Preparing for the Next Pandemic to Protect Public Mental Health

What Have We Learned from COVID-19?

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KEYWORDS

- Covid-19 • Pandemic • Preparedness • Mental health • Public health
- Interventions

KEY POINTS

- Public mental health practices and principles are critical in response to COVID-19 as well as in other pandemics and disasters.
- Distress reactions and health risk behaviors are early and common responses to COVID-19 in addition to psychiatric disorders.
- Risk and protective factors related to adverse psychological and behavioral health effects result from pre-event factors, aspects of impact, and recovery variables.
- Early interventions use an evidence-based framework to enhance well-being, reduce distress, and mitigate disorders.
- Adapting interventions from high-risk occupations provides a rapid and tailored response to enhance organizational sustainment.

INTRODUCTION

The COVID-19 pandemic is an unprecedented global disaster that has killed 5,203,000 people to date,[1] having an impact on nearly all sectors of society. The public's experience of the pandemic has been altered by the collision of multiple disasters: civil unrest, racial inequity, economic crises, political strife, and other events, such as hurricanes, floods, and mass violence. These events pull at the fault lines of communities and amplify distress, mistrust, and uncertainty, altering how these events are

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experienced. Addressing public mental health needs involves an understanding of where risk is concentrated and how it changes over time to allow for more timely and tailored interventions that are altered to meet current and evolving needs. In disasters, certain populations bear a disproportionate burden of risk. For instance, in COVID-19, health care workers have experienced prolonged threats to health and safety for themselves and their families as well as exposure to death and dying.[2] People of color became sicker and died with greater frequency, with black and Hispanic citizens experiencing a 3-fold greater reduction in life expectancy than whites, directly resulting from the COVID-19 pandemic.[3]

Disasters cause an established range of adverse mental health effects, with pandemics creating unique impacts related to fear, uncertainty, and changing risk perceptions. Assessment and treatment of psychological disorders are aspects of managing public mental health during pandemics. Responses, such as distress reactions and health risk behaviors, also confer significant public mental health burden. The scope and magnitude of these events require a public mental health framework for interventions that focuses on disease prevention and wellness in addition to the treatment of disorders. Public health emergencies need coordinated and sustained public health approaches across various services and sectors of society.[4] These community-based approaches include public health education, communication, organizational sustainment, and leadership, all of which focus on fostering wellness, preventing disease, and promoting recovery.[5]

This article examines current findings from the pandemic and identifies gaps in the understanding of public mental health impact and mitigation strategies. Preparing for future pandemics requires examination of lessons learned and implementing relevant system changes, which require sustained commitment and collaboration from public and private sector entities.

SCOPE OF COVID-19 IMPACT ON MENTAL HEALTH

Disasters create adverse mental health effects, from distress to disorders, with various effects beginning early and others emerging over time,[6–9] some of which last for months or years and may result in prolonged or chronic functional impairment and disability. Pandemics produce unique psychological effects, related primarily to fear, and altered risk perception.[10] This perception of risk influences engagement in health behaviors required to control the outbreak, such as physical distancing, mask wearing, handwashing, and vaccinations.[10] During COVID-19, prolonged uncertainty, isolation and quarantine, concerns about shortages, and changing health recommendations exacerbated underlying concerns.

Psychological and Behavioral Effects of Disasters

Psychological and behavioral responses to disasters are depicted in **Fig. 1**. Psychiatric disorders often manifest after weeks or months with available evidence-based treatment. Other responses occur that often receive less clinical and media attention but cause significant public mental health burden. Distress reactions and risky health behaviors are well-established manifestations of disasters, including pandemics. In the severe acute respiratory syndrome (SARS) outbreak of 2007, approximately 40% of ICU nurses experienced significant insomnia,[11] which is associated with work errors, accidents, mental health disorders, exacerbation of cardiovascular and immune diseases, cognitive symptoms, and functional impairment. During COVID-19, for instance, insomnia has been studied largely in the context of sequelae from SARS coronavirus 2 infection, rather than as a distress reaction resulting from the
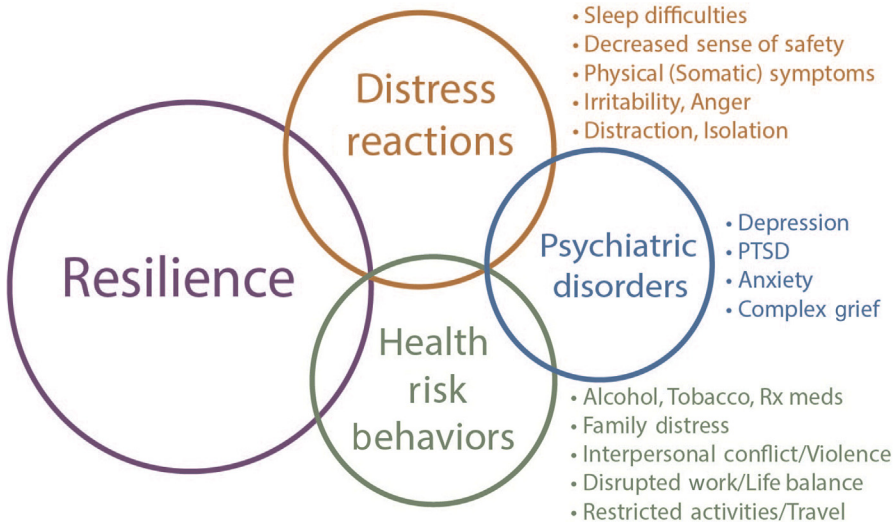
Fig. 1. Psychological and behavioral responses to pandemics and disasters.

experience of living through a pandemic, the latter having a far greater potential impact on public mental health.

Disasters, such as a hurricane, an earthquake, and a mass shooting, that are a single event and occur over a discrete period typically progress through well-established community phases. Initially, a honeymoon phase occurs when resources and support are brought to a community and individuals come together to connect and rebuild with the hope of being made whole again. Later, a disillusionment phase occurs when resources diminish, and mounting stressors reduce a sense of hope. Anniversary reactions remind individuals and communities of what has been lost. Finally is a reconstruction phase, when individuals find ways to make meaning of the event and move forward in the context of a new normal. COVID-19 disrupted these phases by limiting social connection and diminishing community cohesion, which made planning and allocation of community mental health resources more difficult.

The Unique Disaster of COVID-19

COVID-19 differs from other disasters by the very nature of the threat as well as its scope, magnitude, and duration. Even those with experience responding to disasters (eg, first responders, emergency workers, law enforcement, and health care workers) were ill-prepared for a novel infectious disease that has been hard to predict, caused significant illness, resulted in relatively high mortality, and presented significant risk to personal and family safety. Although risk mitigation is essential during COVID-19, risk cannot be eliminated. When the threat is a highly contagious respiratory virus, there is nowhere safety can be guaranteed. All members of society had to determine the extent to which loved ones, friends, and colleagues—traditionally a source of comfort, connection, and companionship—represented a threat to health and safety. These supportive resources often were less accessible due to required or voluntary physical distancing or quarantine after an exposure.

Health care workers played an essential role in preventing illness and death from COVID-19. Inadequate supplies, shifting policies and procedures, working outside their scope of care, and requirements to practice altered standards of care led to

feelings of distress for some workers. Stigmatization by neighbors, friends, and family added to the burden of health care workers.[12] The extremes of COVID-19 caused mental health to become an increasingly significant threat to safety for health care workers around the world.[2]

Like most public health emergencies, the pandemic has pulled at the fault lines within society, further exposing divisions. These are predictable effects of disasters that have a broad impact on health, safety, security, and economics, particularly when they require sustained and changing behaviors to manage effectively. Community conflict over mask wearing, school closures, and vaccine acceptance were exacerbated by the emergence of more contagious and lethal viral variants, all of which served to fuel community anger and resentment and diminish social cohesion.

Psychological and Behavioral Health in COVID-19

Protecting health involves understanding psychological symptoms and behavioral effects of disasters. Symptoms of psychological disorders have received considerable attention, with studies demonstrating elevated rates of depression and anxiety during COVID-19 that persisted in communities around the world[13] and created considerable health burden, which benefited from evidence-based interventions. Beyond symptoms of disorders, insomnia, increased use of alcohol and tobacco, and family violence were responses to COVID-19, having an impact not only on individual health but also on the ability to sustain operations in occupational settings that were critical to maintaining community functioning.

Insomnia is a growing public health problem associated with worsening of underlying physical and mental health conditions,[14] diminished cognitive performance,[15] and impaired immune system. These create significant risks, particularly during a pandemic when decision making around family health behaviors and the ability to fight illness are critical to community health. COVID-19 had a negative impact on sleep around the world, with insomnia rates of 20% to 45% and health care workers reporting some of the highest overall rates,[16] where nurses and those working most closely with sick patients were at greatest risk.[17] Insomnia is both a risk factor for and an adverse clinical feature of numerous mental health conditions with elevated insomnia ratings in health care workers associated with higher rates of probable posttraumatic stress disorder (PTSD).[18] Nochaiwong and colleagues[13] reviewed the global prevalence of mental health symptoms from 32 countries and from approximately 400,000 participants and found a 27.6% prevalence of sleep disorders. Improved sleep can enhance the ability to solve problems, make decisions, and engage in behaviors needed to promote health during a pandemic and may be done through public health education about the benefits of re-establishing sleep and other daily routines, regular exposure to sunlight, calming behaviors that reduce arousal, and limiting exposure to disaster-related media. Access to self-directed cognitive behavioral therapy for insomnia using online and app-based programs and other technologies that foster calming and lower arousal may be useful as well, particularly when face-to-face health care is limited.

Alcohol often is used to manage sleep problems and distressing emotions, both of which are exacerbated during disasters. In March 2020, an online survey of US adults by the American Psychiatric Association revealed 8% of Americans already had begun increasing their consumption of alcohol.[19] Three months later, in June 2020, the Centers for Disease Control and Prevention found 13.3% of adults increased use of substances to manage pandemic-related distress.[20] Pollard and colleagues[21] quantified changes in alcohol use comparing the period during the pandemic with data from the year prior and observed 75% of adults reporting 1 additional drinking day per

month, with 41% of women reporting increased binge drinking and a 39% increase on the Short Inventory of Problems scale related to use of alcohol. These findings have important public mental health implications. Even in the absence of alcohol use disorder, the increased use of alcohol within a community is associated with higher rates of accidents, violence, work and other errors, physical health ailments, and impaired decision making. The last can be particularly problematic when choices about pandemic behaviors have greater consequences for family health and safety. Home confinement, unemployment, work and family stresses, and the persistent availability of alcohol compounded these problems. Limiting access to alcohol as an intervention must be balanced against acute health consequences of abrupt discontinuation. Public health education, community support services, and timely and tailored resources to help mitigate the distress that often leads to increased alcohol use are important aspects of future interventions.

Grief is a near universal aspect of disasters, resulting from loss of possessions, health, perceptions of safety, and certainty about the future. Disenfranchised grief involves loss that is not acknowledged openly, validated socially, or mourned publicly in ways that promote healing, such as the inability to be at the bedside of dying loved or gather at a funeral service due to COVID-19–related health restrictions. Bereavement from the death of a loved one during disaster increases adverse mental health effects, with some estimates of 9 people experiencing bereavement for every COVID-19 death.[22] Hillis and colleagues[23] found more than 1.5 million children had a caregiver die from COVID-19, with the potential for this to increase greatly as more lethal viral variants became increasingly common. Evidence-based and actionable resources to support of children following the death of a caregiver were an important aspect of health education during COVID-19.[24]

Feeling safe during disasters is important to health, with decreased perceptions of safety associated with insomnia, increased substance use, depression, posttraumatic stress symptoms, and general psychological distress.[25] COVID-19 represents an amorphous and ongoing threat to safety, and further understanding the extent to which perceptions of safety influenced the onset of psychological and behavioral response is critical in developing effective interventions for future pandemics. The pandemic also created significant disruption to work-life balance, with virtual education and remote work commonplace. The presence of mental health symptoms and exposure to disasters both have been associated independently with occupational difficulties and impairment, including absenteeism and presenteeism.[26,27] Leveraging and adapting effective workplace health promotion programs that address unique changes required in the home-work environment during COVID-19 also can enhance pandemic preparedness.

Key Points

1. Responses to disasters include distress reactions, health risk behaviors, psychiatric disorders, and resilience. Understanding both the psychological and behavioral impacts of a pandemic on society provides the most robust understanding of community public mental health impacts.
2. Pandemics are characterized by fear and uncertainty that alter perceptions of risk, which directly influence engagement in recommended health behaviors. The ability to alter risk perception is essential to optimizing health behaviors required to control a pandemic.
3. Adverse responses to pandemics that negatively affect community functioning and occupational performance are important targets for interventions that protect health and sustain operations.

RETHINKING RISK AND RESILIENCE

Far more is known about what creates risk for illness than what protects health. Risk and protection in COVID-19 result from a dynamic interplay of biopsychosocial factors related to predisaster factors, impact characteristics, and post-disaster recovery variables. From an occupational and public health perspective, stressors, such as living through a pandemic, can be thought of like a toxin, such as lead or radon. To understand the impact, it is important to know aspects of the exposure, such as who, when, how much, the response over time, and which factors buffered against negative effects. Health surveillance during and after disasters is complex and challenging but critical to understanding where risk is concentrated and how it changes over time, which is essential to developing timely and tailored interventions. Certain populations are at increased risks during disasters and certain groups bear a disproportionate burden of risk. COVID-19 created unique, although often predictable, challenges.

Health care workers had unique and wide-ranging experiences throughout the pandemic, such as (1) being called heroes where communities clapped for them, (2) lacking basic personal protective equipment (PPE) to maintain personal safety, (3) being required to decide which patients lived or died due to constrained resources, (4) begin stigmatized by friends and neighbors, and, ultimately, (5) being vilified by patients and public officials who opposed health recommendations.[28] Health care workers represent a group with numerous risk and protective factors that evolved throughout the pandemic (**Table 1**). Although the transition to recovery is far less clear during COVID-19, the factors listed provide an understanding of how risk and protection evolve throughout a pandemic life cycle.

Risks Created by COVID-19 Response

Health behaviors to control the spread of COVID-19 reduced the risk of illness and death from infections but created other health risks associated with increased mental health burden. Immediately after implementation of physical distancing and restrictions of movement, ambulatory health care visits dropped by approximately 60%,[29] creating risk for missed diagnoses, lack of preventive services, and decreased interventions for poorly controlled medical conditions. For instance, in the first 3 months of the pandemic, screening for breast cancer and for cervical cancer decreased by 87% and 84%, respectively, with significant reductions persisting more than 6 months into the pandemic and the greatest decrease observed geographically in the Department of Health and Human Services Region 2 (including New York), for cervical cancer screening among women who identified as Asian and Pacific Islander (92%) and for breast cancer screening in women who identified as American Indian/Alaskan Native (98%).[30] Santoli and colleagues[31] observed that, when compared with the same time frame in 2019, 3,000,000 fewer childhood vaccinations were given during the first month after lockdowns (March 2020) in the United States. Although it will be years before the full impact of these changes in health care engagement are fully quantified, they increase the likelihood that diseases are missed or are found at more advanced stages, morbidity is higher from poorly controlled illnesses, and preventable infectious illnesses become more prevalent. Increasing health care disease burden is associated with higher rates of mental health symptoms and disorders. Delays in care and missed preventive services during COVID-19 have significant implications for public mental health.

Individuals with serious and persistent mental illness (SPMI) experienced risk early in the pandemic when health care organizations were determining which services to deem essential, allowing patients to continue accessing them when health care

Table 1
Risk and protective factors for health care workers during COVID-19

Time	Risk Factors	Protective Factors
Pre-event period	• Active health problems, mental health, substance use • Need for access to self/family health care • Limited/poor coping skills • Limited social supports • Financial difficulties • Lack of training • Poor team cohesion • Resistance to help-seeking	• Positive health status • Availability/use of health resources • Limited exposure to adverse environmental health factors • History of positive adaptation to stress or stress resistance • Hopeful outlook • Creative coping skills/strategies • Screening and identification of health risk status • Reducing stigma for non-frontline personnel • Adequate training and preparation
Event/impact period	• Requirement to use crisis (altered) standards of care • Inadequate PPE • Moral distress/injury • High exposure to infection • Exposure to death, dying, and human remains • Required work outside specialty training • Weakened community fabric • Punitive or unsupportive work environment • Toxic leadership • Lack of empathy • Poor communication • Death of loved ones	• Short duration, minimal disruption to work/personal life • Community fabric intact • Adequate PPE • Exposure risks and sacrifices shared equitably • Clear communication about evolving infection control and safety policies and procedures • Supportive and accessible leaders • Help-seeking organizational culture • Regular monitoring of health and behavioral health status through multiple means • Early identification and intervention with health and behavioral health issues • Accessible supports, interventions, and referral options • Monitor impact of organizational status and change on well-being of all personnel
Recovery period	• Illness stigma from neighbors/family/friends • Disjointed community response • Isolation from social support systems • Inability to grieve • Job loss • Extended virtual/home school requirements • Lack of access to childcare	• Strong workplace and personal support • Range of supports and interventions • Options and opportunities for personnel interactions • Family friendly personnel policies and strategies • Adaptation to changing patterns of needs, demands

Table 1 (continued)		
Time	**Risk Factors**	**Protective Factors**
	• Fatigue; inability to reset or recover • Diminished health • Vaccination concerns and barriers	• Work culture continues to encourage interventions and support • Rest and reset options provided and encouraged • Health issues addressed • Leadership remains engaged and communicating regularly with personnel

services were being restricted to control spread of infection. Electroconvulsive therapy to manage psychosis and suicidal thinking and long-acting injectable medications to sustain abstinence from substance abuse and dependence often were the subject of debate regarding their "essential" nature. Public health education by psychiatrists and collaboration between health care disciplines elaborated the life-saving role these interventions play in the lives of individuals with SPMI.[32,33] Care for persons with SPMI will be improved in future pandemics when health care systems identify these as essential health care services in disaster planning and preparations and ensure that discussions about resource allocation include psychiatrists and other mental health professionals.

Concerns emerged early in the pandemic for increased child maltreatment and neglect as well as other forms of family violence. Heightened family stress related to shifts to virtual school and remote work, limited access to health care and other helping services, loss of employment, and continued access to alcohol created an environment in which violence is more likely to occur and less apt to be identified. Some studies revealed a reduction in rates of emergency department visits for interpersonal violence as well as child abuse and neglect early in the pandemic.[34] This did not necessarily indicate these events were less common, however, only that presentation to emergency health care settings (where the risk for COVID-19 infection was perceived to be high) decreased over a given period of time. By contrast, law enforcement calls for domestic violence increased significantly during the early months of lockdowns and restrictions of movement, with many of these perceived to be related to pandemic stressors.[35,36] These findings, along with increased calls to domestic violence hotlines around the world, serve as a reminder that people chose to present distress during COVID-19 to places perceived as most safe. Anticipating these shifts, adequately staffing helping resources, rapidly transitioning to remote support services, and community health education campaigns to inform the public about available resources and lower barriers to help-seeking are important aspects of preparing for future pandemics.

Inequitable Distribution of Risk

In disasters, risk is not distributed equitably. Lower socioeconomic status is one of the most consistent global predictors of adverse outcomes following disasters, resulting from factors, such as reduced preparedness and insufficient systems of care. Unsurprisingly, inequities in risk have been observed in COVID-19. During April 2020 and May 2020, Hispanic respondents reported high rates of depression (40.3%) and suicidal thoughts (22.9%) and increased use or initiation of substances (36.9%), remarkably higher than those of white counterparts, and endorsed high rates of worry about having

enough food and stable housing.[37] In the state of Maryland during the first 5 months of the pandemic, suicide mortality for white citizens decreased by approximately 40% but increased approximately 5% for black citizens.[38] Systemic racism, inequities in health care treatment and delivery, and overt harm to people of color fueled feelings of hesitancy and lower rates of vaccination in these communities during the pandemic.[39] Around the world, vaccination rates of developed nations in Asia, North America, and Europe eclipsed vaccination rates in African nations.[40] These findings highlight the importance of engaging with marginalized communities before, during, and after disasters like COVID-19; partnering with community leaders; acknowledging current and historic inequities; and seeking culturally sensitive and collaborative approaches to enhance preparedness and strengthen community resilience.

Changing Risks Over Time

In COVID-19 and other disasters, much of risk comes from evolving health behaviors. Understanding how risk changes over time, what new risks emerge, and where risk is concentrated is essential to protect health. Research found that from March 2020 to November 2020 adherence diminished significantly in nearly all health behaviors recommended to control the spread of the pandemic, with mask wearing remaining the one behavior done with greater frequency.[41] Pew Research tracked trends in willingness to accept the COVID-19 vaccine, observing that althoughb more individuals expressed willingness after the vaccines were first released, hesitancy and refusal persisted, particularly among certain demographics, including those with lower education and less knowledge about the vaccines.[42]

Misinformation created one of the most significant and evolving threats to public health during COVID-19, prompting a report from the US Surgeon General[43] as well as information campaigns from the United Kingdom and the World Health Organization.[44] A significant area of misinformation occurred around vaccines. In July of 2021, a national survey of adults in the United States found that, among those who indicated they were "definitely not" getting vaccinated, a vast majority believed the health risk related to vaccines was higher than the health risk of contracting COVID-19.[45] The prominence of social media and the proliferation of Internet-connected digital devices facilitated global spread of misinformation. Senior government officials and media pundits around the world fueled divisions and misinformation by delivering conflicting messages about the threat of COVID-19, casting blame on its origins in favor of engaging in behaviors to contain spread, suggesting unapproved and untested treatments, undermining the utility of health behaviors intended to prevent the spread of the infection, and minimizing the need for vaccinations. Misinformation will be a predictable aspect of future pandemics and effectively countering it will require early and robust communication using principles of behavioral sciences to develop messages shared by trusted and credible messengers that address the broad range of concerns across different communities.[46]

Reconsidering Assumptions About Risk

Media messages about concerns for severe and prolonged mental health outcomes transmitted the direst projections from health care providers.[47] Historically, mental health difficulties have persisted for long periods of time in certain populations after disasters, and this is important for planning for future events. But, once a new disaster, such as COVID-19, occurs, historical lessons become more speculative. Health surveillance over time is needed to understand community impact during and after COVID-19.

Suicide has been an ongoing focus of global public mental health concern. Loss of employment, social isolation, and family and work stress contribute to suicide.

Research in previous disasters revealed mixed results with respect to the impact of disasters on suicide rates, with infectious disease outbreaks typically showing no association.[48] Temporal changes have been observed with risk changing over time, where suicidal behavior diminished during the time frame typically corresponding to the honeymoon phase of community response but increased in the time frame corresponding to the disillusionment phase.[49] Concerns emerged early in the pandemic about suicide as an adverse outcome. Media attention following the suicide of Dr Lorna Breen, a prominent emergency physician in New York, further heightened fears of suicide in frontline health care workers. Recent global data on suicide and suicidal behaviors have demonstrated mixed findings, with certain demographics and other factors associated with increased risk and others with reduced risk. For instance, studies identified younger age[50] and female gender[51] as risk factors for suicidal ideation and related behaviors during COVID-19. Other studies suggest, however, that overall suicide rates have not increased and, in some cases, have modestly decreased during the pandemic. An understanding of how COVID-19 has had an impact on suicidal thoughts and behaviors during various community phases of the pandemic and steps to help mitigate and intervene require an understanding of the factors that predispose to suicidality during the pandemic as well as interventions that are accessible and adaptable within various social and occupational communities.

Older adults have been found to be at risk for adverse mental health outcomes in disasters, predominantly due to diseases of aging, such as cognitive impairment, diminished vision and hearing, mobility limitations, and increased reliance on systems of care.[52] Increasing age also is associated, however, with increased stress tolerance and resilience to adversities, including disasters. During COVID-19, many studies found older participants reported lower rates of depression, anxiety, sleep disruption, and suicidal thoughts.[53] A literature review by Parlapani and colleagues[54] of studies examining the impact of COVID-19 revealed that older age largely buffered against many of the adverse effects of the pandemic. Factors impacting the experience of older adults during the pandemic include having a fixed income, lower likelihood of job loss concerns, less work-life imbalance due to lack of young children at home requiring childcare and oversight for virtual schooling, and the ability to experience feelings of self-efficacy from serving as a source of support to children and grandchildren dealing with these very challenges. The experience of older adults likely is nuanced and impacted by socioeconomic, cultural, and other regional factors.

Key Points

1. The impact of pandemics and behaviors required to effectively manage the spread of infection will mitigate certain health risks, while exacerbating or creating other risks. Addressing evolving risk protects health and reduces morbidity.
2. Risk is not distributed equitably in disasters, and understanding which populations are at risk during pandemics, as well as how those risks change over time, allows for effective planning and preparation as well as enhanced response.
3. Risk should be evaluated broadly, with ongoing health surveillance among different communities and sectors of society informing where risk is concentrated to provide timely and tailored interventions.

INTERVENTION TO PROTECT MENTAL HEALTH

Public mental health interventions are essential to sustain community well-being and functioning in disasters, such as COVID-19, including public health education, risk and crisis communication, and leadership.[6,55] Approaches should extend beyond

treatment of disorders and emphasize wellness and protective health behaviors. Adapting interventions from occupations with experience in prolonged high-stress environments allowed for a more timely and efficient response to support community health and enhance operational sustainment.[56] Effective interventions to sustain organizations, such as health care systems, include actions by individuals, organizations, and leaders (**Box 1**).

Interventions should foster the 5 essential elements that are protective during disasters, including a sense of safety, calming, social connectedness, self-efficacy and community efficacy, and hope.[57] These elements form what has been called Psychological First Aid (PFA), an evidence-based framework for enhancing well-being and resilience for individuals and communities. Early efforts were made to adapt these elements to address unique aspects of the pandemic.[58] Health care system intervention frameworks that incorporated principles of PFA were better able to address distress and health risk behaviors through interventions other than clinical care. This is particularly important to lower barriers to care because health care workers may perceive mental illness as stigmatizing, whereas interventions that focus on distress and transient impairment may be more accessible. These approaches also enabled organizations to recognize and promote nonclinical, evidence-based interventions to reduce distress.[59] Organizational efforts to acquire protective equipment and establish protocols enable a sense of safety among workers. Enhancement of respite areas within hospitals and promotion of self-help interventions, such as mindfulness and meditation, promote calming. After action reviews and shift huddles create opportunities to reinforce self-efficacy and collective efficacy, promote connectedness among health care teams, and dispel misconceptions or distortions of thought that otherwise might lead to feelings of blame and guilt.

Health education is critical to fostering the principles of PFA for individuals and communities during COVID-19 and other disasters. The Center for the Study of Traumatic Stress developed COVID-19 health education resources that address the unique risks and exposures of various communities, including responder and emergency personnel, health care workers, patients, families, and community leaders.[60] These brief, easy-to-read, just-in-time resources explain complex topics in a way that is easy to understand and address the critical question, "What do I do?" to protect individual, family, and community health during public health emergencies and other disasters. In collaboration with partners around the world, many of these resources have been translated into different languages to support global health throughout the pandemic. Online training in community-based PFA is available through the National Child Traumatic Stress Network that prepares individuals to support community health following disasters.[61] PFA training for supervisors and leaders also is available from the National Association of County and City Healthcare Organizations. Based on the principles of PFA, the Massachusetts Medical Society created training to enhance sustainment of health care workers during COVID-19, through self-care and other actions.[62]

Mobile apps can provide information and access to location-based resources tailored to individual risks and needs. The Heroes Health app provides location-based well-being resources and a weekly self-assessment for health care workers and allows user-approved information to be shared with health care organizations to facilitate the delivery of timely and tailored interventions that address evolving risks for workers.[63] The COVID Coach app provides information about coping during the pandemic, tools for self-care, and trackers to observe trends over time in mood and other measures of well-being.[64] Resources that support interventions in future pandemics should leverage technology, such as wearables, to assess and optimize

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Box 1
Actions to promote organizational sustainment during COVID-19

Individual
  Self-care: sleep, nutrition, hydration, and exercise help with decision making.
  Media use: limiting exposure to disaster-related and other negative media lowers distress.
  Self-monitoring: taking our own pulse through self-checks and feedback from others
  Self-advocacy: speaking up when things do not seem right improves efficacy.
  Social connections: reaching out and connecting with others reminds us we are not alone.

Organizational
  Communication: timely, regular, updated, and accurate messages build trust.
  Training: thorough and realistic training to prepare workers lowers uncertainty.
  Education: understand normal psychological and behavioral responses to stress.
  Practical supports: food, parking, lodging, and childcare meet essential needs.
  Camaraderie: connections among personnel (colleagues, managers, and others)
  Equipment: adequate supplies of protective equipment to feel safer
  Peer support: peer buddies and other support systems to sustain well-being
  Growth mindset: team learning and growing together through difficulties

Leadership
  Modeling self-care: gives permission to all personnel to do the same
  Effective communication: using effective strategies enhances health behaviors.
  Grief leadership: acknowledging grief and honoring losses make meaning of the event.

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physiologic measures of distress, including heart rate and sleep quality. The ability to crowdsource information from wearables and other mobile devices could provide significant insights into community psychological responses and health behaviors that identify evolving public mental health hot spots to which resources can be more efficiently directed in future pandemics.

Adapting Interventions

During the pandemic, considerable work was done adapting interventions used in occupations that routinely conduct prolonged operations in unsafe, high-stress environments, such as the military, for use in health care systems and other settings to support well-being and enhance sustainment for workers. Public-private partnership facilitated adaptation of interventions through the rapid transfer of information, resource sharing, and proliferation of lessons learned across sectors.

In New York City, a collaboration of public and private partners created Healing, Education, Resilience & Opportunity for New York's Frontline Workforce (HERO-NY).[65] This interdisciplinary group developed training materials to help workers and supervisors manage the stresses of multiple pandemic waves. HERO-NY applied a tiered approach that reinforced principles of self-care, buddy aid, and help-seeking. The University of Minnesota Medical School promoted a battle buddy system, adapted from the US Army, using periodic check-in meetings with a designated peer as a means of reinforcing safety, social connectedness, and efficacy during pandemic surges.[66] Buddy systems and other formal, rather than ad hoc, peer support can be helpful in organizations where personnel have more difficulty asking for help, such as health care workers, military personnel, first responders, and other emergency workers.

Principles of the military's Stress Continuum model (Fig. 2) shaped approaches to interventions aimed at worker sustainment. This framework emphasizes that

- Workers' experience generally occurs on a continuum of expectable responses and does not require clinical care or medicalizing.

READY	REACTING	INJURED	ILL
DEFINITION • Adaptive coping • Effective functioning • Well-being FEATURES • In control • Calm and steady • Getting the job done • Playing • Sense of humor • Sleeping enough • Ethical and moral behavior	DEFINITION • Mild and transient distress or loss of function FEATURES • Anxious • Irritable, angry • Worrying • Cutting corners • Poor sleep • Poor mental focus • Social isolation • Too loud and hyperactive	DEFINITION • More severe and persistent distress or loss of function TYPES • Trauma • Fatigue • Grief • Moral injury FEATURES • Loss of control • Cannot sleep • Panic or rage • Apathy • Shame or guilt	DEFINITION • Clinical mental disorders • Unhealed stress injuries TYPES • PTSD • Depression • Anxiety • Substance abuse FEATURES • Symptoms persist>60 days after return from deployment
Self-help	*Stressor* Leadership/Organizational Support Peer Support		Screening/Referral

Fig. 2. Stress continuum model. (*Adapted from* Nash WP. US Marine Corps and Navy combat and operational stress continuum model: a tool for leaders. In: Ritchie EC, ed. Combat and Operational Behavioral Health. Fort Detrick, MD: Borden Institute; 2011.)

- Communities in which individuals live and work greatly influence their well-being and serve as the main source of support and sustainment.
- Support systems should focus primarily on identifying reactions on the continuum and providing interventions to facilitate adaptation and wellness.

Interventions that incorporated a stress continuum allowed health care system leaders and wellness experts to think beyond a model that limits responses to illness and individual treatment to also recognize a range of distress responses and health risk behaviors that may or may not ultimately result in lasting illness. The Mount Sinai Center for Stress, Resilience, and Personal Growth incorporated a stress continuum approach as part of facilitating peer support and guiding health care workers to optimal helping resources.[67] In the United Kingdom, hospitals created Supported Wellbeing Centres, providing employees with rest facilities and trained peer supporters.[68] These approaches incorporated aspects of embedded mental health, which utilizes mental health providers as members of a care team without providing direct care to colleagues. Instead, their presence fosters connections, facilitates communication, encourages help-seeking, and lowers stigma. Deploying support staff in an embedded mental health model can enhance access to interventions for stressed workers.[69]

Media Exposure

Some studies have revealed that use of media in disasters may increase compliance with recommended health behaviors and reduce distress. Disaster-related media exposure, however, also is associated with disrupted sleep, increased use of alcohol and tobacco, elevated symptoms of depression and posttraumatic stress, and higher general psychological distress.[70] Bendau and colleagues[71] found that German citizens with increased exposure to COVID-19 media indicated greater symptoms of depression and anxiety and similar associations were found in other countries.[72] Increasing use of social media and use of a greater number of sources of media were associated with higher rates of general psychological distress.[73] Engaging with the media to create messages that inform the public while avoiding sensationalized and distress-related messaging is an important aspect of public health education.

Infectious disease outbreaks create additional risks related to how media consumption has an impact on health behaviors. Higher reliance on social media as a primary source of information about COVID-19 was associated with increased vaccine hesitancy.[74] As health recommendations evolved, disinformation proliferated rapidly, with considerable effort given to evidence-based approaches that counter disinformation and protect community health.[75] Preparing for future pandemics requires the public to use trusted sources of information and limit overall disaster-related media exposure.

Communication and Messaging

Communication influences perceptions of risk and the public's willingness to engage in recommended health behaviors.[76] Messaging the evolving changes and helping society manage ongoing uncertainty requires trusted principles of risk and crisis communication,[77] which include being first and accurate with information, sharing what is known and unknown, committing to finding answers, and then following up, letting the public know when further information will be shared and avoiding efforts to mislead or provide excessive reassurance. The conflicting messages from community leaders and elected officials as well as deliberate efforts to spread misinformation made obtaining accurate health information difficult for the public during COVID-19.

Clinicians, public health professionals, community leaders, and the media play an important role in creating messages to the public that lower distress and enhance community cohesion. Using a word like "concern" rather than "anxiety" helps normalize the public's experiences. Using language that is understandable is increasingly important because society has a growing mistrust of scientific information with medical jargon, fostering disengagement.[78] A mistrust in science has been associated with increased interest, adoption, and spread of misinformation during COVID-19.[79] Although efforts have been made to draw attention to the importance of communication with the public during COVID-19,[80] virtually no literature has been published to inform understanding of how communication and messaging have had an impact on engagement in health behaviors and public mental health during the pandemic. Research on the effects of communication and messaging during COVID-19 is essential to develop lessons learned to inform the development of interventions more precisely for specific communities. Consistent application of the principles of communication and messaging during disasters, by scientists, elected officials, and community leaders, will be critical to optimize health behaviors in future pandemics.

Leadership in Crisis

Leadership during crisis plays an essential role in community recovery. The actions and words of leaders play a vital role in the overall well-being of organizations and communities after crisis events and can even facilitate growth following exposure to trauma.[81] Leaders exist at many levels within organizations and communities. During times of crisis, individuals also rise and exert leadership influence regardless of their formal position or established authority. In addition to effective communication, leaders model behavior for members of their communities. Decisions by leaders to support health professionals and encourage health behaviors, such as wearing masks, physical distancing, and vaccinations set a tone that often is modeled by community members aligned with those leaders. There have been efforts to bring attention to principles and practices for leaders to support communities during COVID-19, emphasizing important crisis leadership actions, such as communication, collaboration, and connection.[82] Nevertheless, little research exists on the impact of leadership behaviors on community well-being during the current pandemic.

Grief leadership is a critical aspect of leading during a crisis that is associated with improved community well-being and recovery.[83] Grief leadership involves ongoing communication that acknowledges losses through community-conceived and implemented rituals, efforts to help make meaning of the event, and, ultimately, helping communities look hopefully to the future. Efforts by community leaders to address loss within their communities, collaborate with community members in developing rituals and symbolic acts to recognize and honor aspects of loss, and foster a sense of hope moving forward even through uncertain times can aid in recovery of communities around the world.

Key Points

1. The 5 essential elements of PFA (safety, calming, self-efficacy and community efficacy, social connectedness, and hope) form the foundation for interventions in COVID-19 and other disasters.
2. Effective interventions incorporate a stress continuum that extends beyond illness and addresses distress and health risk behaviors while incorporating actions that involve the individual, peers, organizational practices, and leadership support.
3. Risk and crisis communication principles should inform messaging through media and other means to reduce community distress, inform risk perceptions, and optimize engagement in pandemic-related health behaviors.

SUMMARY

The COVID-19 pandemic has brought unprecedented uncertainty to the global society. The evolving impact on public mental health is only beginning to be understood and includes numerous responses beyond psychiatric illness, such as distress reactions, health risk behaviors, resilience, and growth. Recognition of this continuum of response allows for more effective interventions. Risk for adverse outcomes during this pandemic is not distributed equitably, will change over time, and may emerge in unexpected communities. Ongoing health surveillance will inform understanding of who is at risk and when, temporal responses, and factors that buffer against this far-reaching disaster event. Continued research to better understand the unique aspects of risk created by this global event is critical to future preparedness efforts. Public mental health interventions in COVID-19, as with all disasters and future pandemics, must consider the full range of responses beyond medical illness, rapidly adapt established interventions to address current needs, and be developed within an evidence-based framework that includes established principles of PFA, communication and messaging, and leadership behaviors. Additional studies are essential to better inform understanding of how adapted interventions have an impact on outcomes to prepare the global society more effectively for future pandemics.

DISCLOSURE AND DISCLAIMER STATEMENT

The author has nothing to disclose.

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