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The Effect of Workload and Fatigue on Employee Occupational Health and Safety: A Literature Review

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ABSTRACT
Workload is a task used to measure an employee's activity and achievement, while work fatigue also often occurs in employees who are commonly referred to as high-touch jobs that involve a lot of face-to-face. In occupational health and safety (K3), namely ensuring the health and safety of employees who are working and preventing unwanted work accidents. This literature review is to find out about the effect of workload and fatigue on occupational health and safety in employees. In this study, an analysis or approach was carried out by means of a literature review. By searching for various relevant sources using the observation method through the Google Scholar, PubMed, and Garuda platforms. Then in the search criteria for this journal there are two types of access, namely inclusion and exclusion, in this literature review using the mixed case control or cross-sectional method. The results of the journal obtained 13 articles explaining that the effect of workload and fatigue on occupational health and safety has significant results or has an effect on employees. The effect of workload and fatigue provides significant results on occupational health and safety (K3) in employees, so this study will provide further intervention to find out how many employees experience accidents due to large workloads and the resulting fatigue.

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INTRODUCTION

Work fatigue is a condition in which there is a decline in physical, eye, and even nerve function in the body, from all of that is the main thing or source that attacks when workers are tired (Roya et al., 2021). Fatigue in workers is a decline that begins with a feeling of tiredness which then spreads to mental and even other physical fatigue so that it will disrupt work motivation and can reduce work productivity (Pratama, 2021). According to Notoadmojo (Sari 2024), the main goal of Occupational Health and Safety is to ensure workers remain safe and comfortable so that productivity continues to run smoothly, and prevent workplace accidents. Meanwhile, the workload itself can be interpreted as a condition in which workers are given tasks that have been assigned to the worker themselves and there is a time that has been

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determined for each of them in the work (Muhammad Alfiansyah Miftachul Ridho1; Sri Wahyuni2; Nur Falah Setyawati3, 2024). The workload felt by the average employee must be felt according to the abilities of the workers in mental workloads that are dominated by mental and thinking, while in this workload it is often known as manual handling, namely activities that depend on the efforts of those who control their work (Sahilah Amrina Rosadah et al., 2024). Fatigue is one of the main factors that disrupt activities in activities and at work, so this workload must be overcome by workers to get enough rest or have support from the industry to provide safe and comfortable rest facilities.

Workload can be defined as a task used to measure employee activity and achievement. A person assigned a task or job with a predetermined timeframe is required to complete it thoroughly and within the allotted time. The workload assigned must also be appropriate for the employee. If it exceeds an employee's capabilities, it will disrupt their psychological and physical well-being (Anugrah, U., I. & Brilliant, 2022). Therefore, assigning workload to employees is also an important aspect that management must consider, as excessive workload can impact their performance, resulting in work inefficiency.

Employee fatigue can be defined as a common problem among workers. Terminology explains that work fatigue also frequently occurs in employees, commonly referred to as high-touch jobs that involve a lot of face-to-face interaction. If employees who work in this way never get tired, productivity never stops and employees are enthusiastic in doing their work (Anugrah, U., I. & Brilliant, 2022). The impact of fatigue on workers can be seen from both psychological and physical aspects. Physical fatigue can be characterized by the emergence of things like absenteeism from the workplace, many experience difficulties in achieving success, and workers also doubt their competence and policies for maintaining the type of work performed by employees. Very heavy and numerous demands can also affect employee fatigue. Psychological fatigue can also cause high emotions, and a lack of personal achievement can cause individuals to compare other workers in achieving a solution when working (Anugrah, U., I. & Brilliant, 2022). This can be seen from the aspect of fatigue which is divided into three explanations, namely emotional fatigue, fatigue in depersonalization and low levels of performance, these three aspects can be felt by employees who feel fatigue at work (Anugrah, U., I. & Brilliant, 2022).

According to Notoadmodjo (Sari, 2024), occupational health and safety (OHS) is defined as efforts to ensure the health and safety of employees who experience workplace accidents. Companies face challenges not only related to workload and fatigue, but also employee health and safety. Therefore, companies must develop an OHS program for all employees to reduce the risk of occupational diseases. Continuous workplace accidents will hamper production processes and can reduce employee performance.

This literature review builds on previous research, hoping to provide a comprehensive and in-depth understanding of the impact of workload, fatigue, and employee health and safety. It is hoped that both employees and industry management can address and assign work appropriate to the physical workload of employees, enabling employees to complete their tasks without hindrance and without disrupting daily productivity. This study addresses the lack of results in previous studies in the literature, which have not comprehensively

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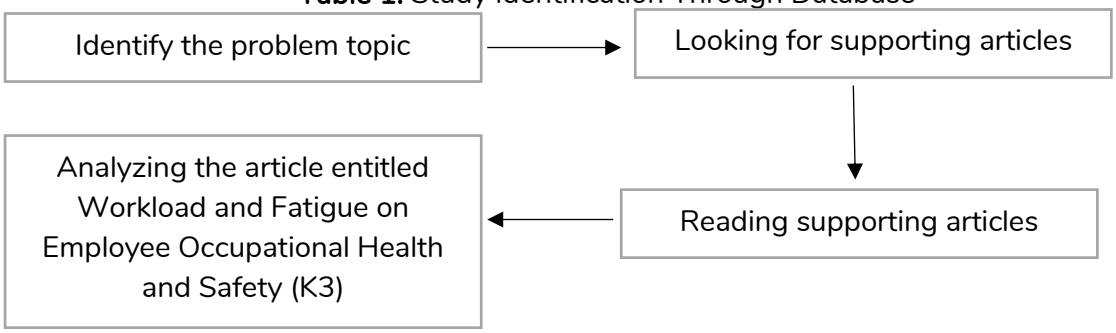
examined the simultaneous relationship between workload, fatigue, and their impact on employee health and safety within a single integrated model. This study also implicitly recommends previous research emphasizing the importance of examining causal relationships and a systemic approach to occupational risk management. This literature review will discuss the influence of workload on employee fatigue levels, the impact of fatigue on employee health and safety, and provide evidence-based policy recommendations or work interventions to improve employee health and safety.

METHODS

This study uses a current study approach using a literature review, where this literature review can produce evidence and even an evaluation of an activity in a concise manner and can be selected as a reference, the report in this study is adjusted to its classification such as open access and full text. Meanwhile, the exclusion criteria for papers in this study cannot be read in full, the article is not relevant to the search keywords. The keywords used to search for this article are Workload, Fatigue and Occupational Health and Safety (K3) in Employees. By searching for article sources through the Google Scholar platform (n = 1,530), PubMed (n = 8) and Garuda (n = 4). Then the article was reviewed and observed according to keywords and inclusion and exclusion criteria.

Table 1. Study Identification Through Database



After searching and filtering the results in the table above, it can be concluded that this literature review utilizes primary and secondary data from the referenced articles. This article utilizes both secondary and primary data, drawn from articles that meet the inclusion and exclusion criteria. This literature review is expected to provide concrete, even direct, evidence related to employee workload, fatigue, health, and safety.

In this literature review, articles were searched over a 10-year period (2015–2025) to ensure the relevance of the results. Selected articles can then be used as references in this literature review. This study used a cross-sectional case-control design that specifically addressed employee workload, fatigue, and occupational health and safety (OHS).

RESULTS AND DISCUSSION

Based on the results of articles that have been obtained using quantitative methods, the total number of journals taken on average uses Indonesian and English which are searched using database platforms namely Google Scholar (n = 1,530), PubMed (n = 8) and Garuda (n = 4), in the articles that have been obtained can be a reference for the study in this literature review,

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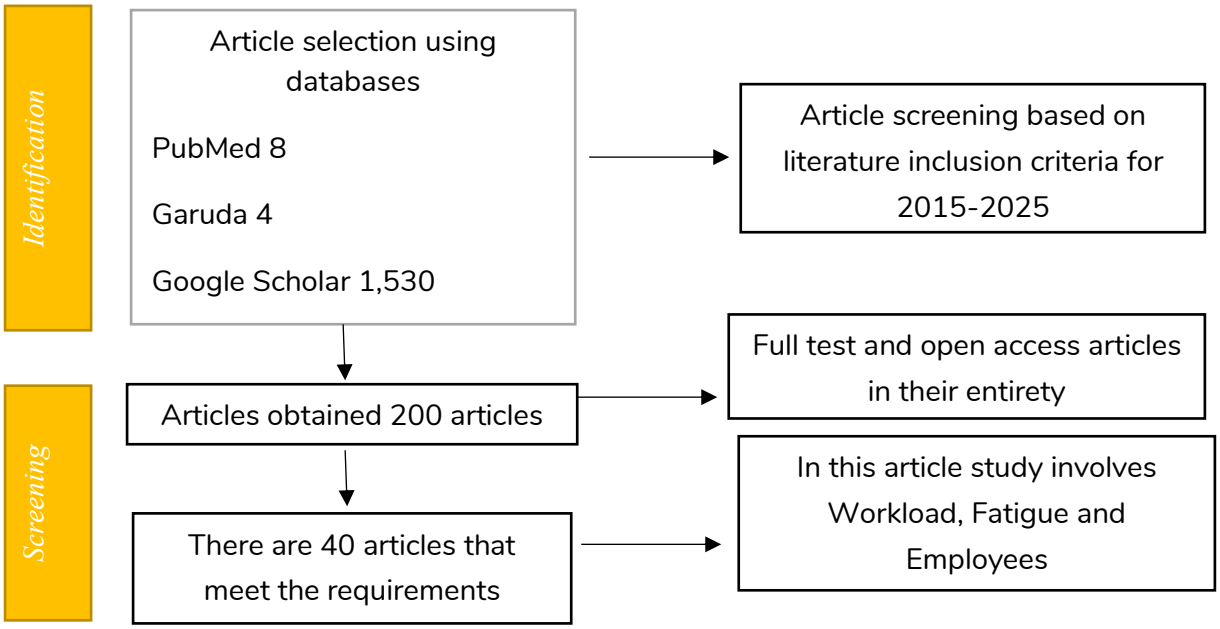
before a more detailed filtering of this article was obtained as many as 40 articles, so it cannot be used as a reference because it does not match the classification of inclusion and exclusion criteria, after filtering the articles only got 13 journals that match the inclusion and exclusion criteria with keywords workload and fatigue on employee health and safety. After filtering the journals based on the inclusion criteria: this article can be read in full-text, open access and uses a case-control and cross-sectional research design, from as many as 1,542 from Google Scholar, 8 from PubMed, and 4 from Garuda, then the articles were selected so that the results were 40 articles.

After a more detailed screening of the articles and adjusting them to the existing criteria, 13 articles were obtained that were suitable and met the final eligibility criteria, so they could be used for this literature review. These 13 articles discussed the various effects of workload and fatigue on employee health and safety. Therefore, the title of this literature review study is often conducted for research using the keywords workload and fatigue on employee health and safety. This screening has obtained 13 articles. The articles that have been used as references in this literature review study also discuss workload and fatigue on employee health and safety.

All articles that have been analyzed on average use case control and cross sectional research designs, in the reference journals (11) the journals use a cross sectional research approach, while in (2) this journal uses a research study approach using case control, in the journals that have been filtered and have become references on average using instruments in the form of questionnaires, questionnaires that have been completed and are in accordance with the keywords will be distributed to respondents, where the questionnaire is filled out by respondents who want to be respondents and have been determined. So this process can be described systematically in the flow, as below.

Table 2. Article Screening and Selection Flow



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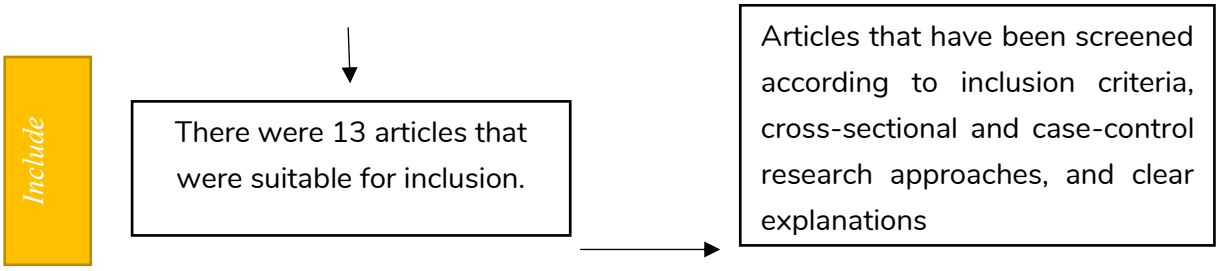

Based on the articles that have been screened and in accordance with the inclusion and exclusion criteria, the results of 13 articles were obtained. The articles in this study were initially searched using the Google Scholar, PubMed and Garuda platforms according to the keywords Workload, Fatigue, Occupational Health and Safety (K3) of workers using Indonesian language search. After conducting a search based on the full text and open access inclusion criteria and using a mixed cross-sectional and case-control research approach, from the many articles that have been screened, the final results were 13 articles as reference material for this literature study (Table 2).

Of the 13 articles that have been filtered, (11) articles were found discussing the influence of workload and fatigue on occupational health and safety (K3) on employees, while the other (2) articles only discussed work fatigue. The articles that meet the keywords and inclusion and exclusion criteria are described in the table below:

Table 3. Articles reviewed

No	Title	Researcher	Method	Sample	Research Location	Relevance and Quality	Results
1	Factors Related to Work Fatigue in Tailors at Bulukumba Central Market	(Innah et al. 2021)	*Cross sectional*	30 Workers	Bulukumba	Medium	The results showed that 12 tailors (40.0%) experienced fatigue, and 18 tailors (60.0%) did not. Statistical tests showed that: - Length of service: no relationship with length of service (p=0.403) - Length of service: no relationship (p=0.367) - Workload: no relationship (p=0.187)

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No	Title	Researcher	Method	Sample	Research Location	Relevance and Quality	Results
							- - Body mass index: relationship with work fatigue (p=0.006)
2	The Influence of Work Fatigue and Occupational Health of Employees at the National Search and Rescue Agency (BASAR-NAS) in Gorontalo City	(Ratnawati, Alam, and Monoarfa 2023)	*Cross sectional*	62 Employees	Gorontalo	High	The results of the study show that - Work fatigue has significant results on K3 - Workload has significant results on K3
3	Factors Associated with Work Fatigue among Employees of PT. Andalas Agro Industri in West Pasaman	(Handayani, Dewi, and Wahyuzafitra 2023)	*Cross sectional*	55 workers	Pasaman	High	The results of this study showed that - Work fatigue, work shifts, length of service and age produced significant results - Nutritional status was not significant
4	Analysis of Workload on Physical Fatigue in the Workforce of PT. Galangan Kalimas, Balikpapan City	(Alfiansyah et.al 2024)	*Cross sectional*	3 workers	Balikpapan	High	The results of this study showed: - Workload showed significant results - Physical fatigue showed significant results
5	The Relationship between Physical Workload and Mental Workload and Job Fatigue in Welding Workers	(Sahilah Amrina Rosadah et al. 2024)	*Cross sectional*	26 Workers	Surabaya	High	The results of this study showed that the most respondents were in the moderate category,

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No	Title	Researcher	Method	Sample	Research Location	Relevance and Quality	Results
	at PT. PAL Indonesia						with 13 respondents. - Mental workload is significantly related to job fatigue. - Mental workload is significantly related to job fatigue.
6	The Influence of Workload and Work Fatigue on Occupational Safety and Health (K3) of PT JNE Express Employees.	(Sari and Susilawati 2024)	*Cross sectional*	93 Workers	Medan	High	The results of the study showed that there was a significant influence on work fatigue with a contribution of 50.5%.
6	The Relationship Between Workload and Job Fatigue in Production Workers at PT. Tri Teguh Manunggal Sejati, Tangerang City	(Hasan et al. 2022)	*Cross sectional*	60 Wokers	Tangerang	High	The results of this study showed that there was a significant relationship between workload and work fatigue.
7	The Relationship between Nutritional Status (BMI), Sleep Quality, and Physical Activity with Work Fatigue in Production Workers at PT. Coca-Cola Bottling Indonesia (Cikedokan Plant/Ckr-B)	(Wulandari 2022)	*Case control*	80 Workers	Cikedokan	High	The results showed that - Work fatigue had a significant effect on poor nutrition. - Sleep quality can significantly affect worker fatigue.

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No	Title	Researcher	Method	Sample	Research Location	Relevance and Quality	Results
							- Shift work had no significant effect on work fatigue.
8	The Relationship Between Workload and Hypertension Incidence in Purwodadi Public Market, Grobogan Regency, Central Java	(Kattan 2021)	*Case control*	20 Sellers	Grobogan	High	The results of this study showed a relationship between workload and hypertension with OR = 0.286.
9	The Relationship between Age, Length of Service and Work Shift with Work Fatigue of Employees in the Production Unit of PT. Bara Adhi Pratama in North Bengkulu Regency.	(Pratama 2021)	*Cross sectional*	15 Workers	Bengkulu	High	The research results showed: - Age was significantly associated with work fatigue. - Work fatigue was highly correlated. - Length of service was significantly associated with work fatigue. - - Work shifts were significantly associated with work fatigue.
10	The Effect of Work Fatigue and Workload on the Occupational Health and Safety of Employees at the National	(Prihatiningsih and Susanti 2023)	*Cross sectional*	80 Workers	Timika, Papua	High	The results of this study showed a significant influence on Occupational Health and Safety, Work Supervision,

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No	Title	Researcher	Method	Sample	Research Location	Relevance and Quality	Results
	Search and Rescue Agency (BASARNAS) in Timika City						and Work Discipline.
11	The Influence of Workload and Work Fatigue on Occupational Health and Safety (K3)	(Patrisia 2018)	*Cross sectional*	187 Workers	Samarinda, Kalimantan Timur	Low	Results: - Work fatigue has no impact on occupational health and safety. - Shift work has no impact on occupational health and safety. - Workload is unrelated to occupational health and safety.
12	The Relationship Between Workload and Fatigue among Laundry Employees in Warung boto Village, Umbulharjo District, Yogyakarta City	(MZ and Hariyono 2013)	*Cross sectional*	62 Workers	Warung Boto, Yogyakarta	High	The results obtained were that there was a significant relationship between workload and work fatigue.
13	The Influence of Occupational Health and Safety (K3) and the Work Environment on the Work Productivity of Employees at PT Bintang Toedjoe Site Cikarang	(Gunawan 2024)	*Cross sectional*	80 Workers	Cikarang	High	This study found that the influence of Occupational Health and Safety (K3) on employee productivity showed a positive and significant influence.

Based on the screening results of 13 selected journals, journals or articles containing the keywords "workload," "fatigue," and "employee health and safety" were frequently used

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for research. However, many researchers did not include the keyword "occupational health and safety" for workers. This research is important for educating and providing a space for workers who need a break or a place to share stories to reduce fatigue.

Industry is a means of providing income to people who need daily necessities, this is supported by research (Anugrah, U., I. & Brilliant, 2022). This research also discusses problems in the industry, these problems can arise related to internal or external to an industry, where the presence of employees or human resources in an industry is the key to an industry. In today's era where time and technology have developed and become more advanced, many companies compete in the market, making employees and companies required to carry out production increasingly stringent, so that employees are told to work effectively and efficiently to be able to produce a better product, and not be left behind in the industry in the market.

The impact of workload, fatigue, and occupational health and safety on employees is still largely unknown, with many health checks still lacking to reduce workload and fatigue. A weakness in this literature study is the lack of knowledge on work fatigue among skilled workers, which can impact employee health and safety (Hasan et al., 2022). The workload must be commensurate with human capacity. When employees are physically weak, their oxygen needs increase, and the workload they receive increases. If the workload imposed by the company is too high and the company still pays little attention to occupational health and safety, it will affect work productivity. This has been explained in the journal (Maghfira, Joesyiana, and Harahap 2023), so the workload obtained must be commensurate with abilities and must be completed according to the specified time to avoid work piling up the next day.

The purpose of the workload assigned by companies to the community is to enable employees to work according to their capacity and efficiently in carrying out their work and can achieve higher productivity than before. If the distribution of workload tasks is not appropriate and balanced among employees, it will create work risks and can reduce employee health. Therefore, companies can regulate workload management properly by implementing K3 within the company to ensure that employees can work safely, healthily, and productively in the long term and reduce employee accidents.

According to research (Anjani, Samdin, and Rachmat Riyaldi Hasan 2025) workloads are divided into three categories: light workloads, standard workloads, and heavy workloads. Companies must ensure fair distribution of workloads so that employees benefit from their effectiveness in completing assigned tasks, without any discrimination in providing equal wages for those performing moderate to heavy workloads and those performing light workloads that produce the same productivity.

Fatigue in employees is characterized by headaches, paleness, interrupted and unfinished work activities, which can trigger workloads on employees due to unfinished work tasks within the specified time (Sahilah Amrina Rosadah et al., 2024). This work fatigue can be characterized by a large workload. In repetitive work, it will cause muscle tension, which can cause increased blood pressure and can increase lactic acid, which can cause fatigue in the muscles. This fatigue can also prevent the body from further damage and allow recovery

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if rest is taken. When the body has given a signal to rest but is still forced to work, it will increase fatigue and can interfere with activities (Hasan et al., 2022). This has also been explained in the journal (Patrisia, 2018) this fatigue is called a symptom, not a sign because it is a subjective feeling that is reported, rather than a single objective observed by others.

Factors causing fatigue in this industry also vary widely, one of which is workload, for example, a workload that is not suitable for the worker's physical condition, poor lighting, minimal rest time, and a lack of rest facilities, resulting in discomfort at work. Fatigue is not only due to the heavy workload taken on in a job; fatigue can also be due to frequent human contact or socializing. This is also emphasized in the journal (Anugrah, U., I. & Brilliant 2022) fatigue can also be caused by high-touch, where a lot of work involves direct or face-to-face contact. If employees do not experience fatigue, work is not disrupted and productivity increases. Therefore, it can be explained that workers who are unable to perform their work can also be called work fatigue.

Work fatigue often manifests in human conditions, such as fatigue in physical and even mental health, which can vary significantly, and reduced productivity in completing tasks. All jobs inevitably involve fatigue. Work fatigue depends on the type of work itself. Research conducted by (Anugrah, U., I. & Brilliant, 2022) found that this gradual loss of emotion can also lead to a loss of motivation and commitment to completing a task, which can lead to occupational diseases. Fatigue can also cause signs and symptoms in the body, such as headaches, weakness, sensitivity, and decreased work motivation, leading to neglect of responsibilities assigned by the company.

Occupational health and safety (K3) is an implementation effort to ensure the integrity and perfection of physical and psychological aspects, and can improve efforts to improve the health and well-being of the workforce. Work fatigue can also be defined as physical, mental, and emotional exhaustion because fatigue can be experienced long-term and cause high stress (Sasanti and Irbayuni 2022). This work fatigue will reduce employee performance with a sensation of fatigue, decreased enthusiasm, and decreased activity. Because in general, the existence of K3 in the work industry is to create comfort and safety for workers and avoid the risk of workplace accidents. K3 is formed into occupational health and safety for employees in the workplace to prevent work accidents or cause work-related illnesses. This has been explained in the journal (Sasanti and Irbayuni 2022).K3 is explained as an employee's basic right and is an effort within the company to improve employee performance. Therefore, it must be a primary program in the company to provide a sense of comfort and safety while carrying out work activities.

Workers need to know the information of occupational health and safety knowledge, which can make every employee aware that work-related illnesses or work accidents can occur, from mild to severe. This has been explained in the article (Syaputra 2017). So one way for workers to know the importance of health and safety while working is to provide supplies or training to employees, this is one of the prevention of work accidents that can be provided by the company to employees, so that workers' knowledge increases and can improve and even prevent themselves, the environment and the team from work accidents. Companies must always provide support and even reminders to employees to always comply with the

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regulations. Occupational health and safety creates and strengthens their motivation to always behave according to the rules that have been made by the company.

Every company must have K3 for workers, but there are still many workers who are still indifferent to not following the regulations that have been determined by the company so that work accidents occur, and there are still many companies that do not provide work to their employees according to the employee's physical abilities, so that employees feel tired and if the fatigue is excessive it can cause work-related illnesses in employees (Sasanti and Irbayuni, 2022).

One of the problems in Occupational Health and Safety (K3) in this industry is one of the triggers for work accidents and even occupational diseases themselves can be caused by fatigue experienced by workers(Juliana, M. Camelia, A., & Rahmiwati. 2022). In Occupational Health and Safety, it is not only the problem of fatigue that causes work accidents, the supporting indicators of a work accident include the layout of work equipment, protection on machines, procurement of equipment for prevention, assistance and protection and the existence of a younger treatment to employees without any discrimination. This is supported by research (Swatika, Wibowo, and Abidin 2022), which explains that the level of productivity in employees will increase if the company that gives praise and even reduces the number of work accidents in the industry creates a sense of security and comfort for workers. This is explained in the journal (Dewi 2018), K3 is one part of the protection provided by the company to employees, this is to fulfill the achievement of the objectives of implementing K3 in a workplace as stated in Law No. 1 of 1970 concerning work safety.

According to data from the Ministry of Manpower (Kemnaker) in 2023, the number of workplace accidents in Indonesia reached 370,747. Approximately 93.83 percent involved wage earners, 5.37 percent involved non-wage earners, and 0.80 percent involved construction service providers. This is consistent with a journal (Londok, Doda, and Sondakh 2020), that found that many workplace accidents among employees stem from a lack of knowledge and a lack of adherence to company regulations. Therefore, it is hoped that changes will occur for employees if they receive support in the form of training on occupational health and safety. These workplace accidents can be caused primarily by the individual themselves at work.

This is supported by the journal (Maulani et al. 2020) obtained results in line with this study that workload and fatigue obtained significant results or were interrelated and caused employee work accidents during production. In line with the journal (Rojaya, R. 2024), that the factors of work accidents are not only from the human scope but can also be from the work environment, a work environment that lacks leadership and lack of supervision on Occupational Health and Safety will have an impact on a high number of accidents among employees who are working, so that many employees are less comfortable which causes production to decrease. Likewise supported by the journal (Salsabila Nurulita, Yulianty, and Pramestiana 2023) if the company has not been able to provide assistance to workers regarding K3 then the company is obliged to provide supporting road access for health and safety for employees such as evacuation routes, fast information and first aid for work accidents where health items such as first aid are also available within the company, easily

accessible to workers or provide health room facilities for workers who have work accidents. So it is hoped that this study can consciously reduce work accidents by providing or giving fair workloads to employees and can reduce the feeling of extreme fatigue in workers.

CONCLUSION

Based on a review of 13 articles, it can be concluded that workload itself can be defined as an employee's responsibility to complete a task within the specified working hours. If this workload cannot be completed, it will accumulate and exceed physical or bodily limits, leading to worker fatigue. Occupational health and safety (K3) within a company can also protect employees, ensuring their safety and comfort while carrying out work activities, thus preventing disruptions to their productivity. If employees comply with company regulations, the costs incurred in the event of a workplace accident will be lower, and the number of worker accidents during work will decrease. lthough various studies have shown that workload and fatigue are major risk factors for employee occupational health and safety (K3), several limitations remain that require attention. Many previous studies have focused solely on physical workload, while other dimensions, such as mental and emotional workload, tend to be overlooked, even though both contribute significantly to fatigue. The instruments used to measure workload and fatigue in various studies have not been standardized, complicating data synthesis and comparisons between studies. Many studies are limited to specific sectors or types of work, without considering contextual variables such as differences in work culture, age, work experience, and applicable OSH policies in certain regions. Furthermore, evaluation of the effectiveness of interventions to reduce workload or address fatigue is still minimal, leaving open the question of which solutions are most effective in practice. Therefore, further, more comprehensive and multidimensional research is needed to address these shortcomings and produce policy recommendations that are based on real and applicable evidence.

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