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ORIGINAL ARTICLE

Analysis of Context-Specific Mental Health Factors of Construction Workers in Indonesia

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ABSTRACT

Introduction: The construction industry is widely recognized as one of the sectors with significant mental health challenges. Many studies revealed that mental health problems such as depression, burnout, and sleep difficulty are more common in the construction industry compared to other industries. The causes may include high risk environment, long working hours, job insecurity, and machoism culture. On the other hand, the issue of mental health in the Indonesian construction sector is still not widely understood. Hence, this study investigates the key context-specific factors that influence the mental health of construction workers. **Method:** A mixed-method approach was employed, consisting of an integrative literature review (ILR) and exploratory factor analysis (EFA). The ILR identified twenty-three context-specific mental health factors, subsequently used as input in the questionnaire survey. The questionnaire consists of demographic characteristics and measurement of mental health factors using a six-point Likert scale. The survey was distributed to construction workers in Indonesia, each with a minimum of two years of work experience. The collected data were analyzed using EFA. **Result:** This study found five key groups of context-specific factors: workplace, work pressure, role, gender inequality, and psychosocial factors. These factors are found to be deeply interconnected, often exacerbating one another. The study underscores the complexity of mental health issues in this high-pressure, high-risk industry. The results suggest that addressing these challenges requires a multifaceted approach to better understand and alleviate the stress experienced by construction workers. **Conclusion:** This study presents five mental health determinants among construction workers in Indonesia. The findings can form the basis for further research and the formulation of work policies that are more responsive to local conditions.

Keywords: construction workers, context-specific exploratory factor analysis, mental health factors

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INTRODUCTION

In the construction, labor-intensive industry, issues related to worker health are among the important sustainability indicators (Tennakoon *et al*., 2023; Pratiwi and Setyawan 2024). Health is a condition in which a person obtains complete physical, mental, and social well-being and is not limited to disease and weakness (World Health Organization, 2020). In the construction sector, one of the types of health that has not been widely studied is mental health. Mental health is a state of well-being in which individuals realize their potential to cope with life's pressures, work productively and usefully, and contribute to their community (World Health Organization, 2020).

However, mental health issues are often overlooked in the construction industry due to stigma and work ethic (Hon, 2021). Many studies revealed that mental health problems are more common in the construction industry compared to other industries (Chan, Nwaogu and Naslund, 2020; Gruttadaro and

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Beyer, 2021; Hon *et al*., 2024). One of the leading causes of the high level of mental health issues in the construction industry is the high level of work pressure (Hansen, 2024b). A survey conducted by the American Psychiatric Association Foundation (APAF) found that concerns about mental health in the construction industry are increasing because this industry is ranked second in terms of suicide rates among major industries (Gruttadaro and Beyer, 2021). Some examples of types of mental health disorders in construction workers are anxiety, depression, suicidal tendencies, difficulty managing emotions, difficulty concentrating, and difficulty sleeping (Hansen, 2024b).

Mental health and well-being can be grouped into "context-free" and "context-specific" (Sun *et al*., 2022). Context-free mental health factors are factors that influence a person's mental health universally, regardless of a particular social or cultural context. These factors are general and apply across individual backgrounds. For example, certain genetic variations have been associated with the risk of disorders such as depression or schizophrenia, which appear consistently across cultures. Thus, context-free mental health factors have a universal scope.

Meanwhile, context-specific mental health factors are factors that influence the mental health of a person and are highly dependent on a particular social, cultural, economic, or political environment. These factors vary across groups of people and often cannot be separated from the social construction and collective experiences of the community. In this study, mental health factors are focused on the context of construction work, namely, factors that influence the mental health of workers due to their occupation in a construction project. Work-related

Table 1. Context-specific Factors Influencing Construction Workers' Mental Health

Code	Factor	References
X1	Machoism culture	(Rostiyanti, Hansen and Harison, 2020; Hansen, 2022; Tennakoon *et al*., 2023)
X2	High-risk environment	(Chan, Nwaogu and Naslund, 2020; Hansen, 2022; Tennakoon *et al*., 2023)
X3	Time pressure	(Hon, 2021; Hansen, 2022)
X4	Uneven workload	(Hansen, 2022)
X5	Role conflicts	(Sun *et al*., 2022)
X6	Interpersonal conflicts	(Hansen, 2022; Hon *et al*., 2024)
X7	Role ambiguity	(Hansen, 2022; Sun *et al*., 2022; Hon *et al*., 2024)
X8	Job insecurity	(Hon, 2021; Hansen, 2022; Sun *et al*., 2022; Hon *et al*., 2024)
X9	Low work support	(Chan, Nwaogu and Naslund, 2020; Hansen, 2022; Hon *et al*., 2024)
X10	Lack of recognition and appreciation	(Hansen, 2022)
X11	Low control of work	(Hansen, 2022; Sun *et al*., 2022)
X12	Exposure to traumatic events	(Hansen, 2024a; Hon *et al*., 2024)
X13	Task interdependency	(Hon *et al*., 2024)
X14	Excessive client demand	(Hon, 2021; Hansen, 2022; Hon *et al*., 2024)
X15	Contractual pressure	(Chan, Nwaogu and Naslund, 2020; Hansen, Rostiyanti and Septaria, 2024)
X16	Condition of physical work environment	(Hansen, 2022; Hon *et al*., 2024)
X17	Low income	(Hansen, 2022; Tennakoon *et al*., 2023)
X18	Workplace injustice	(Chan, Nwaogu and Naslund, 2020; Sun *et al*., 2022)
X19	Limited opportunity for competency improvement	(Hansen, 2022; Sun *et al*., 2022)
X20	Limited career promotion	(Chan, Nwaogu and Naslund, 2020; Scott-Young, Turner and Holdsworth, 2020; Hansen, 2024a)
X21	Limited improvement mechanism	(Sun *et al*., 2022; Hansen, 2024a)
X22	Gender discrimination	(Galea *et al*., 2018; Hansen, 2024a)
X23	Language and cultural barriers	(Liu *et al*., 2021, 2022)

anxiety and depression, as well as work fatigue, are drivers for mental health disorders associated with the occupation (Chan, Nwaogu and Naslund, 2020; Nurahma *et al*., 2022; Sun *et al*., 2022). In construction, mental health encompasses mood and emotions as well as the safety and comfort of construction workers (Hon *et al*., 2024).

While Law No. 13 of 2003 concerning Manpower and Law No. 17 of 2023 concerning Health provide regulations pertaining to worker protection, the mental health issue is still not widely understood in the Indonesian construction industry (Hansen, 2022). Hence, conducting a study on context-specific factors affecting construction workers' mental health is crucial. By identifying and understanding these factors, construction companies may design effective programs, such as stress management training, to improve the mental health of construction workers. The findings of this study can assist in creating evidence-based policies to enhance the well-being of construction workers, promoting sustainable aspects within the sector.

METHODS

Research Design

This study design includes an integrative literature review (ILR) and an exploratory factor analysis (EFA). ILR is a semi-systematic literature review technique that synthesizes representative literature on a topic in an integrated manner. This technique involves evaluating and synthesizing secondary data to create new perspectives from existing literature (Hansen, 2024c). It consists of five steps, starting from (1) problem formulation (identification of mental health factors in construction sector), (2) data collection (literature search from relevant publications), (3) evaluation of data (read and organize information from literature), (4) data analysis (factor identification and synthesis), and (5) presentation of results (list of identified mental health factors). In this study, ILR was used to identify context-specific factors that affect the mental health of construction workers, as shown in Table 1. Each factor is given a code starting from X1 to X23.

EFA was chosen as it allows the identification of latent structures from various interrelated variables. This study was conducted on construction workers in Indonesia, including project managers, site managers, quantity surveyors, quality controllers, engineers, and architects. They must have at least two years of working experience in the industry. Before actual survey distribution, a pilot survey was conducted on four construction experts who met one of the criteria: ten years of working experience, publications on mental health, or a certified health and safety officer in the construction sector.

Research Instrument

The instrument used was a structured questionnaire consisting of two main parts: (a) demographic characteristics (covering information on age, gender, length of working experience, and current job position), and (b) measurement of mental health factors. Using a Likert scale (1–6), the questionnaire included 23 items related to context-specific factors influencing the mental health of construction workers. These items were developed from a literature review and a pilot survey. This study has received research ethics approval from LPPM Universitas Agung Podomoro No. LPPM/RE/044.2/24 dated 14 August 2024.

Data Collection Procedure

Data were collected through Google Forms (online questionnaire) for easiness from August 19 to October 2, 2024. The preliminary examination found that out of 89 responses, only 78 were valid for analysis. Table 2 presents the profile of respondents.

Data Processing and Analysis

The collected data were screened to identify missing data and outliers. Respondents with incomplete data (>10% of items not filled in) were excluded from the analysis. SPSS v.25 was utilized to analyze the data. Cronbach's Alpha was used to ensure the internal consistency of the instrument. Data feasibility was tested with Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity. Data is declared feasible if the KMO value is > 0.5 and the Bartlett result is significant ($p < 0.05$). Principal Component Analysis (PCA) is used to identify the main dimensions and factors with eigenvalue ≥ 1 will be retained. Direct oblimin rotation with a suppressed loading factor of 0.40 was carried out to obtain a more interpretative factor structure.

Interpretation of Results

The factor analysis results will be used to identify groups of strongly correlated variables and

form latent factors. These latent factors were labeled based on theoretical interpretations.

RESULT

Cronbach's Alpha measures how closely related a set of items is as a group. As presented in Table 3, the value of Cronbach's Alpha is 0.941, which indicates that the items have high inter-item correlation, statistically meaning that the items measure the same underlying construct (i.e., mental health factors) consistently. The value exceeds the commonly accepted threshold of 0.70, signifying excellent internal consistency. Therefore, based on statistical rules, the instrument is considered reliable and suitable for further analysis (Exploratory Factor Analysis/EFA), which assumes that the items represent latent variables reliably. Meanwhile, KMO (Kaiser-Meyer-Olkin) value of 0.867 suggests that the sample size is adequate and the data is factorable. Bartlett's Test being significant ($p < 0.05$) confirms that the correlation matrix is not an identity matrix, validating the appropriateness of Exploratory Factor Analysis (Table 4).

Table 5 shows the formation of five components (factor groups) with eigenvalues greater than one, which explains 68.908% of the variance. The same number of components can be seen in Figure 1, which presents a scree plot. It is a graphical representation to determine the optimal number of factor components to retain in a model by plotting the eigenvalues of factors (y-axis) against the number of factor components (x-axis). Factors with eigenvalues > 1 (the Kaiser criterion) are considered significant. This scree plot shows that the number of components with eigenvalue > 1 is five factor components.

Next, factor analysis provides two matrices where the pattern matrix (Table 6) is chosen as the basis for interpretation. It can be seen that X17 has no factor loading, so it is not included in any component group. Factors with more than one loading will be grouped into the component with the most significant loading. The interpretation results are presented in Table 7 with five latent factors.

Based on the results of EFA on 23 initial indicators (Table 5), five latent factors were obtained (Table 7) representing the main structure of the data. The determination of the number of factors was carried out through a combination of statistical approaches and theoretical rationale. Statistically, the retention of the five factors is supported by the eigenvalue >1 and the distribution of the scree plot which shows a clear elbow on the 5th factor.

In addition to the statistical basis, the selection of the five factors also considers the thematic consistency and coherence of the content of the indicators grouped in each factor. Thematic consistency ensures that the indicators within a factor share a common theme or subject area, while coherence of the content refers to the logical connection and conceptual alignment among indicators, ensuring that they represent a single,

Table 2. Respondent Profiles

Profile	Number	%
Gender		
Male	39	50.0
Female	39	50.0
Age		
Less than 25 years old	25	32.1
25 - 30 years old	24	30.8
30 - 35 years old	8	10.3
35 - 40 years old	2	2.6
More than 40 years old	19	24.4
Years of Working Experience in Construction		
2 - 5 years	44	56.4
5 - 10 years	18	23.1
10 - 15 years	4	5.1
More than 15 years	12	15.4
Job position		
Directors	3	3.8
Project manager	11	14.1
Consultants	9	11.5
Quantity surveyors	22	28.2
Staff engineers	23	29.5
Others	10	12.8

Table 3. Cronbach's Alpha Value

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.941	.941	23

Table 4. KMO and Bartlett's Test Values

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.867
Bartlett's Test of Sphericity	Approx. Chi-Square	1163.119
	df	253
	Sig.	.000

unified concept rather than a mix of unrelated ideas. The interpretation process begins by looking at the results of the factor loading on the factor rotation (Table 6), where indicators that have a loading ≥0.4 are considered significant. Indicators with a dominant correlation to one factor are grouped and examined based on their conceptual meaning. For example, indicators such as "time pressure", "excessive demand", and "contractual pressure" have a strong loading on one factor, which then interpret as "work pressure factors".

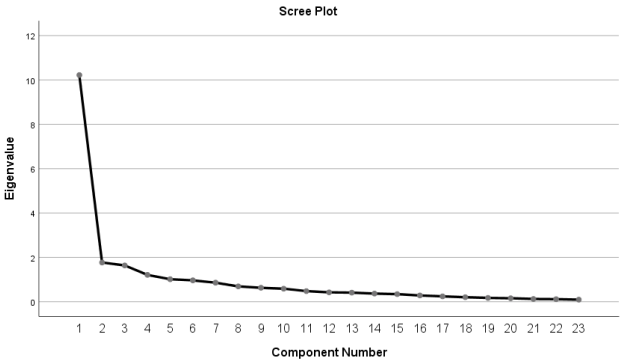

Figure 1. Scree plot

DISCUSSION

Mental Health Determinants Among Construction Workers in Indonesia

The EFA results in five groups of context-specific factors affecting the mental health of construction workers in Indonesia. The first group is workplace factors. These are factors in the workplace that can negatively impact workers' mental and physical well-being, productivity, and

Table 5. Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadingsa
Component	**Total**	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**	**Total**
1	10.219	44.429	44.429	10.219	44.429	44.429	7.538
2	1.769	7.690	52.119	1.769	7.690	52.119	4.377
3	1.623	7.114	59.233	1.623	7.114	59.233	5.578
4	1.210	5.262	64.495	1.210	5.262	64.495	2.226
5	1.015	4.413	68.908	1.015	4.413	68.908	5.441
6	.964	4.192	73.100				
7	.859	3.734	76.834				
8	.693	3.011	79.845				
9	.628	2.732	82.577				
10	.588	2.556	85.133				
11	.479	2.084	87.217				
12	.423	1.841	89.058				
13	.412	1.789	90.847				
14	.368	1.599	92.446				
15	.343	1.491	93.936				
16	.283	1.229	95.165				
17	.242	1.054	96.219				
18	.204	.888	97.107				
19	.173	.751	97.857				
20	.157	.682	98.539				
21	.125	.543	99.082				
22	.116	.506	99.588				
23	.095	.412	100.000				

Extraction Method: Principal Component Analysis.

a.When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

job satisfaction. They contribute to workplace stress, particularly affecting the workers' mental and emotional health. They highlight an organizational or managerial structure deficiency, creating an unsupportive or inequitable workplace. These factors limit opportunities for professional development, autonomy, and career advancement, reducing a worker's ability to thrive (Sun *et al*., 2022; Hon *et al*., 2024). They contribute to a feeling of injustice or mistrust between employees and the organization, potentially leading to disengagement or attrition (Chan, Nwaogu and Naslund, 2020; Sun *et al*., 2022). These factors are interconnected as they create a workplace environment where workers feel undervalued, unsupported, and uncertain about their future (Hansen, 2022; Hon *et al*., 2024). Addressing them requires organizational strategies to improve employee well-being, promote fairness, and foster growth.

Table 6. Pattern Matrix

	Component				
	1	**2**	**3**	**4**	**5**
X1				.642	
X2		.726			
X3		.627	-.589		
X4			-.878		
X5			-.771		
X6					.432
X7			-.625	-.439	
X8	.637				
X9	.489				
X10	.439				
X11	.482				.409
X12	.404				.514
X13		.425			.406
X14		.619			
X15		.642			
X16		.424			
X17					
X18	.658				
X19	.952				
X20	.732				
X21	.458				
X22				.641	
X23					.962

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization
a.Rotation converged in 14 iterations

The second group is construction work pressure factors. These stressors are unique to the construction industry, where project complexity, tight deadlines, and hazardous conditions contribute to significant challenges. The high-risk environment exacerbates stress when combined with time pressure, as workers may rush tasks at the expense of safety (Hon, 2021; Tennakoon *et al*., 2023). Task interdependency creates additional challenges when delays or errors disrupt workflows, compounding team stress (Hon *et al*., 2024). Excessive client demand and contractual pressure force contractors and workers to prioritize speed and cost efficiency, often leading to overwork and burnout (Chan, Nwaogu and Naslund, 2020; Hansen, 2024a). A poor working environment reduces morale and exacerbates physical strain, making it harder for workers to perform effectively under stressful conditions. These stressors contribute to high rates of workplace accidents, worker turnover, mental health issues (such as anxiety or depression), and decreased productivity (Hansen, 2024a). Addressing these challenges requires

Table 7. Key Influencing Factors

Component 1 (workplace factors)	Job insecurity
	Low work support
	Lack of recognition and appreciation
	Low control of work
	Workplace injustice
	Limited opportunity for competency improvement
	Limited career promotion
	Limited improvement mechanism
Component 2 (work pressure factors)	High-risk environment
	Time pressure
	Task interdependency
	Excessive client demand
	Contractual pressure
	Condition of physical work environment
Component 3 (role stressor factors)	Uneven workload
	Role conflicts
	Role ambiguity
Component 4 (gender inequality factors)	Machoism culture
	Gender discrimination
Component 5 (psychosocial stressor factors)	Interpersonal conflicts
	Exposure to traumatic events
	Language and cultural barriers

industry-wide solutions, such as improved safety protocols, realistic timelines, effective stakeholder communication, and better workplace conditions.

The third group is role stressors. These factors are associated with the challenges workers face in understanding, balancing, and fulfilling their responsibilities within an organizational structure. In the construction industry, role stressors are particularly prevalent due to the dynamic, high-pressure nature of construction projects. Uneven workloads can lead to role conflicts as overburdened workers struggle to balance competing tasks or meet unrealistic deadlines, while others may feel underutilized and disengaged. Role conflicts are exacerbated by role ambiguity when individuals are unclear about prioritizing conflicting demands or lack guidance on resolving stakeholder disputes (Sun *et al*., 2022). These factors can harm team dynamics, lower morale, and reduce project performance because unclear responsibilities can result in errors, delays, or safety problems (Hansen, 2024a).

The next group is gender inequality factors. In the construction industry, these factors are often tied to cultural norms and structural barriers that perpetuate a male-dominated environment, causing difficulties for women and marginalized groups to thrive. Macho culture reinforces gender discrimination through stereotypes that women are not suited to construction work, creating barriers to career entry and advancement (Tennakoon *et al*., 2023). Limited female representation in the industry allows hypermasculine norms to dominate (Galea *et al*., 2018). This creates an intimidating work environment for women and other marginalized groups, which makes diversity and inclusion difficult in the sector.

The last group is psychosocial stressors. These factors relate to the diversity and dynamics of the team, the nature of the work, and the multicultural nature of the construction project workforce. Interpersonal conflicts can arise due to language and cultural barriers, leading to frustration (Liu *et al*., 2022). Workers exposed to traumatic events may have difficulty in interpersonal relationships or find it difficult to communicate their needs (Hon *et al*., 2024). These stressors disrupt morale, trust, and teamwork, increasing the risk of delays, errors, and safety problems.

Research Implications

Various studies have shown that construction workers have higher rates of depression and suicide risk than workers in other sectors on average. In Indonesia, although data on this is limited, socioeconomic conditions (such as low wages and lack of job security) can worsen the mental health of construction workers. Unstable work environments and lack of emotional support contribute to high rates of mental health disorders in construction workers (Batubara, Safitri and Siregar, 2021; Hansen, 2022).

This industry has historically been male-dominated, fostering a machoism culture (Frimpong *et al*., 2022). This culture causes difficulties for women and others in feeling accepted or respected in the workplace (Rostiyanti, Hansen and Harison, 2020). To address this, it is recommended to take steps such as implementing anti-harassment policies, encouraging women's participation in the construction industry, promoting women in leadership roles, and eradicating gender-related stereotypes in the construction sector (Rostiyanti, Hansen and Harison, 2020; Rohayati *et al*., 2022). By doing this, the construction industry is expected to become an inclusive environment and benefit from diverse perspectives that drive innovation.

On the other hand, this study also highlights the importance of improving the welfare of construction workers. In Indonesia, the construction sector is one of the main drivers of national infrastructure development. Construction companies can provide programs, such as counselling services and stress management training, to improve worker welfare (Mollo and Emuze, 2020; Iremeka *et al*., 2021). This can improve the company's image as a responsible workplace, thus becoming an attraction for getting qualified workers.

CONCLUSION

This study highlights the construction industry as a sector facing significant mental health challenges and provides an initial understanding of the latent structure of context-specific factors influencing construction workers' mental well-being in Indonesia. Through exploratory factor analysis, five interrelated domains: workplace, work pressure, role stressor, gender inequality, and psychosocial stressor, were identified as key determinants of mental health. These findings underscore the complexity of occupational mental health issues in this high-pressure industry and emphasize the need for a multidimensional approach that integrates improvements in work standards with behavioral

and cultural interventions. Practical implications include designing policies that address working hours, work environment, and career development, alongside strategies such as stress management training, counselling services, and fostering a supportive workplace culture. Understanding this complexity is essential for creating a healthier, more productive, and humane work environment, and aligns with national and global sustainability goals. Future research should focus on identifying risk factors and early indicators of mental health disorders, as well as exploring the link between psychological distress and workplace accidents to inform preventive strategies.

CONFLICT OF INTEREST

The authors declare that there is no significant competing financial, professional, or personal interests that might have affected the performance.

AUTHORS' CONTRIBUTION

All authors declare that they are participating actively in research and article writing and are partly responsible for the content of the writing, including in the preparation and writing of concepts, designs, analysis, or revision of the article. SH: Conceptualization, Methodology, Writing, and Reviewing the paper. FF: Conceptualization and Methodology. NSP: Conceptualization, Methodology, Investigation.

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