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PII: S2352-5525(22)00109-8

DOI: <https://doi.org/doi:10.1016/j.jemep.2022.100860>

Reference: JEMEP 100860

To appear in: *Ethics, Medicine and Public Health*

Received Date: 1 August 2022

Accepted Date: 21 November 2022

Please cite this article as: Ross MM, Sagrera C, McPherson P, Gurgel Smith D, Alfrad Nobel Bhuiyan M, Tinsley MS, Goeders NE, Patterson JC, Murnane KS, Use of virtual meeting and survey technology to assess Covid-19 related mental wellbeing of healthcare workers, *Ethics, Medicine and Public Health* (2022), doi: <https://doi.org/10.1016/j.jemep.2022.100860>

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Use of virtual meeting and survey technology to assess Covid-19 related mental wellbeing of healthcare workers

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Keywords: COVID-19¹, mental health², mental wellbeing³, Louisiana⁴, healthcare workers⁵.

Abstract

Background and aims. - Healthcare workers (HCW) throughout the world have been exposed to economic and existential stress during the Covid-19 pandemic. The American Medical Association (AMA) has documented that increased healthcare burden correlates with increased HCW stress, burnout, and psychological burden. However, limits on personnel, time, and in person interactions make it challenging to assess mental health outcomes during a pandemic. This pilot test case study used virtual technology to efficiently assess these outcomes.

Setting. - Data were collected based on voluntary participation in the Coping with Covid-19 for Caregiver's survey created by AMA. The survey was sent out to approximately 300 participants who included local physicians, medical residents, medical students, and allied health professionals and students who attended a virtual Mental Health Summit.

Methods. - The survey was developed by the AMA, and it included questions about demographics, overall stress, fear of infection and transmission of the virus, perceived anxiety or depression due to Covid, work overload, childcare issues, and sense of meaning and purpose. The AMA allows for up to five additional questions to be added to their survey, therefore five questions regarding support service utilization, perseverance, and resilience during Covid-19, and two items to further understand students' areas of medical interest. The survey was administered using an online platform through the AMA. The data were analyzed using descriptive statistics.

Results. - There were 81 survey respondents. Based on the results of the survey, "high stress" was found in 52 (64%) participants. 66 (81%) were afraid (moderately or to a great extent) of exposure or transmission, 61 (75%) described high levels of anxiety or depression, and 67 (84%) noted work overload. Despite this increase in stress, most respondents (77%) said they were not likely to reduce their devoted hours in clinical care or research in the next 12 months, and 81% answered that they would not leave their practice or research within two years.

Conclusion. - Covid-19 has negatively affected the wellbeing of HCW. This is a similar trend seen during other times of healthcare strain. Mental health support, work modulation, and various provisions should be explored as means to reduce Covid-related negative impacts. The use of online an online summit and online data collection methods were appropriate for collecting data on the impact of Covid on mental health. This pilot study supports the larger scale implementation of this technology for health informatics research.

Keywords: Covid-19; Healthcare workers; Louisiana; Mental health; Mental wellbeing

1 Introduction

With the rise of the coronavirus disease, healthcare systems felt the global strain of being pushed past their limits, including facing resource and capacity insufficiencies [1]. This strain may be felt disproportionately by healthcare workers (HCW), who were reported by one survey to be more likely than others to worry about being infected by the virus, exposing their loved ones to the virus, and knowing someone who has died from Covid-19 [2]. HCW appear to be further affected by their integral role in combatting the spread of this deadly virus. This has been shown through the exploration of HCW psychological responses to previous epidemics of infectious disease. Those working directly with patients have been shown to experience increased rates of depression, anxiety, insomnia, and distress [3–6]. Furthermore, Wang et. al (2021) found a significant association between Covid-19 related physical symptoms, such as sore throat, headache, and cough, even in the absence of positively documented infection, and increased anxiety and depression [7,8]. This proves especially relevant in HCW, who are routinely subjected to positive Covid-19 cases, long stretches of physical inactivity and chronic sleep deprivation in the presence of long work hours, all of which may impact physical health and contribute to nonspecific symptoms similar to those experienced during Covid-19 [9]. HCW have been documented to be psychologically affected by Covid-19 regardless of direct exposure to high-risk work areas or infected patients; this has negatively impacted the psychological, physical, and social aspects of HCW's daily functioning [10–12]. Studies showed that conditions such as depression, insomnia, anxiety, burnout, and general distress increased in those directly working with those affected by Covid-19 [3–5].

This psychological strain can have devastating impacts and be borne disproportionately by different groups. Studies have reported an increased death rate by suicide in frontline HCW, especially with female nurses [3,13,14]. One study found increased risk for negative wellbeing via Covid-19 is most strongly associated with factors of being female, being < 45 years old, and having higher education [12]. Further, Etheridge and Spantig 2020 found the effect of Covid-19 on subjective wellbeing to impact women twice as much as men [15]. Several other studies have documented those who identify as women to report disproportionately lowered wellbeing during Covid-19 [15,16]. However, causative factors for these findings have not been strongly documented [17]. Covid-19's toll on HCW wellbeing is exacerbated by amplifying preexisting mental illness and increasing workplace stressors [14].

Decreased wellbeing due to Covid-19 is thought to be caused by an amalgam of all aforementioned stressors. The psychological burden of these factors may be explained by the “allostatic load” theory [18]. This theory explains how high acuity of significant and stressful events triggers an acute adaptive physiological and psychological response designed to meet the anticipated demand of the task. This acute stress response involves changes in neurotransmitters, neuropeptides, and the body’s organ systems to prime the brain and body for an acutely stressful event [19]. If this response is not aborted after the trigger, or if the trigger is sustained past an acute timeline, deleterious psychological and physiological effects may result, including abdominal fat deposition, muscle wasting, bone mineral loss, hypertension, insulin resistance, increased risk for cardiovascular disease, and hippocampal dendritic remodeling. These detriments may predispose the individual to stress-related conditions such as depression and post-traumatic stress disorder [11,20,21]. This risk is especially pertinent in HCW, whose immune systems may be further affected by chronically inadequate sleep and increased workplace stress with rising demands from the pandemic [22].

Between January 2020 to May 2021, the World Health Organization reported 115,493 deaths among HCW due to Covid-19 around the globe [23]. The vulnerability to tragic outcomes in HCW is related to the aforementioned factors, compounded by individual risks of exposure through direct patient care, and inadequate supply or reuse of personal protective equipment (PPE), the latter of which has been documented as a significant causative factor for the increased susceptibility of Covid-19 among HCWs [17,24,25]. Long working hours during the Covid-19 pandemic were also associated with increased infection rates among HCW [9]. Studies have shown that those factors can significantly impact the physical and mental health of this group [26–30].

Moreover, HCW in different contexts and cultures may have different outcomes, and different groups may exhibit differential vulnerability in different cultures. In the United States, it has been reported that African-Americans are more like to serve as HCW that are exposed to infection, experience difficulties with providing for their families during Covid-19, or to directly know someone who has died from Covid-19 [24,25,31,32]. In Asia-Pacific countries, nurses were less psychologically affected compared to other HCWs [26,27]. The prevalence of anxiety and depression varied among HCWs from India, Indonesia, Malaysia, Singapore and Vietnam [26]. It is important to provide support to all HCWs and to take account of these differential impacts and vulnerabilities.

When analyzing protective factors identified in different countries, it was found that the population in China was more likely than other countries to wear a face mask, even in the absence of Covid-19 related symptoms [33]. Chinese respondents who wore face coverings were associated with lower levels of stress in comparison with the Americans, who showed higher levels of stress while wearing face coverings [33,34]. Compared with China, Spain utilized less face coverings and showed higher rates of adverse mental health experiences [35]. The Polish population and the Iranian population were both less likely than the Chinese population to wear face coverings [36,37]. In Malaysia, a protective factor that was identified to reduce stress and anxiety among the population was owning a communication tool such as a television, radio, smartphone, or laptop [38]. In the Vietnamese population, people began to stop sharing utensils, a culturally appropriate activity, due to fear of contracting Covid-19 [39]. It is imperative that global protective factors be identified in order to decrease mental and physical adverse health outcomes amongst the population.

Psychological resilience has been documented as one of the most protective factors for perceived wellbeing during Covid-19 [40,41]. Resilience is defined as the ability to maintain normal functioning in the face of stressful disruptions by anticipating and preparing for the stressor [42,43]. In 2020, Heath et al. found resilience in the context of significant stressors to depend on several factors, namely confidence in professional support and training, coping style, ability to respond adaptively during stressors, and existing interpersonal problems or mental health conditions. Specifically, improving coping mechanisms has been shown to correlate to resilience [44]. Yan et al. (2020) found coping mechanisms of frequent contact with social support systems and colleagues to be protective against stress [12]. Data specific to HCW reveal similar findings: resilience and social support protect against depression, psychological distress, and thoughts of death [45].

The psychological distress and widespread impact on wellbeing caused by Covid-19 are predicted to continue during future healthcare crises. Understanding group-specific and region-specific barriers to and factors affecting the wellbeing of HCW is imperative to aid those currently suffering from the fallout of the pandemic and mitigate future burdens in HCW. Studying these factors in time- and resource-constrained settings can be challenging, but these challenges can potentially be addressed using virtual technology. The current study used virtual presentation and assessment technology in our local setting.

2 Methodology

The American Medical Association (AMA) created a survey titled “Coping with Covid Survey” to assess healthcare workers’ and students’ wellbeing during Covid-19. This 20-question survey includes questions regarding demographics, medical specialty/interest, and experiences of Covid-19 as a healthcare worker. Specific items addressed the perception of stress experienced that day, worry of transmitting Covid-19 to loved ones, concern about compromised integrity with Covid-19 decision-making, childcare concerns, and thoughts about general depression, suicidality, and burnout. Items were scored 1-4 by a Likert scale, with 1 considered “not at all,” 2 and 3 considered “high,” and 4 as “very high.” The AMA allows for up to five additional questions to be added to their survey, so researchers at LSU Health Shreveport included five questions regarding support service utilization, perseverance, and resilience during Covid-19 (free response), and two items to further understand students’ areas of medical interest.

The Coping with Covid survey included demographic items such as gender, race/ethnicity, years in practice, outpatient vs. inpatient, and specialty. In addition, the survey contained 10 core questions about overall stress, fear of infection and transmission of the virus, perceived anxiety, or depression due to Covid, work overload, childcare issues, sense of meaning and purpose, feeling valued by one’s organization, and the degree of benefit from healthy snacks in combination with mental health and inbox management support (available online at <http://mcpiqjournal.org>). The items typically ran from a choice of 1 (not at all/minimal) to 4 (very high/to a great extent); 3 and 4 were considered high (e.g., high stress).

The survey was sent out to approximately 300 participants at the Louisiana Addiction Research Center Mental Health Summit in Shreveport, Louisiana, on April 22, 2021. Participants included local physicians, LSU Health Shreveport (LSUHS) medical residents and students, LSUHS allied health professionals and students, and LSUHS physician alumni. There were 81 respondents.

The data collected were analyzed to determine overall wellness outcomes related to SARS-CoV-2 in order to highlight the specific needs of HCW, to encourage the need for social policy changes and for educational opportunities to help alleviate SARS-CoV-2 related negative wellness outcomes amongst HCW.

Basic descriptive statistics were used to portray stress levels and predictors for Covid-related stress among health care workers and the differences seen based on race/ethnicity, gender, years of practice, and practice location (outpatient vs. inpatient). The high [3] and very high [4] categories on the survey's Likert scales were combined to describe stress levels, fear due to exposure/transmission, anxiety, depression, and workload. Respondents who selected "Prefer not to answer" (n = 1) or "Nonbinary/third gender" (n = 1) were removed from this analysis.

3 Results

Of the 81 respondents, 80% were female, 64% identified as Americans of European descent, 73% were practicing in the outpatient setting, and 58% were in practice for more than 11 years. We found "high stress" in 52 (64%) participants, based on their response to a single question asking them to identify their current level of stress. High stress was defined as anyone who responded, "very high," "high," or "modest." There were 66 (81%) HCW who feared (moderately or to a great extent) of exposure or transmission, 61 (75%) who described high levels of anxiety or depression, and 67 (84%) who noted work overload. Meaning and purpose were increased (moderately or to a great extent) in 68 (84%), and 67 (83%) felt valued by their organization (moderately or to a great extent) (Table I).

Stress levels were higher in women (28%), in those working in the inpatient setting (26%), and those early in their career (31%). Twenty-seven percent of Americans of European descent endorsed stress as compared to 20% of Americans of non-European descent. Further, high anxiety and depression were reported in more women than men (23% vs. 7% respectively) and more Americans of European descent than Americans of non-European descent (21% vs. 17%, respectively). Regarding those who reported work overload, 48% were female, 53% practiced in an inpatient setting, and 52% had practiced for 1 to 10 years. Forty-eight percent of Americans of European descent endorsed work overload as compared to 40% of Americans of non-European descent. Burnout levels were highest among women (28%), those in the inpatient practice setting (42%), and those in their early career (34%). Twenty-nine percent of Americans of European descent endorsed burnout as compared to 20% of Americans of non-European descent (Table II).

The results showed that most respondents (77%) said they are not likely to reduce their devoted hours in clinical care or research in the next 12 months, and 81% answered that they would not leave their practice or research within two years. When asked about barriers regarding support service utilization, 25% prefer to seek help from alternative sources (such as family members or friends), 22% prefer to

handle their problems by themselves, 16% are concerned about confidentiality, and 15% said that mental health services are not accessible or convenient (Table III).

Regarding perseverance and resilience during Covid-19, most respondents said that their driving forces were the feeling of helping patients (30%); supporting their coworkers, friends, and family (26%); and the need to support their family (Table IV).

4 Discussion

This study evaluated wellbeing in North Louisiana HCW during March of 2021 with the goal of understanding their unique needs to inform potential future policy changes. Results showed Covid-19 has taken a toll on HCW in this region, a result consistent with other literature [2,5,6,10].

Hamel et al. (2020) reported HCW were more likely than others to worry about exposing their loved ones to the virus. Our study echoed these findings, directly correlating to results observed in this study's population in North Louisiana, where 81% of North Louisiana respondents feared "exposing themselves, or their family to Covid-19" [2]. This fear is also consistent with data from the 2003 outbreak of SARS, a pandemic of similar magnitude and repercussions as Covid-19. The wellbeing of HCW during the SARS outbreak was studied from 2004 to 2005, with results indicating HCWs withstood significant emotional distress attributed to quarantine, concern for family members, fear of self-contagion, job stress, and intrapersonal isolation [11]. In our study concerning HCWs of North Louisiana during the times of Covid-19, HCW withstood high stress (64%), possessed significant fear of transmitting Covid-19 to loved ones (81%), endured heightened anxiety and depression (75%), and faced significant work overload (83%). Results from both SARS and Covid-19 outbreaks show HCW endure significant psychological distress during times of healthcare system strain. Stress was further stratified by Race/Ethnicity. Our investigation showed that 27% of Americans of European Descent indicated they were stressed, compared to 20% of Americans of Non-European Descent. Our data reinforce the existing need for HCW mental health support during times of similar healthcare strain [46].

Pieh et al. (2020) collected data monthly to assess the effects of Covid-19 on mental wellbeing amongst the general population [15]. The study showed females to be more susceptible to an overall decline in mental wellbeing than males [15]. Similar results were seen in the North Louisiana region. Compared

to men, women reported greater stress levels (28% vs 7%), a higher fear of exposure to Covid-19 (29% vs 21%), more anxiety and depression (23% vs 7%), a greater work overload (48% vs 29%), and higher rates of burnout (28% vs 7%). Similarly, women indicated less of a feeling of meaning and purpose (42% vs 57%) and felt less valued by their employer (48% vs 57%) than men. These data highlight a mental health disparity regarding Covid-19 according to sex. Healthcare systems need to acknowledge this disparity to find solutions for female HCW in order to bridge this gender gap.

The comparisons of stress and work-life factors between HCW in the inpatient vs outpatient setting indicated that HCWs in the inpatient setting experienced greater negative effects to wellbeing when compared to their outpatient counterparts. Inpatient HCW reported a 42% burnout rate, compared to a 20% burnout rate in the outpatient setting. Inpatient HCW also indicated slightly less of a sense of meaning and purpose (42% vs 43%) and felt less valued by their employer (32% vs 51%) than outpatient HCW. A potential cause could be workload, with inpatient workers reporting a greater work overload (53%) than outpatient workers (43%). This highlights the need for adequate mental, physical, and emotional support for all HCW, with increased focus on inpatient workers. Appropriate policy implementation can mitigate similar HCW stress during future times of healthcare strain.

When asked to identify the driving force behind their perseverance during the Covid-19 pandemic, HCWs' top three answers were: 1 – the feeling of being able to help patients (30%), 2 – the support from coworkers, friends, and family (26%), and 3 – the need to support their family (25%). When asked what could improve their ability to sustain wellbeing through the crisis, 48% indicated the availability of healthy food at all hours, 42% indicated staff or colleague support, and 40% indicated personal access to mental health care. As previously stated, 48% of HCW did not feel valued by their employer, which can lead to feelings of decreased meaning and purpose. To help motivate, encourage, and sustain employees during times of healthcare strain, healthcare systems must show their employees that they value not only their physical health but also their mental health. These data may be used to inform future resource allocations for HCW.

Based on our findings, it can be concluded that HCW desire mental health support from friends, family, or by dealing with stress on their own. With this knowledge, healthcare systems could provide alternative methods for their employees to de-stress, as well as provide and emphasize the demand for essentials of daily living. These basic needs could be met by creating an area within the hospital that provides employees with free meals while at work, snacks, and a place to sleep and shower. Hospitals

could also provide team-building exercises as well as reduced/free subscriptions to stress relieving activities, such as yoga, to support their employee's mental health. Additionally, for those HCW who do desire mental health or spiritual services, providing various options for employees, both onsite and via telehealth, could accommodate more employees needs and desires [47].

While the pandemic has created wellbeing challenges for HCW, new opportunities have emerged as well. Telemental health services rapidly became commonplace during the early months of the pandemic with multiple studies validating the efficacy of Internet CBT (iCBT) [48–52]. The open access iCBT program “*My Health Too*” has shown promise in providing psychoeducation and coping strategies for HCW [53]. iCBT has also been effective in reducing symptoms of depression, anxiety and PTSD in HCW [54,55]. The twenty-four hour a day accessibility and confidentiality offered by such programs are additional factors likely to appeal to HCW.

A limitation of this study includes the limited sample size and sample population. Of the 81 participants, 65 were women. Having additional men and an overall more diverse sample population would increase the external validity of the findings. Furthermore, most responses were outpatient HCW. Lastly, the results reflect HCW wellbeing in Northwest Louisiana; data can be generalized only to areas with similar population demographics.

Despite the limitations, these results highlight a common theme of decreased HCW wellbeing during times of healthcare system strain. With the data from HCW of Northwest Louisiana during Covid-19, policy changes need to be implemented to allow access to vital personal protective equipment (PPE), mental health services, basic needs of living, and overall support for this vulnerable population. Further research needs to be conducted on the continued impact of Covid-19 on HCW. It would be beneficial to compare the wellbeing of HCW at various points throughout the pandemic, and the lasting impacts on HCW overtime, even after the pandemic wanes.

5 Conclusion

In conclusion, Covid-19 has negatively affected HCW wellbeing in the North Louisiana region. HCW are more stressed, more fearful, reported more anxiety and depression, and more work overloaded. This is a similar trend that has been seen during other times of healthcare strain. Mental health support, work modulation, and various provisions should be explored as means to reduce Covid-related negative

impacts. The use of online data collection system provided by the AMA and an online summit was appropriate for collecting information on the impact of Covid on mental health. The results collected in this resource sparing manner that is more easily implemented during a pandemic, which places constraints on time, resources, and in person interactions, were similar to those collected by conventional means. This pilot study supports the larger scale implementation of this technology for health informatics research related to mental wellbeing in healthcare workers.

6 Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Table I. Demographics and Responses of 81 healthcare workers on Coping with COVID Survey.

Demographics	N	%
Gender		
Male	14	17
Female	65	80
Race		
American of European descent (Caucasian)	52	64
American of non-European descent (Black, Asian, and Native American)	25	31
Years in practice		
1-10	29	36
>11	47	58
Practice setting		
Inpatient	19	27
Outpatient	51	73
Responses to specific questions		
High stress (modest and to very high)	52	64
High fear of exposure/transmission (moderately and to a great extent)	66	81
Anxiety/depression (moderately and to a great extent)	61	75
Work overload (moderately and to a great extent)	67	83
Enhanced meaning and purpose (somewhat, moderately and to a great extent)	68	84
Feeling valued by organization (somewhat, moderately and to a great extent)	67	83
Factors that would help mitigate stress		
Inbox support (somewhat, moderately, and to a great extent)	45	56
Access to mental health support (somewhat, moderately, and to a great extent)	60	74
Healthy food available (somewhat, moderately, and to a great extent)	64	79

Numbers may not add to 81 or 100% in specific categories due to missing data or health care workers with responses other than those listed.

Table II. Comparisons of Stress and Work-life Factors by Sex, Location, and Years in Practice.

	Stress, No. (%)	Fear of Exposure, No. (%)	Anxiety and Depression, No. (%)	Work Overload, No. (%)	Meaning and Purpose, No. (%)	Feeling Valued, No. (%)	Burnout, No. (%)
Gender							
Male	1 (7%)	3 (21%)	1 (7%)	4 (29%)	8 (57%)	8 (57%)	1 (7%)
Female	18 (28%)	19 (29%)	15 (23%)	31 (48%)	27 (42%)	31 (48%)	18 (28%)
Race/Ethnicity							
Americans of European Descent	14 (27%)	12 (23%)	11 (21%)	25 (48%)	21 (40%)	22 (42%)	15 (29%)
Americans of Non-European Descent	5 (20%)	8 (32%)	4 (16%)	10 (40%)	13 (52%)	14 (56%)	5 (20%)
Practice Setting							
Inpatient	5 (26%)	5 (26%)	3 (16%)	10 (53%)	8 (42%)	6 (32%)	8 (42%)
Outpatient	10 (20%)	14 (27%)	9 (18%)	22 (43%)	22 (43%)	26 (51%)	10 (20%)
Years after training in practice							
1-10 years	9 (31%)	9 (31%)	6 (21%)	15 (52%)	13 (45%)	12 (41%)	10 (34%)
>11 years	10 (21%)	12 (26%)	9 (19%)	20 (43%)	20 (43%)	24 (51%)	9 (19%)

High (3) and very high (4) categories on Likert scales from 1 to 4 were combined. Respondents who selected “Prefer not to answer” (n =1) or “Nonbinary/third gender” (n =1) were removed from this analysis.

Table III. Specific questions about mental health during COVID-19.

Responses to specific questions	N	%
How would the following improve your ability to sustain through the COVID-19 crisis?		
Staff or colleague support for inbox, documentation, and order entry	34	42
Healthy food available at all hours	39	48
Personal access to mental health care	32	40
What is the likelihood that you will reduce the number of hours you devote to clinical care or research over the next 12 months?		
Definitely/Likely/moderate	10	12
Slight/None	62	77
What is the likelihood that you would leave your practice or research within two years?		
Definitely/Likely/moderate	13	16
Slight/None	56	81
Over the past two weeks, how often have you been bothered by little interest or pleasure in doing things?		
Nearly every day or half the days	20	25
Several days	30	37
Over the past two weeks, how often have you been bothered by feeling down, depressed, or hopeless?		
Nearly every day or half the days	12	15
Several days	30	37
What may prevent you from seeking mental health services or support?		
I am concerned about what others would think if they knew I sought help	5	6
I am concerned about confidentiality	13	16
Such services are not accessible or convenient	12	15
I am concerned this would impact my professional licensure	5	6
I am concerned this would impact my employment	3	4
I prefer other sources of help (family, friends, etc.)	20	25
I prefer to handle my problems by myself	18	22
I cannot afford it	8	10

Table IV. Perseverance and resilience during COVID-19 among healthcare workers.

In your own words, what has been the driving force behind your perseverance during the SARS-CoV-2 Pandemic?	N	%
The feelings of being able to help patients	24	30
The support of coworkers, friends, and family	21	26
The need to support the family	20	25
Doing self-care and having an increased sense of faith	10	12
The need for a job	6	7
None	5	6
The feelings of being able to help coworkers	2	2

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