A CRITICAL ASSESSMENT OF MENTAL HEALTH RESEARCH IN CONSTRUCTION INDUSTRY

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Abstract

An issue as serious as mental health and suicide prevention demands the utmost scientific rigor in its investigation. Yet a structured review of research on mental health illness and suicides, antecedents of poor mental health, and proposed interventions in the construction industry have major limitations that may lead to ineffective and even potentially dangerous interventions. The review presented in this paper reveals much of the work undertaken in the construction domain is based only on correlations, pseudoscience, and positivistic explorations rooted in confirmation bias. Indeed, many solutions proposed by academics and so-called thought leaders have in some instances been labelled as potentially harmful by clinical psychologists in peer-reviewed publications. The resulting morass from research that is not firmly rooted in appropriate scientific methods has encouraged some construction practitioners to accept dogmas as unquestionable scientific axioms. The critical review presented here seeks to highlight key gaps in the body of knowledge, while providing guidance on how practitioners can begin to better understand the potential impacts of mental health interventions. The aim of this article is to open a dialogue and debate within the construction community on the role of organizations in combatting mental health-related issues, whilst encouraging the careful interrogation of any proposed solutions against preset standards of success and failure.

Keywords: work-related stressors, employee assistance programs, and performance metrics.

1 INTRODUCTION

Workers in the construction industry have suicide rates that are orders of magnitude higher than any other industry in the U.S. [1]. Studies have found that most construction workers reported experiences with serious mental health issue [2], a concern exacerbated by the poor culture surrounding mental health within the industry e.g., stigma, peer-pressure, alcohol and substance abuse etc. [3-5]. This is true for most developed nations from which reliable research is emerging to show construction workers are posting high rates of mental illness diagnosis, long-term disorders, addictions, and suicide rates [3,15- 18]. For the long-term sustainability of this critical global industry that is highly dependent on its human resources, there is a need to understand the what, why, and how of poor mental wellness among construction workers. In this study, the focus will be on construction workforces in North America, United Kingdom, and Australia because they have significant similarities in work methods, demographical makeup, and other demographic characteristics.

Foundationally, Fig. 1 illustrates the goals of the construction engineering and management (CEM) academic and professional community within this space. It is a highly simplified model that does not represent a medical position on treating mental health; however, for the purposes of this paper it demonstrates the three key areas in which mental health of construction workers is currently being studied [2-6]. Specifically, both research and practical efforts within the CEM domain have been focused on identifying which stressors (personal and work-related) are negatively impacting the mental health of employees and testing the efficacy of interventions touted to minimize the impact of stressors, to facilitate positive mental health outcomes.

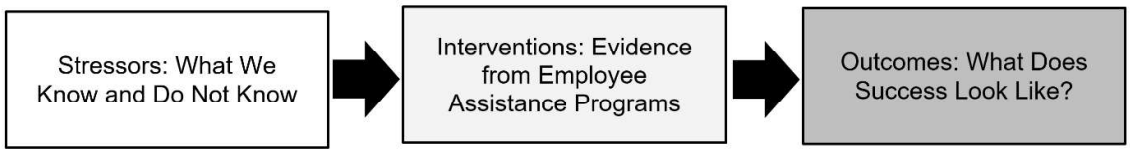

***Fig. 1*:** Foundational Framework

This paper tackles each of the constructs in Fig 1 individually and demonstrates that **some** of the research being conducted and the interventions being proposed are potentially ineffective and harmful. Given the burgeoning nature of research on mental health in the CEM domain, the authors intend to layout the basis for an argument that supports the creation of a better framework for reviewing mental health research and wellness research and practices. Based on interdisciplinary research grounded in scientific methods, this paper proposes some guidance for practitioners and future researchers on potential pathways to avoid biased, pseudo-scientific, or context-dependent evidence with limited validity.

A search was performed to capture key publications on this subject using a wide variety of individual or combined keywords. These key words included but were not limited to "construction," "suicide," "mental health diagnosis," "stressors," "Employee Assistance Programs (EAP)," and "work-related antecedents to poor mental health." These keywords were searched in the following recognized databases and indexing tools: Google Scholar, Web of Science; Engineering Village; PubMed; PsychInfo; and the American Society of Civil Engineering. The literature reviewed was used to critically evaluate the research being performed and suggest pathways for future research.

2 STRESSORS IN CONSTRUCTION: WHAT WE KNOW AND DO NOT KNOW

A stressor is defined as stimuli within an individual's environment that causes long lasting and measurable negative psychological or neurological change. Stressors can lead to different kinds of mental health issues ranging from negative affective mood states to suicide ideation. Unfortunately, a universal definition for a *clinically diagnosed* stressor is contentious and confounded by not only the inconsistencies in opinions among medical professionals [13, 24] but also a number of psycho-social facets [22- 23]. The authors adopted the aforementioned definition which is based on the seminal work published in peer-reviewed literature [19- 21] because it sets a high bar for what constitutes as a stressor which increases the relevancy of the discussion presented below. By classifying stressors as the agents that have been empirically proven to cause negative physiological impacts on critical organs and chronic neurological strains [25-31], the discussion presented below has high significance from an individual and organizational perspective. Indeed, the medical community itself is still debating definitions, diagnoses and treatments, and therefore strict adherence to a definition with objectively measurable outcomes in individuals will help reduce subjectivity and any implicit biases in this paper.

Table 1: Evidence on Work-related Stressors found in Construction Industry

Work-related Stressor	**Definition**	**Evidence QualityMedical)**
Sexual Harassment and Assault [32-35]	Although harassment and assault are not similar, the stressor here captures offensive sex-related acts in workplace.	Causal with high external validity
Bullying [36-37]	Repetitive negative and aggressive actions taken that canbe verbally or physically abusive in nature.	Causal with high external validity
Discrimination[38-39]	Systemic practice of treating any individual or group ofpeople less fairly than others.	Causal with high external validity
Job Demand[40, 42]	The physiological and psychological demands placed onthe individual by the work they are performing.	Correlational with high external validity
Social Isolation[48]	The weakening relationships that threaten the sense of contact and belongingness causing social disengagement.	Causal with low external validity
Traumatic event[49]	A traumatic event is any "exposure to actual or threatened death, serious injury or sexual violation"	Causal with high external validity
Financial Uncertainty [50]	The chronic uncertainty in the sustainability and security of economic future.	Correlational with high external validity
Poor physicalhealth [51]	The degree to which the physical health is beingnegatively impacted by work.	Causational with low external validity
Work-life balance [52]	The degree to which an individual is able to achieve work-related and non-work-related goals.	Correlational with high external validity

The stressors noted in Table 1 have been summarized based on the work produced by [4; 8-9; 14] wherein the authors conducted a comprehensive review of studies on mental health published in the construction domain. This list only represents the work-related stressors found within the construction industry context. To ensure a reasonable scope, stressors that are not work-related (e.g., COVID-19, politics, major societal events etc.) [10-11] were not included in the analysis. Additionally, stressors that had significant overlap in their definitions were combined into one unit of analysis (e.g., work overload, hours worked, and work burnout were considered part of one theme: job demand) as a separation was not warranted from a clinical standpoint. Finally, stressors that have been noted in literature as potential negative coping strategies (e.g., substance abuse, addictions etc.) [12] were not included because it is not possible to consistently determine if they are direct, mediating, moderating, or after-the fact causes of poor mental health [13].

Causal Evidence: All the stressors noted in Table 1 are negative in nature and have been found to have causal links to mental health. For example, sexual harassment, sexual assault, and bullying, across different contexts and experimental constraints [32-37] impact the neurochemistry of human beings albeit to varying degrees. Because of the strong generalizability of this work, construction researchers may directly apply this knowledge to minimize the work-related antecedents associated with these stressors by introducing targeted interventions. Put simply, construction researchers do not need to reinvent the wheel showing relationships between these stressors and poor mental health.

Associative Evidence: Although stressors such as isolation and poor physical health have been noted to be causal factors of poor mental health, there are more pronounced interacting effects of individual differences (e.g., sex, ethnicity, age, education level etc.) that potentially confound the nature and strength of the relationship between these stressors and mental health [22-23]. For example, the stress of a divorce impacts physical health in men and women differently [41]. This implies that CEM researchers need to study individual differences across stressors with lacking causal evidence to understand how other moderating and mediating factors can impact relationship between the stressor in question and the physiological and psychological health of employees. Without deeper clinical or quasi-field experimentations, the generalizability of some of these stressors and interventions cannot be determined. Finally, stressors such as job demand and work-life balance have become highly relevant with on-going debates around their impact onto an individual's mental health especially post-pandemic [43]. To the best authors knowledge, the few clinical trials that have been conducted found no *causal* relationship between these stressors and wellness [44]. Thus, any large- scaled interventions to address these stressors would be premature since the antecedents of such stressors and the corresponding individual differences have not yet been proven across the population.

Although these precursors of poor mental health deserve our attention, there is little to suggest they are unique to the construction industry. In fact, the same stressors also appear in other industries such as transportation, mining, and medicine [45-48].

Despite the positive efforts to treat mental health issues with respect and seriousness, we are seeing an increase in suicide rates over the last decade. These trends suggest it is possible that the stressors unique to construction have yet to be identified. For example, does the industry have higher suicide rates because there is an over-representation of white/Caucasian males that also happens to be the demographic that at this time is disproportionately dying by suicide [53]? Or is it possible that the stressors are internalized differently among the key demographical groups represented in the construction workforce (e.g., toxic masculine culture)? Or are there confounding factors (e.g., masculine culture) that makes these stressors more prevalent and pervasive in the construction industry than other industries [78]? We actually have still yet to explain with evidence why construction has a disproportionately high rate of mental illness and suicide rate.

Another gap in the body of knowledge is the overreliance on correlational evidence stemming from quasi-field experiments. Correlational fallacies are rarely acknowledged in mental health research, which is highly concerning. The field of construction safety has several examples of false conclusions stemming from correlations like the Heinrich's pyramid. This model emerged from correlation-based evidence showing every 300 near hits (incidents resulting in no injury) correspond to 29 minor accidents, and 1 major accident, which has finally been shown by empirical evidence of stagnant fatality rates and declining total recordable injury rate to not be causal in nature, something Heinrich himself had to clarify[58]. People used the model in a manner it was never meant to be used. However, the pyramid for years guided safety leadership and decision-making yielding ineffective interventions and solutions. We are atrisk of repeating such mistakes (i.e., treating associative evidence as if it is

causal) in mental health research by over relying on correlations and failing to perform controlled trials to determine the presence of stressors, the nature of those stressors across different demographical groups, and to establish their hierarchy of importance i.e., which have the biggest and most statistically significant effect sizes of negative impacts on individual's mental health. There are very few construction studies with quasi- experimental field data, and none to the best of authors knowledge that leverage experiments with control groups. In many cases, this is not unreasonable or surprising since conducting clinical trials is might not feasible for CEM researchers and practitioners in most cases. However, the lack of discussions within publications on the limitations of the work should be addressed. Appropriate caution in language should be required by editors and peer-reviewers when presenting findings within publications to appropriately forewarn practitioners on the limitations of the work being produced.

It is undeniable that construction workers are susceptible to suffering from chronically diagnosed mental illnesses, and physiological health issues stemming from chronic stress. However, the work cited above and the meta-data does not make it clear that construction workforce is *uniquely* challenged by some specific stressor(s). Research is needed to understand what makes construction workers occupationally more susceptible to clinically diagnosable mental health issues especially as it relates to suicide ideation. If research is limited to the types of correlational studies already present in the literature, we may fall prey to confirmation bias and drawing causal inferences from potentially spurious relationships. Keeping ourselves focused on work-related stressors only and using validated approaches to confirm their presence on the jobsite would foundationally set us up for success. The success would translate into us having a better understanding of the work-related stressors for construction workers. Finally, only by confirming the external validity of the impacts of these stressors on mental health across relevant demographical groups can we begin to create impactful employee assistance programs (EAP).

3 SCIENTIFIC EVIDENCE IN EMPLOYEE ASSISTANCE PROGRAMS (EAPs)

EAPs are defined as "workplace program designed to assist: (1) work organizations in addressing productivity issues, and (2) "employee clients" in identifying and resolving personal concerns, including health, marital, family, financial, alcohol, drug, legal, emotional, stress, or other personal issues that may affect job performance." by the EAP Association [54, pg. 6]. In other words, it is a list of programs launched by any organization to support primarily the well-being of its employee. Historically, it was launched to fight rising alcoholism and absenteeism in the workplace [56]. These efforts came to light as organizations accepted that increasing personal concerns amongst employee will result in a less optimal work culture and performance [56]. EAPs have been shown to be effective across different contexts and the construction industry settings. The authors recommend readers to review some of the citations [55] that discuss creation of an EAP within organizations where trained professionals are responsible for tackling stressors in workplace proactively and improve wellness of employees. In essence, EAPs can not only foster an empathetic culture within the company, but the evidence would suggest it would also reflect in the bottom line of the company, making their absence a mistake. However, like with any corporate program, not all are equally effective. Not only is there often lack of awareness amongst employees on knowing what EAPs actually are, there is also a general mistrust towards their touted effectiveness [57,60].

3.1 Peer-based Support

Consider the popular intervention proposed by many self-help gurus: peer-based support. Peer-based support is defined as "the provision of emotional, appraisal, and informational assistance by a created social network member who possesses experiential knowledge of a specific behavior or stressor and similar characteristics as the target population, to address a health-related issue of a potentially or actually stressed focal person." [65, pg. 329]. This is a multi-billion-dollar industry based around the self-help concept that people with a "mutual" problem can take control of their adverse situation through personal and collective efforts. Peer-based support is arguably a highly controversial intervention that has struggled to define its scope [63], prove its effectiveness medically across diverse demographics [60,63], or even stay impervious to frauds masquerading as experts sharing wisdom on diets, financial advice, and also mental health [66]. It is not surprising that many have sought to take advantage of expensive medical systems and the lack of access to instead suggest extremely harmful technology-based applications [67] to cash in on a global challenge. This is not to say that there are no strong proponents with robust evidence demonstrating the virtues of a self-help (e.g., informal personal, formal personal, group-based; [66]) approach to mental health.

Peer-based support is becoming the most popular intervention for construction organizations to adopt, despite the complexity and nuance involved. Although construction professionals feel compelled to action, many do not understand the nature and construct of mental health challenges or the role that they could play in mental health improvement. Pervasive ignorance of the nuanced and complex nature of mental health can yields actions that are counterproductive [61, 63, 64]. There is also a need for deeper investigation, as construction professionals are often woefully unprepared to engage in mental health improvement and suicide prevention conversations. To the best of authors knowledge, the different mental health first aid trainings being delivered to construction professionals do not, as yet, have robust empirical evidence demonstrating: (a) improved learning outcomes amongst diverse group of practitioners, (b) improved application of mental health first aid from the training, or (c) improved mental health outcomes amongst employees from diverse backgrounds receiving first aid from construction practitioners trained. There have been a few studies on this, but not only is the evidence not generalizable [79] but there were also potential ethical concerns discovered [80]. Additionally, we have to ask ourselves if the peers can ensure the psychoeducation/enrichment of others without jeopardizing their own well-being. We also need to ask ourselves if there are conditions within which our peers could lack the skills to maintain gains or avoid regression. Finally, we need to ask if the peers are capable distinguishing coping strategies that could be beneficial from the ones that could be physically and psychological detrimental to individuals seeking help [66]. If the answer is even slightly hesitant, the authors suggest using abundance of caution so as to not further harm which is unfortunately a more commonplace phenomenon than people give credit [77].

Consider the intervention funded by Centre for Disease Control labelled 'Man-therapy' [https://mantherapy.org/about]. Man-therapy was not able to demonstrate statistically significant reductions in depression and suicide ideation numbers compared against a control group in a quasi-field experiment [75]. It did, however, show improvements in men wanting to seek professional mental health help while controlling for marital status, education, and sexual orientation [76]. As one digs deeper, the fundamental concept of 'Man-therapy' is to use stereotyped crude humor to engage men in the intervention, which is not a generalizable strategy. Additionally, the authors wonder how companies reconcile using Man-therapy alongside DEI statements, given that the construction industry is also notorious for being overly-masculine and sometimes a hostile working environment for other genders and minorities. Finally, the authors can assure readers that decades of research on cognitive biases suggests usage of 'Man-therapy' will likely exacerbate the presence of many cognitive biases that have made the fight against mental health challenging in the first place (see Table 2). There is absolutely no doubt that 'Man-therapy' as an approach can be effective (as the testimonials on website demonstrate), but to implement without due consideration on how it could reinforce stigmas through toxic mentalities or simply make any "male" feel less "manly" for not fitting the image of vulnerability shown therein. EAPs need to be sensitive enough to undertake a *number* of interventions in a tactful manner so that largest impact can be made. Practitioners need to actively communicate the diverse portfolio of interventions to ensure that some employees do not feel "othered" or neglected.

Table 2: Biased Support of Peers

Work-related Stressor	**Definition**	**Evidence QualityMedical)**
Availability	The tendency to inflate the importance of information or likelihood of events that come to uswith cognitive ease.	Peers can engage in seeking information or providing resources that confirms their bias based on recent experiences. [59]
Anchoring	Taking a specific piece of initial information andforecast skewed outcomes.	Peers can lose focus from listening to intervening based on the miscalibrated opinions. Asking leading questions basedon the information. [59]
False Consensus	Incorrect beliefs and assumptions on how well one's opinions or values aligns with that of others.	Peers can incorrectly correlate the mentalhealth experiences, responses, and situation of others with their own. [59]
Representativeness	A conjunction error – the degree to which we attribute an individual, situation, or event has characteristics of population it is believed to havecome from event has characteristics of populationit is believed to have come from.	Peers can engage in "fitness for duty" assessments that makes them seek out patterns or attributes typically associatedwith "insert name" mental health issue. [59]

In general, human beings – laypersons – are untrustworthy because we function on affective heuristics
– how do I feel about this? [73]. Decades of evidence has shown that we value our emotional appraisalsmore than cognitive counterparts [74]. Table 2 shows some common biases emerging from peer-basedsupport intervention because really, none of us are immune to these biases. Indeed, there is significantresearch demonstrating not just us laypersons, but medical professionals also fall prey to these biases leading to reduced diagnostic accuracy [71]. To ensure that good intentions translate to positive impacts, it is crucial that EAP-based interventions are first tested in a controlled setting and community validation through peer-review. As it stands, there are severe limitations in research methodologies, practical efficacies, and validity in interventions being proposed and being *actively* adopted on sites.

Thus, clear strategies are needed to enable construction professionals to listen, observe, understand, and address mental health concerns of an increasingly diverse construction workforce in reasonable manner. As [66, pg. 8] noted "[f]or individuals suffering with more severe problems, it is simply not enough to be empathetic, understanding or mature; the therapist must be skilled in the selection of appropriate principles and strategies of change and the selection of effective interventions." If we need therapists and psychiatrists to lean into their respective cognitive and allopathic toolkits respectively, we need peers who wish act as mental health advocates to be reasonably well-versed in the empirically validated practices through rigorous training and periodically updated certification. Additionally, practitioners need to therefore ask this non-exhaustive list of questions before nominating someone to be a peer-supporter:

1. Are the peers effectively able to navigate their experiential biases?
2. Are the peers effectively able to identify individuals requiring help without resorting torepresentativeness bias?
3. Are the peers trained in personalizing their guidance for individuals from differentbackgrounds towards seeking professional help?
4. Are the peers acknowledging and understanding the impact of participating in EAP could haveon their own mental well-being?

Self-help groups can be incredibly powerful in acting as societal agent catalyzing individuals to accept issues and reach out for more help [66]. The intention behind Table 2 is to not be captious but to be cautious because the evidence is lacking. The challenge for us is that construction organizations cannot outsource the management of mental health by simply tasking individuals in safety or Human Resources who are likely untrained and unqualified to manage mental health issues. If we believe mental health issues are just as serious other diseases, we must function accordingly – wherein medical help is sought at all times from professionals. Peer-groups can be powerful agents in getting someone to agree to seek help, but not be the "fix" to the mental health issues. Having philosophical clarity on what we want to do based on rigorous scientific evidence will help us in launching interventions that are slated to succeed.

4 WHAT DOES SUCCESS LOOK LIKE?

A recent study by Hallowell et al. showed that measuring total recordable injury rates is poor safety performance metric [68]. The statistics of recordable incidents and fatality numbers do not allow us to predict future safety performance on business unit, project, or even the organizational level. The work has propelled safety community to discuss alternative measures of safety performance where for decades statistical randomness in injury and fatality rate was awarded or punished. So, we need to ask ourselves in mental health, a similar question – how do we plan to measure our success as it relates to improving well-being of workers? Not only is success measured using suicide rates a lagging metric whichhas determinantal impact on the culture given its after-the-fact nature, it may not be statistically valid assuicides compared against the overall size of the workforce are thankfully rare.

There are no internally, externally, and ecologically valid self-report instruments that could be used to measure the mental health of all construction workers. Most surveys or interview techniques, which is what the vast majority of current construction mental health research is using, cannot overcome the applicability problems stemming from demand characteristics [69] and poor reliability in diagnosis of personal mental health [70-71]. Consider the simple example of translating common surveys or assessment tools - there is research that has shown straightforward translations can be highly inaccurate [72]. Thus, we need proxy measures of well-being that in the short-term that can be used to assess well-being of workers without asking intrusive questions in a purely positivistic experimental setting triggering self-preservation heuristics and biases of workers (e.g., observer expectancy bias). Short-term goals

such as reductions in absenteeism and annual health care claims have been proposed as proxy measures of well-being through the tracking of organizational costs. Although very promising, these metrics are also lagging and the predictive capacity of these metrics against long-term suicide rates in construction industry remains unclear. The report labelled "U.S. surgeon general's framework for Workplace Mental Health & Well-Being" produced by the U.S. government sets out an ambitious agenda for organizations across the spectrum: protection from harm, connection and community, work-life harmony, mattering at work, and opportunity for growth [62]. Although, the framework is industry agnostic – its components can be taken to create an EAP model for future testing for our diverse field-based and office-based workforce. This is a research area within CEM context that is yet to see major contributions and therefore, remains the biggest gap in the body of knowledge.

5 CONCLUSION

The construction industry's willingness to act is admirable but poor worker mental health is a problem that deserves attention grounded in serious scientific foundations. When it comes to mental health, sometimes doing nothing at all can be better than doing something that is not helpful, not least because it is a genuine (albeit rare) possibility that we instead cause lasting harm. There is sufficient evidence demonstrating that we all – medical community included – are dealing with significant biases as it relates to mental health. Some biases manifest in treating mental health issues with disdain and a "soldier on" approach while others manifest into swearing by techniques that will change the other person's life based on experiences. The medical community acknowledges that mental health is a field with evolving sensibilities resulting from the piecemeal discovery of knowledge. As the professionals navigate the unknown number of neurological crevices of our brains, both not taking action and action without proper understanding can both be harmful. Instead, the research community should more rigorously peer-review any mental health publications by considering the internal, external, and ecological validity of the work by comparing it against relevant medical research that is showing incredible heterogeneity in clinical opinions and diagnosis when it comes to mental health issues, illnesses, and disorders. This includes having the professional humility to admit when we don't know what we don't know, and when medical professions are struggling with a phenomenon, it is rather unlikely that construction researchers are able to step into the breach. Future research should aim to better measure success, whilst constantly seeking to improve our understanding of stressors within the construction industry Professionally, as a community we also need to ensure vigilance when creating, evaluating, and managing interventions – and given the current state of research of mental health, it is possible that being overly cautious and interrogative will better serve the industry, and its workers, in the long run.

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