

INTERNATIONAL JOURNAL OF OCCUPATIONAL MEDICINE AND PUBLIC HEALTH

FACTORS ASSOCIATED WITH CASE FATALITY IN WORK ACCIDENTS EXAMINED AT THE SERANG AND CILEGON REGIONAL HOSPITAL

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ABSTRACT

Backgrounds

The fatality cases in the latest BPJS Employment data for 2021 amounted to 6,054 out of 234,370 work accident cases. The Serang and Cilegon areas are known as industrial areas in Banten province. The effect of fatalities in work accidents has a negative impact on various sectors, including workers, companies and the country, where the number of claims from work accident cases reaches 1.79 trillion a year. This research was conducted to look at the picture of fatality cases examined at the Serang and Cilegon regional hospitals and also identify factors related to fatalities in work accident cases.

Methods

This research uses quantitative methods with a retrospective cross sectional approach. Research subjects were taken through medical record data and corpse obstruction reports in work accident cases sent to the Emergency Room (IGD) and the Forensic & Medicolegal Installation at RSUD. Dr. Dradjat Prawiranegara and Cilegon City Regional Hospital. The method for taking subjects used a total sampling technique, a total of 323 subjects were obtained from this research. The data analysis used was univariate and bivariate analysis using the Chi-Square test and FISHER's Exact Test in the SPSS data processing application.

Results

The number of subjects in the study was 323 workers with information that 297 were live work accident cases and 26 were fatal work accident cases. From univariate analysis, data was obtained that the location of the most injuries in work accident cases was in the head, the majority of workers who experienced work accidents were <45 years old (83.28%) and a greater number of male workers experienced work accidents compared to female workers (82.66%). Meanwhile, work accidents were found to occur more frequently during the day (75.54%). From the results of the bivariate analysis, it was found that there was a statistically significant relationship between gender and fatality ($p < 0.012$), where in this study all fatality cases were experienced by men.

Keywords: Work Accidents, Fatalities, Deaths, Occupational Medicine, Serang and Cilegon Regions

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INTRODUCTION

The International Labor Organization (ILO) defines a work accident as an unexpected and unplanned event that arises because of a relationship with work, causing one or more workers to experience injury, illness or death.¹ The ILO describes that work-related injuries can result in injuries ranging from minor in nature resulting in loss of working time to fatal ones resulting in loss of life or death.¹ From global data published by the ILO, data shows that 340 million workers experience work accidents every year, with a total of 2.3 million fatalities or the equivalent of 6,000 people dying every day due to work accidents. In Indonesia, BPJS Employment reports that the latest data in 2021, the number of work accidents reached 234,370 cases with a total of 6,552 fatalities.²

Research on factors related to work accidents has been carried out by researchers in various countries.³ However, the results of these studies are still mixed and there is no clear consensus regarding which factors are the most dominant in causing work accidents. Age is related to a person's memory and ability to grasp information as well as alertness in carrying out work, generally older workers tend to have capabilities that are no better than young workers, however, in research conducted by Khodabandeh et al (2016) and Gonzalez et al (2015) stated that younger people tend to have

more frequent work accidents which are fatal and even cause death. This is thought to be because older workers are generally more skilled and experienced in carrying out their work.^{4,5} Meanwhile, according to research conducted by Sucipto (2014), young people generally lack discipline, are in a hurry, and lack attention in doing their work so that work accidents often happen to them. There is other research that states that workers who are in their early 45s will generally experience a decrease in functional capacity due to physiological changes in the body due to aging such as decreased aerobic capacity, decreased cognitive function, decreased bone density and quality and decreased muscle strength so that workers who are at the age of 45 years and above is significantly correlated with the occurrence of fatalities that occur in work accident cases.⁶

Another factor related to the incidence of death in KK is gender, the existence of differences both physically and psychologically in men and women as well as the social allocation of workload between the two can be factors related to work accident cases. In research conducted by Asady et al (2018) on work accident cases that caused death in Iran, all of them were male.⁷ The results of this study are in line with research conducted by Khodabandeh et al (2016) & Gonzalez et al (2015) which states that gender is significantly related to the incidence of death in work accident cases.^{4,5,7} Physiologically, humans have a circadian

rhythm that regulates cycles of alertness and sleepiness in response to light in the environment. This circadian system evolved so that humans can adapt to changes in their environment so that they can optimize energy expenditure and the body's internal physiology.⁸ Sleep or wake cycles are needed by the body to restore the rhythms involved and help various processes such as nerve remodeling, memory consolidation, metabolic processes and the assimilation of complex motor systems. Workers who do work in their circadian sleep cycle tend to need to adapt in their work process. In a previous study, Helena (2019) found that there was a high risk of work accidents occurring in night shift workers when compared to morning shift workers, but this study did not in line with research by Khodabandeh et al (2016) where in this study the majority of cases (55.2%) of KK actually occurred during work hours in the morning and afternoon. It was also stated in this study that work accidents often occurred in the morning.^{4,9}

Work accidents can trigger injuries to workers' body parts. In forensic medical thanatology, the meaning of somatic death (clinical death) is defined as the cessation of the function of the three life support systems (nervous, cardiovascular and respiratory systems) so that death in work accident cases can be found to be due to injury. around these life supporting organs.¹⁰ In several studies, including research conducted by Asady et al (2018), it was found

that the highest percentage of deaths in work accident cases was that the location of the injury was in the head and neck, followed by injuries to the abdomen-pelvis and lower limbs while in work accident cases of survivors, the highest order of injury location was in the lower extremities followed by the upper extremities, head & neck, and thorax. In another study conducted by Guimares et al (2022) in Ceara, Brazil, data was found that the most common locations for injuries in work accidents in order of highest were the extremities, lower extremities, head, abdomen and thorax.^{7,11,19}

The existence of differences between one study and another, as well as the absence of research regarding factors related to fatalities in work accident cases at the Serang-Cilegon regional regional hospital, encouraged researchers to conduct research.

METHODS

This research uses design study observational analytical by method *Cross Sectional* with approach Retrospectively, the total number of subjects in this study was 323 patients, with 297 patients alive and 26 patients dead. Data retrieved from record medical and reports obduction corpse case accident Work from 2021-2023 from Installation Bad Emergency (IGD) & Installation Forensic Hospital Dr. Dradjat Prawiranegara and Cilegon City Regional Hospital with engineering *total sampling*. Criteria inclusion patient This is patient data accident work that has data on age

, type gender, and time incident. Collected data processed use SPSS 27.0 application with analyze univariate data For evaluate percentageae from age, type gender, time events, as well location happen injury and bivariate data For evaluate connection between factor age, type gender, time incident to case fatality accident Work. Test analysis bivariate using the *Chi-Square* test and *Fisher's Exact Test* with limited significance p value <0.05. After the data is processed the data will be presented in table form to determine the number of fatality cases and factors related to fatality cases. This research uses individuals as respondents, so they must apply for ethical permission from the Ethics Committee of the Faculty of Medicine and Health Sciences, Sultan Ageng Tirtayasa University. This research has received approval from the Ethics Committee with permit number 9/UN43.20/KEPK/2024.

RESULTS

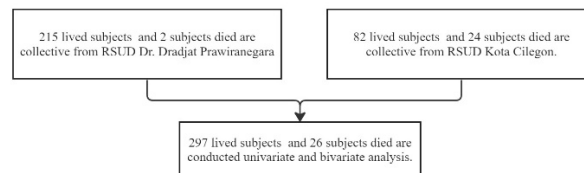


Figure 1. Flow description of research respondents participation.

Of the total subjects research , there were 297 subjects alive and 26 subjects died in cases accident checked work .

Table 1. Distribution of fatality cases in work accidents.

Variables	n	%
Number of cases		
- Fatal	26	8
- Non-fatal	297	92

Of the total 323 subjects , patients accident Work dominated by workers age young under 45 years old . Worker man more Lots experience accident Work compared to women. Time of incident accident Work Lots happens in time Afternoon compared to Evening .

Table 2. Characteristics subjects of work accidents

Characteristics of Subject	Frequency (n)	Percentage (%)
Age, median (min-max)	32 (13-76)	
- Young Workers(<45)	269	83.28
- Older Workers (≥ 45)	54	16.72
Gender		
- Male	267	82.66
- Female	56	17.4
Time of Work Accidents		
- Day time	244	75.54
- Nighttime	79	24.46

Source: SPSS 27.0

A. Univariate Analysis

Univariate analysis was carried out to see the magnitude or proportion of each studied. In this study, it was found that the most common injury location in live work accident cases was the head, while in fatal work accident cases the injury location was in multiple locations.

Table 3. Location of Site Injuries Work Accident

Location of injury	Non Fatal	Fatal	n	%
Head	91	4	95	29.4
Neck	1	0	1	0.3
Body	27	0	27	8.4
Upper Extremities	84	0	84	26
Lower Extremity	64	0	64	19.8
Multiple Locations	12	12	24	7.4
Common Injuries	5	5	10	3.1
Other Injuries	10	4	14	4.3
Data not found	3	1	4	1.2

Source: SPSS 27.0

B. Bivariate Analysis

Analysis bivariate used For see connection between variable free with variable bound with using the Chi Square Test and if mark count hope >20% in one of the tables then the test is carried out is Fisher's Exact Test. Based on results Fisher Exact Test analysis with level significance of 5%, was found that there is connection between type sex with fatality (p-value = 0.012) and not found exists relationship between age and time incident accident Work to fatality . Complete data can seen in table 4 below This .

Table 4. The Relationship between Age, Gender, and Time of Work Accidents on Fatalities

Variables		Fatalities				Total		P- value	OR (95% CI)
		Fatal		Not Fatal					
		n	%	n	%	n	%		
Age	Young worker s (<45 years)	18	6,7	251	93.3	269	100%	0.056 ^f	2,425 (0.996—5.907)
	Old Worke rs (≥ 45 years)	8	14.8	46	85.2	54	100%		
Gender	Male	26	9.7	241	90.3	267	100%	0.012 ^f	NA
	Female	0	0	56	100	56	100%		
Time of Work Accidents	Day time	22	9	222	91	244	100%	0.262 ^{cs}	1,858 (0.620-5,566)
	Night time	4	5.1	75	94.9	79	100%		

*cs : *Chi-Square* *f: Fisher's Exact Test

DISCUSSION

From this research data it is known that multiple injury becomes the location most cases studied fatalities, injuries multiple according to ILO classification is injuries that occur in at least two organs of the body. According to Becker et al (2022), it is stated that the patient is suffering injury multiples are very susceptible to complications and even death, this is the case fatality general mechanism of injury happen complex and involving more than One type style nor collision as for the effects of this complex mechanism often exceed ability body to tolerate trauma especially if injury the regarding vital organs such as the brain, heart, lungs, or vessels major blood loss blood massive from multiple injuries generally can cause the patient to go into shock or die.^{12,20,21}

In this study, this was not found connection age with fatalities in accidents work not found significant relationship in a way statistics (p value= 0.056), results This research is in line with research conducted by Puspitasari A (2015) who sought connection factor age on fatality accident work examined at RSUPN Cipto Mangunkusumo Jakarta ($p=0.064$; OR 7.245, CI 95% 0.891-59.049). As for from description descriptive the number of cases obtained more fatal injuries experienced aged workers under 45 (69.2%).¹³ This research is in line with research conducted by Asady (2018) where fatal injuries were more common

happens to workers age young under 45 years (79.3%) in Asady's research were also found results are not available significant relationship in a way statistics (p value= 0.170) between age with fatal injuries in cases accident Work. There is no significant relationship in a way statistics between age youth and age old against fatality, so there is no enough strong evidence to conclude that age in a way direct played a role in the incident fatality so worker age and worker age old own equal chance of experiencing fatality.^{7,14}

The results of this study show that there is no relationship between gender and fatality in work accident cases, resulting in a p value of 0.012, which means there is a statistically significant relationship. This research is in line with the results obtained in Asady's (2018) research, where of the 6,052 work accident cases studied, 33 fatal cases were found, all of which were male. Another study conducted by Khodabandeh (2016) also stated that from 2014- In 2016, there were 714 fatal cases and all of them were male. A *systematic review* and *meta analysis* prepared by Alamneh et al (2020) found that male workers have a greater risk of injury compared to female workers. (OR 1.46, CI 95% 1.01-2.11).¹⁵ The large proportion of work accident fatalities that occur in men is because male workers generally have a heavier workload compared to female workers, and placement in dangerous work locations

generally places more of a burden on male workers than female workers.^{5,7,15}

Based on the results of bivariate analysis, statistical tests using *Chi-Square* related to the time factor of occurrence and fatalities in work accidents were obtained ($p=0.262$; $OR=1.858$; $CI\ 95\% 0.620-5.566$) which shows that there is no statistically significant relationship between the time of work accidents. both during the day and at night with fatalities occurring in workers. However, from the descriptive description of this research, it was found that fatal work accidents occurred more frequently during the day, with 22 of the 26 fatalities occurring during the day. This research is in line with the results obtained by Puspitasari A (2015) where from the results of the *Fisher Exact Test statistical test* which examines the time of work accident occurrence and injury fatality, the value of $p = 0.346$; $OR=2.138$; $CI95\% 0.440-10.390$ which shows that the time of work accident is not statistically related to fatality. Descriptive data obtained by Puspitasari A (2015) shows that the number of fatal cases has an equal proportion, namely 13 people during the day and 13 people at night. As for research by Khodabandeh (2016), it was found that fatal work accidents occur more often in the morning, this is because active work is generally carried out in the morning and afternoon, while other research was conducted by Miguel Lopez et al which examined the "*lunch effect*" regarding the severity of work accidents during the day, it is stated that the

fatalities of work accident injuries in construction workers are mostly found between 13, 14, 15, and 16 and from this data the frequency and severity of work accidents mostly occur between 14:00-16:00. After these factors were analyzed, it was found that several factors played a role in the occurrence of "*the lunch effect*" in cases of work accident injuries, including the use of alcohol after lunch, use of drugs, and *postprandial sleepiness* which caused The frequency of work accidents generally occurs during the day.^{16,17}

This research was carried out using a retrospective approach which could only rely on secondary data from the two hospitals so that the search for risk factors that could be explored was limited. The fatality rate data obtained in this study cannot be generalized to all regions, this is because this study was only limited to 2 hospitals. It is hoped that taking research subjects using *the total sampling method* from all data will provide an overview of the work accident cases studied from 2021-2023. In this research, other data cannot be obtained such as type of work, company origin, history of PPE use, level of education, and understanding of PPE use, so the information attached to this research is very limited and can only look for analysis of factors related to fatalities based on available data. at the hospital. The time of the accident in live patient work accident cases is based on the time of admission to the hospital (IGD) even though work accident cases are urgent cases and require immediate treatment

so that the time of hospital admission can provide an idea of the time of the incident, but the accuracy of the exact time the accident occurred is still a limitation. in this research.

CONCLUSION

Obtained data on case fatality rates accident work examined at the Serang and Cilegon Regional Regional Hospital in 2021-2023 was 8%. Distribution location injury in case accident Work life is in the head temporary distribution location injury in case fatality Lots found at the location multiple . A relationship was found between gender and fatality in work accident cases.

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