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The Influence of Shift Work, Lighting and Boredom to Quality of Life in Air Traffic Controller (ATC) at Sultan Hasanuddin Airport

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Abstract

The Purpose of this research is to determine the effect between shift work, lighting, boredom with quality of life and to determine factor that most influence quality of life in Air Traffic Controller at Sultan Hasanuddin International Airport Makassar. Design analytic observational studies with a cross-sectional study approach. The population of this study was all Air Traffic Controllers at Sultan Hasanuddin International Airport Makassar amounting to 184 controllers and the sample used amounting 65 controllers. The instruments used in this study were questionnaires and lux meter. Data analyzed with SPSS using the chi-square test and logistic regression test. The significance value of shift work and quality of life ($0.004 < 0.05$), the significance value of lighting and quality of life ($0.019 < 0.05$), the significance value of boredom and quality of life ($0.005 < 0.05$). Through the logistic regression test, the OR value of shift work (2.08), lighting (4.474), and boredom (.150). There is affect between shift work, lighting, boredom and quality of life in Air Traffic Controller at Sultan Hasanuddin International Airport Makassar, the factor that most influences quality of life is lighting.

Keywords: Air Traffic Controller (ATC), boredom, lighting, quality of life, shift work.

1. Introduction

Air Traffic Controller (ATC) duties include monitoring, evaluation, planning and implementing traffic plans (Histon, 2002). ATC needs to maintain safe and efficient traffic flow (Loft et al., 2009). Air traffic control is generally considered one of the most demanding jobs. In fact, it entails a complex set of tasks requiring very high levels of knowledge and expertise, as well as the practical application of specific skills pertaining to cognitive domains (e.g. spatial perception, information processing, logic reasoning, decision making), communicative aspects and human relations (Costa, 1995).

Air Traffic Controller at Makassar Air Traffic Service Center (MATSC) serves flight traffic guidance for aircraft flying from National to International at Sultan Hasanuddin Makassar airport. Not only serving aircraft that take-off and landing, MATSC also functions as a provider of air traffic guidance services in the Ujung Pandang FIR area, covering two-thirds of Indonesia's airspace, for en-route flights above FL 240 both domestically and international.

Law No. 13 of 2003 on Manpower regulates that every worker/laborer has the right to obtain protection for occupational safety and health. The good performance of ATC employees will support aviation safety, and a safe flight will save millions lives of passengers every day. Therefore, the occupational health and safety of ATC must always be one of the priorities to get optimal performance (Saleh et al., 2018). According to WHO, the form of protection that can be obtained is by paying attention to the quality of life. The domain that includes the quality of life is very broad and complex, including physical health problems, psychological status, level of freedom, social relations and the environment in which they are located (World Health Organization, 1997).

Many employees around the world are engaged on non-standard working hours, namely, shift work and night work, weekend work, split shifts, on-call work, and varying working hours. Several

studies have revealed an association between shift work and health problems, usually associated with a chronic mismatch between the endogenous circadian time system and behavioral cycles, including sleep/wake and fast/eating cycles. Shift work is associated with sleep disturbances, impaired quality of life, and is a risk factor for several health conditions (Nena et al., 2018).

Boredom at work has negative consequences for workers and the organization of workplace. Research shows that the effects of boredom are job stress, job dissatisfaction, physical and mental health problems, workplace hostility, and poor performance (Balzer, 2017). According to research conducted by showing boredom, work monotony increased stress and decreased employee performance have an impact that affects each other (Leksono, 2014). Job stress and job satisfaction are related to the quality of life (Hardani, 2016). A comfortable physical environment is necessary for ATC employees to work properly and healthily. Healthy environmental conditions will have a positive influence on the quality of work (Saleh, 2017).

2. Methods

This type of research used is quantitative. The research design used was an analytic observational study with a cross-sectional study approach. The number of population in this study amounted to 184 Air Traffic Control Branch of Makassar Air Traffic Service Center Sultan Hasanuddin International Airport, the number of samples studied was taken using purposive sampling technique totaling 65 controllers. The data source used is secondary data. The measuring instruments used are the WHOQOL-BREF questionnaire to measure the quality of life, Lee Jones Boredom to measure boredom, and Luxmeter to measure lighting. The data analysis used was the chi-square test and logistic regression using the SPSS program.

3. Results and Discussion

Table 1. Frequency Distribution of Shift Work, Lighting, Boredom and Quality of Life in Air Traffic Controller at Sultan Hasanuddin International Airport Makassar

Variable	n	%
Shift Work		
Night	20	30.8
Day	45	69.2
Lighting		
Low	33	50.8
High	32	49.2
Boredom		
Boredom	36	55.4
Not Boredom	29	44.6
Quality of Life		
Poor	34	52.3
Good	31	47.7

The frequency distribution in Table 1 shows that of 65 Air Traffic Controllers at Sultan Hasanuddin International Airport, in the shift work variable most of respondents were in the day shift category (69.2%), in the intensity of lighting variable most of respondents were in low category (50.8), in the boredom variable most of respondents were in the boredom category (55.4%) and the quality of life variable most of respondents were in the poor category (52.3%).

Table 2. Relationship between Shift Work, Lighting Boredom and Quality of Life in Air Traffic Controller at Sultan Hasanuddin International Airport, Makassar

Variable	Quality of Life Category				Total		Test results Statistics
	poor Quality of Life		Good Quality of Life				
	N	%	n	%	N	%	

Shiftwork							
Night	16	80%	4	20%	20	100	p=0,007
Day	18	40%	27	60%	45	100	
Lighting							
Low	22	66.7	11	33.3	33	100	p=0,035
High	12	37.5	20	62.5	32	100	
Boredom							
Boredom	24	66.7	12	33.3	36	100	p=0,020
Not Boredom	10	34.5	19	65.5	29	100	

Based on category variables in Table 2, most of the respondents who have poor quality of life are those on night shift (80%), have low lighting (66.7%) and have boredom (66.7%). The results statistics using the chi-square test show that significant value between variable independent and dependent <0.05. Shift work (sig=0.007), lighting (sig=0.035) and boredom (sig= 0.020).

Table 3. Multivariate Analysis of Variables that Influence Quality of Life on the Air Traffic Controller (ATC) at Sultan Hasanuddin Airport, Makassar

Variable / Stage	¹⁷ B	S.E.	Wald	Sig.	Exp(B)
STAGE 1					
Shift work	-2.127	.793	7.186	.007	.119
Boredom	-1.772	.680	6.795	.009	.170
Lighting	1.451	.644	5.079	.024	4.265
Workload	-.661	.612	1.167	.280	.516
Contant	6.277	2.389	6.906	.009	532.428
STAGE 2					
Shift Work	-2.221	.780	8.112	.004	.108
Boredom	-1.899	.670	8.032	.005	.150
Lighting	1.498	.637	5.533	.019	4.474
Constant	5.614	2.260	6.172	.013	274.279

Based on the Table 3, the result of multivariate shows that the sig value for each variable <0.05, shift work has a sig value 0.004, boredom has a sig value 0.005 and lighting has a sig value <0.019. The table above also known that the variable has greater effect on the quality of life in lighting with Exp B (4.474).

The Effect of Shift Work with Quality of Life

The results showed that there is an effect between shift work and quality of life. ¹⁰ This research is in line with research conducted by J. G. Sonati et al (2016) which shows that ¹¹ of sleep is significant for night and morning shift works, there are reducing worker performance, health, and quality of life for Air Traffic Controllers (Sonati et al., 2016). Similar research was also conducted by Kim, Lee, Choi, & Park (2016) which shows that shift work is associated with a decrease in the quality of life of workers in Korea. (Lee et al., 2018). According to another research, shows that Shift work can affect the ⁶ quality of life workers (Nena et al., 2018).

In this study, the most of respondents have poor quality of life is ATC who works on night shifts. In general, the night shifts play an important role in assessing the quality of workers life (Saleh, 2018). The night shifts have an impact on the worker's own performance. The human body has own rhythm, which is called the circadian rhythm. This circadian rhythm functions to regulate the work

processes of the human body (Saraswati & Paskarini, 2018). Quality of life analysis, the night shift worker is less satisfied with the spiritual, physical domain of existence than the other two shift workers. Researchers also reported that night shifts had fewer opportunities to improve physical, leisure and personal affairs than the other two groups (Kaliterna et al., 2004).

The Effect of Boredom with Quality of Life

The results of the research on the effect between Boredom with the quality of life using the regression logistic showed there is a Boredom effect to the quality of life in Air Traffic Controller (ATC) at Sultan Hasanuddin International Airport Makassar. According to Cumming, the impact when employees experience boredom is that they fail to focus on work, they will often daydream or think about problems that are not related to their duties (Cummings et al., 2015). Boredom can occur when there are substantial activities but everything becomes routine, requires little effort and has no challenges to resolve. There are many factors that cause boredom on ATC, such as underload, monotonous work, overload (Saleh, 2018).

In this study, the bad quality of life was mostly experienced by respondents who experienced boredom. The consequences of boredom at work harm workers and the organization. Research shows that the effects of boredom on workers are job stress, job dissatisfaction, physical health problems and mental health issues, hostility at work which ultimately has an impact on decreasing quality of life (Balzer, 2017).

The effect of Lighting with Quality of Life

The result of the study indicates there is an effect between lighting with quality of life. This research is in line with research conducted by Boubekri which shows there is a relationship between lighting in the workplace and quality of life. Workers who are exposed to more light at work tend to have longer sleep duration, better sleep quality and better quality of life than workers with less light exposure at work (Boubekri & Zee, 2014). Based on this study, Air Traffic Controllers who experienced a bad quality of life were mostly experienced by respondents who worked in low lighting. This is due to low lighting which is associated with various bad health effects, both physical and mental, such as eye strain, headaches, fatigue, stress, and anxiety in a more high-pressure work environment (Agarwal, 2018).

The use of natural lighting from the sun can make a healthy environment. Naturally, daylight is very intense, strong in the shortwave (blue) part of the spectrum, and maximally supports circadian rhythms and is absent at night (Kort, 2013). The circadian rhythm is very sensitive to the presence of light. If the light received by the body decreases, the circadian rhythm will instruct the body to slow down its work process, and vice versa (Saraswati & Paskarini, 2018).

The most influential factor is lighting with an EXP (B) value of 4.474. This research is in line with researchers in the Interdepartmental Neuroscience program at Northwestern University in Chicago. A new study entitled "Impact of Workplace Daylight Exposure on Sleep, Physical Activity, and Quality of Life" concludes that there is a strong association between daytime exposure in the workplace and sleep, activity, and quality of life of office workers (Bergland, 2013).

Compared to workers in windowless offices, those with windows at work received 173 percent more exposure to white light during work hours and slept an average of 46 minutes more per night. Windowless workers reported lower scores than their peers on measures of quality of life-related to physical and vitality problems. They also had worse results in measures of overall sleep quality, sleep efficiency, sleep disturbances, and daytime dysfunction (Celmer, 2013).

4. Conclusion

There is a significant effect between shift work, lighting, boredom with quality of Life in Air Traffic Controller at Sultan Hasanuddin International Airport Makassar, the factor that most influences quality of life is lighting. Therefore, it is expected Management of Makassar Air Traffic Center (MATSC) company management will give attention to the quality of life in Air Traffic Controller, especially physical health problems, psychological status, level of freedom, social relations and the environment in workplace.

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