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Assessment of Construction Workers' Mental Health to Improve Wellbeing

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Abstract

Poor mental health has a significant negative impact on the US economy, costing $193.2 billion annually, and increasing the risk of suicide. There are more than ten million construction workers in the United States, and prior research has shown that their mental health is often neglected, making them more susceptible to substance misuse, drug overdose, and suicide than workers in other industries.

We undertook the present study to review the literature about mental health of construction workers, conduct a survey to assess and identify mental health issues/concerns among construction workers, and develop recommended organizational and individual worker-level responses for mental health issues. Our literature review indicated that 10.7% of the world's population is affected by at least one type of mental health disorder, which increases the risk of suicide and has costly consequences for workers, families, and employers. Furthermore, the review helped to comprehensively define mental health, inform the most appropriate measures for assessing mental health in a work context, and identify how organizations and societies have studied and addressed mental health globally.

After the literature review, the research team conducted a survey of a heterogeneous sample of construction workers in the U.S. to assess their mental health and well-being, with 143 workers completing the survey. Workers in the study reported indicators of poor mental health at a higher rate than previous studies. Work-related stress was strongly associated with various indicators of poor mental health, including anxiety, depression, and number of days of poor mental health.

These findings highlight the need for targeted interventions to address specific work-related stressors and alleviate the strains associated with poor mental health. One potential intervention identified is leadership training, which operates at an organizational level and so can have a broad impact. Leadership can shape the organizational culture, establish supportive policies and procedures, and improve communication about mental health. Leadership training has been shown to increase leaders' support for employees' mental health, encourage resource utilization, and enhance overall employee well-being. The findings underscore the value of focusing on leadership and organizational change efforts to promote worker mental health and well-being in the construction industry.

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Introduction

Project Significance

The construction industry in the United States significantly contributes toward the GDP, with a value of $2.8 trillion in 2022, and employs more than ten million workers (U.S. Bureau of Labor Statistics, 2023). However, research has shown that the mental health of construction workers is often neglected, and they are more susceptible to substance misuse, drug overdose, and suicide than workers in other industries (Long, 2021; Lorek 2021; National Alliance of Mental Illness 2021 a, b; SAMHSA, 2020). This lack of attention to mental health is a major and growing concern, and there is a need for industry involvement and intervention to address this issue.

There is also a need for more research to assess the mental health and well-being of U.S. construction workers and recommend suitable interventions. Research studies in other countries have addressed construction workers' mental health and have suggested interventions such as creating self-checking tools, clinical training and support, and awareness programs. For example, the MATES program in Australia has incorporated several best practices to improve mental health in the construction industry. Similar research in the U.S. has been limited. The primary objectives of this study were:

1. Identify mental health problems and initiatives designed to mitigate them.
2. Assess and identify mental health issues/concerns among construction workers
3. Develop recommended organizational and individual worker-level responses for mental health issues.

A secondary objective was to explore how gender and cultural or ethnic perspectives relate to mental health problems (the accomplishment of this objective would depend on the diversity of the participants from whom data was collected).

This study is aligned with NIOSH and NORA goals to prevent negative mental health outcomes among construction workers and increase the reach, scope, and effectiveness of training in construction, including mental health and resilience training. The study uses the new NIOSH Worker Well-Being Questionnaire (WellBQ) to assess the mental health and well-being of construction workers. Based on the results of this study, we recommend suitable interventions to create a healthy work environment conducive to mental health wellness.

Detailed Summary of Literature

Defining and Assessing Mental Health

Mental health encompasses various conditions such as alcoholism, anxiety disorders, bipolar disorder, depression, eating disorders, schizophrenia, and substance abuse (American Psychiatric Association, 2021; NIH, 2022; Ritchie & Roser, 2018; SAMHSA, 2020; WHO, 2021). These conditions have important implications for employers, including absenteeism, presenteeism, turnover, disability, accident and injury rates, as well as healthcare and workers compensation costs (SAMHSA, 2020).

Approximately 10.7% of the world's population is affected by at least one type of mental health condition. Depression is the most prominent condition worldwide, contributing to 1 million suicides annually (Ritchie & Roser, 2018; United Nations, 2017). The COVID-19 pandemic has worsened the prevalence and severity of mental health issues, with an estimated 1 billion people suffering from these illnesses (Kovacevic, 2021). Globally, mental health issues also have a significant economic impact, costing an estimated $1 trillion, and individuals with these conditions can lose one in every five years lived (WHO, 2021).

Mental health conditions are even more prevalent in the construction industry, with 1 in 5 workers suffering from some kind of illness. This high level has led a researcher to label it "the silent epidemic" (Stephenson, 2019). Discrimination and stigma often exacerbate these issues, with half of those suffering from mental

health problems not seeking assistance due to stigma. Construction workers may perceive even greater stigma, limiting their ability to seek appropriate help. Therefore, a strong peer and organizational support system is needed to address mental health in the construction industry. (Mental Health America, 2021a; CDC, 2021; NIH, 2021; National Alliance of Mental Illness, 2021a; WHO, 2021; APA, 2020; Eyllon et al., 2020).

Workplace Mental Health

The World Health Organization (2022) identified several risks associated with poor workplace mental health, including inadequate health and safety policies, poor communication and management practices, and limited employee support. To promote mental health in the workplace, WHO (2022) recommended enforcing health and safety policies, creating awareness about available mental health resources, providing avenues for employees to contribute to the decision-making process, initiating career development programs, and recognizing and rewarding employee contributions. The National Alliance of Mental Illness (2021b) suggested that organizations should break the stigma of mental illness, reduce workplace stress, provide family-related benefits, and mitigate social isolation by creating an inclusive workplace. Rawe (2022) recommended that organizations understand the mental health needs of employees, including mental health coverage in their health insurance plans, establishing an employee assistance program (EAP), increasing access to mental health resources, and promoting workers' well-being. (Mental Health America, 2021b).

Mental health issues in construction and among trade workers

Construction has one of the highest suicide rates of any industry in the U.S. Trade workers in construction are more likely than most workers to have long and irregular hours and endure extensive, long-term work-related travel. These stressors may lead to various mental health issues, such as substance misuse, smoking, binge drinking, and lack of downtime. Roofers, painters, construction laborers, carpenters, and concrete finishers are the five trades most vulnerable to binge drinking; steelworkers, masons, and roofers have the highest suicide rates in the construction industry. Opioid addiction is also a significant problem in the industry, with trades that do heavy physical labor—including bricklayers, carpenters, and laborers—being particularly susceptible. Substance misuse among these trades can lead to addiction to prescription and non-prescription drugs such as fentanyl, oxycodone, morphine, and heroin. Mental health issues could result in suicide, so it is essential to address these issues in their nascent stages (NIOSH, 2020; Relojo-Howell, 2020; Haynie, 2021; Boal et al., 2020; Ompad et al., 2019; Morano et al., 2018; Lubin & Giang, 2011; Peterson et al., 2020; Sanati, 2009).

Mental health issues – gender comparison

The ratio between men and women in the U.S. construction industry remains largely imbalanced, with around 89% male and 11% female workers (BLS, 2020; Best, 2021a). Among construction trade workers, women are even more underrepresented, with only 3% being female (BLS, 2020; Curtis et al., 2018). Although data on substance abuse and drinking are limited, males are generally more likely than females to have addiction issues (SAMHSA, 2016). Physical injuries and illnesses have been linked with mental health status and can have a significant impact on the mental state of construction workers. In 2019, around 3.3% of injured workers were women (BLS, 2019b). Suicide rates are higher in males than females, with steelworkers, masons, and roofers being the most vulnerable trades (Peterson et al., 2020).

Mental health issues – race and ethnicity-based comparisons

Ricci et al. (2021) suggested that risk perceptions may vary depending on the ethnic background of the construction workers. The U.S. construction industry consists of the following demographic breakdown: Whites (88.6%), Hispanics or Latinos (30%), Black or African Americans (6%), and Asians (2%) (BLS, 2020). Health behaviors and substance use that have been linked to mental health and well-being, such as smoking, substance abuse, and binge drinking may affect people from different races/ethnicities differently. For instance, American Indians and Alaskan Natives have the highest rate of smokers, followed by African

Americans, Non-Hispanic Whites, Hispanics, and Asian Americans (American Lung Association, 2020). Brown et al. (2021) found that the highest number of fatal injuries in the industry occur among Hispanic workers, while the highest suicide rate is observed in American Indian or Native American population, followed by Whites, Hispanics, Black or African American, and Asian Americans (Balfour Beatty, 2019). However, no ethnicity-based comparison data is available for smoking, binge drinking, and substance abuse-related issues among construction workers (Roche et al., 2020; Strickland et al., 2017).

Mental health indicators

According to the Mayo Clinic (2021) and the National Alliance on Mental Illness (NAMI; 2015), signs of poor mental health can include emotional indicators like sadness, depression, and worry, as well as physical indicators like headaches, stomach aches, and fatigue. These indicators can be categorized as activity-based or thought/emotion-based. For instance, physical symptoms like headaches categorized under activity-based indicators, while emotional symptoms like mood swings can be categorized under thought/emotion-based indicators. Friedman (2020) and Gurin & Goleman (1993) have proposed that stressors that can lead to poor mental health be categorized as physical (like trauma), psychological (like cognitive stress), psychosocial (like relationship issues), and psycho-spiritual (like lack of purpose). Psychosocial and psycho-spiritual stressors have been considered as mental health factors.

Mental Health Factors

According to McKenzie et al. (2014), socioeconomic factors such as labor force status, annual household income, socioeconomic deprivation, and area deprivation are associated with mental health and contribute to mental health disparities between groups. Chan et al. (2020) identified the top eight factors affecting mental health in the construction industry, including job demands, job control, family life imbalance, welfare and socioeconomic status, work hazard exposures, coping mechanisms, workplace support, and workplace injustice. Tijani et al. (2020) identified multiple factors affecting mental health, including organization-related, task-related, personal, physical, and gender-related factors. Fordjour and Chan (2019) identified factors related to lifestyle, psychosocial conditions, physiological conditions, and work attitudes. These factors can lead to mental health indicators such as lowered concentration levels, frequent feelings of confusion, excessive fear, worry, guilt, and suicidal thoughts, among others. To assess mental health status in the construction industry, various tools have been created (Chung et al., 2014; Murphy et al., 2017; Salamonson et al., 2016).

Mental Health Assessment

Assessing the mental and emotional state of an individual is a vital process, both to screen for and ideally diagnose mental health conditions and to identify appropriate resources and treatment (Rainey, 2018; Romito et al., 2020). Several screening measures exist to determine mental health status, including physical exams, lab tests, mental health history, personal history, mental evaluation, and cognitive evaluation (Rainey, 2018). Mental health disorders, including their severity, are typically assessed by specially trained professionals (e.g., psychologists, psychiatrists, or other licensed professionals) using validated tools such as the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), published by the American Psychiatric Association. However, obstacles to accessing healthcare, along with factors related to healthcare utilization such as stigma, sufficient health insurance, and transportation, can hinder the process of assessment, diagnosis, and treatment. It is essential to ensure sufficiently large population samples to facilitate accurate assessments (Newson et al., 2020).

The construction industry has been the subject of numerous mental health assessment studies. For instance, the Dutch Questionnaire on the Experience and Evaluation of Work identified psychosocial factors that influence the mental well-being of bricklayers (Boschman et al., 2013). It is essential to validate screening tools for mental health assessment in the construction sector (Chan et al., 2020). Wearable devices have the potential to provide real-time data for validating other health metrics, as physical and mental health are inherently interconnected (Jebelli et al., 2018; Xing et al., 2019). However, studies that employ convenience

oversampling lack accuracy when it comes to race/ethnicity-based or gender-based comparisons (Curtis et al., 2018; Jacobsen et al., 2013; Turner & Lingard, 2020). Therefore, It is imperative to implement appropriate measures to address mental health concerns and effectively manage their severity.

Initiatives and Interventions to Address Mental Health

Mental health interventions refer to interpersonal or informational activities, techniques, or strategies that aim to improve health functioning and well-being. England et al. (2015) defined mental health interventions as a three-step process consisting of 1) interventions and ways that interventions affect, 2) change, and 3) outcomes. Mayo Clinic (2017) proposed a simplified set of steps for mental health interventions, including planning, information collection, team formation, consequence definition, agenda creation, intervention performance, and post-intervention follow-up. Mental health interventions can be categorized as psychotherapies, community-based treatment, vocational rehabilitation, peer support services, and integrated care interventions (England et al., 2015) or as intervention counseling, mental health crisis intervention, and psychological intervention (Baton Rouge Behavioral Hospital, 2008). Mental health interventions can also be classified as individual-level, organizational-level, or multilevel (De Angelis et al., 2020; Lingard & Turner, 2017; Martin et al., 2016; Nwaogu & Chan, 2020; Westerveld et al., 2020).

Milner et al. (2015) used brief contact interventions (BCIs) to reduce depression symptoms and suicidal thoughts in unemployed construction workers. The MATES program, an evidence-based suicide prevention initiative, was introduced in Queensland, Australia, in 2008 and has reduced the number of suicides in the construction industry (Gullestrup et al., 2011; MATES, 2008). Milner et al. (2019) conducted a longitudinal study using the MATESmobile app as a tool for face-to-face interventions, which resulted in a greater reduction in stress and suicidal thoughts. Okoye et al. (2017) found that overall, multilevel interventions at the individual and institutional levels, are more effective in reducing mental health issues, and Xing et al. (2019) demonstrated the effectiveness of progressive muscle relaxation and trigeminal nerve stimulation in reducing mental fatigue. Baton Rouge Behavioral Hospital (2008) emphasized the importance of considering variables such as time, location, intervention team, and language/tone during interventions. Mental health interventions are typically helpful to 65%-80% of people seeking support (Morin, 2016).

Public policy and mental health

In addition to the various bills introduced in the U.S. Congress to promote mental health awareness (e.g., H.R. 7666- 2021/2022 and S.1795- 2021/2022) and mitigate the associated issues, several initiatives have been adopted globally to address mental health issues. A multi-billion dollar effort has been undertaken by the Healthy Brains Global Initiative (HBGI) to explore science-backed strategies which could improve mental health-related conditions in individuals around the world (Cookson, 2020; HBGI, 2021). Another global mental health initiative was established by Stanford Medicine (2021) to formulate international research partnerships and leverage cutting-edge technologies to enable mental health-related activities at the global level. These activities include but are not limited to advancements in science, clinical innovation and service, educational excellence, community engagement, and leadership.

A few siloed efforts have been initiated during the past decade to promote mental health and well-being in the construction industry (Chesterfield, 2019; Long, 2021; NAHB, 2021). One of the first came from the United Suicide Survivors International (2020), in which multiple industry members formed an alliance to provide resources to construction workers to reduce the number of suicides. Australia's largest construction companies and leading researchers formed the Construction Industry Culture Taskforce (CICT), which aims to address "excessive work hours and fatigue, poor mental health, and failure to attract a diverse workforce" (Australian Constructors Association, 2021).

Project evolution due to different data constraints and accessibility

After completing the literature review, the research team developed and conducted a survey among construction workers using a convenience sample based on the PI's industry contacts. It proved difficult to

get construction companies to allow access to their workers proved difficult and to get them to encourage participation. This challenge of collecting data on site was compounded by the COVID-19 pandemic. The research team considers it valuable to include the lessons from this process in this report, as they provide insights into obstacles and potential strategies for future research in similar settings.

Collecting accurate and comprehensive data on mental health poses significant challenges. Primarily, the stigma surrounding mental health often discourages individuals from openly discussing their experiences, leading to underreporting and limited access to reliable data. Moreover, privacy concerns and confidentiality issues also impede data collection, as individuals may be reluctant to disclose personal information about their mental health. Furthermore, marginalized communities, including those with limited access to healthcare and resources, present additional barriers, exacerbating existing disparities in mental health data. Language and cultural barriers also contribute to difficulties in gathering diverse and representative data, particularly in multicultural societies. Most importantly, most companies fear for their image and the liability issues that can stem from mental health studies, even when guaranteed multilayered and complete anonymity. Addressing these constraints and difficulties is crucial to ensure accurate and inclusive mental health data that can inform effective interventions and policies. Also, due these constraints, it was almost impossible to focus only on the trades, as they are the hardest to access without employers' permission, and therefore the overall results were included more field engineers and non-trade specific construction personnel.

Objectives

- Identify mental health problems and associated initiatives for their mitigation
- Assess and identify mental health issues/concerns among construction workers
- Explore how gender and cultural or ethnic perspectives relate to mental health problems
- Develop recommendations for organizational and individual worker-level responses for mental health issues
- Modify the objectives based on the constraints of the data

Methods

Data Collection

This project employed two main methods for data collection. The first was an exploratory literature review, which involved a comprehensive study of previous research on workers' mental health. This review encompassed a wide range of sources, including occupational health and clinical psychology journals, National Institute of Health (NIH) mental health sources, and other relevant literature. The aim was to identify the most prevalent mental health issues and the latest global advancements in this area. The second method utilized a quantitative-oriented approach using survey tools. The survey questionnaire was designed to gather data and insights from the participants and consisted of various types of questions, including those with ordered and non-ordered choices, as well as with Likert-type scales.

To provide survey participants with a comprehensive understanding, the questionnaires were divided into five sections. The first two focused on assessing the workplace environment and included questions about workplace policies, culture, physical environment, and safety climate. The aim was to gain insights into the factors within the workplace that may impact mental health. The third section evaluated the participants' health status, encompassing relevant mental and physical aspects, with the goal of gathering information about the overall well-being of the participants. The fourth section focused on socioeconomic issues, exploring the impact of home, community, and society on mental health. This section aimed to understand the broader factors that could influence mental well-being. The fifth section consisted of demographic questions designed to collect information related to the identification and differentiation of participants, such as their job role, industry organization type, experience, and background.

By combing a literature review and a comprehensive survey the research team aimed to gather a holistic understanding of the mental health landscape among construction workers, exploring workplace factors, health status, socioeconomic influences, and participant demographics.

Literature

The research team's extensive literature review explored the following issues in detail:

- The mental health indicators/issues and the associated statistics in the construction industry.
- The different qualitative and quantitative data on the different mental health issues such as suicide rates, substance misuse, drug overdose, alcohol misuse, accidents, and health conditions among many other mental health issues, and their statistics.
- The initiatives and efforts that have been taken locally, nationally, and globally to address mental health issues in general, and specifically in the construction industry.
- The literature and data on gender and ethnicity-specific mental health issues as it is essential to understand specific population vulnerabilities.

Survey Tool

The research team developed a self-administered online survey, available in both English and Spanish, using Qualtrics software. The team assessed workers' mental health and well-being using the NIOSH Worker Well-Being Questionnaire (the NIOSH WellBQ; NIOSH, 2021). Items in the survey to assess mental health included self-report questions about a history of having depression, items assessing depressive symptoms based on the Center for Epidemiological Studies of Depression (CES-D; Radloff, 1977), and the Generalized Anxiety Disorder (GAD) scale. The NIOSH WellBQ also covered related questions, such as number of poor mental health days in the last month, insomnia, difficulty concentrating, and substance use. One advantage of the WellBQ is the rich assessment of other work-related issues, including a variety of work-related stressors and other work characteristics that may affect mental health.

In most cases, the survey request was sent to employers, who sent a link to the survey to workers with a request to complete it. In other words, the respondents were contacted through their employers or through direct communication with anonymous links. The companies were contacted first to get permission and upon obtaining that, the link was sent in an invitation letter/email which will then be distributed (with an anonymous link) to the employees within the company electronically or via paper according to the participant's preference. A total of 311 individuals opened the survey, with 143 workers (142 in English and 1 in Spanish) providing a complete response.

Sample Characteristics

One hundred and forty-three U.S. construction workers (91.5% employed full-time, 8.5% part-time) completed the survey. The majority (82.1%) are regular permanent employees, 13.7% work as contractors, and 2.6% work on-call or have a temporary work arrangement. The sample was 63% male, 26% female, with 11% not reporting gender. Regarding sexual orientation, 63% of participants identified as straight, 11% as gay or lesbian, 4% as bisexual, 3.5% identified as another sexual orientation identity, and the remainder preferred not to say. Approximately two-thirds of the sample (64.5%) identified as White, 14.5% Black or African American, and 7.3% Alaskan Native.

For highest level of educational attainment, approximately two-thirds (65.3%) of respondents earned a Bachelor's degree or higher, 15.3% had some college education, 9.2% completed high school or obtained a GED, and 7.1 had less than a high school education. The sample was very diverse in socioeconomic status, with household income ranging from <$20,000 to >$200,000 per year, and there was a great deal of variability across income categories. The table below summarizes occupations of the workers.

Table 1 - Study Participants Categorized by Occupation

Occupation	%
Project Manager	30.8%
Project Engineer	10.3%
Field Engineer	2.6%
Superintendent	9.4%
Management/Admin	13.8%
Sales/Estimating	6.8%
Steelworker	6.9%
Carpenter	2.6%
Other Worker/Laborer	3.4%
Safety	3.4%
Other	10.0%

**Percentages shown are among the n=117 who indicated an occupation.*

Results

The research team conducted descriptive and inferential statistics on the dataset derived from the survey responses. In the subsequent sections, we will exclusively concentrate on the noteworthy and significant findings from those analyzed questions. First we present basic descriptive statistics in response to key questions in the survey. (The exact wording of survey questions is included in the summary). Following the basic percentages of responses, we summarize results from additional analyses based on the study aims to compare differences based on demographic characteristics of construction workers. This summary highlights key findings of interest.

Descriptive statistics results summary

Have you ever had depression?

No:	53%
In the past	30.8%
Have currently	15.8%

These results indicate that almost half the sample has experienced depression at some point, which is higher than reported in some other studies about the general population in the U.S. (CDC, 2021).

Number of days with poor mental health in the last month:

Seventy percent of participants answered this question, with 63.3% of respondents indicating at least one day with poor mental health in the past month (6.9% indicated 0 days). The distribution of responses was positively skewed, with a median of 5 days and a mean of 8.12 days (SD=7.70).

Depressive Symptoms

Over the last 2 weeks, how often have you been bothered by feeling down, depressed, or hopeless?

Not at all	47.1%
Several days	42.0%
More than half the days	8.4%
Nearly every day	2.5%

Over the last 2 weeks, how often have you been bothered by little interest or pleasure in doing things?

Not at all	47.1%
Several days	42.9%
More than half the days	7.6%
Nearly every day	2.5%

Anxiety

Over the last 2 weeks, how often have you been bothered by feeling nervous, anxious, or on edge?

Not at all	37.8%
Several days	41.2%
More than half the days	12.6%
Nearly every day	8.4%

Over the last 2 weeks, how often have you been bothered by not being able to stop or control worrying?

Not at all	48.7%
Several days	35.3%
More than half the days	10.1%
Nearly every day	5.9%

Demographic Differences

To investigate whether there were any demographic differences by gender and race/ethnicity, the researchers compared men and women, workers who identified as White and those of other racial identities, and workers who identified as Latino/and non-Latino/a. In our results, there were no differences in depression status, depressive symptoms, anxiety, or days with poor mental health based on gender or race/ethnicity ($p > .05$). It is likely that the small sample size for the study overall and low power for detecting differences between these groups may explain the non-statistically significant findings. Based on previous research as described in our literature review, which found that women and individuals from underrepresented groups are more likely to report worse mental health, additional research is warranted to investigate these differences.

To further understand mental health and well-being among construction workers, the research team examined the correlations among mental health variables and responses to other survey questions. In a regression analysis examining various sources of stress (e.g., stress associated with family/social relationships, finances, and work), stress associated with work ($\beta=.41$, $p < .05$) and health ($\beta=.32$, $p < .05$) were strongly associated with symptoms of anxiety (i.e., being bothered by feeling nervous, anxious or on edge). Similar results were found for the extent to which workers reported feeling bothered by not being able to stop or control worrying ($\beta=.34$, $p < .05$ for stress associated with work and $\beta=.27$, $p < .05$ for stress associated with health). These results suggest that more clearly identifying specific work-related stressors and developing interventions to reduce prevent or reduce work stress and to strengthen coping skills may help reduce strains associated with mental health.

Findings and Recommendations

The results of our empirical study aligned with the findings in the literature review indicating that workers in the construction industry report indicators of poor mental health and well-being. Among the participants in our study, the proportion of workers who reported strains associated with poor mental health was higher than previous epidemiological studies. This result is concerning although not surprising in light of recent studies that have indicated an increase in poor mental health since the start of the COVID-19 pandemic (Campion et al., 2020). Our results should be interpreted with caution due to survey non-response and the possibility that workers who chose to respond may differ in mental health and/or other characteristics

compared to those who did not participate.

The preliminary findings also indicated that work-related stress is strongly associated with multiple indicators of poor mental health, including symptoms of anxiety and depression and number of days experiencing poor mental health. These results call for a more fine-grained analysis to investigate specific work-related stressors that will help guide more specific recommendations for work-related interventions to help ameliorate strains linked to poor mental health.

Improving construction worker mental health calls for intervention. In general, occupational health interventions operate at primary, secondary, or tertiary levels based on the extent to which individuals have experienced or may be at risk for or likely to have poor mental health. Primary interventions focus on preventing stressors and negative consequences (e.g., poor mental health) from the outset and are most effective. Secondary interventions are implemented among those suspected to be at risk but prior to experiencing negative consequences (e.g., poor mental health). Tertiary interventions are for those who already have experiences negative consequences, such as workers who report poor mental health.

Our first recommendation is for leadership training to support construction worker mental health. One benefit of leadership training is that it is an may organizational-level intervention, which can have greater and broader impacts than individual level interventions that are targeted at individual workers (Frieden, 2010; Tetrick & Winslow, 2015). Leadership training can take a variety of forms, including training leaders how to establish and maintain a positive and supportive work culture, training leaders to be effective in preventing or reducing work-related stressors that may lead to poor mental health (e.g,. work role overload, long work hours, ambiguity about work responsibilities, interpersonal conflict, etc.), to training leaders how to be positive role models, and provide a positive and supportive work culture, Leadership training is one type of primary intervention strategy because training leaders to be effective in these ways mentioned above may prevent more workers from developing poor mental health. Leadership training may also help workers who may also be experiencing poor mental health, by educating leaders about signs and symptoms of depressive symptoms, anxiety, etc. so that leaders can support employees if they are absent from work, need to seek healthcare for treatment. Leaders with awareness about signs of poor mental health among workers may be better equipped to refer employees to employee assistance programs or encourage workers to seek help, which may be especially helpful when there can be a negative stigma associate with poor mental health and seeking assistance. Leadership training may take the form of classroom-based training, one-on-one coaching, and/or feedback sessions, all of which have been shown to be effective (Kelloway & Barling, 2010).

Our second recommendation is for **construction business leaders to make worker health and well-being an important value and business priority and communicate this to workers** (Kelloway & Barling, 2010). Specific examples of how business leaders can accomplish this is to provide resources such as employee assistance personnel and paid work time to receive mental health care and support. By directly communicating to workers that their safety, health and well-being is a priority, workers will likely feel more valued, appreciated, and supported by the organization. In turn, this could reduce absenteeism and turnover and help foster a positive and supportive organizational culture. Buy-in from senior leaders in an organization can signal to other leaders and workers that their organization values employee health and safety.

Organizational change efforts, including those that are aimed toward building and sustaining a culture of supporting worker mental health should focus on leaders because they typically make decisions that influence employees' outcomes on the job, as well as at home. Leadership shapes the climate of an organization – i.e., employees' perceptions of the work environment and their observations about what kinds of behaviors are encouraged, rewarded, and supported on the job (Denison, 1996). Research has shown that employees are more likely to participate in health promotion and wellness programs if the

organizational culture/climate is supportive of individual health and well-being (Goetzel et al., 2014; Passey et al., 2018). Leaders' visible support of and engagement with employees is central to creating and sustaining an organizational culture that supports employee wellness (Baird & Carroll, 2011). Without leadership support and buy-in, sustained organizational change is rarely successful (Kelloway & Barling, 2010). It is also important to note that workplace interventions that plan for integrated change across workers at multiple levels (e.g., employee/worker, manager/supervisor, work team, organization) will be most likely to effectively reduce health problems compared to interventions only focused on one level (Heaney, 2023).

Taken together, leadership training and organizational culture are linked. Specifically, a clear benefit of leadership training is that it can help with building and sustaining a culture to support worker health and well-being. For example, an evaluation of a leader-focused mental health training on employees' resource use and leaders' communication about mental health, including available resources, showed that leaders who received training shared more information, were more supportive of employees' mental health issues, and actively encouraged employees to use available resources (Dimoff & Kelloway, 2019). Further, employees whose leaders attended the training reported increased willingness to seek out and use available mental health resources. Although not specific to leadership training for worker mental health, a meta-analysis from Lacerenza and colleagues (2017) found that leadership training consistently leads to improvements in employee reactions, learning, and results. Our hope is that the implementation of leadership training focused on worker mental health would yield results consistent with these previous studies, although future research will be needed to evaluate and report results of training interventions.

Future Funding Plans

The research team is planning on submitting more grant proposals to target specific issues that was realized during this research study such as the following:

- Analyzing the U.S. construction industry's programs for workers' mental health and their effectiveness.
- Investigate specific work-related stressors that will help guide more specific recommendations for work-related interventions.
- Mental health data collection and accessibility issues.

The research team will be seeking funding from institutions such as the National Institute of Health NIH and the Department of Labor, among others. The research team is also hoping work further with CPWR and are very thankful for the opportunity to have the small grant that acted as a great gateway for more research impactful research opportunities that can benefit the construction industry and beyond.

Dissemination Plan

An executive summary of the results of this study and recommendations will be shared with the organizations that participated in the study, along with a list of resources for construction industry leaders. Additionally, a brief summary of the results of this study and accompanying resources and recommendations will be shared with CPWR for dissemination to relevant constituents. Moreover, the investigators in the study will share results with the outreach director at the Center for Health, Work, and Environment, a NIOSH Center of Excellence in Total Worker Health, in order to reach additional organizations and workers in our region who may benefit from these results. The study has also garnered a lot of attention within Colorado state University community and on social media.

Presentations

Mehany, M. and Kumar, S. Status of Mental Health of Construction Workers in the US Construction Industry. Poster Presentation, Associated Schools of Construction (ASC) 58th Annual ASC International Conference, April 20-23, 2022, Atlanta, GA, USA.

Mehany, M., Kumar, S., & Fisher, G. G. Mental health and well-being among construction workers. Poster to be presented at the APA/NIOSH/SOHP Work, Stress, and Health Conference, November 8-11, 2023, Miami, FL.

Publications In Progress

Mehany, M., Kumar, S., & Fisher, G.G. – Literature review – To be submitted 2023

Mehany, M., Fisher, G. G. & Kumar, S. - Work characteristics, mental health, and well-being in the construction industry. Manuscript in preparation for submission 2023.

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