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Shift Work System Analysis of Store Employee Fatigue Using the Subjective Self Rating Test and Independent Sample T Test Methods (Case of Sports Station Plaza Surabaya)

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A B S T R A C T

This study analyzed the initial symptoms of fatigue and measured the level of fatigue with the subjective self rating test method as the subjective method, the CVL (Cardiovascular Load) method as the objective, and the independent sample t test at the Plaza Surabaya sports station. shop. Shift work in the workshop has the potential to pose health risks in the form of fatigue due to differences in physical workload experienced in each shift. Sports Station Plaza Surabaya outlets face work activity problems that are at risk of ergonomics, with several worker complaints due to work shifts that only do rotating shifts per month and unclear employee jobdesk placements. The Subjective Self Rating Test method is used to identify early symptoms of employee fatigue by filling out a questionnaire, the CVL method is used to measure pulse to obtain the level of physical workload fatigue experienced by employees. While the independent sample t test test is to find out whether there is a significant difference in the level of shift fatigue at the Sports Station Plaza Surabaya store. get the highest classification value in shift 1, for the independent t test test method get a significance value of 0.01 which means there is a significant difference in the level of worker fatigue in shift 1 and shift 2.

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1. INTRODUCTION

Early symptoms of work fatigue are a common problem that we often encounter in workers at work. The word fatigue refers to different physical and mental states of the body, but all of them result in a decrease in working power and a decrease in the body's resistance to work. The causes of work fatigue vary according to internal factors that come from oneself and external factors that come from outside or the work environment (Nerva, 2021). Work fatigue is not only experienced by workers who carry out physical activities such as work in factories, namely moving material from conveyors, storing unit items in warehouses. But it is also experienced by workers whose activities provide services to the community, one example is shop workers. Fatigue can be caused

by physical or mental stress. One of the causes of fatigue is sleep disturbance, which among other things can be affected by lack of sleep and disturbance due to work shifts (Rahmaniyah, 2019). Shift work as a method of working from an organization where workers succeed with each other at work so that they can operate longer than normal working hours, for workers is a workload that must be borne as workers. A worker with shift work is someone who works outside normal working hours for a certain period of time.

Sports Station Indonesia is a private store engaged in product sales services to end consumers, specifically selling sports equipment and supplies. The products offered by the company can be a part of the process of forming consumer perceptions and motivation to create a consumer purchase. This company offers quality products from various well-known brands in the world and also offers affordable prices for the public. Based on an initial survey conducted by the author of the workers at the Sports Station Plaza Surabaya shop, it can be seen that the workforce in the field works on a permanent shift system per month, which is divided into 2 shifts, namely shift I starting with working time at 10.00-18.00 WIB, shift II starts with working time at 14.00-23.00 WIB. There are 30 employees in the shop divided into two work shifts, 20 people in the first shift and 10 people in the second shift. Each employee experiences one shift by providing workers only once a week off. Apart from working selling products in stores, employees experience a work system that is not the same in each shift, for shift I they do more movements because products arrive almost every day and they have to unload and also organize their goods in the store, then, for shifts II does not require more energy because it only closes or calculates sales financial reports per day. does not meet the standard of work, namely 9 hours of work and also the unclear positioning of employee jobdesk.

Based on the description above, the researcher is interested in conducting research on the initial symptoms of fatigue for each shift employee at the Sport Station Plaza Surabaya shop and analyzing the differences in fatigue levels for shift 1 and shift 2. The Subjective Self Rating Test method was chosen because it is a subjective method that can conducted to determine the initial symptoms of work fatigue. Then the objective method is carried out by using the CVL (Cardiovascular Load) method to find out the problem of the level of fatigue in the work system where, in this method, the pulse is carried out using a tool, namely an oximeter. Then, the independent sample t test test method was chosen because to find out the data test from filling out the subjective self rating test questionnaire whether there is a difference in the level of work fatigue among shop employees shift I (Morning) and Shift II (Afternoon) at the Sports Station Plaza Surabaya shop. The method he chose was the Subjective Self Rating Test because the researcher wanted to know the initial symptoms of worker fatigue and the method he chose was the Subjective Self Rating Test because he wanted to find out whether there were significant differences in fatigue levels in shifts 1 and 2.

2. LITERATURE REVIEW

Work fatigue is a condition experienced by workers which can result in a decrease in work vitality and productivity. Work fatigue referred to in this study is general fatigue experienced by workers, characterized by slowed reaction times and feelings of tiredness (Suma'mur, 2019). Shift work is defined as a period of time worked by a group of employees who start working when another group finishes. According to Muchinsky (2019), the definition of work shift is the division of work time based on a certain time. Tarwaka (2004) states that the Subjective Self Rating Test from the Industrial Fatigue Research Committee (IFRC) Japan is one of the questionnaires that can measure the level of subjective fatigue. The level of subjective fatigue in question is the level of fatigue felt by the person himself. The questionnaire contains 30 questions consisting of: (A) Ten questions about impairment of activity (feeling of heaviness in head, whole body tired, heaviness in legs, yawning, messy mind, drowsiness, eyestrain due to radiation, awkward movements of legs, unsteady standing, and desire to lie down). (B) Ten questions about weakening motivation (difficulty thinking, tired of talking, stress, lack of concentration, difficulty concentrating, forgetfulness, reduced self-

confidence, feeling anxious, difficulty controlling attitudes due to work stress, and not being diligent at work). (C) Ten questions describing physical fatigue (headache, stiffness in shoulders, back pain, shortness of breath, thirst, hoarse voice, feeling tired, eyestrain, lack of sleep, tremors in limbs, and feeling unwell). Cardiovascular load is a method to determine the level of work fatigue. Recommended Weight Limit is a method to determine the recommended weight. To determine the classification of workload based on an increase in working heart rate compared to the maximum heart rate due to cardiovascular load (cardio-vascular load = % CVL) which is calculated using the following formula:

$$\%CVL: \frac{100\ X\ (DNK - DNI)}{DNMak - DNI}$$

DNK = Working Pulse
DNI = Resting Pulse
DNMak = Maximum Heart Rate

Working heart rate is average pulse during work and pulsation maximum pulse is (220 – age) for men and (200 – age) for woman.
From the results of the %CVL calculation, it can then be compared with the clarification that has been applied which can be seen in the Table 1.

Table 1. CVL fatigue classification

%CVL	Classification %CVL
≤ 30 %	No fatigue occurs in workers
30 s.d ≤ 60 %	Repairs are permitted but not urgent
60 s.d ≤ 80 %	Allowed to work for short periods of time
80 s.d ≤ 100 %	Immediate corrective action is permitted
%CVL > 100 %	Work activities may not be carried out

(Source : Tarwaka, 2014)

A. INDEPENDENT SAMPLE T TEST

According to Andri (2019) this test is to find out the average difference between two populations/groups of independent data. A case example of a study wishing to determine the relationship between smoking status of pregnant women and the weight of the baby born. Respondents were divided into two groups, namely those who smoked and those who did not smoke. This independent T-test has assumptions/conditions that must be met, namely: (a) The data is normally distributed, (b) Both groups of data are independent (free), (c) The related variables are numerical and categorical (with only 2 groups).

According to (Nuryadi) 2017 the Independent Sample T-Test is a statistical test to find out the comparison between the averages of two unpaired or independent data groups. or different. The gap in this research is that researchers get new answers with the independent sample t test method by knowing significant differences in the level of shift fatigue experienced by workers.

3. RESEARCH METHOD

This research was conducted by taking a case study at the Sports Station Plaza Surabaya store. Data collection was only carried out on prominent employees, totaling 30 employees consisting of 20 shift 1 employees and 10 shift 2 employees. significant fatigue level between shift 1 and shift 2 at the sports station plaza surabaya store The dependent variable in this study is the early symptoms of employee fatigue and the level of employee fatigue while the independent variables in this study are unloading a lot of goods, lifting goods to the warehouse, arranging goods to the warehouse, stand a long time to serve customers.

The data collection technique used is primary data. Primary data is carried out using a questionnaire subjective self rating test method which includes 30 questions in it then distributed to all employees of the Surabaya Plaza Station Sports Shop, The secondary data used is active employee data at the sports station shop Plaza Surabaya The information obtained includes, among other things, the name of the employee, Position and distribution of work shifts in August at the Sports Station Plaza storeSurabaya research sample The research steps to solve the problem can be seen in Figure 1.

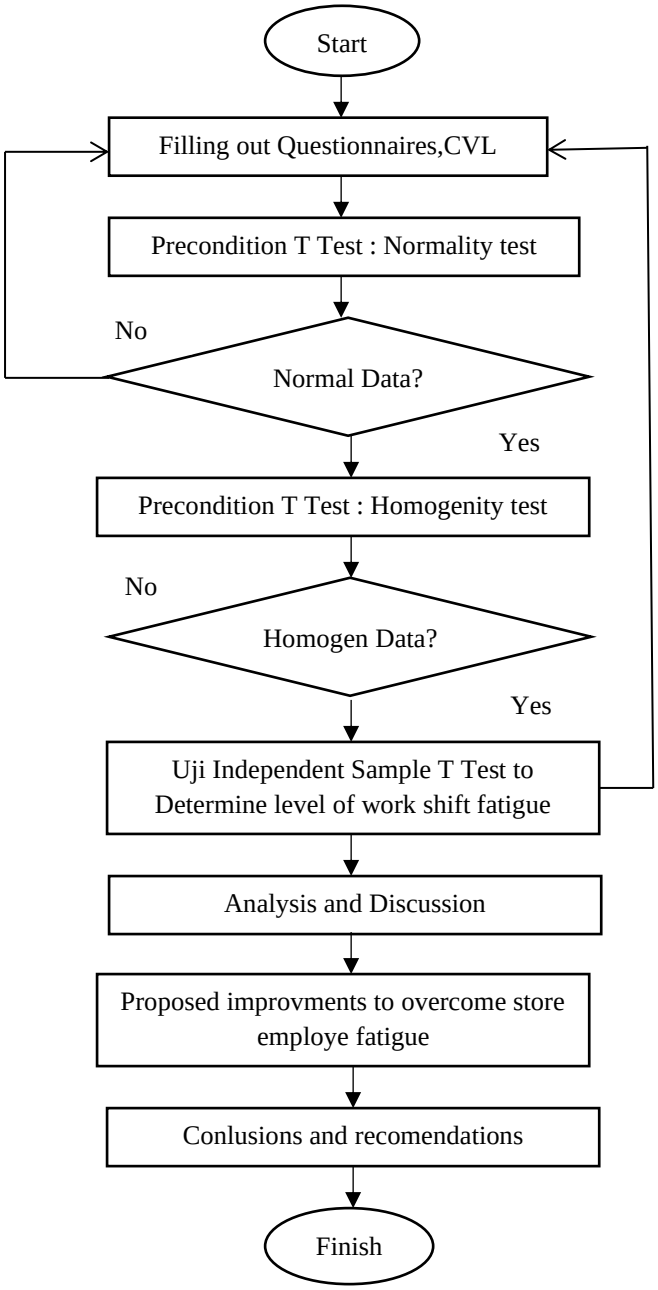

Figure 1. Research flowchart

4. RESULT AND DISCUSSION

A. Subjective Self Rating Test

Research data was obtained using the questionnaire method. The measuring instrument used to determine the level of employee fatigue is the Subjective Self Rating Test (Questionnaire for Measuring Feelings of Work Fatigue). Based on the results of the subjective self-rating test questionnaire that was filled in by 30 store employees in shift 1 and shift 2 as respondents obtained a total score of 30 questions, the results can be seen as follows (Table 2).

Table 2. Results of filling in the SSRT questionnaire for weakening shift 1 activities

Fatigue Complains	Never	Sometimes	Often	Very Often
Heavy on the head			1	19
Tired all over			20	
Heavy on the feet				20
Yawns a lot while working				20
Feeling confused		18	20	
Sleppy		16	4	
Tired in the eyes			20	
Stiif and awkward		18	2	
Unbalance standing			20	
Want to lie down		16	4	
Final Score : 79				

Table 3. Results of filling out the SSRT questionnaire for weakening motivation in Shift 1

Fatigue Complains	Never	Sometimes	Often	Very Often
Find hard think				20
Lazy talk		20		
Feeling nervous		15	5	
Cant concetrate				20
Not focusing				20
Forget things			18	2
Lack confidance				20
Worried something			19	1
Cant control atttitude		2		18
No diligent to work		18	2	
Final Score : 78				

Table 4. Results of filling in the SSRT questionnaire for shift 1 physical fatigue

Fatigue Complains	Never	Sometimes	Often	Very Often
Pain in the head			15	5
Pain in the soulder			15	5
Paim in the back			15	5
Feeling depressed		3	17	
Feeling thirsty			20	
Voice feels hoarse			18	2
Feeling dizy				20
Stuck in the eyelids		2		18
Limbs tremble			18	2
Feeling unwell				20
Final Score : 104				

Based on this data, 3 complaints of fatigue can be analyzed 20 employees in shift 1 are very often felt by workers, namely feeling thirsty, feeling dizzy, and feeling unwell. Feeling thirsty because of the employees do a lot of arranging goods while they are in the warehouse so they need it more energy so that it can drain

the energy, feeling dizzy in feel for employees because the average person doesn't start work in the morning with breakfast so that from lack of intake employees feel dizzy in the head,and employees feel unhealthy because of the type of work they do What they have to do repeatedly is unpacking, carrying, all at once Organizing items from work, the body feels unhealthy.

Based on the results of the subjective self-rating test questionnaire on shift 1 it can be stated that the initial symptoms of fatigue are highest in physical fatigue with a total score of 104.

Based on the results of the fatigue level score, physical weakness in shift 1. A total of 104 can be interpreted as a very high level of fatigue category

Table 5. Results of filling in the SSRT questionnaire for weakening shift 2 activities

Fatigue Complains	Never	Sometimes	Often	Very Often
Heavy on the head	3	7		
Tired all over	5	5		
Heavy on the feet				10
Yawns a lot while working	2	8		
Feeling confused	10			
Sleppy	2	8		
Tired in the eyes			6	4
Stiif and awkward	5	5		
Unbalance standing			8	2
Want to lie down		7	3	
Final Score : 73				

Table 6. Results of filling out the SSRT questionnaire for weakening motivation in shift 2

Fatigue Complains	Never	Sometimes	Often	Very Often
Find hard think	10			
Lazy talk	10			
Feeling nervous	8	2		
Cant concetrate	2	8		
Not focusing		5	5	
Forget things	8	2		
Lack confidance	8	2		
Worried something	10			
Cant control atttitude	10			
No diligent to work	7	3		
Final Score : 38				

Table 7. Results of filling in the SSRT questionnaire for shift 2 physical fatigue

Fatigue Complains	Never	Sometimes	Often	Very Often
Pain in the head		5	5	
Pain in the soulder		8	2	
Paim in the back			6	4
Feeling depressed	10			
Feeling thirsty		5	5	
Voice feels hoarse				10
Feeling dizy		2	8	
Stuck in the eyelids	10			
Limbs tremble	9	1		
Feeling unwell	10			
Final Score : 67				

Based on the results of filling in the SSRT questionnaire results in shift 2, the highest total score in the activity weakening category was obtained with a total score of 73.

the number for weight on the head is 3 in the never categoryand 7 in the sometimes category, the number for fatigue throughout the body is 5 in never category and 5 in sometimes category, total for weight in section feet is 10 in the very frequent category, the number for frequent yawning while working is 2 in the never category and 8 in the sometimes category, the number for problems Disorganized thinking is 10 in the very frequent category, the number for drowsiness problems is 2 in the never category and 8 in the sometimes category, for problems tired eyes: 6 in the frequent category and 4 in the very frequent category, for stiffness problems and body awkwardness is 5 in the never category and 5 in the very category sometimes, for unbalanced problems the standing is 8 in the frequent and category 2 categories are very frequent, and the last one is for the problem of feeling like lying down

is 7 in the sometimes category and 3 in the often category.

B. CVL (Cardiovascular Load) Objective Measurement Data

The results of the employee pulse data at the Sports Station Plaza Surabaya shop for Shift 1.

Table 8. CVL result data for shift 1 store employees

No	Name	Gender	Age	DNI	DNK	DNM	% CVl
1	Affan	M	24	64	94	196	23
2	Vivi	F	28	65	106	172	39
3	Faizal	M	21	65	101	199	27
4	Sandy	M	22	67	95	198	22
5	Ailsa	F	19	69	106	181	33
6	Rara	F	20	70	104	175	33
7	Fitri	F	21	78	111	180	33
8	Kaka	M	20	62	90	179	24
9	Ega	M	20	78	99	200	18
10	Widi	F	23	70	108	177	36
11	Daffa	M	21	68	91	179	21
12	Lenka	F	24	70	106	176	34
13	Yahya	M	19	77	99	181	21
14	Wisnu	M	25	64	90	175	23
15	Dimas	M	20	62	97	180	29
16	Dinda	F	23	71	105	177	32

17	Jecky	M	21	62	90	179	24
18	Sabir	F	26	59	87	174	25
19	Dea	M	35	62	87	165	25
20	Adis	F	28	65	98	172	31

Based on the results of the CVL calculation for shift 1 store employees, which is classified as no fatigue. With a CVL value, it needs improvement. The results of the employee pulse data at the Sports Station Plaza Surabaya shop for Shift 2.

Table 9. CVL Result data for shift 2 store employees

No	Name	Gender	Age	DNI	DNK	DNM	% CVl
1	Agung	M	23	77	97	177	20
2	Syanz	F	21	77	96	179	19
3	Erli	F	23	70	95	177	24
4	Andy	M	20	65	92	180	24
5	Iklas	M	21	74	98	179	23
6	Quinzi	F	29	69	92	171	23
7	Dina	F	23	77	102	177	25
8	Luq	M	23	69	86	177	16
9	Radin	M	22	67	95	198	21
10	Farid	M	27	81	98	173	19

Based on the results of CVL calculations in the shift shop employee Table 2, the highest rating level classification is felt, namely CVL of 23.96 which is classified as not experiencing fatigue in workers.

C. Independent Sample T Test

Based on the independent sample t test that has been tested through the SPPS statistical application. the variance of the data is normal and homogeneous, then the Equal variances assumed column is selected, and in the t-test for Equality of Means row, the value of t = 3.895, df = 28 and significant (2 tailed) is 0.01. It can be interpreted, if the value of Sig. (2 tailed) < 0.05, then H0 is rejected, Ha is accepted, then there is an average difference in the level of work shift fatigue among employees at the Sports Station Plaza Surabaya store.

Independent Samples Test

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
HASIL TINGKAT KELELAHAN	Equal variances assumed	1.286	.266	3.895	28	.001
	Equal variances not assumed			3.372	12.871	.005

Figure 2. Output independent sample T Test

D. Improvement Proposal

Based on the results of calculations using the subjective method through a subjective self rating test questionnaire and calculating the objective CVL (Cardiovascular Load) method, employees at the Sprots Station Plaza Surabaya store, Shift 1 experience a high level of fatigue and receive a heavy physical workload. From the calculation of the two methods, it can be concluded that it is necessary to propose a shift work system improvement proposal at the Sports Station Plaza Surabaya store. Shift work system arrangements that only experience rotation every month and shops that do not employ employee jobdesk placement are not clear, so that employees easily experience fatigue. The proposed improvements are: (1) Provide shift rotation every day, (2) Provide clear employee jobdesk placement with positions such as cashier, warehouse boy, sales, (3) Providing additional work shifts to 3 work shifts to reduce excess workload with a morning, middle and afternoon shift work system, (4) Pay attention to the health of workers by providing medical check-ups once a month. The industry takes advantage of this research by minimizing work fatigue in the industry by differentiating between age and occupation in each job description

5. CONCLUSION

Based on the results of the subjective method analysis by filling out a subjective self-rating test questionnaire with 30 questions that were worked on by 30 employees at the sports station plaza shop in Surabaya in shift 1 and shift 2, the highest total score in shift 1 was physical fatigue of 106 and it is known that the initial symptoms of fatigue are feeling thirsty, feeling dizzy, and feeling unwell with scores in the very often category of 20 employees and it can be concluded that these values are categorized as very high levels of fatigue. While the highest score in shift 2 is physical fatigue of 67 and it can be seen that the initial symptoms of fatigue are hoarseness with a score in the very frequent category of 10 employees and it can be concluded that the value is categorized as moderate fatigue Based on the results of the CVL calculation for shift 1 store employees, the highest rating level classification is felt, namely CVL of 38.32 which is classified as needed for repair but not urgent, while the lowest rating classification level is felt, namely CVL 17.21 which is classified as no fatigue.

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