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THE ANALYSIS OF THE RISK FACTORS OF UNSAFE BEHAVIOR AMONG CONSTRUCTION WORKERS IN TANGERANG

ANALISIS FAKTOR RISIKO PERILAKU TIDAK AMAN PADA PEKERJA KONSTRUKSI DI TANGERANG

Research Report
Penelitian

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A B S T R A C T

Background: *The Minister of Manpower stated that the construction sector contributed to the highest number of work accidents. The cause of construction-sector work-accidents as much as 40% came from unsafe behavior from workers. Unsafe behavior is described as the possibility of individuals not following safety standards, procedures, instructions, and criteria specific to the work that the organization applies to. According to a preliminary study, 6 out of 10 workers (60%) have unsafe behavior while working.* ***Purpose:*** *To find out the risk factors of unsafe behavior in construction workers at the Cartenz apartment construction project in Tower D, PT. Nusa Raya Cipta, Tangerang in 2021.* ***Method:*** *A cross-sectional design was used in this present study. The population and sample included 42 workers that were used as total sampling technique. The primary data were collected by questionnaire, whereas the analysis was done with the Chi-square test in bivariate analysis.* ***Result:*** *The analysis showed that 40.5% workers had unsafe behavior, 45.2% had poor knowledge, 31% showed bad attitudes, 52.4% had new work period, and 42.9% had poor supervision. Bivariate analysis indicated that knowledge (p-value 0.016), attitude (p-value 0.028), work period (p-value 0.004), and supervision (p-value 0.041) are associated with unsafe behavior.* ***Conclusion:*** *The risk factors of unsafe behavior in construction workers in Tangerang include knowledge, work period, attitudes, and supervision.*

A R T I C L E I N F O

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A B S T R A K

Latar belakang: Kementerian ketenagakerjaan menyatakan sektor konstruksi adalah penyumbang tertinggi kecelakaan kerja. Kecelakaan kerja sektor konstruksi sekitar 40% disebabkan oleh perilaku tidak aman pekerja. Perilaku tidak aman digambarkan sebagai peluang individu tidak mengikuti standar aturan keselamatan, instruksi, prosedur, dan kriteria khusus untuk pekerjaan yang ada di organisasi. Berdasarkan studi pendahuluan diketahui 6 dari 10 pekerja (60%) memiliki perilaku tidak aman saat bekerja. **Tujuan:** Untuk mengetahui faktor risiko perilaku tidak aman pada pekerja konstruksi di proyek pembangunan apartemen Cartenz di tower d, PT. Nusa Raya Cipta, Tangerang pada tahun 2021. **Metode:** Desain studi *cross-sectional* adalah desain penelitian ini. Populasi dan sampel yang diambil adalah 42 pekerja dengan menggunakan teknik total samping. Data primer dikumpulkan dengan menggunakan kuesioner. Analisis dilakukan menggunakan uji *Chi-square* pada analisis bivarat. **Hasil:** Hasil analisis terlihat pekerja yang berperilaku tidak aman sebanyak 40,5%, pekerja yang memiliki pengetahuan yang buruk sebanyak 45,2%, sikap buruk sebanyak 31%, masa kerja baru sebanyak 52,4%, pengawasan yang buruk sebanyak 42,9%. Analisis bivariat menunjukkan pengetahuan (*p-value* 0,016), sikap (*p-value*0,028), masa kerja (*p-value* 0,004), pengawasan (*p-value* 0,041) berhubungan dengan perilaku tidak aman. **Kesimpulan:** Faktor risiko perilaku tidak aman pada pekerja konstruksi di Tangerang adalah pengetahuan, masa kerja, sikap, dan pengawasan.

Kata kunci:
Sikap, Pengetahuan, Pengawasan, Perilaku tidak aman, Masa kerja

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INTRODUCTION

Occupational accidents are accidents that occur in workers related to work in the workplace. Factors causing work accidents are divided into worker factors, construction methods, equipment, funds, and management. Heinrich stated that the causes of work accidents around 88% were unsafe behavior, unsafe environmental conditions 10%, and caused by both happening at the same time (Wahyudi, 2019). Unsafe action is a dangerous behavior by workers due to factors such as lack of knowledge and skills, bad attitude, fatigue, lethargy, or invisible physical defects. Many accidents are caused by human factors, primarily unsafe human actions (Huda *et al*., 2021; Kristiawan and Abdullah, 2020; Pisceliya and Mindayani, 2018). In terms of work safety, human components, materials, management, machinery and terrain (work environment) are elements that may cause work accidents (Irzal, 2016).

Based on data from the Employment Social Security Administering Body in the 2020 K3 Monthly Report, there has been an increase in work accidents from 2017 to 2018. The construction sector is the sector that has the highest work accident rate, which is around 31.9% of every 100,000 workers. Unsafe behavior by workers causes 40% of work accidents in the construction sector (Ministry of Manpower, 2021). Internal and external factors influence behavior change-internal factors are such as education, years of service, and knowledge. The last education attained will influence a person's response to external stimuli (Notoatmodjo, 2014). The working period is closely related to his experiences so that he can better understand and carry out his work (Suwarno and Aprianto, 2019). Knowledge provides a fundamental foundation that requires effective participatory self-determination in the workplace (Notoatmodjo, 2012). Meanwhile, external factors consist of K3 facilities and supervision. The availability of PPE provided by the company is used to maintain worker safety (Rejeki, 2016). Work supervision can lead workers to safe behavior. Cartenz apartment project PT. Nusa Raya Cipta is in the development stage. Several work processes are still running at Tower D: formwork, casting, and welding. This can pose risks such as being pinched, slipped, cut, crushed by material, punctured, and fallen from a height.

A preliminary study was carried out by distributing questionnaires to 10 respondents in the tower at the Cartenz apartment project PT. Nusa Raya Cipta and showed that six respondents (60%) had unsafe behavior. Based on the questionnaire, it is known that most workers answered the question "workers do not use PPE (helmets/vests/masks/ safety shoes /gloves) while working" as many as six respondents (60%), "workers smoke while working or smoke in the wrong place" as many as seven respondents (70%), and "workers have joked excessively (such as startling coworkers, being ignorant and shouting at coworkers)" as many as seven respondents (70%).

Based on data from the Accident Investigation and Handling Report (LKIP) of PT. Nusa Raya Cipta, from October 2019 to September 2020, nine work accidents were caused mainly by unsafe behavior. This happens because 75% of workers have unsafe behavior while 25% of work equipment that is not good is still used. This shows that workers who have unsafe behavior are still high. The impact of the accident company must result in cost maintenance of hospitals/clinics as well as workers having to lose their working hours, which will reduce the company's productivity. The study aimed to determine the risk factors for unsafe behavior in construction workers at Tower D of the Cartenz Apartment Development Project PT. Nusa Raya Cipta City of Tangerang in 2021.

MATERIAL AND METHOD

Study design was cross-sectional. The dependent variable of this research is unsafe behavior and the independent variables are knowledge, attitude, years of service, and supervision. This research is located in Tower D of the Cartenz apartment project PT. Nusa Raya Cipta, Gading Serpong, Tangerang City in August 2021-February 2022. The population is workers in Tower D Cartenz apartment project PT. Nusa Raya Cipta, Gading Serpong, Tangerang City in 2021. The sample for this research is 42 workers in Tower D of the Cartenz apartment project PT. Nusa Raya Cipta, Gading Serpong, Tangerang City in 2021. The exclusion criterion in this study was workers who were not willing to be respondents. The total sampling technique was used in this study.

Validity and reliability tests were carried out before data collection. Validity and reliability tests were carried out on unsafe behavior, knowledge, attitudes, and supervision variables. The validity test results showed that six statements regarding unsafe behavior, ten questions regarding knowledge of unsafe behavior, six statements concerning attitudes, and five statements concerning supervision were valid ($r_{count} > 0.444$). The reliability test showed that the variables of unsafe behavior (0.814), knowledge (0.840), attitude (0.988), and supervision (0.807) were reliable, with a *Cronbach's* alpha value >0.6.

Primary data were collected by direct data collection using a questionnaire on the variables to be studied, namely knowledge, attitudes, years of service, and supervision. Data were obtained through the questions contained in the questionnaire with

the interview method. In this study, unsafe behavior included the use of PPE, placement of work equipment in its place after work, understanding the job desk and SOP of the work being done, smoking behavior while working or not in the right place, excessive joking behavior (such as startling co-workers, shouting, fun or being ignorant) towards colleagues during work time in which the behavior is assessed during the ongoing work process at the research location, namely formwork, casting, and welding.

After the data were collected, they were processed to be ready for univariate or bivariate analysis. Before univariate and bivariate analysis, a normality test was carried out to determine the cut-off point used for unsafe behavior, knowledge, attitudes, and supervision. The normality test results showed that the data were not normally distributed (*p-value*<0.05), so the cut-off point used was the median value. The distribution and frequency of the unsafe behavior, knowledge, years of service, attitudes, and supervision variables were produced in univariate analysis. Bivariate analysis used the *Chi-square* test and described the relationship between the independent and dependent variables.

RESULT

Based on Table 1, the results of the study from 42 respondents showed that the highest proportion was safe behavior by 25 respondents (59.5%), good knowledge by 23 respondents (54.8%), new working period (<3 years) by 22 respondents (52.4%), good attitude by 29 respondents (69%), and good supervision by 24 respondents (57.1%).

Table 1. Distribution and frequency of unsafe behavior and its risk factors among construction workers in Tower D

Variable	Frequency	Percentage (%)
Unsafe Behavior		
Safe	25	59.5
Not safe	17	40.5
Knowledge		
Good	23	54.8
Bad	19	45.2
Attitude		
Good	29	69
Bad	13	31
Years of service		
New	20	47.6
Long	22	52.4
Supervision		
Good	18	42.9
Bad	24	57.1

The *Chi-square* test shows that there is a relationship between knowledge and unsafe behavior (*p-value* 0.016). Construction workers with inadequate knowledge are at risk 2.905 times compared to workers with good knowledge of unsafe behavior. A relationship exists between attitudes and insecure behavior with values (*p-value* 0.028). Construction workers with a bad attitude are 2.5 to 10 at risk times compared to workers with an excellent attitude to behave unsafely. The relationship between the length of service and unsafe behavior can be seen with a *p-value* of 0.004.

Table 2. Bivariate analysis of risk factors for unsafe behavior in construction workers

Variable	Unsafe behavior (%)	Safe behavior (%)	*p-value*	PR (95%CI)
Knowledge				
Good	12 (63.2%)	7 (36.8%)	0.016	2.905 (1.244 - 6.764)
Bad	5 (21.7%)	18 (78.3%)		
Attitude				
Good	9 (69.2%)	4 (30.8%)	0.028	2.510 (1.256 - 5.014)
Bad	8 (27.6%)	21 (72.4%)		
Years of service				
New	14 (63.6%)	8 (36.4%)	0.004	4.242 (1.426 - 12.619)
Long	3 (15%)	17 (85%)		
Supervision				
Good	11 (61.1%)	7 (38.9%)	0.,041	2.444 (1.115 - 5.358)
Bad	6 (25%)	18 (75%)		

Construction workers with new tenure are 4.242 times at risk compared to workers with long service tenure to behave unsafely. There is a supervisory relationship with unsafe behavior with a value (*p-value* 0.041). Construction workers with poor supervision are 2.444 times at risk compared to workers with good supervision to behave unsafely.

DISCUSSION

The proportion of unsafe behavior among construction workers in Tower D of 42 workers found that the highest proportion was for workers who had safe behavior by 25 workers (59.5%), while the lowest proportion was for workers who had unsafe behavior by 17 workers (40.5%). Unsafe behavior that workers often carry out is smoking at work (42.9%), not placing equipment in the right place after work (33.3%), and needing to understand job descriptions and SOPs (31.0%). Research conducted by Ginting *et al*. (2020) and Purnomowati and Milah (2020) stated the same thing. Namely, the highest proportion was workers with safe behavior with 33 workers (54.1%). According to Ramli (2013), unsafe behavior from humans, such as removing safety devices or working while joking and not using safety equipment at work, can endanger humans and cause work accidents. Nearly 85% of work accidents occur due to unsafe acts, around 10% are due to unsafe conditions and 5% are due to other factors. Based on these facts, it can be said that a person's behavior plays a significant role in the occurrence of inevitable accidents (Lestari and Lestari, 2018).

Analysis shows a significant relationship between knowledge and unsafe behavior (Table 2). This is in line with several studies which also state the same thing, that knowledge is significantly related to unsafe behavior (Pratiwi and Situngkir, 2020; Putra and Citroatmojo, 2021; Larasatie *et al*., 2022). In the field of OSH, knowledge provides a fundamental foundation so that effective worker participation is required in determining problems in the workplace independently. Workers with adequate Occupational Safety and Health (OSH) knowledge will understand what actions are risky and can harm them while working and also understand work instructions and methods (Rejeki, 2015).

In this project, the implementation of toolbox meetings and safety talk programs by HSE officers has been carried out. Matters discussed in the activity included work plans and basic knowledge of occupational safety and health that might arise before starting work. The results of this study indicate that there still needs to be better knowledge. This may be due to the need for maximum implementation of the toolbox meeting program. Some workers do not attend it and lack enthusiasm when participating, so the information conveyed needs to be absorbed correctly. Several workers also stated that these activities tended to be boring because the materials and delivery techniques were the same daily.

Bivariate analysis shows attitudes about unsafe behavior in construction workers (Table 2). Several studies have also stated that there is a relationship between attitudes and unsafe behavior (Pratiwi and Situngkir, 2020; Larasatie *et al*., 2022; Monalisa *et al*., 2022). Attitude consists of a positive attitude and a negative attitude. Positive behavior will arise from positive attitudes, and vice versa (Lumbanbatu *et al*., 2019). Positive behavior is expected to produce something positive to avoid unwanted results, for example work accidents. The positive attitude of workers will create a feeling that prevention of unexpected events such as work accidents needs to be done.

Based on the interviews, it is known that there has been an implementation of punishment for workers who do not comply with the Standart Operating Procedur (SOP) and are too severe, such as cutting their ID Cards up to dismissal. As such, workers inevitably Because of this binding rule not because of themselves. This results in bad attitudes toward workers, which can also lead to unsafe behavior at work. Analysis shows a significant relationship between work tenure and unsafe behavior in construction workers (Table 2). Research conducted by Sovira and Nurjanah (2015) and Amaliah and Yusvita (2022) also states that there is a relationship between tenure and unsafe behavior.

Tenure is the length of time an individual has worked in an agency in a years (Koesindratmono and Septarini, 2011). Workers with a new working period tend to experience work accidents more often. Various studies have shown a decrease in the number of work accidents due to an increase in years of service and skills. Awareness of work-related accidents tends to increase with the length of work and age at work (Sucipto, 2014). Handoko's theory (2012) categorizes the working period into an old working period of >3 years and a new working period which is <3 years.

The proportion of new employees in this project is higher than those of old employees. Workers with long service tenure tend to understand the hazards and risks in the work area, company policies, and applied SOPs. The large number of workers with new tenure is due to the trust between the foreman and the company so that the recruitment can be carried out personally by the foreman without having to consider his tenure and experience. New workers need to be given education and knowledge about hazards and risks in the workplace and their prevention repeatedly and routinely so they do not engage in unsafe behavior that can cause work accidents.

Bivariate analysis shows a significant relationship between supervision and unsafe behavior (Table 2). This is also the same as in several previous studies (Sangaji *et al*., 2018; Utami, 2021; Amaliah and Yusvita, 2022; Larasatie *et al*., 2022) with the result that there is a relationship between supervision and unsafe behavior. One of the essential factors in causing a person's behavior so that program activities and objectives can be implemented and achieved is supervision (Sanur *et al*., 2020). The target is to go as desired and planned (Notoatmodjo, 2012).

The supervision carried out by the Health, Safety, and Environment (HSE) team is in the form of a safety patrol program where the team will tour each work area to look for conditions that are not in accordance with standards, then record them for monthly K3 reports and determine control measures. However, workers were still not working according to procedures because the HSE officers were only a few moments in the work area. The size of the work area of this project and the incomparable number of safety officers created opportunities for workers to engage in unsafe behavior.

CONCLUSION

The proportion of unsafe behavior among construction workers in Tower D, Cartenz apartment development project, PT. Nusa Raya Cipta, Gading Serpong, Tangerang City in 2021 is of 40.5%. The *Chi-square* test shows that knowledge, attitudes, years of service, and supervision are risk factors for unsafe behavior.

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