

# Measures to boost mental health in the construction industry: lessons from the Nigerian workplace

Janet M. Nwaogu<sup>1</sup> and Albert P.C. Chan<sup>2</sup>

<sup>1</sup>The Hong Kong Polytechnic University, Hong Kong. Ph.D. Candidate, Dept. of Building and Real Estate. Block Z, 181 Chatham Road South, Hung Hom, Kowloon, Hong Kong, China.

E-mail: [janet.nwaogu@connect.polyu.hk](mailto:janet.nwaogu@connect.polyu.hk) (MSc., corresponding author).

<sup>2</sup>The Hong Kong Polytechnic University, Hong Kong. Chair Professor and Head, Dept. of Building and Real Estate. Block Z, 181 Chatham Road South, Hung Hom, Kowloon, Hong Kong, China.

E-mail: [albert.chan@polyu.edu.hk](mailto:albert.chan@polyu.edu.hk) (Ph.D.)

## ABSTRACT

The construction industry's workforce is experiencing deteriorating mental health. In Nigeria, the reported prevalence rate of depression, anxiety, and suicidal ideation among construction supervisors is 55.1%, 14.8%, and 0.1%. Thus, spurring this research into examining measures to implement to prevent and mitigate the onset of common mental ill-health. This was done by evaluating a mix of 19 strategies divided into seven constructs that can be adopted to promote mental health. The strategies were selected from existing literature using the multi-modal intervention approach to mental health promotion as a guiding principle. Surveys were collected from 82 purposively selected construction supervisors and experts, and were analyzed using mean score and Mann-Whitney U test. The study revealed that strategies related to morale-boosting are essential. The study highlights primary, secondary, and tertiary intervention strategies that could be implemented to boost mental health and well-being in the construction workplace. This study contributes to the existing global body of knowledge on measures essential for workplace intervention on health and safety.

**Keywords:** Strategies, Multi-modal intervention approach, Mental health, Health and safety

## INTRODUCTION

High job demands, job insecurity, financial insecurity, inflexible work schedules, poor interpersonal relationship, work-life imbalance, low job control, low support are prevalent psychosocial stressors in the construction industry. The consequences of such stressors include job dissatisfaction, mental ill-health symptoms (e.g., depression and anxiety) at the individual level, low productivity, high safety claims, and compensation at the organization level (Nwaogu and Chan, 2021a). In Nigeria, there is a prevalence of mental ill-health in the general population (World Health Organization, 2017) and the working population (Oyewunmi et al., 2015). The prevalence rate of self-reported depression, anxiety, and suicidal ideation among construction supervisors was 55.1%, 14.8%, and 0.1% (Nwaogu et al., 2021a). Irrespective of the economy (lower-middle-income or high income), the construction industry is facing an epidemic of mental ill-health (Rees-Evans, 2020, Boschman et al., 2013, Burki, 2018).

Without breaking the circle of stressors or mitigating it, mental ill-health outcomes may worsen. Other reasons for worsening mental ill-health include the stigma that prevents open discussion on stress and mental ill-health (Bryson and Duncan, 2018, Black et al., 2019). Worsening mental ill-health is a heightened risk factor for suicidality. This has drawn increasing

attention to the need to arrive at sustainable approaches for mitigating and preventing stress among construction personnel. More so, there is no health and safety without mental health (Bryson and Duncan, 2018). A way to alleviate stressors and their negative impact is to put in place policies that help create a workplace that is psychologically safe and healthy for professionals (Burke, 2019). This can be achieved by adopting a multi-modal intervention approach (Joyce et al., 2016). The multi-modal approach to mental health includes the adoption of primary, secondary, and tertiary intervention strategies to achieve a more rounded approach to mitigate the onset of stress and its related mental ill-health outcomes (Martin and LaMontagne, 2018). According to Kane et al. (2017), “multi-modal interventions theorize that an integrated approach to addressing multiple risk factors is more successful than single-component interventions in producing benefits”. Primary interventions help prevent the onset of work-related mental health problems by eliminating or reducing the stressor (LaMontagne et al., 2014). They include job redesign measures and other measures mostly directed to the source of the work (LaMontagne et al., 2014, Pignata et al., 2017). Secondary interventions are designed to reduce stress in employees by equipping them with resources that can help them deal effectively with the stressors directed towards them (LaMontagne et al., 2014). Finally, tertiary interventions are reactive and mostly involve techniques or measures used to respond to developed mental health problems, e.g., counseling, treating, or rehabilitating affected employees (LaMontagne et al., 2014). However, if counseling happens before the symptom, it is a secondary intervention (LaMontagne et al., 2014).

Previous studies on mental health in the construction industry (e.g., Boschman et al., 2013, Bowen et al., 2018, Langdon and Sawang, 2018, Goldenhar et al., 2003) have focused on determining stressors and mental health symptoms. The studies provide a foundation on mental ill-health risk factors in the industry and inform this present study. However, there remains a dearth of research into strategies to mitigate the onset of common mental health problems in the construction industry. In order to advance the body of research, this study focused on researching strategies to improve mental health in the construction industry of a lower-middle-income country like Nigeria from the viewpoint of a multi-modal approach to mental health. In order to achieve the aim, the objective was to identify and assess the strategies that can be implemented to create a psychologically safe and healthy workplace within the context of the Nigerian construction industry. The study will inform on the perception of two construction professionals’ groups on the strategies that should be subjected to further testing for effective reduction of stress and related mental health outcomes. The result of this study can highlight intervention strategies that hold promising benefits in the improvement of mental health among the construction workforce, which may be subject to scrutiny on applicability in other countries.

## **METHODOLOGY**

### **Face and Content validity of research instrument**

A draft questionnaire was developed by identifying a number of strategies from occupational health literature (e.g., Enns et al., 2016, Hlanganipai and Mazanai, 2014, LaMontagne et al., 2014, Pignata et al., 2018, VanAntwerp and Wilson, 2018). The draft questionnaire passed through content validity involving a panel of five experts, among whom are occupational health psychologists and construction professionals. All the panelists were sourced based on their research contribution to the field of construction health and safety. The content validity involved two stages of review. The first stage of the review consisted of the panelists assessing the fit of 31 strategies identified from literature to the study aim. In the second stage, they were asked to rate

the importance of the strategies in achieving the aim of the study over a four-point Likert scale. Based on the importance rating, any strategy with three panelists scoring it a four was used to arrive at the final questionnaire. A list of 19 strategies making up seven constructs was rated very important by at least three panelists. Therefore, 19 strategies made up the strategy section of the final questionnaire.

The questionnaire was divided into two parts, namely Part A and B. Part A elicited demographic questions, and Part B consisted of the proposed strategies. Part B required the respondents to indicate the level of importance of the proposed strategies using a four-point Likert scale: 1 = Extremely not important; 2 = Not important; 3 = Important; 4 = Extremely important. The four-point Likert scale was employed as an ipsative item because it eliminates the neutral point of the 5-point Likert scale, which has been faulted for affecting reliability and consistency arising from neutrality and indecision (Jamieson, 2004). The questionnaire was pilot tested for face validity among fifteen construction practitioners who are members of professional construction bodies in Nigeria. The practitioners were asked to comment on the adequacy of the questions and time required to complete the survey. All participants indicated that the questions were easy to understand and adequate for achieving the aim of the study. They also indicated that the questionnaire took an average of five minutes to complete.

## **Data Collection**

The questionnaire was administered to purposively selected experts and construction supervisors. The experts had to occupy a policy-making role in the construction industry, while the supervisors had to be engaged in a supervisory position related to building production and management. For this study, an expert refers to a person with the skills and pedigree related to policy-making roles in the construction workplace (Nwaogu and Chan, 2021a). The supervisors and experts were sourced from construction-related professional bodies in Nigeria particularly: the Nigerian Institute of Building (NIOB), Nigerian Institution of Civil Engineers (NICE), Nigerian Institute of Architects (NIA), and Nigerian Institute of Quantity Surveyors (NIQS). The professional organizations were contacted and briefed on the intention of the research. Thereafter, the study was advertised among suggested members of the organizations. The survey respondents consisted of a total of 42 experts and 40 supervisors who met the criteria and gave their informed consent to participate in the survey. Therefore, purposive sampling was adopted for this study.

## **DATA ANALYSIS**

The data collected were analyzed using mean score and Mann-Whitney U test via the IBM SPSS software (26.0 version). Prior to data analysis, the internal consistency (reliability) test was conducted using Cronbach's Alpha ( $\alpha$ ). The internal consistency test indicates the reliability of the strategies in measuring the need for the strategies among the respondents. The reliability is checked using cut-off points:  $\alpha \geq 0.9$  = excellent,  $0.9 > \alpha \geq 0.8$  = good,  $0.5 > \alpha$  = unacceptable" (Flo et al., 2018).

### **Mean ranking of the strategies**

Mean score and standard deviation (SD) values, the most commonly used descriptive statistics, were used to rank the strategies into perceived order of importance. In a case where a tie existed

between the mean of two or more strategies, the strategy with the lowest standard deviation was ranked higher, as shown in (Darko et al., 2017). Thereafter, the strategy groups were ranked into order of importance using mean score.

### **Mann-Whitney U test**

An in-depth analysis of the mean in Table 1 was performed using the Mann-Whitney U test in order to determine whether the perception of the strategies differed among the experts and construction supervisors. Understanding the difference in perception could highlight the strategies unique to each group and provide information that would improve decision-making. The Mann-Whitney U test does not make any normality assumption about the population (Darko et al., 2017). In the Mann-Whitney U test, the null hypothesis holds that “there is no difference in the means of two groups” (Nwaogu and Chan, 2021b). However, if the p-value is less than 0.05, the null hypothesis is rejected, indicating that there is a statistically significant difference in the means of the groups.

### **RESULT**

The reliability test yielded an excellent Cronbach’s Alpha ( $\alpha$ ) value of 0.81, indicating that all the strategies are consistent in achieving the aim of the study. As shown in Table 1, with a p-value above 0.05 for all the strategies, the Mann-Whitney U test did not show any statistically significant difference in the means of the response between the experts and supervisors. The respondents agreed to the importance of implementing all the strategies as they all ranked above 2.50 cut-off for a four-point Likert scale (see Table 1). Among both experts and supervisors, the top two ranking strategies were “celebrate employee’s success” and “provide employees with competence training” with mean scores 3.61 and 3.51, respectively. The constructs, “boosting employee morale”, “improving interpersonal relationships”, “building coping and resilience”, “promoting workplace civility”, “employee assistance programme”, reducing excessive job demands”, and “job redesign strategies” had group mean of 3.49, 3.47, 3.40, 3.38, 3.36, 3.24 and 3.22 respectively.

### **DISCUSSION**

Among the experts and supervisors, “celebrate employee’s success” and “provide employees with competence training” ranked the top two strategies that should be in place. This corroborates Nwaogu and Chan (2021a), where both strategies were ranked most important strategies needed for mental health improvement by construction experts. Implementing these strategies can boost morale among supervisors and motivate them, which would alter the perception of psychosocial work stress. For instance, Pignata et al. (2017) indicated the need to celebrate success as a strategy to reduce stress among employees in Australian universities. The seven constructs for the strategies had means above importance scale, which implies their perceived importance in helping to mitigate work stress and its outcome. Similar to Nwaogu and Chan (2021a), among the strategy groups, constructs related to “boosting employee morale” ranked the highest, followed by those aimed at “improving interpersonal relationships,” indicating the importance attached to the strategies within the construct. However, contrary to Nwaogu and Chan (2021a), where the construct focused on improving workplace justice ranked the lowest, the construct related to implementing job redesign strategies ranked the lowest in this study.

Table 1. Supervisors and experts on strategies required to improve mental health among construction site supervisors

Code	Strategies and group mean	All respondents (N = 82)			Supervisors (N = 40)			Experts (N = 42)			Mann-Whitney U test	ToI		
		Mean	SD	R	Mean	SD	R	GMs	Mean	SD	R		GMe	p-value
<b>SG1</b>	<b>Boosting employee morale (group mean = 3.49)</b>							<b>3.45</b>				<b>3.54</b>		
ST11	Celebrate employee's success	3.63	0.58	1	<b>3.60</b>	<b>0.67</b>	<b>1</b>		<b>3.67</b>	<b>0.48</b>	<b>1</b>		1.00	P
ST16	Provide employees with competence training	3.60	0.54	2	<b>3.53</b>	<b>0.60</b>	<b>2</b>		<b>3.67</b>	<b>0.48</b>	<b>2</b>		0.32	S
ST09	Give constructive feedbacks instead of reprimanding	3.39	0.64	11	3.42	0.71	8		3.36	0.58	15		0.40	P
ST07	Job sculpting (i.e., promote employees' deeply embedded life interest by designing job roles inline with embedded interest)	3.35	0.73	14	3.25	0.90	14		3.45	0.50	8		0.60	P
<b>SG2</b>	<b>Improving interpersonal relationships (mean = 3.47)</b>							<b>3.43</b>				<b>3.52</b>		
ST10	Ensure swift conflict resolution	3.51	0.61	4	<b>3.43</b>	0.68	7		<b>3.60</b>	0.54	3		0.26	P, S
ST17	Put in place measures that support improved relationships at work	3.43	0.67	8	3.43	0.68	6		3.43	0.67	12		0.99	P
<b>SG3</b>	<b>Building coping and resilience (mean = 3.40)</b>							<b>3.33</b>				<b>3.46</b>		
ST03	Promote mental health awareness and anti-stigma (anti-stigma campaign)	3.44	0.61	7	<b>3.45</b>	<b>0.71</b>	<b>4</b>		3.43	0.50	10		0.51	S
ST02	Introduce wellness programs to workplaces/site offices	3.40	0.66	10	3.33	0.80	12		<b>3.48</b>	0.51	7		0.64	S
ST04	Provide practical stress management training	3.38	0.66	12	3.35	0.74	10		3.40	0.59	13		0.94	S
ST01	Empower staff to be individually more resilient through resilience training programs	3.37	0.76	13	3.20	0.91	16		3.52	0.55	6		0.14	S
<b>SG4</b>	<b>Promoting workplace civility (mean = 3.38)</b>							<b>3.29</b>				<b>3.46</b>		
ST05	Create policies to eliminate harassment and bullying	3.48	0.97	5	<b>3.35</b>	0.86	11		<b>3.60</b>	<b>1.06</b>	<b>4</b>		0.69	P
ST06	Promote equality policies irrespective of gender, and age	3.27	0.77	16	3.23	0.90	15		3.31	0.72	16		0.75	P
<b>SG5</b>	<b>Employee Assistance Programme (mean = 3.36)</b>							<b>3.32</b>				<b>3.40</b>		
ST19	Offer a sustainable retirement plan for employees	3.54	0.63	3	<b>3.53</b>	<b>0.64</b>	<b>3</b>		<b>3.55</b>	<b>0.63</b>	<b>5</b>		0.90	P, S
ST18	Offer assistance to non-work stressors such as marital, family or relationship challenges or lifestyle challenges	3.17	0.72	17	3.10	0.81	18		3.24	0.62	17		0.53	T
<b>SG6</b>	<b>Reducing excessive job demands (mean = 3.24)</b>							<b>3.26</b>				<b>3.23</b>		
ST15	Conduct regular team meetings with supervisors and tradesmen focused on addressing work stress	3.41	0.82	9	<b>3.38</b>	<b>0.90</b>	<b>9</b>		<b>3.45</b>	<b>0.74</b>	<b>9</b>		0.95	S
ST13	Better planning of work tasks and shifts	3.34	0.79	15	3.27	0.91	13		3.40	0.67	14		0.79	P
ST14	<b>Hire more personnel to reduce the workload</b>	<b>2.98</b>	<b>0.85</b>	<b>19</b>	<b>3.13</b>	<b>0.88</b>	<b>17</b>		<b>2.83</b>	<b>0.79</b>	<b>19</b>		<b>0.06</b>	P
<b>SG7</b>	<b>Job redesign strategies (mean = 3.22)</b>							<b>3.23</b>				<b>3.22</b>		
ST12	Offer employee's opportunities to balance work and life using compressed working week arrangements	3.44	0.72	6	<b>3.45</b>	<b>0.82</b>	<b>5</b>		3.43	0.63	11		0.47	P
ST08	Job crafting (i.e., employees should be allowed some flexibility to design their job roles and tasks while human resources approve it in line with the job position and goals of the organization)	3.00	0.85	18	3.00	0.91	19		3.00	0.80	18		0.87	P

Note: SD = Standard Deviation; R = Rank; p-value = significance level; GMs = Group mean for supervisors; GMe = Group mean for experts, ToI = Type of Intervention; P = Primary intervention; S = Secondary intervention; T = Tertiary intervention.

### **SG1: Boosting employee morale**

This construct is the highest-ranking strategy group. The strategies in this construct are a combination of secondary and primary intervention measures that can help boost employee morale and encourage satisfaction. Implementing an organizational culture that celebrates employee success and gives constructive criticisms offers a sense of respect to employees, thereby mitigating work stress related to fears of failure and job insecurity (Havermans et al., 2018). Aligning job roles with an employee's deeply embedded life interest, a method referred to as job sculpting, has been shown to improve employee satisfaction (Hlanganipai and Mazanai, 2014, VanAntwerp and Wilson, 2018). Hence, it becomes expedient for the construction industry to build an aspect of a supervisor's job responsibility to capture their individual embedded life interest.

### **SG2: Improving interpersonal relationships**

This construct, ranking second, contains two strategies that are concerned with strengthening interpersonal relationships in the workplace. Poor interpersonal relationships have been reported to increase adverse psychological outcomes among construction personnel (Chen et al., 2017, Goldenhar et al., 2003). On the other hand, creating a quality relationship in the workplace can provide compassion, increase job performance, and promote mental health (Chu, 2017). Thus, putting in place strategies to improve interpersonal relationships may offer therapeutic and health benefits. In order to create quality interpersonal relationships among colleagues, the constructs of communication, mutual trust should be developed, and barriers such as difficulties in information sharing, complex organizational culture should be eliminated (Migowski et al., 2018).

### **SG3: Building coping and resilience**

This construct ranked third and was characterized by four strategies aimed at helping supervisors cope appropriately with stress so as to reduce adverse mental health outcomes. Although promoting mental health awareness and anti-stigma campaigns have not statistically improved psychological health problems, they stimulate knowledge about mental health, their importance, and care (Deady et al., 2018). Additionally, strategies that improve cognitive coping skills and enhance resilience to significant stressors can increase employee's mental health and well-being (Berry et al., 2011, Nwaogu et al., 2021b). Among construction personnel, increased individual resilience has been reported to mitigate psychological stress, anxiety, and depression (Chen et al., 2017, Nwaogu et al., 2021b). Thus, enhancing resilience is an essential target for mental health intervention.

### **SG4: Promoting workplace civility**

This construct ranked the fourth in order of importance and consists of two strategies directed towards achieving organizational justice in the construction workplace. Specifically, among the supervisors, the construct ranked fifth while it ranked fourth among the experts. This may indicate that experts realize the importance of implementing strategies that improve organizational justice among supervisors, especially those that will eliminate bullying and harassment. Organizational injustice-related behaviors, acts, or policies such as bullying, harassment, bias, and discrimination are identified psychosocial stressors that negatively impact mental health in the construction industry (Sunindijo and Kamardeen, 2017, Bowen et al., 2014). Therefore, promoting acts of

civility would be a significant resource to improve mental health and well-being in the construction workplace.

### **SG5: Employee Assistance Programme (EAP)**

This construct ranked fifth and consists of two strategies that can form part of employee assistance programs. The construct is made up of intervention strategies that either preventive or reactive. Employee assistance models are effective interventions to enhance mental health and well-being in the workplace (Saju et al., 2019). The EAP strategies considered in this study could help eliminate financial stress and fear of the future, affecting an employee's mental health at work and productivity (Harnois et al., 2000). For instance, improperly planned retirement is risky to psychological health; thus, it may be of essence that employees are enlightened on available retirement schemes to drive job satisfaction and productivity (Marcellus and Osadebe, 2014). Hence, a sustainable retirement plan sponsored by the employer integrating financial psychology and employee engagement should be encouraged in the construction industry of Nigeria .

### **SG6: Reducing excessive job demands**

Surprisingly, this construct ranked sixth and consists of three strategies that can be taken to reduce high job demand. These findings are consistent with Havermans et al. (2018), who found that employees indicated a need for organizational measures, particularly better planning of work shifts and tasks, and hiring more personnel to ensure that workloads are properly reduced. In order to adequately mitigate high job demand as a mental ill-health risk factor, it is worth listening to supervisors' feedback on work stress during meetings. The information gathered on an individual-to-individual or team basis at meetings could inform the organization on relevant job demand-related factors that need attention and guide necessary measures to put in place.

### **SG7: Job redesign strategies**

The strategies in this construct are all primary interventions targeted towards redesigning the job. Although this strategy construct ranked the least among the experts and supervisors, supervisors signified that implementing a compressed working week arrangement that would "offer employees opportunities to balance work and life" is most important. Job redesign intervention strategy has an affirmative relief on low job control, support, and high job demand significantly impacting mental health and reduced sickness absence (Joyce et al., 2010). In the construction industry, a compressed working week has been found to reduce work-life imbalance/conflict among personnel in Australia (see Lingard et al., 2007). This implied that implementing strategies of job crafting and compressed working weel arrangement in the construction workplace could improve the perceptions of supervisors on the job and strengthen their mental health and well-being.

## **CONCLUSION**

This study using a purposively selected sample of experts and supervisors, determined and assessed strategies needed to improve the mental health of supervisors within the Nigerian construction workplace. A list of 19 strategies was determined on a multi-modal intervention basis. This study revealed that both supervisors and experts agree that all the strategies are important for

improving the mental health of supervisors. The study highlight that job redesign strategy, mainly job crafting, job sculpting, and work flexibility, were significant intervention points among both groups. Further studies should explore the effect of implementing this range of strategies on mental health over time using a cluster randomized controlled trial approach. This study points to primary, secondary, and tertiary intervention strategies that could be implemented to boost mental health and well-being promotion in the construction workplace. From the perspective of the experts and construction supervisors in Nigeria, this study contributes to the existing global body of knowledge on measures essential to workplace intervention on health and safety.

## ACKNOWLEDGMENT

The Hong Kong Polytechnic University financially supports this research. The study forms part of a more extensive Ph.D. research. Therefore, studies with varying backgrounds and scope but related methodologies may be published.

## REFERENCES

- Berry, L. L., Mirabito, A. M. and Baun, W. B. 2011. What's the hard return on employee wellness programs? *Harvard business review*, 89, 20-21.
- Black, K. J., Munc, A., Sinclair, R. R. and Cheung, J. H. 2019. Stigma at work: The psychological costs and benefits of the pressure to work safely. *Journal of Safety Research*, 70, 181-191. <https://doi.org/10.1016/j.jsr.2019.07.007>.
- Boschman, J., Van Der Molen, H., Sluiter, J. and Frings-Dresen, M. 2013. Psychosocial work environment and mental health among construction workers. *Applied Ergonomics*, 44, 748-755. <https://doi.org/10.1016/j.apergo.2013.01.004>.
- Bowen, P., Govender, R. and Edwards, P. 2014. Structural equation modeling of occupational stress in the construction industry. *Journal of Construction Engineering and Management*, 140, 04014042. [https://doi.org/10.1061/\(ASCE\)CO.1943-7862.0000877](https://doi.org/10.1061/(ASCE)CO.1943-7862.0000877).
- Bowen, P., Govender, R., Edwards, P. and Cattell, K. 2018. Work-related contact, work–family conflict, psychological distress and sleep problems experienced by construction professionals: an integrated explanatory model. *Construction Management and Economics*, 36, 153-174. <https://doi.org/10.1080/01446193.2017.1341638>.
- Bryson, K. and Duncan, A. 2018. Mental health in the construction industry scoping study. In: SR411, B. S. R. (ed.). Judgeford, New Zealand: BRANZ Ltd.
- Burke, R. J. 2019. Creating psychologically healthy workplaces. *Creating psychologically healthy workplaces*. Edward Elgar Publishing.
- Burki, T. 2018. Mental health in the construction industry. *The Lancet Psychiatry*, 5, 303. [https://doi.org/10.1016/S2215-0366\(18\)30108-1](https://doi.org/10.1016/S2215-0366(18)30108-1).
- Chen, Y., McCabe, B. and Hyatt, D. 2017. Impact of individual resilience and safety climate on safety performance and psychological stress of construction workers: A case study of the Ontario construction industry. *Journal of safety research*, 61, 167-176.
- Chu, L. C. 2017. Impact of Providing Compassion on Job Performance and Mental Health: The Moderating Effect of Interpersonal Relationship Quality. *Journal of Nursing Scholarship*, 49, 456-465. 10.1111/jnu.12307.



- Darko, A., Chan, A. P., Owusu-Manu, D.-G. and Ameyaw, E. E. 2017. Drivers for implementing green building technologies: An international survey of experts. *Journal of Cleaner Production*, 145, 386-394. <https://doi.org/10.1016/j.jclepro.2017.01.043>.
- Deady, M., Johnston, D., Glozier, N., Milne, D., Choi, I., Mackinnon, A., Mykletun, A., Calvo, R., Gayed, A. and Bryant, R. 2018. A smartphone application for treating depressive symptoms: study protocol for a randomised controlled trial. *BMC psychiatry*, 18, 166. <https://doi.org/10.1186/s12888-018-1752-5>.
- Enns, J., Holmqvist, M., Wener, P., Halas, G., Rothney, J., Schultz, A., Goertzen, L. and Katz, A. 2016. Mapping interventions that promote mental health in the general population: a scoping review of reviews. *Preventive medicine*, 87, 70-80.
- Flo, J., Landmark, B., Hatlevik, O. E. and Fagerström, L. 2018. Using a new interrater reliability method to test the modified Oulu Patient Classification instrument in home health care. *Nursing open*, 5, 167-175.
- Goldenhar, L. M., Williams, L. J. and Swanson, N. G. 2003. Modelling relationships between job stressors and injury and near-miss outcomes for construction labourers. *Work & Stress*, 17, 218-240.
- Harnois, G., Gabriel, P. and World Health Organization 2000. *Mental health and work: Impact, issues and good practices*, Geneva, World Health Organization.
- Havermans, B. M., Brouwers, E. P., Hoek, R. J., Anema, J. R., Van Der Beek, A. J. and Boot, C. R. 2018. Work stress prevention needs of employees and supervisors. *BMC public health*, 18, 642.
- Hlanganipai, N. and Mazanai, M. 2014. Career management practices: Impact of work design on employee retention. *Mediterranean Journal of Social Sciences*, 5, 21-21.
- Jamieson, S. 2004. Likert scales: how to (ab) use them. *Medical education*, 38, 1217-1218.
- Joyce, K., Pabayo, R., Critchley, J. A. and Bambra, C. 2010. Flexible working conditions and their effects on employee health and wellbeing. *Cochrane database of systematic reviews*.
- Joyce, S., Modini, M., Christensen, H., Mykletun, A., Bryant, R., Mitchell, P. B. and Harvey, S. B. 2016. Workplace interventions for common mental disorders: a systematic meta-review. *Psychological medicine*, 46, 683-697. <https://doi.org/10.1017/S0033291715002408>.
- Kane, R. L., Butler, M., Fink, H. A., Brasure, M., Davila, H., Desai, P., Jutkowitz, E., Mccree, E., Nelson, V. A., McCarten, J. R., Calvert, C., Ratner, E., Hemmy, L. S. and Barclay, T. 2017. AHRQ Comparative Effectiveness Reviews. *Interventions to Prevent Age-Related Cognitive Decline, Mild Cognitive Impairment, and Clinical Alzheimer's-Type Dementia*. Rockville (MD): Agency for Healthcare Research and Quality (US).
- Lamontagne, A. D., Martin, A., Page, K. M., Reavley, N. J., Noblet, A. J., Milner, A. J., Keegel, T. and Smith, P. M. 2014. Workplace mental health: developing an integrated intervention approach. *BMC psychiatry*, 14, 131.
- Langdon, R. and Sawang, S. 2018. Construction Workers' Well-Being: What Leads to Depression, Anxiety, and Stress? *Journal of Construction Engineering and Management*, 144, 04017100. 10.1061/(ASCE)CO.1943-7862.0001406.
- Lingard, H., Brown, K., Bradley, L., Bailey, C. and Townsend, K. 2007. Improving employees' work-life balance in the construction industry: Project alliance case study. *Journal of Construction Engineering and Management*, 133, 807-815.
- Marcellus, I. O. and Osadebe, N. O. 2014. A review of the promises and challenges of the 2004 pension reform in Nigeria. *Mediterranean Journal of Social Sciences*, 5, 472-482. 10.5901/mjss.2014.v5n15p472.

- Martin, A. J. and Lamontagne, A. D. 2018. Applying an integrated approach to workplace mental health in SMEs: A case of the “too hard basket” or picking some easy wins? *Organizational Interventions for Health and Well-being*. Routledge.
- Migowski, E. R., Oliveira Júnior, N., Riegel, F. and Migowski, S. A. 2018. Interpersonal relationships and safety culture in Brazilian health care organisations. *Journal of Nursing Management*, 26, 851-857. 10.1111/jonm.12615.
- Nwaogu, J. M. and Chan, A. P. C. 2021a. Evaluation of multi-level intervention strategies for a psychologically healthy construction workplace in Nigeria. *Journal of Engineering, Design and Technology*, 19, 509-536. <https://doi.org/10.1108/JEDT-05-2020-0159>.
- Nwaogu, J. M. and Chan, A. P. C. 2021b. Work-related stress, psychophysiological strain, and recovery among on-site construction personnel. *Automation in Construction*, 125, 103629. <https://doi.org/10.1016/j.autcon.2021.103629>.
- Nwaogu, J. M., Chan, A. P. C., Naslund, J. A., Hon, C. K. H., Belonwu, C. and Yang, J. 2021a. Exploring the Barriers and Motivators for Using Digital Mental Health Interventions Among Construction Personnel in Nigeria: Qualitative Study. *JMIR Formative Research*. 10.2196/18969.
- Nwaogu, J. M., Chan, A. P. C. and Tetteh, M. O. 2021b. Staff resilience and coping behavior as protective factors for mental health among construction tradesmen. *Journal of Engineering, Design and Technology*. <https://doi.org/10.1108/JEDT-11-2020-0464>.
- Oyewunmi, A. E., Oyewunmi, O. A., Iyiola, O. O. and Ojo, A. Y. 2015. Mental health and the Nigerian workplace: Fallacies, facts and the way forward. *International Journal of Psychology*, 7, 106-111.
- Pignata, S., Boyd, C. M., Winefield, A. H. and Provis, C. 2017. Interventions: Employees' perceptions of what reduces stress. *BioMed Research International*, 2017. 10.1155/2017/3919080.
- Pignata, S., Winefield, A. H., Boyd, C. M. and Provis, C. 2018. A qualitative study of HR/OHS stress interventions in Australian universities. *International journal of environmental research and public health*, 15, 103.
- Rees-Evans, D. 2020. Understanding Mental Health in the Built Environment. Bracknell, UK: Chartered Institute of Building.
- Saju, M., Rajeev, S., Scaria, L., Benny, A. M. and Anjana, N. 2019. Mental health intervention at the workplace: A psychosocial care model. *Cogent Psychology*, 6, 1601606.
- Sunindijo, R. Y. and Kamardeen, I. 2017. Work Stress Is a Threat to Gender Diversity in the Construction Industry. *Journal of Construction Engineering and Management*, 143, 04017073. [https://doi.org/10.1061/\(ASCE\)CO.1943-7862.0001387](https://doi.org/10.1061/(ASCE)CO.1943-7862.0001387).
- Vanantwerp, J. J. and Wilson, D. 2018. Differences in motivation patterns among early and mid-career engineers. *Journal of Women and Minorities in Science and Engineering*, 24, 227-259. 10.1615/JWOMENMINORSCIENENG.2018019616.
- World Health Organization 2017. Depression and Other Common Mental Disorders: Global Health Estimates. Geneva: World Health Organization.