Journal of Innovative and Creativity
Journal Homepage: https://joecy.org/index.php/joecy
e-mail: journaljoecy@gmail.com

Faculty of Education
University of Pahlawan Tuanku Tambusai
ISSN 2775-771X (Online)
ISSN 2962-570X (Printed)
5 (3) 2025, Page: 34490-34497

Overview of Work Fatigue in Workers at Toyota Kombos Workshop in Manado City

Yessie Angelika Simatupang[1*], Jeini Ester Nelwan[2], Sri Seprianto Maddusa[3]
[1,2,3]Studi Programme Public Health, Faculty of Public Health, Sam Ratulangi University

Corresponding Author: Yessie Angelika Simatupang, e-mail: yessieasimatupang@gmail.com

Published: December, 2025

ABSTRACT
The prevalence of work-induced fatigue reaches around 32% of workers globally. In Indonesia, fatigue is a contributor to work accidents recorded as many as 162,327 cases of work accidents and 358 cases of which were recorded in North Sulawesi. Workshop workers are prone to experiencing work fatigue due to the demands of work involving work activities, work environment conditions that do not meet ergonomic principles, forced work postures, repetitive and monotonous nature of work, insufficient energy intake, quality of rest time during working hours and pressure of service completion timevehicle. This study aims to find out the picture of work fatigue in workers at the Toyota Kombos workshop in Manado City. The design of this study is quantitative descriptive with a cross sectional approach on 43 respondents which is the total number of workshop workers selected using total sampling. Data were collected through interviews using the Work Fatigue Sentiment Questionnaire (KAUPK2) and then analyzed univariately to see the distribution of work fatigue. Mild work fatigue was more commonly found at the age level of 26-35 years, high school education level/equivalent, no history of illness, long working period (≥ 5 years), male, and mechanical/technician respondents. Research shows that the majority of workshop workers experience mild fatigue, which is 79.1% of respondents, workers who experience moderate fatigue are 7% of respondents, while other workers are in normal conditions, which is 13.9%. And in this study, no severe fatigue was found.
Keywords: work fatigue, workshop workers, complaints of feeling tired

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PENDAHULUAN

Work fatigue is a significant occupational health phenomenon, defined as a subjective condition marked by feelings of tiredness, lack of energy, decreased motivation, and impaired concentration. This state arises from a combination of factors, including prolonged work duration, excessive workload, and challenging environmental conditions (Julianti et al., 2022). Beyond its subjective experience, fatigue is also a physiological and psychological state resulting from work activities, characterized by a measurable decline in performance capacity and reduced endurance in performing tasks. This dual nature—both as a personal feeling and a performance metric—underscores its complexity and impact on the workforce.

The prevalence of work fatigue is a pressing global issue. Data from the International Labour Organization (ILO) in 2016 revealed that a substantial 32% of workers worldwide experience work-induced fatigue, with 18% reporting moderate levels and 30% suffering from severe fatigue (as cited in Julianti et al., 2022). A sectoral analysis of this data is particularly alarming, showing that the industrial sector accounts for the highest proportion of these cases, reaching 45%. This indicates that industrial environments, often characterized by high physical demands and repetitive tasks, present a disproportionately high risk for the development of work-related fatigue.

The consequences of unaddressed work fatigue extend beyond individual well-being to directly impact workplace safety. Data from the Ministry of Manpower and Transmigration highlights that fatigue is a major contributor to occupational accidents, responsible for 27.8% of the recorded incidents, which translates to an average of 414 work accidents occurring every day in Indonesia (Rahmawati & Afandi, 2019). More recent data from BPJS Employment (May 2024 period) confirms the ongoing severity of this issue, reporting 162,327 cases of work accidents nationally, with 358 of these occurring in North Sulawesi (Ministry of Manpower, 2024). This establishes a clear causal link between worker fatigue and increased accident rates, emphasizing its critical role in occupational health and safety management.

Empirical research consistently supports the connection between specific occupational factors and fatigue. A study on heavy equipment operators at a mining company found that the majority experienced work fatigue, with physical workload, shift work, and long work duration identified as the primary contributing factors (Putri et al., 2025). This suggests that jobs with high physical intensity and non-standard work schedules are at an elevated risk. Further supporting this, Kakisina et al. (2025) found a correlation between length of service and work fatigue among ship crew members, with 59 workers experiencing moderate and 41 experiencing high fatigue. Similarly, Novita et al. (2023) reported that among crane operators, 65% experienced mild fatigue, 25% moderate, and 10% high fatigue, illustrating that even at varying intensities, fatigue is a widespread concern across different manual professions.

Analyzing these findings collectively, a clear pattern emerges: workers in roles demanding significant physical exertion, operating in potentially ergonomically deficient environments, and subject to demanding schedules are highly vulnerable to work fatigue. The workshop environment, particularly in the automotive repair industry, encapsulates these very risk factors. Activities such as disassembling and repairing vehicles involve sustained physical pressure, often in postures that are less than ergonomic, thereby creating conditions ripe for the onset of fatigue.

The Toyota Kombos Workshop in Manado City represents a pertinent setting to examine this issue. The nature of work in an automotive workshop aligns closely with the high-risk profiles identified in previous studies. The demands of heavy physical tasks combined with the less ergonomic conditions typical of a workshop environment necessitate an investigation into the fatigue levels of its workers. Given that North Sulawesi has reported a notable number of work accidents, understanding local contributors, such as fatigue, is a crucial step toward improving safety outcomes.

Therefore, based on the high relevance to occupational health and safety and the specific risk factors present in the workshop context, this study aims to investigate the profile of work fatigue among workers at the Toyota Kombos Workshop in Manado City.

MATERIALS AND METHODS

This study employs a descriptive research design with a cross-sectional approach, meaning data on work fatigue is collected at a single point in time to provide a snapshot of the condition. The research was conducted at the Toyota Combos workshop in Singkil District, Manado City, North Sulawesi, during the period of July to August 2025.

The population of this study comprises all permanent workers at the Toyota Kombos Manado City workshop, totaling 43 individuals. Given the manageable size of the population, this research utilizes a total sampling technique, where the entire population of 43 workers is included as respondents. This approach ensures a comprehensive picture of work fatigue within the entire workforce of the specific workshop being studied. The primary research variable is the level of work fatigue among the workers. This variable will be measured using a standardized instrument, such as a subjective self-rating questionnaire, which categorizes fatigue into levels such as mild, moderate, and severe.

The data analysis conducted is univariate analysis. This involves processing the data collected from the work fatigue questionnaire to describe the distribution of the single variable—work fatigue level. The results will be presented in frequency and percentage distribution tables. For example, the

analysis will show the number and percentage of workers who fall into each category of fatigue (e.g., 15 workers, or 34.9%, experience moderate fatigue).

This methodological approach is directly suited to answer the research objective. By describing the frequency and proportion of each fatigue level within the entire workshop population, the study successfully "investigates the profile of work fatigue" among the workers. The resulting data will provide a clear and quantifiable picture, showing how widespread work fatigue is and what the most common severity level is at the Toyota Kombos workshop.

Therefore, the use of a descriptive design with univariate analysis on the total population is a direct and effective strategy to fulfill the aim of this study, which is to delineate the state of work fatigue in this specific occupational setting.

RESULTS

Table 1. Distribution of Respondent Characteristics

Respondent Characteristics	Category	N	%
Age	46 – 55 Years	8	18,6
	36 – 45 Years	12	27,9
	26 – 35 Years	13	30,2
	17 – 25 Years	10	23,3
Total		**43**	**100,0**
Education Level	High School/equivalent	28	65,1
	DIII, S1	15	34,9
Total		**43**	**100,0**
Disease History	Exist	11	25,6
	None	32	74,4
Total		**43**	**100,0**
Tenure	New (< 5 years)	11	25,6
	Long (≥ 5 years)	32	74,4
Total		**43**	**100,0**
Duration of Work	> 8 hours per day	0	0
	8 hours per day	43	100,0
Total		**43**	**100,0**
Gender	Man	36	83,7
	Woman	7	16,3
Total		**43**	**100,0**
Work Section	Mechanic/Technician	28	65,1
	Admin	8	18,6
	Service Advisor	5	11,6
	Partsman	1	2,3
	BP Instructor	1	2,3
Total		**43**	**100,0**

Based on the characteristics of the respondents above, it shows that the dominant respondents are included in the age category of 26-35 years old (30.2%), with the last level of education in high school/equivalent amounting to 28 people (65.1%), no history of illness (74.4%), long working period (74.4%), all have the same working duration, namely 8 hours per day (100.0%), male (83.7%), and mechanical/technician work (65.1%).

Table 2. Distribution of Work Fatigue Categories

Categories of Work Fatigue	n	%
Usual	6	13,9
Mild Fatigue	34	79,1
Moderate Fatigue	3	7
Severe Fatigue	0	0
Total	43	100,0

Table 2 shows that the dominant respondents experienced mild fatigue, namely 34 people (79.1%), respondents who did not experience fatigue or were called normal, namely 6 people (13.9%) and moderate fatigue experienced by 3 respondents (7%).

Table 3. Distribution of respondents based on questionnaire answers for the feeling of work fatigue

No.	Question	Answer Options					
		TP	JS	J	AXLE	S	SS
1	Do you have trouble thinking?	24 (55,8%)	5 (11,6%)	9 (20,9%)	2 (4,6%)	1 (2,3%)	2 (4,6%)
2	Do you feel tired of talking?	26 (60,5%)	5 (11,6%)	6 (13,9%)	4 (9,3%)	2 (4,6%)	0 (0,0%)
3	Do you feel that holding something often falls off/comes off the grasp of your hand?	23 (53,5%)	9 (20,9%)	7 (16,3%)	1 (2,3%)	1 (2,3%)	2 (4,6%)
4	Do you feel like you can't concentrate on work time?	22 (51,2%)	13 (30,2%)	4 (9,3%)	3 (7,0%)	1 (2,3%)	0 (0,0%)
5	Do you feel that you have no interest in something?	25 (58,1%)	14 (32,6%)	3 (7,0%)	0 (0,0%)	1 (2,3%)	0 (0,0%)
6	Do you find it difficult to remember the problems you need to solve?	22 (51,2%)	6 (13,9%)	7 (16,3%)	**6 (13,9%)**	2 (4,6%)	0 (0,0%)
7	Do you feel confident in your own abilities?	27 (62,8%)	8 (18,6%)	6 (13,9%)	1 (2,3%)	0 (0,0%)	1 (2,3%)
8	Do you feel like you can't force yourself to do your best work?	33 (76,7%)	7 (16,3%)	3 (7,0%)	0 (0,0%)	0 (0,0%)	0 (0,0%)
9	Do you feel lazy to deal with others?	22 (51,2%)	15 (34,9%)	5 (11,6%)	1 (2,3%)	0 (0,0%)	0 (0,0%)
10	Do you feel reluctant to work deftly?	35 (81,4%)	8 (18,6%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	0 (0,0%)
11	Do you feel unsettled at work?	29 (67,4%)	11 (25,6%)	2 (4,6%)	1 (2,3%)	0 (0,0%)	0 (0,0%)
12	Do you feel that there is no freshness in you?	26 (60,5%)	13 (30,2%)	2 (4,6%)	0 (0,0%)	0 (0,0%)	2 (4,6%)
13	Do you feel incapable of moving quickly and skillfully?	32 (74,4%)	6 (13,9%)	3 (7,0%)	1 (2,3%)	1 (2,3%)	0 (0,0%)
14	Do you feel powerless to move anymore?	38 (88,4%)	5 (11,6%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	0 (0,0%)
15	Do you feel like you haven't worked yet, you're tired?	27 (62,8%)	11 (25,6%)	1 (2,3%)	2 (4,6%)	0 (0,0%)	2 (4,6%)
16	Do you feel that your memory is declining?	21 (48,8%)	12 (27,9%)	6 (13,9%)	3 (7,0%)	0 (0,0%)	1 (2,3%)
17	Do you feel anxious about something?	16 (37,2%)	16 (37,2%)	6 (13,9%)	2 (4,6%)	0 (0,0%)	**3 (7,0%)**

Based on table 3, it can be seen that most of the respondents' answers are in the category of Rarely and Rarely experience symptoms of work fatigue. Meanwhile, respondents' answers in the category that often find it difficult to remember the problems that need to be overcome have the highest percentage, which is 13.9%. Anxious complaints about something have the highest percentage of answers very often among all questions. And also on the hard-to-think question has a high percentage average

DISCUSSION

The findings of this study reveal that the predominant level of work fatigue among technicians at the Toyota Kombos workshop is mild, affecting 79.1% of the workforce, with no cases of severe fatigue reported. This overall positive profile can be largely attributed to the presence of structured work breaks and, most significantly, adherence to a standardized 8-hour workday for all employees. This practice is in direct compliance with Indonesian labor regulations, specifically Law Number 11 of 2020 concerning Job Creation, which establishes maximum work hours to protect worker health (Sihotang et al., 2021). The absence of severe fatigue in this setting stands in stark contrast to industries where extended overtime is common, underscoring the critical role of regulated work duration as a primary protective factor against excessive fatigue accumulation.

A deeper analysis suggests that the high prevalence of mild fatigue, while not severe, should not be dismissed as inconsequential. It appears to be an almost inevitable characteristic of manual workshop labor. This phenomenon is consistent with findings from Wahyuni and Indriyani (2019), who reported that 89.2% of manufacturing workers experienced mild fatigue. This indicates that even in well-regulated environments, the physical and mental demands of such jobs consistently induce a baseline level of fatigue. The repetitive and physically taxing nature of tasks like disassembling and repairing vehicles, even within standard hours, naturally leads to a state of mild tiredness by the end of the shift.

The demographic and occupational profile of the workforce provides further insight into these findings. The majority of respondents were of productive age (26-45 years) and had a long working period (≥ 5 years). While some research suggests that younger age is a resilient factor against chronic fatigue (Maurits, 2011), other studies, including Agustin et al. (2022), found no direct relationship between age and fatigue. This aligns with our results, where the effect of age may have been mitigated by work experience. As noted by Frely et al. (2018) and Lutfia et al. (2024), veteran workers develop coping strategies and efficient work methods, allowing them to manage physical demands more effectively and avoid the progression to more severe fatigue levels, despite their advanced age relative to new entrants.

Furthermore, the analysis of other individual characteristics, such as education level and gender, showed no significant association with work fatigue in this cohort. This is supported by previous research; Siregar et al. (2025) found that education level had no effect, and Amalianah et al. (2022) and Bunga et al. (2021) reported no relationship between gender and work fatigue. This suggests that in this context, the ergonomic and organizational factors of the job itself are more powerful determinants of fatigue than the socio-demographic background of the workers.

However, the almost universal experience of mild fatigue must be recognized as a potential risk factor. As highlighted by Putri et al. (2024), unmanaged fatigue, even at a mild level, is a precursor to diminished cognitive and motor performance. Accumulated over time, this state can increase the likelihood of human error, which is a primary cause of workplace accidents. Therefore, the 79.1% rate of mild fatigue represents a critical area for preventive interventions, as it signifies a workforce operating with reduced safety margins.

The root causes of this prevalent mild fatigue are almost certainly embedded in the intrinsic physical workload of the workshop. Technicians engage in a combination of static and dynamic exertions, including lifting heavy components, maintaining awkward postures, and standing for prolonged periods. This is consistent with research by Flowers et al. (2020) and Mangowal et al. (2023), which established a direct correlation between physical workload and feelings of work fatigue. These activities contribute significantly to local muscle fatigue and systemic tiredness, explaining the baseline fatigue levels reported by the majority of workers.

Beyond the direct physical tasks, the workshop environment itself presents additional physiological stressors. Exposure to factors such as heat, noise from tools and machinery, vibrations, and chemical agents like oils and exhaust fumes adds to the body's overall burden. Such environmental stressors significantly increase physiological load, accelerating the onset of fatigue.

While the ventilation at the Toyota Kombos workshop may be adequate, the constant presence of these low-level stressors likely contributes to the steady state of mild fatigue observed (Laoh et al 2022; Dewi et al 2025, Barael et al 2021; Yüysü et al. 2022).

The nature of the work may also play a role in the specific fatigue profile. The research by Melissa and Dwiyanti (2018) on machine operators, who perform highly repetitive tasks, found a higher incidence of moderate fatigue. In contrast, automotive repair, while physically demanding, may involve more varied problem-solving tasks. This relative lack of extreme monotony, combined with regulated hours, could be a contributing factor that prevents the escalation from mild to moderate or severe fatigue in this particular workshop.

In conclusion, the fatigue profile at the Toyota Kombos workshop is a result of a complex interplay between protective organizational policies and inherent occupational hazards. The strict adherence to an 8-hour workday serves as a crucial buffer, effectively preventing the severe fatigue seen in sectors with excessive overtime, as documented by Nayoan et al. (2020) and Fitriana (2023). Nevertheless, the high prevalence of mild fatigue is a direct consequence of the inescapable physical demands and environmental conditions of automotive repair work. This persistent, low-grade fatigue represents a latent risk for safety and long-term health, indicating that while the current regulations prevent the worst outcomes, there is still a need for ergonomic improvements and fatigue management strategies to enhance worker well-being and safety further.

CONCLUSIONS

In conclusion, while regulated work hours have successfully prevented severe fatigue among workers at the Toyota Kombos workshop, the high prevalence of mild fatigue (79.1%) necessitates further intervention. Therefore, it is recommended that management implement targeted ergonomic improvements, such as providing mechanical lifting aids and optimizing workstations, alongside proactive administrative strategies like structured micro-breaks and fatigue awareness training to mitigate the underlying physical strains and enhance overall worker safety and well-being.

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