

# Evaluation of Ergonomic Complaints and Stress Level of Educational Workers at The Faculty of Engineering UNISBA

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## Article

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## Abstract

Educational personnel has urgent role in supporting educational administration process. The number of tasks that must be completed by educational workers naturally drains the energy and mind. Change in the work system during Pandemic of Covid-19 increases work-related sitting time and screen time which also applies to the educational personnel at the Faculty of Engineering UNISBA. The main purpose of the study is to discover ergonomics factors (complaints of the body part) and work stress levels as well as the possible contribution that can be given to parties related. The method used in this study is analysis related to ergonomics aspects using Nordic Body Map and work stress levels using Visual Analogue Scale. Measurement is conducted on 27 educational workers at the Faculty of Engineering UNISBA. Research results show that a number of complaints on body parts include back pain, waist pain, wrist pain, and neck pain as well as the average level of stress experienced that is included in the medium category. Those results show that related parties need to notice problems related to ergonomics complaints and work stress so as not to cause disease (physically or mentally) in the future.

**Keywords:** Educational Personnel; Ergonomics; Workload; Work Stress Level.

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## Introduction

One news source said that an employee of a ride-sharing company was suspected of experiencing stress and committing suicide (Prihadi, 2017). This is alleged because the workload is too heavy. In addition, a study that has been conducted reveals that suicide has claimed 1 million victims each year. Researchers at the Bureau of Labor Statistics Census of Fatal Occupational Injury reported that there were approximately 1,700 suicides that occurred in the workplace or office (Sadnyari, 2015). In addition to news related to problems at work, several studies related to work stress and work problems related to ergonomic complaints have been carried out in an effort to find solutions to these problems. Rahdiana conducted research to identify ergonomic risks for guillotine cutting machine operators at PT. XYZ. The research method was carried out using the Nordic Body Map questionnaire. The results showed that the risk level of MSDs in

guillotine cutting machine operators was 63% in the "low" category and 37% in the "medium" category (Rahdiana, 2018). Achiraenwati redesigned lecture benches and produced lecture chairs according to the user's wishes and body size (Achiraeniwati et al., 2018). Wartono conducted research using a questionnaire and showed that there was a very strong or positive significant effect between work stresses on employee performance (Wartono, 2018).

The number of cases related to work stress that occurs needs to be a concern for all fields of work including work in the field of education and educational personnel in particular. UU (Law) No 20 Tahun 2003 states that educational staff are members of the public who are devoted to and appointed to support the process of administering education ((Law), 2003). The many tasks that must be completed by educational personnel certainly take a lot of energy and mind, especially during the Covid-19 Pandemic that is currently hitting every corner of the world and work systems or procedures that require sitting for a long time and facing a computer screen. Many workers had a new work system and schedule during the Covid-19 Pandemic because the regulations made stated that 50% of their working time worked from home and the remaining 50% worked in the office. Any change in the work system will certainly affect the ergonomic aspects and stress levels. However, despite dealing with these conditions, work productivity must still be maintained, one of which is by maintaining occupational health and safety.

On the proportional side, cases of work-related stress are most common in larger organizations, especially among managerial staff and in professional jobs especially public administration, health and social care, and education (Hughes & Ferrett, 2015). This is no exception for UNISBA. UNISBA is a tertiary institution that has many human resource components in its management to carry out main tasks in the educational process. UNISBA has many work units, one of which is the Faculty of Engineering. The Faculty of Engineering requires many roles from educational staff to support the smooth running of the educational process. The smooth running of the educational process must of course be supported by optimal educational staff productivity.

To maintain optimal work productivity, one of the things that need attention is complaints related to ergonomics and work stress. In this study, an analysis related to ergonomic aspects (complaints about body parts) will be carried out. This research was conducted using a questionnaire related to ergonomic complaints, namely the Nordic Body Map to find out complaints about body parts that are felt when doing work. Meanwhile, to determine the level of work stress, this research was conducted using the Visual Analogue Scale (VAS) questionnaire.

## **Research Method**

The method used in this study is quantitative analysis in which data collection is carried out by distributing questionnaires to respondents, namely educational personnel who are in the work unit of the UNISBA Faculty of Engineering consisting of 27 people. Quantitative analysis is analysis related to data in the form of numbers and uses mathematical operations to investigate its properties. The level of measurement used in data collection, namely nominal, ordinal, interval and ratio, is an important factor in choosing the type of analysis that can be applied (Walliman, 2011) . Quantitative research is research that emphasizes objective phenomena and is studied quantitative (Siyoto & Sodik, 2015).

This research requires work steps to achieve research objectives and obtain optimal results. Some of the steps taken in this study can be seen in Figure 1.

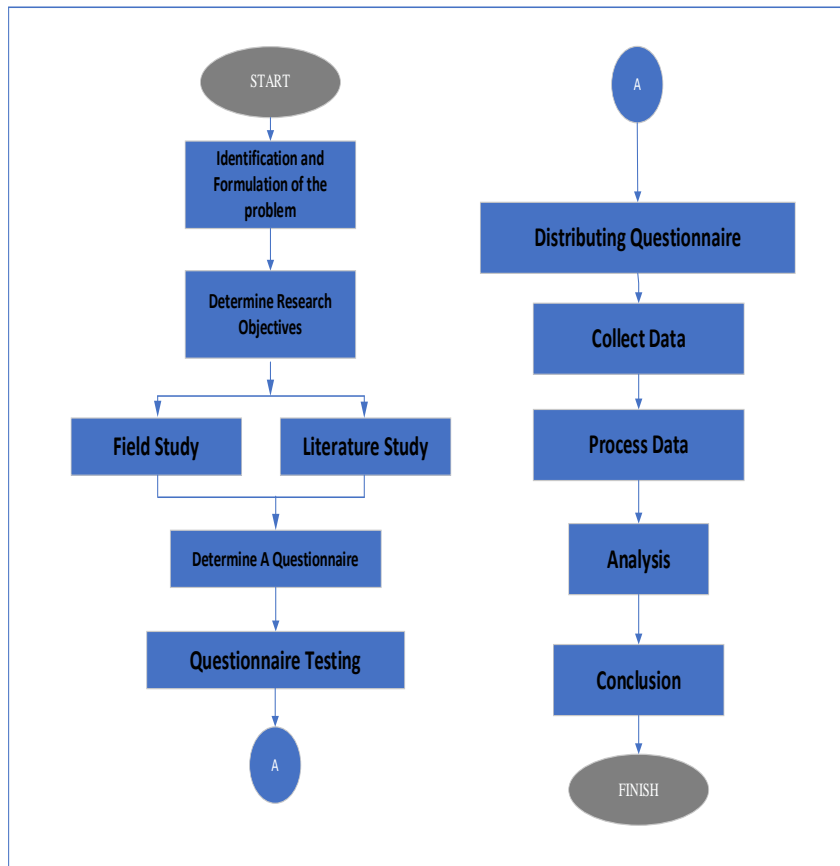


Figure 1. Work Steps

The steps taken are the identification and formulation of the problem; determining research objectives; field study and literature study; determining a questionnaire related to ergonomic complaints and work stress; questionnaire testing; distributing questionnaires; collecting data; performing data processing; conducting an analysis (presented in the discussion) and drawing conclusions from the overall results of the research that has been conducted.

The problem identification and formulation stages are the initial stages carried out in research with the aim of identifying problems that occur in educational staff and formulating the core issues. The stage of determining the research objectives is the stage that aims to convey matters related to the output resulting from the research conducted. The field study stage is the stage for reviewing field conditions, namely reviewing the conditions of education personnel, especially in terms of ergonomic complaints and work stress. The Library study stage is the stage of studying literature especially related to ergonomics and work stress. The stage of determining the questionnaire is the stage that aims to select a questionnaire that will be used to evaluate ergonomic complaints and work stress levels. Before the actual questionnaire was distributed to the respondents, the questionnaire was tested first by means of being pilot tested to find out the approximate understanding of the respondents to the questionnaire given.

The stage of spreading the questionnaire is the stage of giving the actual questionnaire to the respondents. The data collection stage is the stage that is carried out by distributing questionnaires related to ergonomic complaints and work stress and aims to input the research data obtained. The data obtained at this stage is the actual data used in the research for further data processing. The data processing stage is the stage carried out with the aim of processing the data obtained from the questionnaire that has been distributed. The results of the data processing obtained will be used as material for analysis. The analysis phase is the stage that aims to provide an explanation of the results

of data processing. The conclusion drawing stage is the final stage carried out. This stage aims to present the final conclusions obtained from the overall results of the research.

## Results & Discussion

### Ergonomics and Work Stress

Many experts express the meaning of ergonomics and work stress. Ergonomics is a systematic branch of science to utilize information about the nature, abilities and limitations of humans in designing a work system so that people can live and work in the system properly, such as achieving the goals set through the work, in an effective, safe, healthy, comfortable and efficient manner (Sutalaksana et al., 2006). In addition, it was also revealed that ergonomics includes the study of interactions between humans and elements of other work systems, namely materials and the environment.

Meanwhile, regarding work stress, Robbins and Coulter (2010) reveal that stress is a negative reaction from people who experience excessive pressure imposed on them due to the enormous demand, obstacles or opportunities (Asih et al., 2018). The European Commission defines work-related stress as an emotional and psycho-physiological reaction to unpleasant and dangerous aspects of work, work environment and work organization (Hughes & Ferrett, 2015).

### Respondent Profile

The profile of respondents in this study consisted of gender, age, last education and work experience. The profile can be seen more clearly in Table 1.

**Table 1.**  
**Respondent Profile**

	Respondent	Number	Percentage (%)
Gender	Male	16	59,3
	Female	11	40,7
Age	20-25	3	11,1
	26-30	9	33,3
	31-35	8	29,6
	36-40	2	7,4
	41-45	1	3,8
	46-50	2	7,4
	>51	2	7,4
	SMA / SMK	7	25,9
Last Education	D3	5	18,5
	S1	15	55,6
	Work	< 5	37,1
Experience (Year)	5 – 10	12	44,4
	>10	5	18,5

### Nordic Body Map (NBM)

To find out complaints related to ergonomics, it is necessary to have a measurement, one of which can be done using a questionnaire. Wilson & Corlett state that one of the subjective measurement methods for measuring workers' muscle pain is to use the NBM questionnaire (Rahdiana, 2018). The NBM questionnaire was used to find out the body parts complaints felt by respondents while working. In this questionnaire, respondents were asked to make an assessment of the part of their body where they felt sick while doing work.

Respondents gave an assessment by giving marks on which parts of the body they felt sick according to the complaints they felt. From the results that have been obtained, the next step is to score individuals with a Likert scale that has been set, namely NOT SICK (does not feel a disturbance

in certain parts) with a score of 1, SOMETHING SICK (feels slight disturbance or pain in certain parts) with score 2, SICK (feeling discomfort in certain parts of the body) with a score of 3, and VERY SICK (feeling discomfort in certain parts with a high scale) with a score of 4. The result of processing the NBM/scoring that has been done can be seen in Table 2.

**Table 2**  
**Recapitulation of NBM Questionnaire**

No	RECAPITULATION OF NBM (%)			
	Not Sick	Something Sick	Sick	Very Sick
0	2,12	1,19	0,26	0,00
1	2,12	1,19	0,26	0,00
2	2,65	0,93	0,00	0,00
...	...	...	...	...
26	2,91	0,53	0,13	0,00
27	2,78	0,53	0,26	0,00

The results of NBM data processing show that the parts of the body that feel a lot of pain are the back, waist, wrists and neck. To find out more detailed evaluation results, scoring and classification were carried out on individual respondents. Risk level classification is done by looking at the total individual score obtained; the total score of individuals in the range of 28 – 49 includes a low-risk level and no corrective action is needed; the range of 50 – 70 includes a moderate risk level and corrective action may be needed in the future; the number range 71 – 90 includes a high level of risk and immediate corrective action is needed; the number range 92 – 122 includes a very high level of risk and comprehensive corrective action is needed as soon as possible (Wijaya, 2019). The results of the scoring and classification of individual respondents can be seen in Table 3. The scoring results show that there is a perceived level of risk in the moderate category so corrective action may be needed in the future.

**Table 3**  
**NBM Individual Scoring Results Recapitulation**

No	Individual Score	Risk Level	Corrective Action
1	36	Low	no corrective action is needed
2	33	Low	no corrective action is needed
...	...	...	...
25	52	Moderate	corrective action may be needed in the future
26	43	Low	no corrective action is needed
27	31	Low	no corrective action is needed

**Visual Analogue Scale (VAS)**

To determine the level of stress experienced by respondents, measurements were carried out using the VAS questionnaire. The VAS is presented as a horizontal line 100 mm (10 cm) long. In filling out this VAS questionnaire, the respondent only needs to mark the part that represents the level of stress that is carried out while doing the job.

Reich classifies the VAS score as follows: 0 (none), 0<X<4 (low), 4<X<7 (moderate), 7<X<9 (severe) and >9 (very heavy) (Adam et al., 2012). VAS data processing is done by calculating the average level of stress experienced by respondents. The results of VAS data processing can be seen in Table 4.

**Table 4**  
**Recapitulation of VAS**

No	Stress Level
1	3
2	6
3	3
4	5
...	...
26	6
27	3

The results of VAS data processing show that from the overall results of the VAS questionnaire, there are 3 respondents who feel the level of stress in the heavy category in carrying out their daily work and 52% of respondents feel a moderate level of stress.

The results of research related to ergonomic complaints and work stress revealed that there were several ergonomic complaints felt by respondents and the level of stress was in the moderate category. Stress and musculoskeletal disorders are known to be the biggest causes of health problems related to work. As'ad revealed that the existence of standardization in the work system is expected to make workers safer and more comfortable in carrying out their work and assist in achieving targets (As'ad et al., 2016). It is known that there are an average of more than 400,000 workers suffering from stress-related illnesses every year and about 50% of these figures are known to have suffered for more than one year or more (Hughes & Ferrett, 2015).

Stress caused at work does not come without a cause. Hughes and Ferrett reveal some of the underlying causes of work stress, including the work itself – for example boring or repetitive types of work, unrealistic performance targets or inadequate training, job insecurity or fear of being fired are some of the things that causing stress at work; individual responsibility – for example unclear roles and too many responsibilities with too little power to influence work outcomes; working conditions – for example cramped, dirty and untidy workplaces; unsafe practices; lack of privacy or security; inadequate welfare facilities; threats of violence; excessive noise, vibration or heat; poor lighting; lack of flexibility in working hours to meet domestic needs and adverse weather conditions for those who work outside; management attitudes – e.g. poor communication, consulting or supervision, negative health and safety culture, lack of support; relationships – for example unhappy relationships between workers, bullying, sexual and racial harassment (Hughes & Ferrett, 2015).

The problem of work stress cannot be left alone. There is a need for efforts or actions that need to be taken to overcome these problems. Hughes and Ferrett revealed that there are several steps that can be taken regarding work stress, including being positive about stress problems by becoming familiar with their causes and controls; taking employee concerns seriously and developing a counseling system that allows honest, confidential discussion of stress-related issues; developing an effective communication and consultation system; establishing a simple policy on work-related stress and include the causes of stress in the risk assessment (Hughes & Ferrett, 2015).

Another thing that can be done is to ensure that employees are provided with adequate and relevant training and realistic performance targets; prevent employees from working excessive hours and/or missing breaks. This requires a detailed job evaluation; introducing job rotation and increasing job variety; developing clear job descriptions and ensuring that each individual fits the job description; encouraging employees to improve their lifestyle for the better; monitoring incidents of bullying, sexual and racial harassment and, where appropriate, taking disciplinary action; train

supervisors to recognize symptoms of stress among the workforce; avoiding a culture of blaming for accidents and incidents of poor health.

## Conclusions

When carrying out daily work activities, respondents felt ergonomic complaints in several parts of the body such as the back, waist, wrists and neck. This can happen because the type of work done is related to sitting posture and computer use. In addition, the level of stress experienced on average is at a moderate level. However, related to ergonomic complaints and the level of stress experienced, it is necessary to pay attention to related parties to improve the work system of education staff so that it does not cause bad consequences and diseases in the future.

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