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Work Fatigue Among Apron Workers in the Mutiara Sis Al-Jufri Airport, Palu, Central Sulawes

Kelelahan Kerja Pada Pekerja Apron di Bandara Mutiara Sis Al-Jufri Palu Sulawesi Tengah

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ABSTRAK

Kelelahan diketahui dapat menurunkan kondisi fisik tubuh, performa kerja, dan motivasi. Penelitian terdahulu mengungkapkan bahwa bekerja di bagian apron bandara dengan durasi kerja yang berat dapat menyebabkan kelelahan. Gejala kelelahan yang umum terjadi antara lain rendahnya tingkat aktivitas dan motivasi dari berbagai faktor internal maupun eksternal. Oleh karena itu, penelitian ini bertujuan untuk mengetahui faktor-faktor yang berhubungan dengan kelelahan pada pekerja apron. Penelitian ini merupakan penelitian observasional kuantitatif dan analitik dengan rancangan cross-sectional. Populasi sampel sebanyak 35 pekerja yang dipilih dengan teknik total sampling. Data yang diperoleh dianalisis dengan Analisis Univariat dan Bivariat menggunakan uji chi-square. Hasil penelitian menunjukkan bahwa sebanyak 1, 30, 3, dan 1 responden berada pada kategori kelelahan sangat tinggi, tinggi, sedang, dan rendah, masing-masing sebesar 2,9%, 85,7%, 8,6%, dan 2,9%. Hasil uji statistik chi-square menunjukkan bahwa terdapat hubungan antara usia (p = 0,0026), lama bekerja (p = 0,021), dan jenis kelamin (p = 0,000), sedangkan pada saat bekerja tidak terdapat hubungan yang signifikan (p = 0,527). Tidak terdapat pula hubungan antara masa kerja dengan kelelahan kerja pada pekerja apron. Selain itu, pihak pengelola bandar udara disarankan untuk memberikan pengetahuan berupa seminar atau pelatihan mengenai kelelahan kerja guna memberikan edukasi kepada karyawan tentang cara mengatasi kelelahan dan faktor penyebabnya. Pekerja apron juga harus beristirahat dan menghindari memaksakan diri untuk bekerja saat kelelahan.

ABSTRACT

Fatigue has been reported to decrease the body's physical condition, work performance, and motivation. Previous studies revealed that working in the apron section of the airport with heavy work duration can cause tiredness. The common symptoms of fatigue include a low level of activity and motivation from various internal and external factors. Therefore, this study aims to determine the factors related to fatigue in apron workers. This is a quantitative and analytical observational study with a cross-sectional design. The sample population consists of 35 workers who were selected with the total sampling technique. The data obtained were analyzed with Univariate and Bivariate Analysis using a chi-square test. The results showed that a total of 1, 30, 3, and 1 respondents were in the very high, high, moderate, and low fatigue categories, accounting for 2.9%, 85.7%, 8.6%, and 2.9%, respectively. The results of the chi-square statistical test revealed that there was a relationship between age (p = 0.0026), length of work (p = 0.021), and gender (p = 0.000), while there was no significant association during work (p = 0.527). There was also no relationship between working period and work burnout among apron workers. Furthermore, airport authorities are advised to provide knowledge in the form of seminars or training on work fatigue to educate employees on how to overcome fatigue and the contributing factors. Apron workers must also rest and avoid forcing themselves to work during fatigue

PRELIMINARY

An airport is an airfield used for taking off and landing aircraft, raising and lowering passengers, loading and unloading goods (cargo), as well as posting. Furthermore, the aviation industry has experienced rapid development, which is indicated by the high number of passengers and airlines since the introduction of regulations. In Indonesia, it has significantly progressed in the last ten years. According to Indonesia's International Air Transport Association (IATA), the country is expected to become the 6th largest market for air travel in the world by 2034. Approximately 270 million passengers were also estimated to fly for domestic and international trips.

An apron is an area designated for parking aircraft, dropping off and boarding passengers, cargo, and mail, as well as carrying out refueling and minor repairs. Workers in this section often require a lot of physical effort in carrying out their duties, especially in the Loader and GSE segments, and this is often caused by the high density of air traffic. Furthermore, a condition where the body runs out of energy due to the extension of the work indicates the worker is experiencing fatigue.

Fatigue is the body's defense mechanism to prevent damage, and can recover after rest. The level experienced by each individual also varies based on efficiency, work capacity, and endurance. Work fatigue is a process of decreased efficiency, performance, and physical strength of the body to continue the activities being carried out. Suma'mur stated that tiredness is influenced by several internal and external factors. The internal include somatic or physical aspects, while the external consists of physical environment, as well as chemical, biological, and ergonomic factors.

Worker fatigue is a significant problem in this modern era, which also acts as the 'end signal' of the wake-up time of the day and the daily workload carried out. According to the International Labor Organization data (2013) cited by Susanti (2019), approximately two million workers die annually due to work accidents caused by tiredness. Data reported by the National Transportation Safety Committee of Indonesia, in 2020, stated that the major causes of aircraft accidents include human negligence caused by fatigue as well as miscommunication between controllers and pilots, which accounted for 51.4% of all cases since 2016.

Apron workers generally work 8 to 10 hours per day, and each section, including Loader, GSE, Marshaller, Ramp Handling, and AMC, involves physical and mental exertion with the same work pattern every day, which can potentially cause fatigue. Any job requiring muscle strength or thinking is a burden for workers who carry out the duties. A worker can suffer from work-related disorders or illnesses due to a heavy workload or weak physical abilities. Silaban reported that the main factor causing fatigue was shift work. Previous studies revealed that nature has regulated the periodization of work and rest time. During the day, the presence of the sun, which causes the environment to be bright, induces the instinct to work, while the dark influence of the night brings the feeling of rest.

Formal and informal sector workers can experience fatigue, and ILOSTAT revealed that 31% of workers worked for more than 49 hours/per week in 2017, causing work-related burnout. The World Health Organization (WHO), in a health model in 2020, also predicted that psychological disorders in the form of severe fatigue and depression are likely to have the highest mortality after heart disease.

The risk of fatigue that can occur is divided into three categories, namely a weakening of activities and motivation, as well as showing a picture of physical tiredness due to circumstances. A previous study by Tarwaka reported that work activities are the cause of fatigue. The existence of work activities increases the workload of the duties carried out. Monotonous work can lead to static muscle loading, which is detrimental to health. Furthermore, working atmosphere with static muscles as well as decreased blood flow causes accumulation of lactic acid, thereby leading to local muscle fatigue.

Fatigue can increase work errors and reduce performance, which causes low productivity. When the level of productivity of a worker is disrupted due to physical and psychological fatigue factors, the consequences are often felt by the company.20

METHOD

This is a quantitative study with a descriptive observational approach. The sample population consists of 35 participants who were selected using a *total sampling technique.* Furthermore, this study was carried out at Mutiara Sis Al-Jufri Airport, Palu, Central Sulawesi in August 2024. The data obtained were then analyzed using a univariate test to determine the distribution and frequency of the variables. Work fatigue data were collected through interviews using *the industrial fatigue research committee* (IFRC) questionnaire.

RESULTS

Univariate analysis was used to analyze the variable descriptively to determine their characteristics. Furthermore, the characteristics of the respondents were inherent to them. Table 1 shows that among the 35 respondents, 1, 30, 3, and 1 of them were in the very high, high, moderate, and low fatigue categories, representing percentage of 2.9%, 8.6%, 85.7%, and 2.9%, respectively.

Table 1. Distribution of Respondents Based on Work Fatigue Respondents in Apron Section Workers at Mutiara Sis Al-Jufri Airport, Palu, Central Sulawesi 2024

Work Fatigue	Respondents	
	Amount (n)	**Percent (%)**
Low	1	2.9%
Currently	3	8.6%.
Tall	30	85.7%
Very high	1	2.9%
Total	**35**	**100%**

Source: Primary Data, 2024.

Based on Table 2, a total of 5, 18, and 12 respondents were in the age range of 17-25, 26-35, and 36-45 with 14.3%, 51.4%, and 34.3%, respectively.

Table 2. Distribution of Respondents Based on Age of Respondents in Apron Section Workers at Mutiara Sis Al-Jufri Airport, Palu, Central Sulawesi 2024

Age	Respondents	
	Amount (n)	**Percent (%)**
17–25	5	14.3%
26 – 35	18	51.4%
36 - 45	12	34.3%
Total	**35**	**100%**

Data *Source: Primary Data, 2024*

Table 3 shows that the sample population consists of 32 males and 3 females, namely 91.4% and 8.6%, respectively.

Table 3. Distribution of Respondents Based on Gender of respondents to Apron Section Workers at Mutiara Sis Al-Jufri Airport, Palu, Central Sulawesi 2024

Gender	Respondents	
	Amount (n)	Percent (%)
Male	32	91.4%
Woman	3	8.6
Total	**35**	**100%**

Data *Source: Primary Data, 2024*

Based on Table 4, a total of 19 and 16 respondents were in the new with 54.3% and long at 45.7% years of service categories, respectively.

Table 4. Distribution of Respondents Based on Respondents' Working Period in Apron Section Workers at Mutiara Sis Al-Jufri Airport, Palu, Central Sulawesi 2024

Working Period	Respondents	
	Amount (n)	Percent (%)
Long	16	45.7%
New	19	54.3%
Total	**35**	**100%**

Data Source: Primary Data, 2024

Table 5 shows that a total of 1, 30, and 4 respondents were in the junior high school (2.9%), high school (85.7%), and undergraduate (11.4%) categories, respectively.

Table 5. Distribution of Respondents Based on Education The last respondent was in the Apron Section at Mutiara Sis Al-Jufri Airport, Palu, Central Sulawesi 2024

Last education	Respondents	
	Amount (n)	Percent (%)
Junior High School	1	2.9%
Senior High School	30	85.7%
S1	4	11.4%
Total	**35**	**100%**

Data Source: Primary Data, 2024

Based on Table 6, a total of 9, 9, 6, and 4, and 7 of the respondents were in the AMC (2.9%), Loaders (25.7%), GSE (17.1%), Marshallers (11.4%), and Ramp Handling (20.0%) categories, respectively.

Table 6. Distribution of Respondents Based on the Share of Respondents in Apron Section Workers at Mutiara Sis Al-Jufri Airport, Palu, Central Sulawesi 2024

Section	Respondents	
	Amount (n)	Percent (%)
AMC	9	25.7%
Loaders	9	25.7%
GSE	6	17.1%
Marshaller	4	11.4%
Ramp Handling	7	20.0%
Total	**35**	**100%**

Data Source: Primary Data, 2024

Table 7 shows that the length of work of 9 and 26 respondents was in the eligible (25.7%) and unqualified (74.3%) categories, respectively.

Table 7. Distribution of Respondents Based on the Length of Working of Respondents in Apron Section Workers at Mutiara Sis Al-Jufri Airport, Palu, Central Sulawesi 2024

Length of working	Respondents	
	Amount (n)	Percent (%)
Qualify	9	25.7%
Not eligible	26	74.3%
Total	**35**	

Data Source: Primary Data, 2024

Table 8. Distribution of Respondents Based on Subjective Fatigue of Respondents in Apron Section Workers at Mutiara Sis Al-Jufri Airport, Palu, Central Sulawesi 2024

Subjective Fatigue	Frequency
	Amount
1. Feeling of heaviness in the head	86
2. Feeling tired all over the body	88
3. Legs are heavy	71
4. Feeling confused	53
5. Yawning	91
6. Being sleepy	91

7. Feeling there is a burden on the eye	76
8. Feeling stiff and awkward in moving	61
9. Standing unbalanced	52
10. Want to lie down	79
11. Having difficulty in thinking	55
12. Tired when talking	67
13. Getting Nervous	59
14. Difficult to communicate	63
15. Difficulty concentrating (Less focus)	59
16. Tends to forget	72
17. Lack of confidence	62
18. Anxiety about something	59
19. Unable to control attitude	54
20. Unable to work diligently	42
21. Dizziness	80
22. Shoulders feel tight	72
23. Pain in the back	62
24. The feeling of being quickly out of breath	59
25. Easily thirsty	54
26. Shortness of voice	42
27. Dizziness (Spinning feeling)	80
28. Eyes feel tense	72
29. Trembling of the limbs	84
30. Feeling unwell	69

Table 9. Relationship between Age, Gender, Working Period, Length of Work, and Work Fatigue in the Apron Section at Mutiara Sis Al-Jufri Airport, Palu, Central Sulawesi 2024

Variable	*P Value*
Age	**0.026**
Gender	**0.000**
Woking Period	**0.527**
Length of working	**0.021**

DISCUSSION

Work Fatigue

Based on the results of subjective fatigue measurements experienced by apron workers using the IFRC questionnaire, a total of 1, 30, 3, and 1 respondents were in the very high, high, moderate and low categories, accounting for 2.9%, 85.7%, 8.6%, and 2.9%, respectively. These findings show that workers in the apron section experienced more fatigue compared to others.

Furthermore, based on the direct interviews using the industrial fatigue research committee (IFRC) questionnaire, the majority of workers in this section experienced symptoms, such as being drowsy, yawning, feeling tired all over the body, feeling heaviness in the head, dizziness, burden on the eyes, weak legs during or after work.

Another factor affecting the fatigue level was the fact that the respondents had to work overtime or extra time outside regular hours when flight schedules are crowded at the airport, especially due to bad weather or technical problems in the field. This indicates that these workers must concentrate on the work being carried out. There was also no variation in the duties of workers in the Apron Movement Control (AMC) section, which performs flight operation services, monitors the movement of aircraft, vehicle traffic, people, and cleanliness in the airside area as well as records flight data. The loaders raise all baggage and cargo/mail that gets off the plane, the ramp handler oversees and coordinates area activities related to departure or the arrival of the aircraft, while the GSE handles the aircraft. These

activities take place from the beginning of operating hours to rest time until the end of the work period.

Routine work that is the same and less attractive for individuals can lead to boredom. Furthermore, Cummings et al. (2016) in Saleh (2018) stated that boredom can also be defined as a collection of tasks or jobs that are monotonous, repeatedly occur in the work environment, and require special attention because they can affect alertness, attention, and performance of workers.[2]

Relationship between Age and Work Fatigue

Based on the results of cross-tabulation using the *Chi-Square test*, the value of $p = 0.026$ was obtained ($p<0.05$), which indicates that there is a relationship between age and work fatigue for workers in the apron section at Mutiara Sis Al-Jufri Airport, Palu, Central Sulawesi 2024. A total of 18 respondents aged 25-35 experienced high fatigue (51.4%), compared to others within a range of 17-25, namely five respondents (14.3%). These results show that tiredness from work increases linearly with age. Based on the age theory by Wijaya in Tarwaka (2004), that old age is characterized by the slow disappearance of the ability of the body to repair itself, replace, and maintain its typical structure as well as function[21]

This study's results are consistent with Andriani (2016) that age has a significant relationship with subjective fatigue in older workers compared to other young employees at PT X Jakarta, part of production unit I using the *Chi-Square* test. Furthermore, Triyunita (2013) in Andriani (2016) revealed that aging age is accompanied by the process of degeneration of the organs, thereby leading to a decrease in their function, and this causes the workforce to easily get fatigued. [22]

The Relationship between Working Period and Work Fatigue

The tenure or duration of a job has both positive and negative influence. A positive effect is experienced because the longer a person works, the higher the level of experience in doing the task. However, the longer working time can also cause boredom due to monotonous work, thereby affecting the level of fatigue experienced.[23]

Based on the results, there was no relationship between the length of service $p = 0.527$ and fatigue, where apron workers with new service tenure of <5 years were more tired at 54.3% , compared to the 16 respondents with longer work duration at 45.7%. Sanjaya (2020) stated that in the ATC profession, most employees who have worked for ≥ 5 years do not feel tired. This is because their bodies have adapted to their working conditions.[24]

Relationship between Length of working and work fatigue

The results showed that the percentage of workers with ineligible work duration who experienced work fatigue was higher, namely 26 respondents (74.3%). Meanwhile, a total of 9 respondents (25.7%) in the eligible category were very tired. Based on data analysis using the Chi-Square test, a value of $p = 0.021$ was obtained, which indicates that there is a relationship between the Length of Work and the level of fatigue experienced by apron workers at Mutiara Sis Al-Jufri Airport, Palu, Central Sulawesi 2024. The working time of a person determines the level of efficiency and productivity. The normal length of work is generally < 8 hours. Furthermore, the rest period of 16-18 hours, is used for sleep and relationships with family, community, and other activities. Furthermore, extending the working time of the worker beyond the normal range causes a decrease in productivity and a tendency for fatigue, illness, and accidents. A person can work well for 40-50 hours within a week. Tarwaka (2015) in Indrawati (2018) also stated that excessive working hours beyond the limits of ability can accelerate fatigue as well as reduce work accuracy and precision.[25]

Relationship between Gender and work fatigue

The results showed that the percentage of male workers, namely 82.9% who experienced high work fatigue was higher compared to females with 8.6%. Based on data analysis using the *Chi-Square test*, p-value of 0.000 was obtained, which indicates there is a relationship between gender and work fatigue experienced by workers in the apron section at Mutiara Sis Al-Jufri Airport, Palu, Central Sulawesi 2024. This study is in line with Atriana A & Rita N. 2020, stating that men are 3.8 times more at risk of experiencing fatigue compared to women. This is because men rarely channel their stress and find it difficult to socialize or be open.[26] Furthermore, workers in the apron section are dominated by males based on observation. There was also a lack of a good rest area for apron workers, especially the Loader, GSE, and Marshaller sections. Tarwaka, 2014 stated gender is a biological and physical characteristic of people, which makes them have the capacity to feel fatigued depending on their level of physical endurance.[27]

CONCLUSIONS & SUGGESTIONS

The results showed that a total of 1, 30, 3, and 1 respondents were in the very high, high, moderate, and low fatigue categories, resembling 2.9%, 85.7%, 8.6%, and 2.9%, respectively. Furthermore, the statistical test results revealed that there was a relationship between age ($p = 0.0026$), length of work ($p = 0.021$), and gender ($p = 0.000$) with the level of fatigue experienced by workers in the apron section of Mutiara Sis Al-Jufri Airport, Palu, Central Sulawesi 2024 while there was no association with the value of work ($p = 0.527$). This indicates that companies and parties related to airports must provide knowledge in the form of seminars or training regarding work fatigue to help workers identify how to recognize fatigue, influential factors, its effect, and ways to overcome the problem. They must also be educated on the need to rest and not push themselves when experiencing tiredness.

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