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## Determinants of Quality of Life Air Traffic Controller in AirNav Surabaya

Muhammad Fandi Ahmad<sup>1</sup>, Lalu Muhammad Saleh<sup>2</sup>, Yahya Thamrin<sup>2</sup>, Syamsiar S. Russeng<sup>2</sup>, Saifuddin Sirajuddin<sup>3</sup>, Agus Bintara Birawida<sup>4</sup>

<sup>1</sup>Master Student Program, <sup>2</sup>Lecturer, Department of Occupational Health and Safety, Faculty of Public Health, Hasanuddin University, Indonesia, <sup>3</sup>Lecturer, Department of Nutrition, Faculty of Public Health, Hasanuddin University, Indonesia, <sup>4</sup>Lecturer, Department of Environmental Health, Faculty of Public Health, Hasanuddin University, Indonesia

### Abstract

<sup>9</sup> The quality of work life is affected <sup>19</sup> by the quality of the work environment. A positive work atmosphere will create a conducive work life. This study aims to determine the factors that affect the quality of life of air traffic controller at AirNav Surabaya. This is a quantitative research with a cross sectional study method. Interviews were conducted on 38 workers who were drawn based on the purposive sampling method. Then, from these results a logistic regression test was carried out which showed that blood pressure, position, and workload had a significant relationship. To determine the effect of individual characteristics, work fatigue and quality of life were measured using a questionnaire, blood pressure using a tensimeter and workload using an oximeter. Data were analyzed using the SPSS <sup>25</sup> application with the chi-square test. Results of the chi-square test analysis showed that there was a relationship between age and quality of life ( $p = 0.009$ ), blood pressure with quality of life ( $p = 0.032$ ), years of service with quality of life ( $p = 0.031$ ), position and quality of life ( $p = 0.029$ ), fatigue with quality of life ( $p = 0.012$ ) and workload with quality of life ( $p = 0.005$ ), while there was no relationship between sex and quality of life (0.279) and marital status with quality of life ( $p = 0.560$ ). From these results, a logistic regression test was carried out which showed that blood pressure, position, and workload had a significant relationship. This research suggests AirNav Surabaya to pay more attention to the quality of life of air traffic controller, maintain the nutritional intake, exercise regularly, and pay attention to rest times.

**Keywords:** *Quality of Life, ATC, Work Load, Safety Aviation, Work Fatigue.*

### Introduction

All flight operations are always directed to optimize flight safety and cost efficiency. Safety is a matter that should be prioritized in the world of aviation, because

it is an unsafe condition of transportation. In an effort to achieve work profitability and flight safety, the world of air transportation involves a potential element related to the safety policy, namely control arrangements for airspace and ground area of airplane movement. This potential element is Air Traffic Controller. Flight safety depends on the capabilities and quality of the controllers. [1]

#### Corresponding Author:

Muhammad Fandi Ahmad

E-mail: muh.fandi85@gmail.com | +6285397719071

Jl. Tidung IV No. 149, Makassar, South Sulawesi, Indonesia

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15 The purpose of air traffic services is to prevent collisions between aircraft in the maneuvering area and obstructions in the area, maintain and smoothen the flow of air traffic, provide information and advice that is useful for safety and efficient flight operations, provide information to the authorities related to the need for search and rescue assistance, as well as assisting the needs of that party. Therefore, air traffic controllers need to perform multiple functions at the same time such as thinking, listening, and talking. [2]

ATC is considered to be one of the most demanding and highly saturated professions. This job has a high level of stress due to the heavy burden of responsibility because they carry the lives of aircraft passengers and the entire crew at risk. [1, 3]

Based on the results of preliminary studies from interviews with several workers, it was found that some of these workers experienced various health problems both physically and psychologically, exhaustions like work stress and fatigue were also reported that many controllers are experience it due to the high workloads.

The concept of quality of life includes how to measure individual happiness from various aspects of their life. This evaluation includes a person's emotional reactions to life events, dispositions, a sense of fulfillment and life satisfaction, and satisfaction with work and personal relationships. [4]

Juanda Airport, located in East Java, is one of the busiest airports in Indonesia. The smooth running of flights that cannot be separated from the role of ATC in regulating, monitoring, and informing all matters related to flight for 24 hours makes this job a fairly high level of stress. This can have an impact on the performance of ATC officers which will affect the quality of work to reduce work productivity and affect their quality of life.

## Materials and Methods

This study is an observational research. The research design is a cross sectional study, which aims to analyze the variables that affect the quality of life of the Surabaya branch of the Air Traffic Controller (AirNav, Surabaya). This research was conducted at AirNav Surabaya Branch from September to December 2020.

Previously, an experiment to examine the effect of progressive muscle relaxation on reducing work stress in air traffic controllers was conducted. The study aims to determine the effect of relaxation on reducing stress levels in Air Traffic Controller (ATC). The study design used quasi experimental research with pre-test post-test control group design. The sample of the research was ATC employees in Makassar Air Traffic Service Center, which amounted to 60 people consisting of 30 people given relaxation therapy interventions and 30 people as a control group. Datacollection using questionnaires and also blood pressure measurements. Data collection was done using the stress scale questionnaire (Perceived Stress Scale) and using the job stress NIOSH questionnaire. [5]

The population in this research were all employees of Air Traffic Control at AirNav Surabaya as many as 83 people. The number of samples to be studied was taken using purposive sampling technique, which is a technique based on certain considerations made by the researcher himself based on previously known characteristics or characteristics of the population. The inclusion criteria in this study were selecting respondents who were active employees at AirNav Surabaya and served as controllers and supervisors. Meanwhile, the exclusion criteria are employees who are on leave. Based on the above inclusion criteria, a sample of 38 workers was obtained.

Data collection related to the demographic variables (age, gender, marital status, blood pressure) and job variables (tenure, position, work fatigue, workload) were obtained through filling out questionnaires to respondents at the research location and also conducting direct interviews. Data processing using SPSS 21 application with multivariate analysis, namely logistic regression LR backward method.

### Discussion

From the results of the research that has been done, several things can be discussed that can be discussed in this paper.

Relationship between Age and Quality of Life on Air Traffic Controller at AirNav Surabaya

Wagner, Abbot, and Lett <sup>6</sup> found that there are age-related differences in aspects of life that are important to individuals, and also, adult individuals express higher welfare in their middle adulthood.

This study shows the results of the analysis of the relationship between age and quality of life get a p-value of  $0.020 < 0.05$ , which means that there is a relationship between age and quality of life on the Air Traffic Controller (ATC) at AirNav Surabaya Branch. Based on the results of observations on ATC AirNav Surabaya employees, the division of tasks or jobs is not based on age categories. However, in general, workers who are old (senior) occupy structural positions or are at the managerial level. In addition, under the International Civil Aviation Regulations (ICAO), employees aged  $< 60$  years are required to undergo a medical examination to obtain a medical examination facility in the form of 3rd medical examination, then obtain a health certificate which is valid for 1 year. While employees aged  $> 60$  years have a valid health certificate for 6 months. If the employee does not pass the results of the inspection, they are not get permission to guide the aircraft.

However, there are still young workers who have a poor quality of life. This is because workers still have minimal experience so that the pressure when doing work has an impact on their psychology which affects their quality of life. This research is in line with research conducted by Hamzah <sup>7</sup> with the results of the Kendal Tau correlation test showing a significance value (p) of 0.001. The significance value (p) which is below 0.05 indicates a significant relationship between age and quality of life for people with heart failure at PKU Muhammadiyah Yogyakarta Hospital. Quality of life can be seen as follows and sometimes it can mean more than one at the same time: <sup>8</sup>

1. State of health,
2. Physical function
3. Perceived health status
4. Subjective health
5. Perceptions of health
6. Symptoms
7. Satisfaction of needs
8. Individual cognition
9. Functional disabilities
10. Mental disorders
11. Well-being

The Relationship between Gender and Quality of Life on Air Traffic Controller at AirNav Surabaya

In general, the welfare of men and women is not much different, but women are more related to positive aspects of relationships, while high welfare in men is more related to aspects of education and better work. <sup>9</sup>

The results of statistical tests obtained p value = 0.557, thus there is no relationship between sex to

the quality of life on the Air Traffic Controller (ATC) at AirNav Surabaya Branch. Based on observations made by researchers, gender does not affect the quality of life in ATC because there is no equal distribution of tasks and workloads for employees, both men and women. In other words, the division of tasks for ATC employees at AirNav Surabaya Branch is not carried out based on gender, therefore both women and men have the same type of work and workload.

This is also supported by other research by Lim [10] that there is no difference in the quality of life between men and women due to the personality factors of each individual.

### 3 The Relationship between Marital Status and Quality of Life on Air Traffic Controller at AirNav Surabaya

Quality of life can be seen as a state of health, physical function, perceived health status, subjective health, perceptions of health, symptoms, satisfaction of needs, individual cognition, functional disabilities, mental disorders, well-being and sometimes it can mean more than one at the same time. [8]

The result of statistical test shows that the value of  $p = 1,000$ , so there is no relationship between marital status and quality of life on the Air Traffic Controller (ATC) at AirNav Surabaya branch. In the research conducted, it was found that marital status did not affect employee performance on their job. The workers continue to do their jobs in a professional manner, without bringing family conflicts into the work environment. In addition, the data in the research are homogeneous, with the status of employees who are married as many as 37 people and 1 person who is not married and there is the possibility of the influence of other variables that require further research.

However, this study is not in line with the results of research conducted by Astuti [11] which states that the relationship between marital status and quality of

life of the elderly is found that as many as 12 elderly (85.7%) who are married have a high quality of life.

### The Relationship between Blood Pressure and Quality of Life on Air Traffic Controller at AirNav Surabaya

Hypertension and quality of life have a reciprocal relationship, hypertension can affect quality of life and vice versa, quality of life can affect hypertension. In hypertension, the domains related to quality of life include physical and mental, social, satisfaction with therapy and general feeling of comfort. [12]

Based on statistical tests, it was found that there was a relationship between blood pressure and quality of life on the Air Traffic Controller (ATC) at AirNav Surabaya with  $p$  value = 0.024. Based on observations of blood pressure on the controller, it was found that more results were in the normal category due to the obligation for the controllers to check blood pressure before working. In addition, ATC workers are also required to stay focused while on duty. Performance level is the dominant factor that causes high blood pressure in ATC operators.

According to research conducted by Grivit [13] shows that there is a relationship between hypertension and the quality of life of residents in Kolongan Village, Central Tomohon District, Tomohon City. More respondents who have a good quality of life do not suffer from hypertension than respondents who suffer from hypertension and respondents who have a poor quality of life suffer from hypertension more than respondents who do not suffer from hypertension.

### The Relationship between Years of Service and Quality of Life on Air Traffic Controller at AirNav Surabaya

The years of service is the length of time a person works in the scope of work which is calculated in months or years. If the longer the period is, it can

produce better work productivity, that is, it can be done by mastering and developing a thought in doing work. So and vice versa, can have a negative influence on the quality of life of workers, where the work period is carried out continuously which can cause health problems. <sup>24</sup> [14]

Working period is a factor associated with work fatigue. The longer working period will cause boredom and boredom will cause work fatigue. The longer the working period gives a negative effect that is disrupting the body's resistance and causing work fatigue. The longer a person works, the the feeling of being familiar with the work will affect the level of endurance to the fatigue they experience. [15]

The statistical test results obtained  $p$  value = 0.027, which means that there is a relationship between the years of service and the quality of life on the Air Traffic Controller (ATC) at AirNav Surabaya. <sup>14</sup>

Most of the ATCs at AirNav Surabaya have long years of service. Based on the observations of researchers, AirNav has provided a work environment that is quite comfortable and safe, but the work carried out is the same as before and has no variation so that sometimes they feel bored and tire easily. However, workers claim that the work they do is worth the incentives they receive. As work life should include occupational safety and health, justice, individual choice, participation in decision-making, opportunities for growth, meaningful work, the ability to control time and place of work, protection from injustice, treatment and the opportunity to meet social needs. [16]

There are ATCs who have a poor quality of life, but are still in a new years of service. Employees with new tenure do not have good experience in doing their jobs so they still feel pressured because they are more afraid of making mistakes in every job. This of course can affect the quality of life of ATC employees.

Meanwhile, employees with long tenure have had work experience that affects their work knowledge and skills. Work experience that employees have indirectly trains employee work attitudes to be more skilled, fast, calm and able to analyze difficulties and be ready to overcome them. [17]

The Relationship between Work Fatigue and Quality of Life on Air Traffic Controller at AirNav Surabaya

<sup>11</sup> International Civil Aviation Organization (ICAO) defines fatigue as a physiological condition of reduced mental or physical abilities due to loss of sleep, length of time awake, circular phase, and excessive workload that can interfere with the ability to carry out security and safety during the operational process carried out [18].

According to Aroem <sup>19</sup>, poor quality of life is always associated with the inability to carry out daily activities as usual, characterized by fatigue, disturbed sleep, and feeling hopeless. Fatigue is a system in the body that signals that something is causing interference with the body and will recover after rest. Fatigue due to work is called work fatigue and is one of the problems in the workplace, both formally and in the formal sector. [20]

<sup>23</sup> Based on the results of the statistical test conducted, the value of  $p = 0.024$  was obtained, so there is a relationship between fatigue and quality of life in the Air Traffic Controller (ATC) at AirNav Surabaya Branch. <sup>9</sup>

ATC fatigue is met by a variety of factors caused by the interplay of professional job requirements and demands on job performance, plus ATCs have to make decisions under time pressure. Stress will increase when you have to make an immediate decision. On the other hand, ATC's working time is very constant in terms of busy and busy work schedules, plus situations and environments that can be said to be

isolated. The work environment can be a physical and mental stress factor for ATC. All of the factors mentioned above contribute to ATC fatigue and job stress which can affect ATC's ability, responsiveness, and alertness.

The Relationship between Work Load and Quality of Life on Air Traffic Controller at AirNav Surabaya

Workload is ATCO's main problem. In their analysis, they found that the best predictor of ATCO workload is traffic load, namely the number of aircraft managed by the controller. Other factors that contribute to the workload include the number of flight altitude transitions, average airspeed of the aircraft, variations in direction, aircraft proximity, and weather conditions. [21]

The results of statistical tests obtained p value = 0.010, so there is a relationship between workload and quality of life on the Air Traffic Controller (ATC) at AirNav Surabaya Branch. Based on observations in the field, the workload experienced by ATC operators is predominantly mental workload because in doing their work they are required to concentrate heavily in monitoring navigation, radiation and supervising and carrying out aircraft monitoring so as to ensure safety and regularity of aircraft traffic. According to Budiman [1], the workload experienced by an ATC controller is located from peak hours.

This research is in line with the research conducted by Lopez [22], which shows the Workload factor shows a significant relationship with the four dimensions of Quality of Work Life on Air Traffic Controller in Equador Airport.

The Relationship between Position and Quality of Life on Air Traffic Controller at AirNav Surabaya

Kirsten [23] states that the type of position or quality of work affects the personal needs of a worker, personal life outside of work, relationships with

fellow workers which of course will affect the quality of life of the worker. The way people respond to their work can impact their personal happiness and quality of life, the effectiveness of their performance, and the success of their organizations. [24]

The results of this study indicate a relationship between position and quality of life with a value of  $p = 0.020 < 0.05$ , which indicates that there is a relationship between position and quality of life on the Air Traffic Controller (ATC) at AirNav Surabaya based on research conducted, employees as a supervisor have a lower job risk because they are required to focus and be responsible only when extraordinary events occur, where this is incidental. So that the pressure that occurs due to work does not take place continuously, then in terms of salary, the supervisor position is higher than the position of controller. Whereas employees with controller status are required to always focus on every time they carry out their work, where this happens continuously and causes pressure.

Analysis of Determinants of Quality of Life for Air Traffic Controllers (ATC) at AirNav Surabaya

Based on the results of the study, it was found that most of the quality of life of ATC employees at AirNav Surabaya was quite good. In accordance with the results of observations, the quality of life of the controllers is indicated by various programs to support the quality of life of the controllers, such as periodic health checks, shift systems, pay attention on incentives and others. However, there are still some controllers that show poor quality of life results. This indicates that the program held is not optimal or still requires improvement from both management and individual factors.

In this research, statistically through multivariate analysis showed no effect or relationship of age, years of service, work fatigue on quality of life. Meanwhile,

those that affect the quality of life are blood pressure, position and workload. The improvement of the quality of life of the ATC positions is because the higher the position of an ATC, the higher the incentives they get. And based on the results of ATC research, whose blood pressure is classified as abnormal, it is dominant to have high blood pressure, which is generally experienced by employees who are at managerial level positions. Workers admit that this affects their quality of life. Not only that, <sup>10</sup> the quality of life of ATCs is also influenced by their workload where workers with high positions have light workloads and vice versa, so it can be concluded that the higher the ATC positions, where they are included in the managerial division or supervisors who have high blood pressure, <sup>8</sup> so that the workload faced is also reduced which will affect the quality of life of the workers.

### Conclusion

<sup>17</sup> The results of this study indicate that there is a significant relationship between age, blood pressure, length of service, work fatigue, workload and position on the quality of life of the ATC of Surabaya AirNav. However, after the Logistic Regression test is carried out to find out the strongest variables that have a relationship to the quality of life, namely blood pressure, position and workload. Meanwhile, gender and marital status did not have a relationship with the quality of life in this study. Based on this, <sup>6</sup> the researcher suggests that the management of the AirNav Surabaya needs to pay attention to the quality of life experienced by the <sup>18</sup> Air Traffic Controller so that it can still have a positive impact on physical health, psychological health, social relationships and spiritual conditions and for ATCs themselves have to pay attention to their health conditions, physical and spiritual. Maintain nutritional intake, exercise regularly, pay attention to rest times, take time for recreation to gather with family or socialize, and get closer to God.

**Ethical Approval:** Hasanuddin University

**Conflict of Interest:** None

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