



RESEARCH ARTICLE

## The Effect of Physical Workload, Mental Workload, Motivation and Income on Job Stress through Fatigue Work Fatigue in TNI-AD Soldiers in Makassar City 2024

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**ABSTRACT**

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The Indonesian National Army (TNI-AD) as a national defense tool has many tasks and responsibilities that cause high levels of fatigue. Large physical and mental workloads can affect activities and work. Excessive workloads will also affect the mental and psychological tension of the TNI-AD. The Aim of this study is to determine how work stress in the TNI-AD in Makassar City in 2024 is influenced by mental and physical workload, motivation, and income. The research method used is Cross Sectional Study Approach. The Slovin formula was used to determine the sample size which obtained a total of 116 samples. The results showed that physical workload ( $\rho=0.010$ ), income ( $\rho=0.000$ ), and motivation ( $\rho=0.140$ ) directly affect job fatigue. Income ( $\rho=0.000$ ) also directly affects job stress, while physical workload ( $\rho=0.797$ ), mental workload ( $\rho=0.824$ ), motivation ( $\rho=0.714$ ), and fatigue ( $\rho=0.000$ ) do not directly affect job stress. Indirect relationships between physical workload and job stress through fatigue ( $\rho=0.015$ ), income and job stress through fatigue ( $\rho=0.010$ ), and mental workload and job stress through fatigue ( $\rho=0.367$ ) and motivation through fatigue ( $\rho=0.135$ ) do not exist. The conclusion is that income and physical workload are factors that influence fatigue and work stress in Indonesian Army soldiers in Makassar City.

### INTRODUCTION

The International Labor Organization (ILO) reported in 2021 that work accidents due to fatigue claim the lives of up to two million workers every year. According to the study, fatigue affected 32.8% or about 18,828 samples out of 58,115 samples (ILO, 2018).

According to data from the Employment Social Security Organizing Agency (BPJS), there were 40,273 cases of work accidents every day in 2021 with a total of 147,000 cases. There were 40,273 cases of work accidents per day, of which 4,678 (3.18 percent) resulted in disability and 2,575 (1.75 percent) resulted in death. This data shows that 12 BPJS Employment participants are disabled and seven participants die every day. In 2021, the Indonesian Ministry of Manpower and Transmigration reported that an average of 414 work accidents occurred every day, with a high fatigue rate reaching 27.8% of these incidents. In Indonesia, an average of 99,000 work accidents occur annually, and 39 people or 9.5% of the population are disabled. About 70% of these accidents are fatal, resulting in death or permanent disability.

Humans face both physical and mental workload when performing work-related activities. Excessive amounts of required skills, excessive work speed, excessive work volume, and other factors can all

contribute to workload. Workload can be affected by a variety of factors, including age, gender, lighting, work environment, pay structure, length of working hours, and night work. As a result, businesses must consider the amount of mental and physical stress placed on each employee's job. Overworked workers can become exhausted, which can result in workplace stress. One of the factors that cause job burnout is workload (N. Salsabila, et al. 2021). Although workers can experience the negative impacts of job burnout, these impacts can be avoided. However, this requires the cooperation of the company as well as the awareness of the employees themselves. Occupational fatigue will impair performance and increase the likelihood of errors. Workplace accidents will increase as a result of increased work errors, especially if the employee's workload increases.

Excessive workload and stress in the office can lead to personal conflicts or pressures that can negatively affect workers. The buildup of workload will lead to decreased performance and increased work-related stress, according to Hauck and colleagues (2008). Excessive workload can cause people to be less productive at work. The activities of the Army need attention because some of them are activities that overburden the organization (R. Salam, et al. 2019).

Stressors include heavy workload and light workload. Workload can be further classified as excessive or resulting from tasks assigned to employees in small or excessive amounts that must be completed within a certain period of time. Workload can be a source of stress in the workplace, both mentally and physically (D. M. Sari, 2019). Mental workload is the use of the brain or mind, and requires relatively less energy than physical workload. However, mental workload is undoubtedly greater than physical workload in terms of roles and responsibilities. This is due to the fact that high mental workload will affect work-related stress.

According to the National Institute of Occupational Safety and Health (NIOSH), about 40% of employees report very high levels of stress at work. Eighty percent of employees report feeling stressed at work, and half of them need help to cope, according to another American Workplace VII report (E. Safitri Sillehu, et al. 2022). According to a Health and Safety Executive (HSE) survey, 1,800 out of 100,000 workers experienced work-related stress and depression in 2017 and 2018. 57% of sick leave absences and 44% of all occupational health problems were caused by workplace stress and depression (M. F. Achmar, et al. 2022).

The Indonesian Ministry of Research and Technology reported that 55% of people suffer from stress, with 0.8% falling into the very high stress category and 34.5% falling into the mild stress category (Kemenristek RI, 2020). In addition, there are OHS issues, such as fatigue, which can jeopardize the health and safety of employees and result in work accidents. Reduced endurance and efficiency at work are symptoms of occupational fatigue. One of the problems that often occurs in the workplace is fatigue. One of the symptoms of job burnout is decreased productivity and skills, boredom, and anxiety.

Although comprehensive national data on the prevalence of work stress among workers is not yet available, many researchers have examined this issue in Indonesia. For example, research by Zulkifli et al. (2019) on employees of PT Elnusa Tbk's Service Well Company found that 23 respondents (57.5%) had experienced work stress, while 17 respondents (42.5%) did not. Eight respondents (18.6%) reported experiencing severe stress, thirty-two (74.4%) reported experiencing moderate stress, and three (7%) reported mild stress, according to research by Putrid et al. (2020) on BTS tower workers at the Huawei PT Xerindo Teknologi Jakarta Medan project. The amount of work TNI soldiers do is one of the many factors that contribute to their stress levels.

Siagian & Khair (2018) define stress as a state of tension that affects a person's emotions, mental state, and physical condition. According to Munandar (2001), activities and work can be affected by the amount of mental and physical workload; lighter workloads will also have very little impact on work pressure. Heavy workloads such as fighting wars and having to be resilient in the face of extreme conditions make the TNI have a very large workload. In addition, too heavy a workload will also have an impact on the mental and psychological stress of the TNI.

So that these pressures do not become problems in the organization that can interfere with employee performance, the agency must continue to strive to motivate employees to be able to overcome them (D. Atrizka et al. 2023). Therefore, the workload of an employee must be adjusted to the level of expertise. This is because a person's workload greatly affects his stress level, especially for those who

serve in the military environment, especially the TNI. Where TNI soldiers are tasked with leading defense, maintaining state sovereignty, and protecting the country from all threats. This requires a workload that is in accordance with their capacity to carry out all their responsibilities as well as possible so that there is no excessive work stress which can result in a decrease in individual performance (Nova Andya 2021).

## MATERIALS AND METHODS

The research design used was a cross-sectional study. This research was conducted in Makassar City in 2024 from August to September. The sample used was the Slovin formula which amounted to 116 TNI soldiers.

Research variables include work stress as the dependent variable, fatigue as the intervening variable, income, motivation, and physical and mental workload as independent variables. Data collection for this study was carried out by direct observation, direct interviews with participants, filling out questionnaires, and monitoring pulse rate with an oxy meter. Data processing and relationship tests between research variables used the SMART PLS application. To present the results of this study, tables and narratives were used.

## RESULTS

Based on the characteristics of the TNI-AD soldiers who were respondents in this study, we can know that for the age of the majority of soldiers aged less than 27 years, namely 77 soldiers or 66.4% and 29 other soldiers (33.6%) aged more or equal to 27 years. For the marital status of TNI-AD soldiers, the majority are unmarried, namely 83 soldiers (71.6%) and 33 other soldiers (28.4%) are married. For the length of service of TNI-AD soldiers, the majority have less than 5 years of service, namely a total of 60 soldiers (51.7%) and 56 other soldiers (48.3%) have been soldiers for more than 5 years. The majority of soldiers' education comes from the high school level, namely a total of 97 soldiers (83.6%) and 19 other soldiers come from the vocational level.

Based on Table 2 above, we can know the direct effect of variables on job fatigue and job stress. For the effect of physical workload on work fatigue, it is stated that it has a significant effect because the p-value is  $0.010 < 0.05$ . The amount of influence is 0.233 or a positive effect. We can conclude that the increasing physical workload will result in increased fatigue. For the effect of physical workload on work stress, it is stated that it does not have a significant effect because the p-value is  $0.797 > 0.05$ . The amount of influence is 0.012 or has a positive effect. We can conclude that the increasing physical workload will result in increased work stress. For the effect of mental workload on work fatigue, it is stated that it does not have a significant effect because the p-value is  $0.206 > 0.05$ . The amount of influence is -1.533 or has a negative effect. We can conclude that the more mental workload increases, the more work fatigue will decrease. For the effect of mental workload on work stress, it is stated that it does not have a significant effect because the p-value is  $0.824 > 0.05$ . The amount of influence is 0.136 or has a positive effect. We can conclude that the more mental workload increases, the more work stress will increase. For the effect of salary on work fatigue, it is stated that it has a significant effect because the p-value is  $0.000 < 0.05$ . The magnitude of the effect is -4.453 or negative effect. We can conclude that the more salary increases, the more fatigue will decrease. For the effect of salary on job stress, it is stated that it has a significant effect because the p-value is  $0.001 < 0.05$ . The amount of influence is -1.023 or has a negative effect. We can conclude that the more salary increases, the more work stress will decrease. For the effect of motivation on work fatigue, it is stated that it has no significant effect because the p-value is  $0.140 > 0.05$ . The amount of influence is 0.775 or has a positive effect. We can conclude that the more motivation increases, the more work fatigue will increase. For the effect of motivation on work stress, it is stated that it has no significant effect because the p-value is  $0.714 > 0.05$ . The amount of influence is 0.098 or a positive effect. We can conclude that the more motivation increases, the more work stress will increase. For the effect of job fatigue on job stress, it is stated that it has a significant effect because the p-value is  $0.000 < 0.05$ . The amount of influence is 0.203 or has a positive effect. We can conclude that the more work fatigue increases, the more work stress will increase.

Based on Table 3.12 above, we can know the indirect effect of variables on job stress through the variable of job fatigue. It is known that the effect of physical workload on job stress through job fatigue is stated to have an indirect effect, this is because the p-value is  $0.015 < 0.05$ . The amount of

influence is 0.047 or has a positive effect. It is known that the effect of mental workload on job stress through job fatigue is declared to have no indirect effect, this is because the p-value of  $0.367 > 0.05$ . The amount of influence is -0.311 or has a negative effect. It is known that the effect of salary on job stress through job fatigue is stated to have an indirect effect, this is because the p-value is  $0.010 < 0.05$ . The amount of influence is -0.903 or has a negative effect. It is known that the effect of motivation on job stress through job fatigue is declared to have no indirect effect, this is because the p-value of  $0.135 > 0.05$ . The amount of influence is -0.076 or has a negative effect.

## DISCUSSION

### The effect of physical workload on work fatigue of makassar army soldiers

Physical workload has an impact on the physiological condition of employees. Employees who work excessively will experience fatigue which leads to boredom and lack of focus which ultimately leads to carelessness and unsafe behavior in the workplace which can result in accidents (M.P. Sari, et al. 2022). Workload is related to fatigue, someone with a high workload can suffer from occupational diseases, one of which can result in complaints of fatigue in the workplace. Fatigue in the workplace can affect employee health and reduce productivity. Fatigue can adversely affect performance, productivity and concentration in the workplace. If forced to continue doing the same job, someone who already has less energy due to their work will produce less than ideal work results (N. Ulfa, et al. 2023).

Physical workload in this study is the amount of work that requires physical energy for human muscles to function. This study used pulse rate measurements taken twice, before and after work, to measure the physical energy needs of soldiers' muscles. An oximeter is the measuring instrument used. Mild, moderate, and severe fatigue are the three categories on which the results of subsequent measurements are based after being calculated as a percentage of CVL (% CVL). The KAUPK2 questionnaire consisting of 17 questions about soldiers' subjective complaints was used to measure work fatigue.

Bivariate analysis of the relationship between physical workload and job fatigue showed a significant correlation between the two. With a p value of  $0.010 < 0.05$ , the Chi Square test provided information on this relationship. In addition, multivariate analysis using path analysis was used to look at specific details regarding the impact of physical workload on job fatigue. It was found that physical workload had an impact on soldiers' job fatigue based on a direct test of the relationship between the two. The influence has a positive effect, with a magnitude of 0.233. We can conclude that fatigue increases with physical workload.

One of the homeostatic theories that explains the relationship between physical workload and fatigue is supported by the findings of the study. The human body has a self-regulating system to maintain internal balance, according to homeostatic theory. Fatigue occurs due to an imbalance that arises when the physical workload exceeds the body's capacity (Umar, et al. 2020). This means that the body experiences an imbalance that leads to increased work fatigue as more physical activity is performed.

Many previous studies have also shown a relationship between physical workload and job burnout in various types of work. For example, studies conducted by Iskandar, I. L (2024) have shown this relationship in NICU nurses. Furthermore, these findings are consistent with occupations that require a high degree of precision, such as temp factory workers, who found that physical workload has a positive impact on occupational fatigue. The rationale of this study suggests that soldiers who perform administrative tasks usually have lower levels of fatigue compared to those who work in jobs that require more physical exertion, such as sports. There are several types of occupational fatigue, including difficulty focusing, speech fatigue, difficulty thinking, and anxiety. Excessive stress and excessive energy consumption are possible if the load is too high, while boredom and saturation or low stress are possible if the differentiation intensity is too low. Therefore, an ideal level of differentiation intensity should be sought, which naturally varies from person to person and lies in the middle of the two extremes (Asmeati, et al. 2022).

### The effect of physical workload on work stress of Makassar army soldiers

When working, the body experiences external physical and mental stress. The gap between individual abilities and the requirements of the task at hand. Low stress can arise from workloads that are too low, and excessive stress can arise from workloads that are too high. Workload in the workplace can also have an impact on productivity. There is no doubt that the amount of work required for each job varies depending on its nature and duration (N. Ulfa, et al. 2023)

The Perceived Stress Scale (PSS) questionnaire was used in this study to measure work-related stress. Unpleasant psychological reactions caused by demands at work that exceed one's capacity are known as occupational stress. Increased job stress is thought to be caused by physical workload, one of the independent variables. Workplace stress can be caused by excessive workload and the potential to exceed physical capabilities. The resting pulse rate of a trained individual should be between 60 and 100 beats per minute; if it is less than 60 beats per minute, the heart is pumping blood efficiently. The heart's capacity to pump blood is weak when the pulse rate is greater than 100 beats per minute, which also indicates that the person's physical condition is impaired (Saehu, 2016). On the other hand, work pulse rate is the pulse rate detected when a person is working. Based on the level of workload in times per minute, the work pulse can be divided into three categories: light workload (75-100), moderate workload (100-100), and heavy: 126-150, very heavy: 151-175, heavy: 101-125, and very heavy (Asmeati, et al. 2022).

According to the findings of the univariate analysis, more than 80% of the soldiers reported having a light workload, and more than 66% reported moderate work-related stress. There was a significant correlation between physical workload and job stress, according to the bivariate analysis of both variables. The p value for this relationship, as determined by the Chi Squared test, was  $0.797 > 0.05$ . In addition, multivariate analysis using Amos analysis was used to look at specific details regarding the impact of physical workload on job stress.

As the p value of the test was  $0.912 > 0.05$ , the results of the path analysis in the direct test indicated that there was no relationship between physical workload and soldiers' job stress. The findings of the two relationship tests showed that while a bivariate relationship between physical workload and job stress was found, the relationship did not conclude that physical workload had an impact on job stress. The effect had a positive effect, with a magnitude of 0.012. We can conclude that greater physical workload will lead to more stress in the workplace.

The results of this study, although contrary to some previous studies such as research (Ekawati, 2020) and (Kasmarani, 2012) which proved on nurses in hospitals, can be supported by several views. One of the relevant views is related to the cognitive view of job stress. This theory emphasizes that work stress is not just a physiological response to environmental demands, but also involves cognitive processes such as assessment of the situation, coping skills, and social support. Army soldiers who have positive perceptions of their abilities, strong support from colleagues and superiors, and effective strategies to prevent stress at work, tend to have stress resilience despite facing high physical workloads.

The results of this study have important implications for human resource management within the Army. Leaders must understand that while reducing soldiers' physical workload can help, efforts to reduce job stress must include a more holistic approach. Programs such as psychological support, stress coping training, and improving comfortable and safe working conditions need to be strengthened to help reduce stress effectively.

### **The effect of mental workload on work fatigue of TNI AD soldiers Makassar**

The ability of TNI Soldiers to meet job demands through high mental or emotional conditions and feelings experienced by respondents while performing work activities is a measure of mental workload in this study. The NASA-TLX method, which is further classified into three categories, namely mild, moderate and severe fatigue, was used to measure the mental workload of soldiers. The KAUPK2 questionnaire consisting of 17 questions about soldiers' subjective complaints was used to measure job fatigue. Based on the results of univariate analysis, more than 46% of soldiers experienced extreme job fatigue, and more than 77% experienced moderate mental workload. After bivariate analysis, it was found that there was no significant correlation between work fatigue and mental workload. In addition, multivariate analysis was conducted using path analysis to look in more detail at the impact of mental workload on fatigue. Since the p value was  $0.140 > 0.05$ , it was

concluded that there was no significant relationship between mental workload and job fatigue. The effect is negative, with a magnitude of -1.533. We can conclude that greater mental workload will lead to less job-related fatigue.

The results of this study, although contrary to previous research such as research (Marfu'ah, 2024) which proved on company employees, can be supported in the context of limited psychological resources. In that context, individuals are modeled as resources with limited psychological capabilities, such as energy and attention. When resource demands increase, job burnout will increase. This study shows that in a military context, other factors such as intensive physical training, environmental conditions and psychological stress may be more important than mental workload.

The results in this study provide implications for occupational health policy in the Makassar Army. Although this study did not conclude a direct effect of mental workload on soldier fatigue, the relationship found still indicates that mental workload must be managed properly to minimize the level of fatigue. Programs such as training, stress management, and psychological treatments can play an important role in reducing the impact of mental workload on soldier fatigue (Nugroho. 2022).

### **The effect of mental workload on work fatigue of TNI AD soldiers Makassar**

One of life's goals is to live a productive life, and work plays an important role in advancing and improving achievement. Every job will definitely burden the body and mind of employees. From an ergonomic point of view, every task given to someone must be in accordance or balanced with their physical and mental capacity and limitations. Mental workload is the difference between the workload required by a task and a person's maximum capacity when motivated. Physical workload is the workload caused by work that involves physical energy, such as lifting, pushing, and carrying. A person's mental workload needs to be matched with their physical abilities. There will be discomfort, fatigue, accidents, stress, and decreased productivity if the mental workload exceeds the body's capacity (D. Fahamsyah, 2017).

According to the findings of the univariate analysis, more than 66% of soldiers reported moderate job stress, and more than 77% reported moderate mental workload. Soldiers' mental workload and job stress were not significantly correlated, according to the bivariate analysis of the relationship between the two variables. With a p-value of  $0.877 > 0.05$ , the Chi Square test provided information on the relationship. In addition, multivariate analysis using path analysis was used to continue investigating the relationship between mental workload and job stress. The p-value for the analysis of the relationship between mental workload and job stress was  $0.824 > 0.05$ , indicating that there was no significant effect. The effect has a positive influence, with a magnitude of 0.136. We can conclude that work-related stress will increase as mental workload increases.

The absence of correlation or influence between mental workload and job stress could be due to other factors, such as individual personality, perceptions of the soldier's organization, and social or family support, which may have a greater impact on soldiers' job stress. In addition, TNI soldiers have previously received cognitive and behavioral training in solving problems, coping with change, and handling threatening situations. This system will make it more difficult for soldiers to feel stressed while on duty.

The results in this study provide implications related to the management of the workload of Makassar Army soldiers. Military management is expected to focus more on improving physical and social working conditions rather than only focusing on reducing mental workload. By thus improving field conditions and ensuring the provision of better support within the unit, it is expected that soldiers' work stress levels can be reduced. In addition, stress coping and psychological skills training programs can also help soldiers in facing work challenges.

### **The effect of income on work fatigue of TNI AD soldiers Makassar**

The size of income in this study is measured based on the wages or income received by TNI soldiers in a month's period. Adequate income can be considered as a factor that can reduce the level of job fatigue in TNI soldiers. The initial hypothesis proposed is that the higher the income received, the lower the level of job burnout experienced. Adequate income can provide a sense of financial security and reduce stress associated with financial problems, thus indirectly improving the quality of life and reducing soldiers' job burnout.

The results of univariate analysis suggested that more than 56% of soldiers thought that the income received was appropriate and more than 46% experienced severe fatigue. Bivariate investigation of the relationship between income and job fatigue concluded that there was a significant relationship between soldiers' income and job fatigue. Information on the relationship can be seen from Chi Squared testing where the p-value is  $0.000 < 0.05$ . Furthermore, to investigate detailed information related to the effect of income on job burnout, multivariate analysis using path analysis was conducted. The results of the path analysis for the effect of salary on job burnout are stated to have a significant effect because the p-value of  $0.000 < 0.05$ . The magnitude of the effect is -4.453 or negative effect. We can conclude that the more salary increases, the more work fatigue will decrease.

Income suitability is one of the motivations in improving work quality. According to Maslow, humans have levels of needs ranging from physiological needs (such as food, clothing, and shelter) to self-actualization needs. Income is one of the factors that can fulfill physiological needs. When these basic needs are met, individuals will be motivated to meet higher-level needs, such as social, esteem, and self-actualization needs. Thus, adequate income can increase the work motivation of TNI soldiers and reduce the level of job burnout.

Previous studies have also concluded that increasing welfare, one of which is income, results in increased work motivation and indirectly makes work fatigue decrease (Nugroho, 2022). In comparison, research conducted by Sari (2022) at the Ciomas Company in South Lampung revealed that one of the company's success factors is ensuring employee welfare while working which can increase employee motivation to work harder.

### **The effect of income on job stress of Makassar army soldiers**

Work stress is almost faced by everyone in the work environment. The cause can be triggered by various problems. One of the causes of work stress is usually caused by the wage / income factor. Apart from being a factor that increases work motivation, the Income variable is also suspected to be a factor that can reduce the work stress of soldiers. This assumption is based on the assumption that fulfilling financial needs can reduce the burden on the mind and improve the psychological well-being of individuals, including soldiers. Thus, adequate income is expected to provide a sense of security and satisfaction which in turn can reduce work stress levels.

The results of investigating the relationship between income and work stress bivariately concluded that there is a significant relationship between soldiers' income and the level of work stress of soldiers. Information on this relationship can be seen from Chi Squared testing where the p-value is  $0.000 < 0.05$ . Furthermore, to investigate detailed information related to the effect of income on soldiers' work stress, multivariate analysis was continued using path analysis. The results of the path analysis for the effect of salary on job stress are stated to have a significant effect because the p-value is  $0.001 < 0.05$ . The amount of influence is -1.023 or negative effect. We can conclude that the more salary increases, the more work stress will decrease or vice versa.

The significant relationship between Income and job stress shows that financial aspects not only affect soldiers' daily living conditions off duty, but also correlate with their physical and psychological conditions in the line of duty. High work stress can reduce work effectiveness, endurance, and increase the risk of errors in operational tasks, which in turn can affect soldiers' productivity and safety. The results of this study are relevant to the influence of welfare on work motivation. This theory explains that the human need to fulfill basic needs, including financial needs, is one of the main factors that can motivate a person to work better. Financial needs are met, in this case a decent income, individuals will feel more satisfied and motivated to achieve other goals, including at work.

Previous research has also shown a relationship between income and reduced job stress. Several empirical studies have shown that employees who receive higher incomes tend to have lower levels of job stress than employees who receive lower incomes. This is because adequate income can provide a sense of financial security and reduce concerns about financial problems. In addition, a fair income can also increase employee perceptions of organizational justice, which can increase job satisfaction and reduce stress (Sari, 2022).

### **The effect of income on job stress of Makassar army soldiers**

Male and female respondents have different motivations at work. Because female respondents have multiple roles, the workload received before starting work will reduce their motivation at work. Employees who have multiple roles tend to feel tired at work. Motivation has an indirect impact on work-related fatigue through workload, stress and capacity. Employees with low motivation will experience psychological stress at work, which makes them more susceptible to burnout. Highly motivated employees will not feel burdened by their work, which will prevent them from fatiguing easily (Dewi, 2018).

Univariate analysis suggests that more than 86% of soldiers have high work motivation. The results of investigating the relationship between work motivation and fatigue in bivariate analysis concluded that there was a significant relationship between work motivation and fatigue. The relationship information can be known from Chi Squared testing where the p-value is  $0.026 < 0.05$ . Furthermore, to investigate detailed information related to the effect of work motivation on soldiers' job burnout, multivariate analysis using path analysis was used. The results of the path analysis for the effect of motivation on work fatigue were stated to have no significant effect because the p-value of  $0.140 > 0.05$ . The amount of influence is 0.775 or a positive effect. We can conclude that the more motivation increases, the more work fatigue will increase.

The absence of a relationship between work motivation and soldiers' job fatigue indicates that although work motivation is important in improving performance, it is not always the determining factor in reducing job fatigue. Physical and mental fatigue experienced by soldiers can also be caused by factors such as a harsh work environment and high physical demands, which cannot be fully influenced only by high individual motivation. Statistical testing results from several previous studies such as Nugroho (2022) actually showed counter-intuitive results. The results of data analysis did not show a significant relationship between work motivation and the level of job burnout in TNI soldiers. The insignificant effect is due to the opinion of the majority of soldiers who almost all have high motivation. So that indirectly the adequacy of data regarding the relationship between work motivation and job fatigue cannot be proven in this study.

### **The effect of income on job stress of Makassar army soldiers**

Another factor that influences job stress in employees is motivation. Motivation, according to Bangun (2012), is a strategy to encourage others to take consistent actions to maximize their productivity. It is hypothesized that there will be a negative correlation between the level of job stress and a high level of motivation. Thus, soldiers who are highly motivated at work experience less stress. When soldiers are in the field, high levels of work motivation can offer excitement and specific goals to overcome obstacles. However, empirical research often produces complex results. The intricate relationship between work motivation and job stress can be weakened or even reversed by the complexity of the factors that influence it, such as task load, work environment and social support (Wulandari, 2019)

The bivariate test of the relationship between work motivation and work stress concluded that there was no significant relationship between work motivation and soldiers' work stress. The relationship information can be known from the Chi Squared test where the p-value is  $0.844 > 0.05$ . Furthermore, to investigate detailed information related to the effect of work motivation on soldiers' work stress, multivariate analysis using path analysis was used. The results of the path analysis for the effect of motivation on work stress are stated to have no significant effect because the p-value is  $0.714 > 0.05$ . The amount of influence is 0.098 or has a positive effect. We can conclude that the more motivation increases, the more work stress will increase.

One of the reasons work motivation was not the cause of the decrease in job stress was because more than 86% of the soldiers thought they were motivated to perform their duties. This means that the adequacy of the data to investigate the relationship could not be proven in this study. However, some previous studies have suggested that work motivation is a variable that needs moderation in influencing job stress. There are other factors such as environmental support, the type of tasks performed or job burnout. High motivation indirectly affects work stress because it could be that if the soldier does not have a comfortable environment, it causes an increase in work stress despite having high work motivation (Nanda, 2020).



The results of this study indicate that managing soldiers' job stress requires a more comprehensive approach that includes factors other than work motivation. Aspects such as effective stress management, social support, mental health programs, and better working conditions may be more relevant in reducing stress in Army soldiers. Intervention programs specifically designed to address the complex sources of stress in the military environment may be a more appropriate solution.

### **The effect of work fatigue on work stress of Makassar army soldiers**

Occupational fatigue is a term used to describe a number of conditions associated with decreased productivity and stamina in the workplace. These conditions include visual fatigue caused primarily by the eyes, general physical fatigue, nervous fatigue, repetitive environmental fatigue, and chronic environmental fatigue which is a constant determining factor. There are comprehensive criteria for occupational fatigue that are not only limited to physical and mental fatigue, but are more closely related to feelings of tiredness, decreased physical performance, decreased motivation, and decreased productivity in the workplace.

Fatigue in the workplace is a major contributing factor to human-caused occupational accidents. To reduce fatigue levels, static work attitudes must be combined with efforts to develop more varied or dynamic work attitudes. This will allow oxygen and air to circulate freely throughout the body. In this study, the independent variable and the work stress variable are linked by the mediating variable of work fatigue. It is suspected that the level of job stress and fatigue of TNI soldiers are interrelated. It is predicted that soldiers' stress levels will increase due to job burnout caused by demanding tasks, long work days, and challenging working conditions. Long-term stress can negatively impact soldiers' performance, relationships with others, and physical and mental health.

Soldiers' job stress and burnout were found to be significantly correlated by the bivariate test of the relationship between the two variables. The Chi Square test yielded information about the relationship, with a p-value of  $0.000 < 0.05$ . In addition, multivariate analysis was conducted using path analysis to look at specific details regarding the impact of job burnout on soldiers' job stress. The p-value for the path analysis of the relationship between job burnout and job stress was  $0.000 < 0.05$ , indicating a significant effect. The effect has a positive effect, with a magnitude of 0.203. We can conclude that job stress will increase in response to an increase in job burnout, or vice versa.

These results are consistent with the specific requirements of military service. TNI soldiers often face risky situations, harsh environments and challenging tasks. Significant physical and mental fatigue can result from such working conditions. In addition, soldiers may experience more psychological stress as a result of the pressure to remain operationally ready and constantly on guard. The findings of this study are consistent with other previous studies looking at the relationship between work-related stress and fatigue in various mining occupations, including Yunus (2021) and Manaroinsong (2022). According to this study, one of the main risk factors for work-related stress is fatigue. Fatigue in the workplace can cause a number of physiological and psychological responses that can make a person more vulnerable to stress. The results vary depending on the worker's level of job fatigue. This is due to the fact that each employee responds differently to their workload. Unequal loading leads to imbalance, and too high a workload leads to excessive fatigue. Furthermore, frustration is another effect of uneven workloads that can cause health problems for employee (Maulana, et al. 2023)

The results of this study provide important results to further investigate the effect of job burnout variables as intermediate variables in this study. As a recommendation from the results of the analysis of the effect of job burnout on job stress, efforts need to be made to reduce the workload of soldiers through optimizing task scheduling and more even distribution of workload. Then, it is necessary to improve the quality of the work environment, including adequate supporting facilities and facilities. Third, more attention needs to be given to the mental health of soldiers through counseling programs and psychological support.

### **The effect of physical workload on job stress through job fatigue of Makassar army soldiers**

A worker's workload can be a stressor that leads to certain conditions, which means people need to exert more energy or focus. External factors such as physical tasks, work organization, and other factors - in particular, internal factors that come from within the body - combine with task demands, effort or energy, and performance to determine workload. There are also other components of

workload, such as mental strain caused by the mental effort required to complete a task, physical strain caused by an individual's physical prowess, and time strain caused by the need to complete a task within a specific time frame. The purpose of this study is to test the hypothesis that soldiers who have a heavy physical workload will experience more job burnout, which will lead to more job stress. The physical workload in question consists of the long workdays, intense physical exertion, and harsh environmental conditions that Army soldiers often face. Soldiers' physical and mental energy can be depleted by job fatigue caused by heavy workloads, which lowers their capacity to handle demands. This can then lead to the development of various stress-related symptoms, such as mood swings, sleeplessness, and reduced concentration.

The p value is  $0.015 < 0.05$ , the results of statistical testing in this study show that the impact of physical workload on job stress through job fatigue is said to have an indirect effect. The effect has a positive effect, with a magnitude of 0.047. This finding gives credence to the original theory that one of the things that can cause work-related stress in Army soldiers is their physical workload. The role of job burnout as a mediating variable between physical workload and job stress is an interesting aspect of this study. In other words, soldiers' physical workload causes job burnout, which in turn causes them to experience more stress at work. Physical workload had less impact on job stress when job fatigue was not present as a mediating variable.

According to the findings, the work of Army soldiers is very taxing on their bodies and minds. They are often faced with heavy workloads, harsh working conditions and erratic schedules, all of which contribute to prolonged physical and mental fatigue and increase the risk of developing work-related stress. Work fatigue is a mediating variable for the physical workload variable on the dependent variable, according to previous research. Work fatigue is a mediating factor between physical workload and blood pressure, according to Djameluddin (2024). The findings of this study also show that, especially for Makassar Army soldiers, job fatigue acts as a mediator between the impact of physical workload and job stress.

Decreased productivity and endurance at work, as well as complicated phenomena that arise from various work-related factors and often result in feelings of fatigue in oneself, can reduce work performance by disrupting concentration and prolonging the time needed to complete a task. Workload can cause job fatigue (A. Rahmadhani, 2023). Work conditions that must be completed within a certain period of time cause workload. Work fatigue can occur due to the increased workload of Army Soldiers and a less supportive physical and mental environment at work. Work fatigue is influenced by workload, and TN AD Soldiers who have a heavy workload will experience it.

### **The influence of mental workload on job stress through job fatigue of Makassar army soldiers**

Every workload must be appropriate or balanced with the limitations, cognitive capacity, and physical abilities of the recipient. The heavier the workload received, the more energy and nutrients needed or consumed by workers. This will reduce physical condition and increase oxygen demand. Depending on the ability and/or capacity of the worker, the amount of work received can be used to calculate how long the worker can complete the task. In addition, workload is likely to influence the causes of occupational fatigue if the number of tasks does not match the ability and sufficient time. Workload is a very important consideration in determining the causes of occupational fatigue in all employees, including Army soldiers.

This study aims to test the hypothesis that mental workload affects soldiers' job stress indirectly through job burnout, in addition to testing the direct relationship between physical workload and job stress. It is believed that soldiers who experience greater mental strain will experience greater levels of job burnout, which in turn acts as a mediator for increased levels of job stress. Excessive cognitive demands caused by high mental workloads, especially in complex and demanding military duty environments, can lead to mental and physical fatigue. Prolonged fatigue can then lead to a number of stress-related symptoms, including erratic emotions, disturbed sleep, and reduced focus.

The findings of the indirect analysis showed that there was no relationship between mental workload and soldier work stress as measured by job burnout. Since the p-value for the relationship between mental workload and job stress through job fatigue is  $0.367 > 0.05$ , it is known that there is no indirect effect. The effect is negative, with a magnitude of -0.311. This suggests that other factors not

measured in this study also mediate the relationship, or the mechanism of the relationship between the three variables may be more complex than we previously thought.

The findings of the investigation into the direct relationship between mental workload and job stress also showed that mental workload had no effect. Since TNI soldiers have previously received soldier training in problem solving, coping with change, and handling threatening situations, both cognitively and behaviorally, mental workload does not directly or indirectly affect job stress. (Kartini, 2018). The components of the training are basically basic treatments in order to avoid work stress, so that before work stress peaks it will be handled as soon as possible by soldiers. In addition, strong military culture in terms of discipline, adherence to duty, and peer support can be protective factors against the effects of fatigue on job stress. Soldiers may be more likely to focus on completing tasks and responsibilities, so job burnout does not directly increase job stress.

The implications of the results of this study indicate that interventions to reduce job stress in Makassar Army soldiers need to focus directly on managing mental workload, rather than focusing only on job fatigue. Effective management of mental workload, for example through training in coping strategies or time management, can be a more efficient way of reducing work stress among soldiers.

### **The influence of mental workload on job stress through job fatigue of Makassar army soldiers**

In addition to investigating the direct effect of soldiers' income on job stress, this study also aims to test the hypothesis that soldiers' income indirectly affects job stress in soldiers through job fatigue. It is assumed that an increase in income will trigger a decrease in soldiers' job fatigue, and this job fatigue is then a mediator that makes a decrease in job stress levels.

The results of statistical testing show support for the hypothesis proposed. The path analysis conducted revealed that there is a significant influence between income and job burnout. In addition, job burnout is also proven to have a significant influence on job stress. Meanwhile, when the variable of job burnout is included in the model, and becomes the mediating variable between income and job stress, it produces a significant indirect relationship. This is because the effect of salary on job stress through job fatigue is stated to have an indirect effect, this is because the p-value of  $0.010 < 0.05$ . The amount of influence is  $-0.903$  or has a negative effect, which means that if the soldier's income increases or is appropriate, it will indirectly make the soldier's work stress decrease. This indicates that job burnout is indeed a strong mediator in the relationship between income and job stress in soldiers.

In previous studies, the effect of income on job stress was only investigated directly without going through intermediaries. In this study, it was also found that increasing income can directly reduce the stress level of Army soldiers. The results in this study add information that job fatigue also mediates the effect of income on job stress specifically for Makassar Army soldiers.

The results of this study illustrate the importance of financial well-being for soldiers in maintaining optimal performance. A decent income not only provides economic stability, but also has a positive impact on soldiers' psychological state. Conversely, when soldiers feel that their financial compensation does not match their sacrifices, frustration and dissatisfaction will increase, adding to their mental stress. In the long run, this can reduce their morale and morale (Sari, 2022).

### **The influence of mental workload on job stress through job fatigue of Makassar army soldiers**

In addition to investigating the direct effect of soldiers' income on job stress, this study also aims to test the hypothesis that soldiers' income indirectly affects job stress in soldiers through job fatigue. It is assumed that an increase in income will trigger a decrease in soldiers' job fatigue, and this job fatigue is then a mediator that makes a decrease in job stress levels.

The results of statistical testing show support for the hypothesis proposed. The path analysis conducted revealed that there is a significant influence between income and job burnout. In addition, job burnout is also proven to have a significant influence on job stress. As for when the job fatigue variable is included in the model, and becomes the mediating variable between income and job stress, it produces a significant indirect relationship. This is because the p-value of  $0.00 < 0.05$ . The amount of indirect influence is  $-0.297$  or has a negative effect, which means that if the soldier's income increases or is appropriate, it will indirectly make the soldier's work stress decrease. This indicates

that job burnout is indeed a strong mediator in the relationship between income and job stress in soldiers.

In previous studies, the effect of income on job stress was only investigated directly without going through intermediaries. In this study, it was also found that increasing income can directly reduce the stress level of Army soldiers. The results of this study add information that job burnout also mediates the effect of income on job stress, especially for Makassar Army soldiers.

The results of this study illustrate that the importance of financial well-being for soldiers in maintaining optimal performance. Decent income not only provides economic stability, but also has a positive impact on the psychological condition of soldiers. Conversely, when soldiers feel that financial compensation does not match the sacrifices made, frustration and dissatisfaction will increase, adding to the mental stress they experience. In the long run, this can reduce their morale and morale (Sari R. P., 2022).

### **Effect of work motivation on job stress through job fatigue of Makassar army soldiers.**

In addition to investigating the direct effect of work motivation on job stress, this study also aims to test the hypothesis that work motivation indirectly affects job stress in soldiers through job fatigue. It is assumed that an increase in work motivation will trigger work fatigue to increase, and this work fatigue is then a mediator that increases the level of work stress. High work motivation, in a complex military task environment, triggers mental and physical fatigue. This prolonged fatigue then triggers various increases in job stress.

The results of the indirect analysis showed that there was no indirect effect of work motivation on soldiers' work stress through job fatigue. It is known that the p-value for the effect of motivation on job stress through job fatigue is stated to have no indirect effect, this is because the p-value is  $0.135 > 0.05$ . The amount of influence is  $-0.076$  or has a negative effect. This concludes that the mechanism of the effect of work motivation on job stress through job fatigue may be more complex than we thought, or other factors not measured in this study play a role in mediating the relationship. The results of the analysis of the direct effect of work motivation on job stress also concluded that there was no effect of work motivation. One of the reasons work motivation was not the cause of the decrease in job stress was because more than 86% of the soldiers thought they were motivated to perform their duties. This means that the adequacy of the data to investigate the relationship cannot be proven in this study.

The results of this study also emphasize that fatigue experienced by soldiers is not always the result of low work motivation. Fatigue can arise due to high physical and psychological task intensity, regardless of an individual's work motivation. Soldiers, although motivated to work and perform their duties, may still experience fatigue that ultimately cannot be overcome by work motivation alone. This ongoing fatigue then becomes a factor that leads to increased job stress.

The role of work motivation as a driver to reduce fatigue is not evident in this study. This is because soldiers' internal motivation does not always correlate with how they feel about fatigue or stress in their duties. In fact, in certain situations, highly motivated soldiers can feel more burdened because they set higher standards for themselves, which can exacerbate fatigue and job stress.

## **CONCLUSIONS**

The results show that physical workload and income have a direct impact on job burnout, but mental workload and motivation have no direct impact on job burnout. In addition, income has a direct impact on job stress, but there is no direct relationship between physical workload, mental workload, motivation, and burnout and job stress. While there is no indirect relationship between motivation and job stress through job burnout, there is an indirect relationship between physical workload and job stress through job burnout, as well as between income and job stress through job burnout. Therefore, measures such as modifying the demands of the tasks assigned to soldiers, utilizing rest periods, and creating a safe and comfortable work environment are needed to reduce work-related fatigue and stress in TNI-AD soldiers.

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## APPENDIX

**Table 1: Characteristics of respondents in Indonesian army soldiers in Makassar city in 2024**

|   | Distribution of Respondents |                  | Frequency |      |
|---|-----------------------------|------------------|-----------|------|
|   |                             |                  | n         | %    |
| 1 | Age                         | <27 years old    | 77        | 66.4 |
|   |                             | ≥27 years old    | 39        | 33.6 |
| 2 | Marital Status              | Unmarried        | 83        | 71.6 |
|   |                             | Married          | 33        | 28.4 |
| 3 | Period of Service           | <5 years old     | 60        | 51.7 |
|   |                             | ≥5 years old     | 56        | 48.3 |
| 4 | Last Education              | High School      | 97        | 83.6 |
|   |                             | Vocational Level | 19        | 16.4 |

**Table 2: Direct effect test**

|   |                                  | Estimate | S.E   | C.R    | p-Value |
|---|----------------------------------|----------|-------|--------|---------|
| 1 | Physical Workload → Work Fatigue | 0.233    | 0.09  | 2.591  | 0.010*  |
| 2 | Physical Workload → Work Stress  | 0.012    | 0.047 | 0.257  | 0.797   |
| 3 | Mental Workload → Work Fatigue   | -1.533   | 1.211 | -1.265 | 0.140   |
| 4 | Mental Workload → Work Stress    | 0.136    | 0.614 | 0.222  | 0.824   |
| 5 | Income → Work Fatigue            | -4.453   | 0.473 | -9.419 | <0.001* |
| 6 | Income → Work Stress             | -1.023   | 0.317 | -3.232 | 0.001*  |
| 7 | Motivation → Work Fatigue        | 0.775    | 0.525 | 1.476  | 0.140   |
| 8 | Motivation → Work Stress         | 0.098    | 0.267 | 0.366  | 0.714   |
| 9 | Work Fatigue → Work Stress       | 0.203    | 0.047 | 4.320  | <0.001* |

**Table 3: Please add your caption here. The same as Table 2 but with full page width.**

|   |  | Estimate | Upper  | Lower  | p-Values |
|---|--|----------|--------|--------|----------|
| 1 | Physical workload → Work fatigue → Work stress | 0.047    | 0.098  | 0.012  | 0.015*   |
| 2 | Mental workload → Work fatigue → Work stress   | -0.311   | 0.224  | -0.893 | 0.367    |
| 3 | Income → Work fatigue → Work stress            | -0.903   | -0.524 | -1.354 | 0.010*   |
| 5 | Motivation → Work fatigue → Work stress        | -0.076   | 0.402  | -0.017 | 0.135    |