolonged close contact with COVID-19 patients or handling infectious materials in settings where care is provided to patients (Zhang, 2020).

The Centers for Disease Control and Prevention (CDC) Morbidity and Mortality Report (MMWR) in 2020 reviewed the seroprevalence of COVID-19 among HCW in 13 medical centers in various states in the U.S. From April 3 to June 19, 2020, 194 of 3,248 HCW (6%) had positive test results for COVID-19 antibodies, suggesting a prior COVID-19 infection. Of those who had positive antibodies for COVID-19, 44% did not believe they previously had COVID-19, and 29% reported no symptoms related to COVID-19 (Self, 2020).

Oda et al. (2021) reviewed laboratory data of reverse transcription polymerase chain reaction (RT-PCR) tests at the U.S. Veterans Health

Administration (VHA) between March 1, 2020, and August 31, 2020. Results showed a 4.5% positivity rate among HCWs at VHA institutions. Of those who had positive PCR tests for COVID-19, 18 HCWs died of COVID-19 infection (Oda et al., 2021). CDC MMWR reviewed COVID-19 confirmed cases reported to the CDC between February 12, 2020, to July 16, 2020, of which 18% of the cases were identified as the HCW and other administrative or environmental service workers in a healthcare setting (Hughes, 2020).

According to the CDC's COVID Data Tracker, COVID-19 has resulted in over 1 million confirmed cases and over 4,000 deaths among the HCW in the U.S. as of April 2022 (CDC, 2022a). Hawkins et al. (2021) reviewed COVID-19 deaths among the working-age population in Massachusetts from March 1 to July 31, 2020. Analysis shows that HCW has the highest age-adjusted mortality rate compared to other occupations. Chen et al. (2021) reviewed death records of adults who died due to COVID-19 from March to October 2020 in California. The study showed individuals in the health or emergency work sector had the fifth highest death rate from COVID-19.

As they worry about the increased risk of COVID-19 infection, their safety as well as their families', the HCW is likely to experience anxiety symptoms and psychological distress. It has been found that those diagnosed with COVID-19 are more likely to have mental health illness, even if without prior history of mental health diagnosis. As with chronic stress resulting from ongoing exposure to severely ill patients and even witnessing patients die due to COVID-19

complications, the HCW is more likely to report depression, burnout, moral injury, compassion fatigue, and post-traumatic stress (Moitra et al., 2021; Sagherian et al., 2020).

Burnout among HCW has been a long-standing issue prior to the COVID-19 pandemic (Linzer et al., 2020; Shanafelt et al., 2015). Shah et al. (2021) analyzed secondary cross-sectional survey data collected from 2018 which they surveyed nurses. The results showed those who left their nursing position, 31.5% indicated burnout was the contributing factor to leaving their jobs. Additionally, 43.4% of the nurses were considering leaving their jobs due to burnout (Shah et al., 2021). Burnout adds to the existing problems in the nursing shortage within the HCW. Now, COVID-19 pandemic fatigue may exacerbate the problem.

Moreover, job satisfaction among the HCW has an impact on the quality of care. Patients who received care from the physicians and nurses who reported job satisfaction tend to report positive experiences, whereas burnout among the physicians and nurses can have a negative effect on patient satisfaction (Haas et al., 2000; Vahey et al., 2004).

While such a current empirical body of literature has predominantly focused on HCW, limited research, however, exists among the PHW. The PHW, such as epidemiologists, contact tracers, case investigators, and public health educators, is urgently tasked with the various risk management and mitigation strategies of COVID-19, such as contact tracing, testing, and vaccination. As with the HCW, PHW experiences mental health symptoms. Stone et al. (2021)

conducted a cross-sectional survey with 225 public health professionals from August 2020 to September 2020 to assess burnout and mental health during the COVID-19 pandemic. The study found about 66% reported burnout, and 46% had anxiety or depressive disorder.

Bryant-Genevier et al. (2021) reviewed mental health symptoms, including depression, anxiety, and Post-Traumatic Stress Disorder (PTSD), among the PHW during the COVID-19 pandemic in the U.S. through a comprehensive survey conducted with the PHW from March 29 to April 16, 2021. Survey participants consisted of 26,174 public health workers in various sectors who reported job tasks directly related to COVID-19. Survey results showed over half (53%) of the survey participants reported symptoms of at least one mental health condition within the two weeks prior to completing the survey. The prevalence of PTSD was the highest (36.8%) and is about 19% to 20% higher than the prevalence among the HCW and the general public. Other symptoms included depression (32.0%), anxiety (30.3%), and suicidal ideation (8.4%). Many worked over 40 hours a week during the pandemic and felt overwhelmed by their workload. Added to their work-related stress, some of the survey participants (23.4%) experienced being bullied, threatened, or harassed by the public due to their work. Interestingly, 12.6% of the survey participants reported having been diagnosed with COVID-19 themselves since March 2020 (Bryant-Genevier et al., 2021).

Case Investigation and Contact Tracing are major segments of public health tools, which became more evident during the COVID-19 pandemic. As with periodic outbreaks and the rise in cases, the demands of case investigators and contact tracers are growing to manage case investigation and contact tracing efforts efficiently and effectively. Between July and October 2020, it was estimated that Case Investigators increased by more than 50%, and Contact Tracers increased by about 90% (Taylor et al., 2021). Despite this rapid increase, there remains limited knowledge on the magnitude of pandemic fatigue such the PHW has experienced. Given the burden of COVID-19 itself, coupled with the work-related pressure of pandemic management strategies, understanding the current needs, especially the mental health outcome of PHW and related professionals, is critical.

Summary

COVID-19, caused by a highly contagious novel virus called SARS-CoV-2, has significantly impacted morbidity and mortality worldwide. Following the initial outbreak in China in December 2019, COVID-19 spread rapidly throughout the world in just a few months and was declared a pandemic by the World Health Organization on March 11, 2021 (CDC, 2021; Cucinotta & Vanelli, 2020). By April 2022, almost 500 million cases were reported, and over 6 million deaths worldwide were attributed to COVID-19 (World Health Organization, 2022). Since the first COVID-19 case in the U.S in January 2020, over 80 million cases and almost 1 million deaths have been reported in the U.S as of April 2020 (CDC,

2022b). COVID-19 was the third leading cause of death in the U.S. in 2020 (Murphy et al., 2021).

HCW is at increased risk of COVID-19 (Zhang, 2020). In the U.S., about 18% of the cases were identified as the HCW (Hughes, 2020), and it is estimated that 4.5% to 6% of the HCW had COVID-19 (Oda et al., 2021; Self, 2020). Additionally, the HCW had the fifth mortality rate among all occupations in California (Chen et al., 2021), and COVID-19 resulted in the highest mortality rate for the HCW in Massachusetts (Hawkins et al., 2021). Given that morbidity and mortality of COVID-19 are disproportionately impacted, the HCW is more likely to report depression, burnout, moral injury, compassion fatigue, and post-traumatic stress during the COVID-19 pandemic (Moitra et al., 2021; Sagherian et al., 2020). Such mental health outcomes can impact the quality of care to patients (Haas et al., 2000; Vahey et al., 2004).

PHW also experiences depression, anxiety, and PTSD symptoms. Over half of the PHW reported symptoms of at least one mental health condition throughout the pandemic, including depression, anxiety, and suicidal ideations. The prevalence of PTSD among PHW is reported to be 10% to 20% higher than the prevalence among the frontline HCW and the general public (Bryant-Genevier et al., 2021; Stone et al., 2021). Throughout the pandemic, the Case Investigators and Contact Tracers workforce increased by about 90% (Taylor et al., 2021), yet there remains limited knowledge on the magnitude of pandemic fatigue such PHW has experienced. Given the burden of COVID-19 itself,

coupled with the work-related pressure of management strategies, understanding the mental health outcome of the PHW and related professionals is critical.

Purpose of Study

The purpose of this study is to assess the mental health outcomes of the public health and the related workforce resulting from the COVID-19 pandemic. Such an assessment is critical to ensure targeted efforts to alleviate the caregiver burden of essential workforces.

Research Questions (RQs)

1. Where do the study participants report their workplace to be?
2. What is the most common job title among the study participants?
3. What is the percentage of study participants directly involved in providing any COVID-19 related services?
4. What is the study participants' target audience for the COVID-19-related services?
5. What is the percentage of study participants reporting personal life problems impacted due to providing COVID-19-related services?
6. What percent of the study participants felt they would benefit from a support group to discuss experiences in providing COVID-19-related services?
7. How often do the study participants feel tired or fatigued after their sleep?

8. How often do the participants feel tired, fatigued, or not up to par during their wake time?
9. What percent of the study participants felt nervous during the past 30 days?
10. What percent of the study participants felt hopeless during the past 30 days?
11. What percent of the study participants felt restless or fidgety during the past 30 days?
12. What percent of the study participants felt so depressed that nothing could cheer them up during the past 30 days?
13. What percent of the study participants felt that everything was an effort during the past 30 days?
14. What percent of the study participants felt worthless during the past 30 days?
15. What are the ways COVID-19 related services have impacted the personal lives of the study participants?
16. What barriers did the study participants feel when providing COVID-19-related services?
17. What resources did the study participants express needing at their workplace in order to better provide COVID-19-related services?
18. What questions, concerns, etc., did the study participants face from their target audience regarding COVID-19 compliance?

19. What are the common barriers study participants felt that the general population faced when being COVID-19 policy compliant?
20. What additional information did study participants share regarding needed COVID-19 services for healthcare professionals and/or the general population?

Significance to Public Health

Addressing the caregiver burden experienced by public health and the related workforces is imperative for the mental health outcome of the workforce. Some practical solutions to relieve the burden include increasing concrete resources, increasing human resources, setting parameters to ensure work-life balance, and implementing a policy to limit working hours with frequent breaks or time-off. Overall, a paradigm shift in capacity building in the workforce and investing in public health programs will help ensure the sustainability of the Public Health Emergency Preparedness programs, in turn, improving the quality of life for all.

CHAPTER TWO

METHODS

Study Design

The study utilized a convergent parallel mixed-methods approach, integrating elements of quantitative and qualitative methods (Ivankova et al., 2006) to assess the mental health outcomes associated with the COVID-19 pandemic among the public health and the related workforce.

Data Collection

This study employed a mix of convenience sampling followed by snowball sampling to collect data. Snowball sampling is a non-probability sampling method in which primary subjects, gathered by convenience sampling, will recruit other participants within their network, and then those will seek other participants within their network. This chain method will continue until a satisfactory sample size has been gathered. Snowball sampling is an efficient way to recruit study participants who may be difficult to access through traditional means (Naderifar et al., 2017).

An Anonymous survey was disseminated through Qualtrics, a cloud-based software, to five public health and the related professionals, including those who worked at the County public health departments and local hospitals/clinics. Next, each participant was asked to share the link with five additional colleagues who also work in public health or related fields.

All participants were adults over the age of 18 who are employed in public health and related work in the U.S. and able to read and write English. Minors under the age of 18 and those who do not work in public health and related fields were excluded. All participants received informed consent, and those agreeing to participate were given an online survey instrument to complete via Qualtrics. Participants were not provided with an incentive for completing the survey. No names of participants were collected during the process.

Measures

The primary variables of interest in this study were: fatigue and mental health outcome resulting from the COVID-19 pandemic.

This study's independent variable of interest is pandemic fatigue, which was defined using the following questions: *"Have providing COVID-19-related services impacted your personal life (including health, work, schedule, etc.)? Do you feel you can benefit from a support group to discuss your experiences in providing COVID-19-related services? How often do you feel tired or fatigued after your sleep? During your wake time, do you feel tired, fatigued, or not up to par?"*

The dependent variable of interest in this study is mental health outcomes, which was defined using Kessler Psychological Distress Scale 6 (K-6). The K6 Scale is a validated 6-item inventory, abbreviated version of the Kessler Psychological Distress Scale 10 assessing psychological distress (Kessler et al., 2002). The inventory provides a 5-point Likert scale, ranging from zero (none of

the time) to four (all of the time), which a total score of 13 or more is considered as having severe psychological distress (Kessler et al., 2003; Prochaska et al., 2012). The latent variable of the K6 Scale was measured following manifest variables: nervousness, hopelessness, restlessness, fidgety, depression, fatigue, and worthlessness. Study participants were asked the following question: *“During the past 30 days, how often have you felt nervous, restless or fidgety, so depressed that nothing could cheer you up, that everything was an effort, worthless?”*.

Manifest variables in this study include workplace setting; job title; target audience in providing services; involvement with providing COVID-19 related services; needs of target audience regarding COVID-19 compliance; perception of barriers that the general population may face when being COVID-19 policy-compliant; the impact of COVID-19 related service on personal life; resource needs at the workplace to provide better services; and feelings about a support group to discuss experiences in providing COVID-19-related services. The following questions were asked in the survey: *“What is your current place of work? What is your current job title? At your current place of work, are you directly involved in providing any COVID-19-related services (these can include answering phone calls, training others, direct patient care, etc.)? Who is your target audience for the COVID-19-related services?”*.

A qualitative assessment was conducted on the following open-ended exploratory questions: *“Have providing COVID-19 related services impacted your*

personal life? Yes, please provide some details. What barriers, if any, have you faced when providing COVID-19-related services? What type of questions, concerns, etc., if any, have you faced from your target audience regarding COVID-19 compliance (such as self-isolation, use of masks, etc.)? What resources could be made available at your workplace in order to better provide COVID-19-related services? What are common barriers you feel that the general population may face when being COVID-19 policy compliant (such as self-isolation, use of masks, etc.)? In your expertise and experience, what additional information would you like to share regarding needed services for COVID-19 (for healthcare professionals and/or general population)?”.

Data Analysis

To evaluate RQs 1 to 14, descriptive statistics was conducted. All quantitative data analyses were conducted in SPSS version 28. For RQs 2 and 3, thematic analysis was conducted. To evaluate RQs 15 to 20, a grounded theory analysis was conducted. All qualitative data analyses were performed using Microsoft Word software.

Ethics

This study was approved as an Exempt status by the Institutional Review Board of California State University, San Bernardino (Approval number: IRB-FY2020-329).

Given this study is considered human subject research, all components of the Belmont Report by the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research were followed. Belmont Report's three ethical principles, providing framework and guidelines for protecting human subject research, are 1) Respect for Persons, 2) Beneficence, and 3) Justice (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979).

To ensure participants' autonomy, all participants received an informed consent form, which outlines the purpose of the study, risks and benefits of participating in the study, confidentiality, and the right to refuse to participate in the study, ensuring autonomous decision. To proceed with the survey, participants must select "Yes, I agree to participate," and if "No, I do not want to participate" is selected, it ended the survey.

All efforts were made to ensure beneficence and reduce harm. For example, surveys were anonymous, and no names or identifying information of participants were collected during this process. The survey comprised a minimal number of questions (16, including two demographic questions) to ensure that participants were not harmed during extended work hours due to the pandemic. To ensure justice, the survey was open to all professionals aged 18 years or older and in public health and related field; thus, not limiting collection from only one group.

CHAPTER THREE

RESULTS

Study Population Characteristics

As shown in Table 1, 17 people participated in the study. Nearly 59% of the study participants were female, and approximately 35% were male. The majority of the study participants (64.7%) were in the 25 to 34 years of age group, and the remaining (35.3%) were in the 35 to 54 years of age group.

Table 1. Study Population Characteristics, n = 17

Demographics	Categories	Percentage
Sex	Female	58.8%
	Male	35.3%
	Other	5.9%
Age Group	25 – 34 years	64.7%
	35 – 54 years	35.3%

Quantitative Analysis Results

Table 2 illustrates the descriptive statistics results of the study participants' current place of work. Approximately 35% reported working at a County/City Public Health Department, while nearly 6% reported working at a County/City Public Health Department and a Hospital/Clinic. Additionally, almost 12% reported working only at a Hospital/Clinic. Approximately 35% of the study participants reported working at least at a non-profit organization focused on

health, among whom 29.4% reported only working at a non-profit organization focused on health. Nearly 12% of the study participants reported “Other,” all specified working in an academic setting.

Table 2. Workplace Settings of Study Participants

Place of work	Percentage
County/City Public Health Department	35.3%
County/City Public Health Department and Hospital/Clinic	5.9%
Hospital/Clinic	11.8%
Non-profit Organization Focused on Health	29.4%
Non-profit Organization Focused on Health and Other	5.9%
Other (Academia)	11.8%

Table 3 illustrates the thematic analysis result of the study participants' current job titles. Responses were in free-text format. Sixteen study participants typed in their answers, and one study participant did not respond. All the responses were coded by highlighting similar texts in the same colors. Themes were generated, and responses were grouped into five categories: 1) Public Health Workers, 2) Health Care Providers, 3) Program Administrators, 4) Academia, and 5) Public Health Program Support. Based on the five themes, statistical analysis was performed to determine the percentages of each job category. Approximately 29% of the study participants are Public Health Workers, and approximately 24% are Health Care Providers. Approximately 18% of the study population are Program Administrators and another 18% work in

Academia. One study participant (5.9%) works in Public Health Program Support, and one study participant did not respond to the question.

Table 3. Job Title of Study Participants

Job Title	Percentage
Public Health Worker	29.4%
Health Care Provider	23.5%
Program Administrator	17.6%
Academia	17.6%
Public Health Program Support	5.9%
No Response	5.9%

Figure 1 shows descriptive statistics results of direct involvement in providing any COVID-19 related services, including answering phone calls, training others, and direct patient care. Nearly 71% of the study participants were directly involved in providing any COVID-19 related services. Of those who were directly involved in providing any COVID-19 related services, responses describing all the services were analyzed. All the responses were coded by highlighting any matching or similar texts in the same colors. Themes were generated, and responses were grouped into two main categories: 1) Direct Service to the Community and 2) Program Planning. Results indicated that most (71%) provided services to the community.

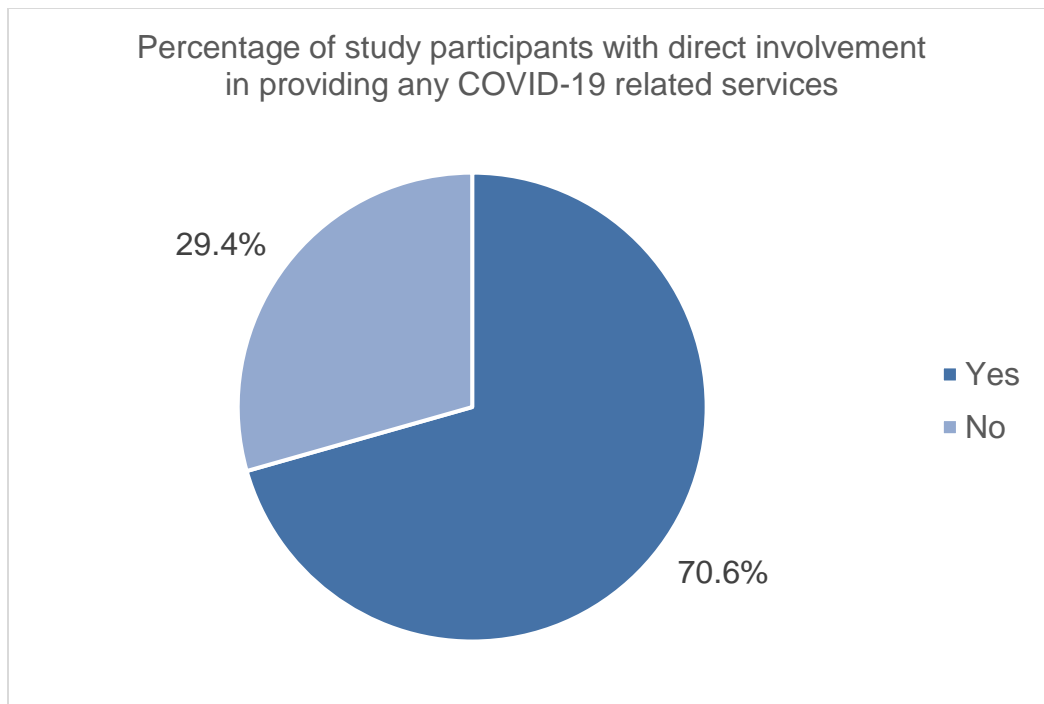


Figure 1. Direct Involvement in Providing Any COVID-19 Related Services.

Figure 2 illustrates descriptive statistics results for study participants' target audience. Among the study participants, approximately 47% reported working with patients with COVID-19, among other populations. Other populations include the elderly, children, pregnant women, patients with other chronic or infectious diseases, and the general population.

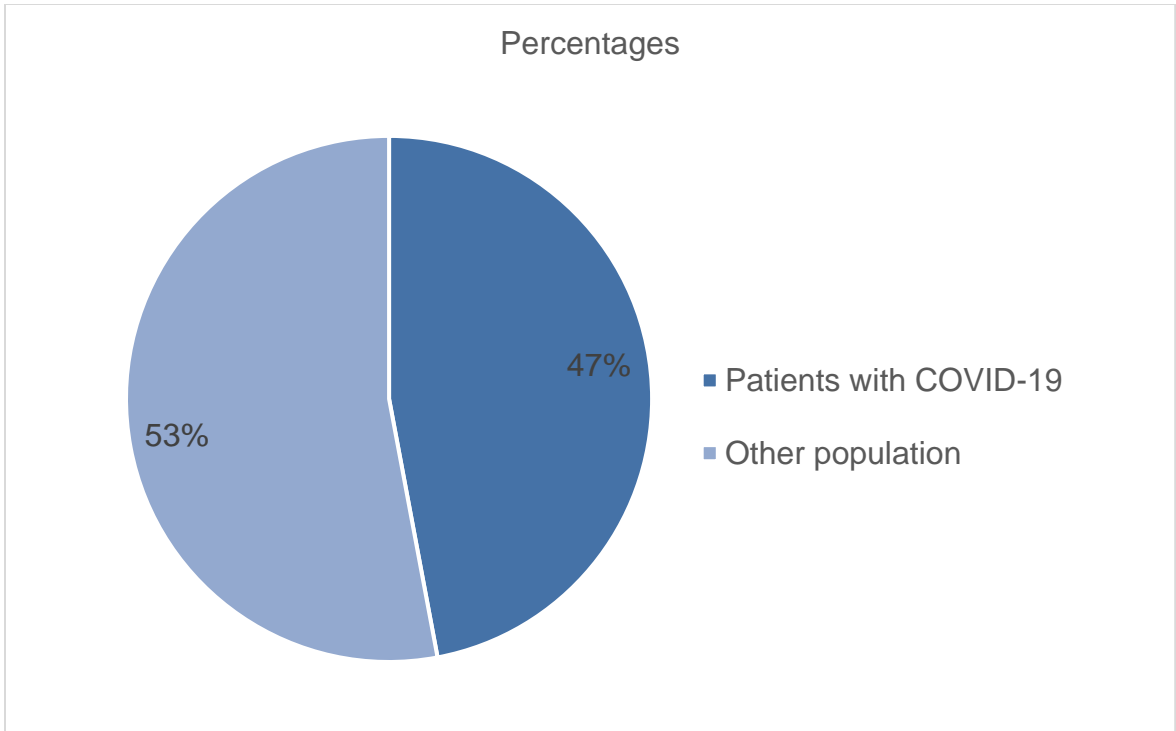


Figure 2. The Target Audience for the COVID-19 Services.

Figure 3 illustrates descriptive statistics results for study participants' reporting impact on their personal lives from providing COVID-19 related services. Nearly 65% of the study participants reported that their personal lives were impacted due to providing COVID-19 related services.

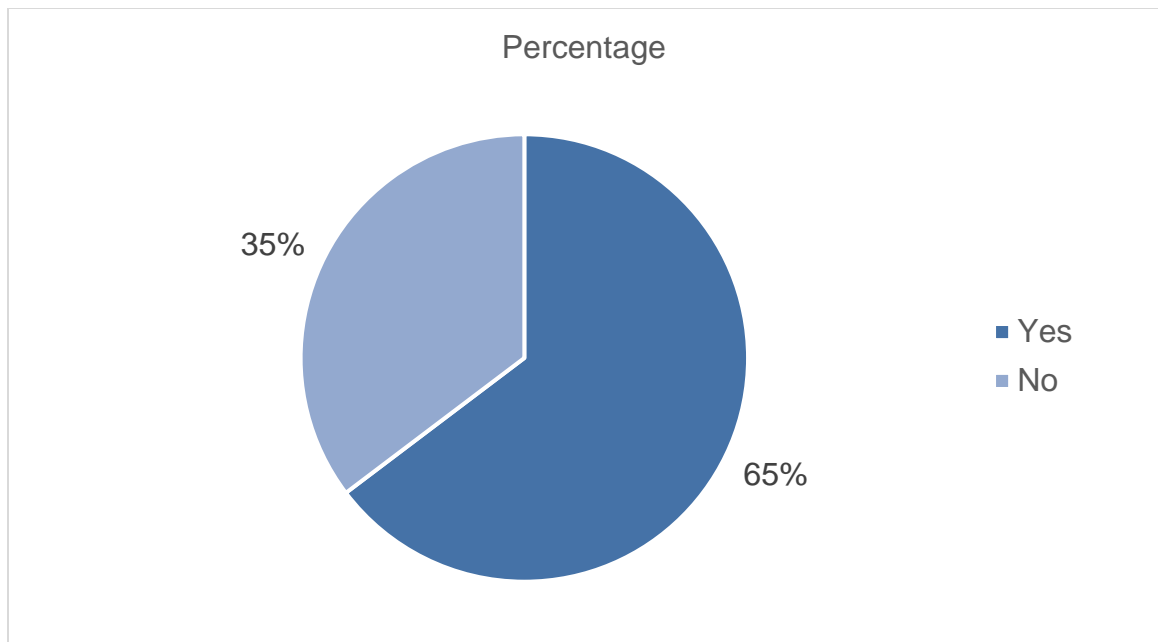


Figure 3. Impact on Personal Lives From Providing COVID-19 Related Services.

Table 4 shows descriptive statistics results for study participants' reporting of feeling they can benefit from a support group to discuss their experiences in providing COVID-19 related services. Nearly 71% reported "not sure" or did not respond to the question. There were same amount of study participants who reported "not sure" (35.3%) as participants who did not respond (35.3%). Nearly 24% of the study participants felt they would benefit from a support group to discuss their experiences in providing COVID-19-related services.

Table 4. Feel They Can Benefit From a Support Group

Response	Percentage
Yes (Definitely Yes, Probably Yes)	23.5%
Not Yes (Probably Not)	5.9%
Not Sure	35.3%
No Response	35.3%

Table 5 illustrates the descriptive statistics results of the study participants who reported feeling tired or fatigued after their sleep and feeling tired, fatigued, or not up to par during their wake time. Approximately 88% of the participants felt tired or fatigued after sleeping at least once a week to nearly every day. Approximately 88% of the study participants felt tired, fatigued, or not up to par during their wake time at least once a week to nearly every day.

Table 5. Feeling Tired or Fatigued

	Percentage	
	Tired or fatigued after sleep	Tired, fatigued, or not up to par during wake time
Nearly every day	29.4%	29.4%
3-4 times a week	29.4%	17.6%
1-2 times a week	29.4%	41.2%
Less than 2 times a month	11.8%	11.8%

Figure 4 illustrates the descriptive statistics results of how often the study participants felt nervous, hopeless, restless or fidgety, so depressed that nothing could cheer them up, that everything was an effort, and worthless, all within the past 30 days. Nearly 65% of the study participants felt nervous at least some of

the time to all of the time. Approximately 29% of the study participants felt hopeless at least some of the time to most of the time. Nearly 71% of the study participants felt restless or fidgety at least some of the time to all of the time. Approximately 29% of the study participants felt so depressed that nothing could cheer them up at least some of the time to all of the time. Approximately 47% of the study participants felt that everything was an effort at least some of the time to most of the time. Nearly 24% of the study participants felt worthless at least some of the time to all of the time.

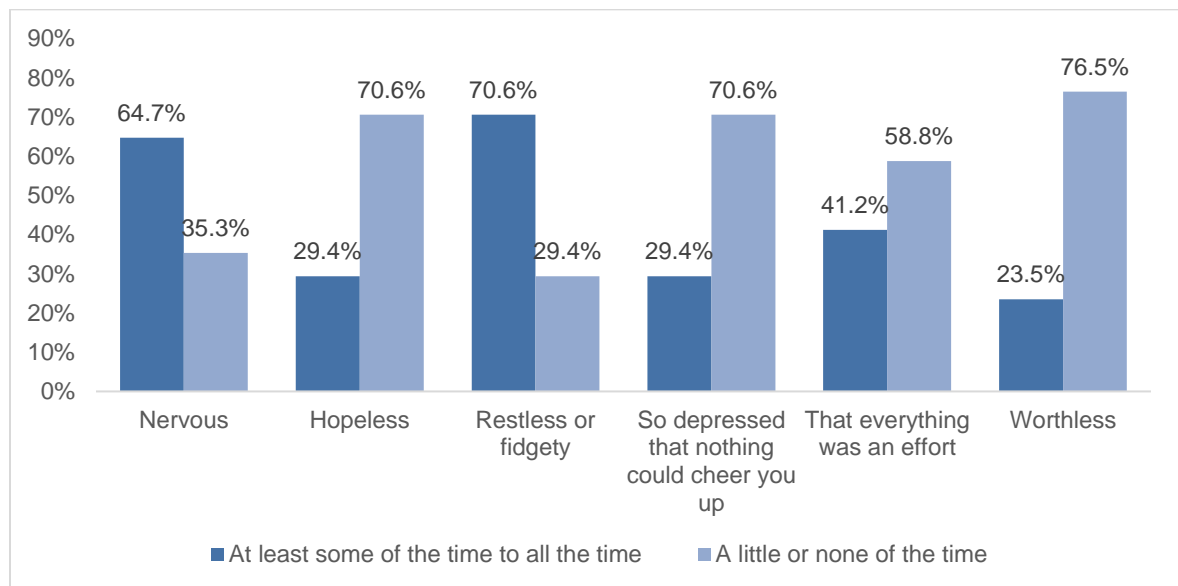


Figure 4. Psychological Distress Within Past 30 Days.

Figure 5 illustrates the results of cross-tabs analysis on the association between the workplace settings of the study participants and the impact on personal lives from providing COVID-19 related services. Compared to other

workplace settings, those working at the County/City Public Health Departments (85.7%) were more likely to report their personal lives were impacted by providing COVID-19 related services.

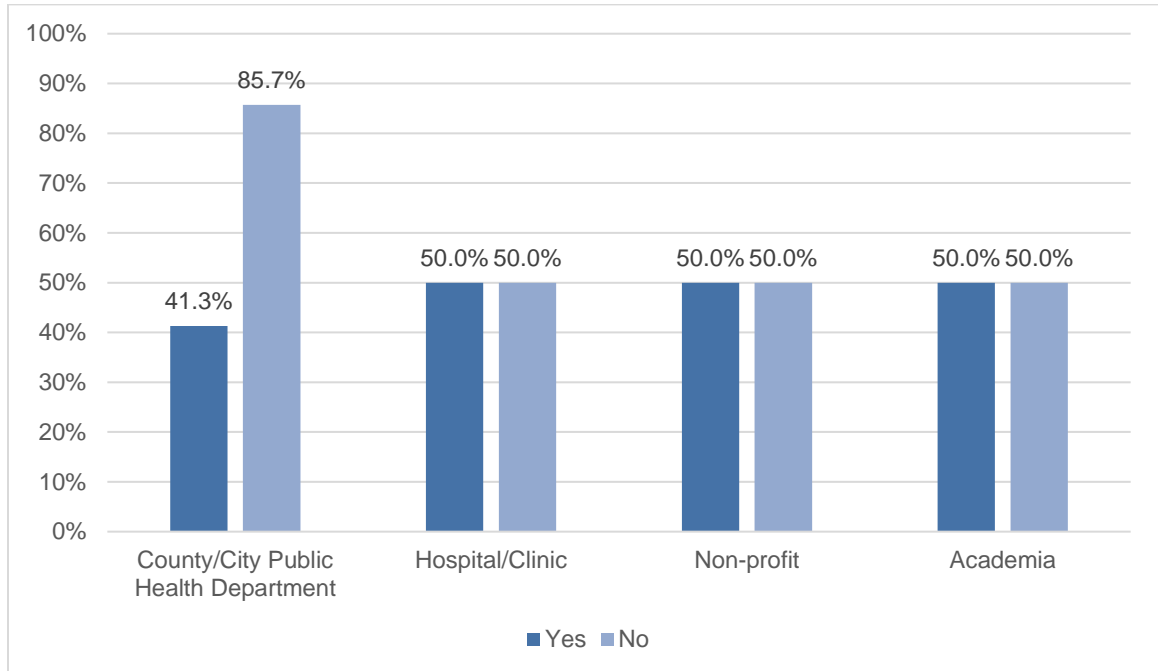


Figure 5. Workplaces Settings and Impact on Personal Lives From Providing COVID-19 Related Services.

Figure 6 illustrates the results of cross-tabs analysis on the association between the age group of study participants and psychological distress within the past 30 days. Compared to the age group 35 – 54 years, the 25 – 34 years age group is more likely to experience all symptoms of psychological distress some of the time to all of the time within the past 30 days.

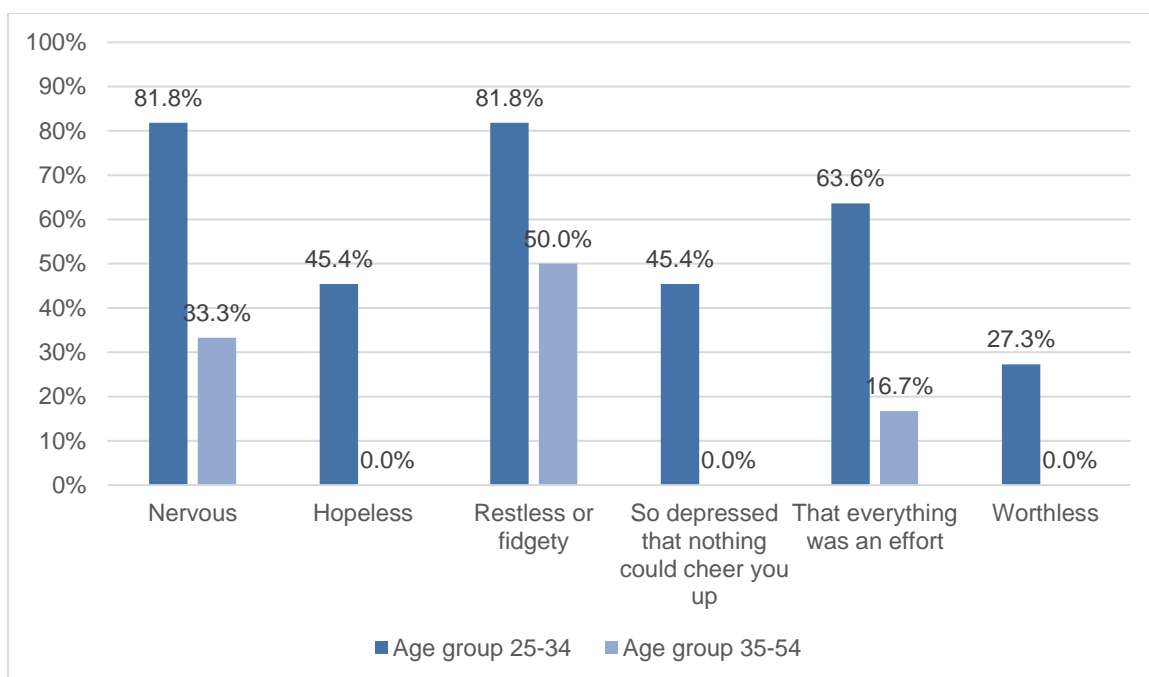


Figure 6. Age Group and Psychological Distress Symptoms

Qualitative Analysis Results

Several emergent sub-themes were identified upon open and axial coding, as discussed below.

For RQ 15, if survey participants indicated that providing COVID-19 related services impacted their personal lives (RQ 5), they were asked to describe it in detail. Responses included “concerns regarding my safety”, “Seems like there is no stopping point at all whatsoever. It feels that [it] has been non-stop”, “Having young children and a high risk child at home does weigh on my

personal life during this time. I can only take all the precautions and hope not to bring any possible infections home.”, “Work load has increased and average daily work time is approximately 12 hours with [occasional] weekend work”, and “Time needed to adjust to changes have been much greater than anticipated taking away from meeting family needs”. Identified sub-themes were impact on emotional or mental health; impact on home environment or family; and stress due to increased workload or schedule. Interestingly, one study participant stated, “But overall, great learning experience”.

For RQ 16, study participants were asked to describe any barriers they felt when providing COVID-19-related services. Responses included “increase in call [volume] and duties, so getting to everyone in a timely manner”, “Some staff in our program have been pulled for COVID-19 services, and unfortunately other services in our program, which is still running, may be delayed or not get done”, “Adequate PPEs, inadequate staff to do testing”, and “Also, we have had some significant local political push back”. Identified sub-themes were time, staffing, protective equipment, service limitation, training for staff, public perception, and policies.

For RQ 17, study participants were asked to describe resources that could be made available at their workplace to provide COVID-19 related services better. Responses included “I think there needs to be a plan put in place in case an outbreak happens and it is followed through with”, “I think there needs to be a plan put in place in case an outbreak happens and it is followed through with”,

“information handouts better explaining testing and results”, and “Adequate PPEs, more staff available for on demand testing”. Identified sub-themes were improvement with COVID intervention programs, improvement with community-based services, public education, protective equipment for staff, training for staff, and improvement with the workload by increasing staff.

For RQ 18, study participants were asked to describe what questions or concerns they faced from their target audience regarding COVID-19 compliance. Responses included “Misinformation and distrust among the community”, “Concerned about being around others, being separated from their babies in the hospital, and their support persons not allowed in the delivery room/hospital when they give birth”, “What are their rights and clear understanding of the expectations of the providers and clients”, “Patients not properly wearing masks, community members not adhering to county protocols, employers not implementing safety measures in their establishments, and questions regarding covid19 transmission and exposure”, “Use of face covering, use of gloves in public, accuracy of antibody testing, should they be tested for COVID”, and “Coming to the ER. People are afraid to come [to] the ER for legitimate reasons because they’re afraid of getting sick”. Identified sub-themes were misinformation about COVID-19, exposure questions or transmission risk concerns, protective equipment, concerns about their family at home, social distancing concerns, questions about COVID testing, questions about COVID treatment, concerns

around medical conditions, access to medical care, access to basic needs, and policies.

For RQ 19, study participants were asked to describe the common barriers they felt the general population faced being COVID-19 compliant. Responses included, “Barriers are the understanding the importance of wearing a mask in public. [The] county had a lot of backlash from the community regarding the usage of masks. Due to the shelter in place, many people are no longer compliant with self isolation”, “Not being in the best position to safely practice self-isolation or social distancing, others around them not complying with the recommendations”, “Mixed information, not understanding or believing the risks, other needs are more urgent”, “Inadequate or poor understanding of rationale behind face covering, inappropriate use of gloves in public, denial of scientific evidence regarding self-isolation and infection control”, and “Misinformation, lack of understanding of service providers”. Identified sub-themes were knowledge deficit or misinformation; access to protective equipment; access to medical care or COVID-19-related services; safety concerns in the home environment; increase in anxiety and stress; returning to usual daily function; and resistance to policies.

For RQ 20, study participants were asked to share additional information regarding needed COVID-19 services for healthcare professionals and/or the general population. Responses included “It would be great to have guidance and help for healthcare/public workers on how to handle people who do not comply

with COVID-19 policy”, “Keep politics out of the public health endeavors”, “I think people have real anxiety about the lack of social contact from masking and sheltering in place. Providing hotlines and information about ways to stay in contact and socially isolate”, “There is too much burden among staff and healthcare workers”, and “Having more age and culturally considerate patient and parent information”. Identified sub-themes were prevention education for the public, improvement with COVID-19 testing process, improvement with quality of medical care system, addressing health disparities, standardizing practice across programs and jurisdictions, mental health burden to public and healthcare workers, policy reinforcement, and separation of public health and political agenda.

Upon selective coding, the following emergent themes were identified: mental health concerns for the healthcare and public health workforces, limited resources for the workforces, limited access to healthcare and social services for the general population, and incongruent policies or inconsistent practices across jurisdictions and systems. One central theme is inadequate resources for healthcare and public health workforces to meet the demands of the increased needs of the general population.

CHAPTER FOUR

DISCUSSION

The purpose of this study is to assess the association between the COVID-19 pandemic and mental health outcomes among public health and the related workforce.

The study results show almost all participants experienced a negative impact on daytime wakefulness or alertness. Nine out of ten participants reported feeling tired or fatigued throughout the day and even after getting sufficient sleep. Daytime wakefulness and alertness are critical elements for job performance and productivity. Public health and related workforces have a professional role as caregivers to the general population as they provide vital health and human services to communities. To suitably manage public health emergency response and provide services to the general population, it is essential to ensure the public health and the related workforces have the maximum occupational performance capacity. In addition, fatigue may lead to various physical and psychological health consequences as the body and cognition functions are decompensated due to inadequate rest (Lock et al., 2018). If the public health and the related workforces are physically or psychologically not well to be a caregiver role to the general population, the quality of services they provide to the general public is impacted (Vahey et al., 2004). Self-care must be a priority to be an effective caregiver. Workplaces in the public health and related workforces should

encourage frequent breaks and personal time-off and implement a policy to limit working hours to a reasonable standard.

The study results also show the majority of the participants reported that their personal lives were impacted due to providing COVID-19 related services. One aspect of personal life is safety. Those working on the frontline are at increased risk of COVID-19 exposure; thus, personal protective equipment (PPE) is vital to minimize transmission risks for themselves and their family at home. However, given that a common theme study participants indicated was a limited supply of PPE, the stress associated with compromised safety from exposure could further negatively impact one's personal life. Workplaces should consider providing adequate occupational safety measures such as PPEs to staff to reduce the transmission risks, which may help with impacted personal life.

Also, personal life may include a plethora of factors such as home, family, friends, and any social-leisure activities outside of the workplace and overall quality of life. As part of a COVID-19 mitigation strategy, many industries, including public health and related workforces, implemented remote work options for social distancing measures. While working remotely from home reduces transmission risks, it creates challenges for staff to set boundaries between work and home. Staff is likely to work longer hours than they usually would in an office setting as they are connected 24/7. Hence, it decreases the time spent with family, friends, or any social-leisure activities to maintain a good quality of life. Kalliath & Brough (2008) proposed a definition of work-life balance as the

“individual perception that work and nonwork activities are compatible and promote growth in accordance with an individuals’ current life priorities” (p.326). One potential public health intervention to promote work-life balance would be to build remote work uniquely designed for public health professions and set parameters.

Furthermore, work-life balance is associated with workplace productivity (Bloom & Van Reenen, 2006) and patient safety culture in the health care industry (Lu et al., 2022). Comparatively, poor work-life balance may lead to job dissatisfaction, occupational burnout, and high turnover (Shah et al., 2021; Vahey et al., 2004), a concern for public health and related workforces. Stone et al. (2021) found that 66.2% of the public health workforce reported burnout symptoms during the COVID-19 pandemic, and there is a threat to the longevity of the public health workforce. To preserve public health and related workforces, workplaces should focus on human resources by increasing the number of employees. Implementing policies to promote work-life balance, such as training on self-care and fostering a wellness culture, are other ways to develop a healthy work-life balance. The same health promotion and prevention messages to the general population from the public health workforce should be applied to the workforce itself.

Finally, the qualitative analysis showed that the overarching theme that emerged from this study is a paradigm shift in capacity building for public health emergency response. Sub-themes identified were mental health burden to the

workforce: stress to home, family, and friends; staffing and workload resources; training; service limitation; public education; standardization of practice across programs; and improvement in policy reinforcement. The central themes identified were: 1) burden to the workforce, 2) micro-level resources, 3) macro-level resources, and 4) social capital.

First, two sub-themes, mental health burden to the workforce, and stress to home, family, and friends, are attributed to how their personal lives are impacted due to their occupational hazards. Second, staffing, workload resources, and training are all attributed to micro-level resources within the organization for the workforce to be competent and adequately staffed to deliver the services to the general population. Macro-level resources are larger scale than micro-level resources involving programs such as standardization of practices across programs and policy reinforcements, which will affect the micro-level resources within the organization. Finally, two sub-themes, service limitation and public education, are part of social capital, which enables equity to maximize the quality of life (Putland et al., 2013).

Public health programs, already understaffed and underfunded, were faced with complicated challenges when called to respond to a public health emergency, such as the COVID-19 pandemic (Madad & Spencer, 2021). The study results highlight the importance of a paradigm shift to invest in public health programs and preserve the sustainability of public health and related workforces to sufficiently handle the increased demands during such emergencies. In turn,

the long-term gain from the investment can include the preservation of healthy workforces and maintaining the quality of life for all.

Strengths and Limitations

The strength of this study is the mixed methodology. As the survey instrument contains open-ended questions and participants may respond anonymously, responses provide contextual data to explore further and establish a central theme. Additionally, quantitative measures are integrated to supplement the findings.

Despite these strengths, there are several limitations. Given the cross-sectional study method of analyzing data at a single point in time, it is difficult to draw causal conclusions, and results cannot be generalized. Another limitation is there is a risk of self-selection bias, given no incentive is offered for study participation. Additionally, there is a risk of social desirability bias, particularly for sensitive questions. Participants may choose to under-report or not report negative views, emotions, or behaviors that may be perceived as undesirable attributes. Both self-selection bias and social desirability bias may influence the validity of the study.

Conclusion

COVID-19 pandemic has led to overwhelming morbidity and mortality globally and continues to be a problem worldwide. With the increased risk of COVID-19, the HCW is likely to experience significant mental health symptoms as a result. However, research among the PHW remains limited. This study aims

to assess the mental health outcomes of public health and the related workforce due to the ongoing COVID-19 pandemic. The study used a convergent parallel mixed-methods approach and convenience sampling followed by snowball sampling. All qualitative results were thematically analyzed. With 17 survey participants, results indicate the majority of the participants reported their personal lives were impacted and reported profound fatigue attributed to their work. One central theme identified is a paradigm shift in capacity building for public health emergency preparedness. Results emphasize the importance of addressing the caregiver fatigue experienced by public health and related workforces.

APPENDIX A
IRB APPROVAL

IRB-FY2020-329 - Modification: IRB Approval Protocol Change/Modification Letter

do-not-reply@cayuse.com <do-not-reply@cayuse.com>

Thu 11/4/2021 1:45 PM

To: Benjamin Becerra <Benjamin.Becerra@csusb.edu>; Monideepa Becerra <mbecerra@csusb.edu>



November 4, 2021

CSUSB INSTITUTIONAL REVIEW BOARD

Protocol Change/Modification

IRB-FY2020-329

Status: Exempt

Prof. Monideepa Becerra and Prof. Benjamin Becerra
CBPA - Info & Decision Sci, CNS - Health Science
California State University, San Bernardino
5500 University Parkway
San Bernardino, California 92407

Dear Prof. Becerra and Prof. Becerra:

The protocol change/modification to your application to use human subjects, titled "Caregiver burden of COVID-19 healthcare providers" has been reviewed and approved by the Chair of the Institutional Review Board (IRB). A change in your informed consent requires resubmission of your protocol as amended. Please ensure your CITI Human Subjects Training is kept up-to-date and current throughout the study. A lapse in your approval may result in your not being able to use the data collected during the lapse in your approval.

This approval notice does not replace any departmental or additional campus approvals which may be required including access to CSUSB campus facilities and affiliate campuses. Investigators should consider the changing COVID-19 circumstances based on current CDC, California Department of Public Health, and campus guidance and submit appropriate protocol modifications to the IRB as needed. CSUSB campus and affiliate health screenings should be completed for all campus human research related activities. Human research activities conducted at off-campus sites should follow CDC, California Department of Public Health, and local guidance. See CSUSB's [COVID-19 Prevention Plan](#) for more information regarding campus requirements.

You are required to notify the IRB of the following by submitting the appropriate form (modification, unanticipated/adverse event, renewal, study closure) through the online Cayuse IRB Submission System.

- 1. If you need to make any changes/modifications to your protocol submit a modification form as the IRB must review all changes before implementing them in your study to ensure the degree of risk has not changed.**
- 2. If any unanticipated adverse events are experienced by subjects during your research study or project.**
- 3. If your study has not been completed submit a renewal to the IRB.**
- 4. If you are no longer conducting the study or project submit a study closure.**

You are required to keep copies of the informed consent forms and data for at least three years.

If you have any questions regarding the IRB decision, please contact Michael Gillespie, Research Compliance Officer. Mr. Gillespie can be reached by phone at (909) 537-7588, by fax at (909) 537-7028, or by email at mgillesp@csusb.edu. Please include your application approval number IRB-FY2020-329 in all correspondence.

Best of luck with your research.

Sincerely,

Nicole Dabbs

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