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The 4th International AgroNursing Conferences **2020**  
**PROCEEDINGS**

# Optimizing the Role of Nursing and Health Professionals

November 24<sup>th</sup> 2020



FACULTY OF NURSING  
**UNIVERSITAS JEMBER**

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**PROCEEDING THE 4<sup>th</sup> INTERNATIONAL  
AGRONURSING CONFERENCE**

**“Optimizing the Role of Nursing and Health Professionals to  
Enhance the Health Care Quality in  
The New Normal Era”**

**UPT PERCETAKAN & PENERBITAN  
UNIVERSITAS JEMBER  
2020**

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AGRONURSING CONFERENCE**  
**“Optimizing the Role of Nursing and Health Professionals to  
Enhance the Health Care Quality in  
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## GREETING MESSAGE

Bismillahirrohmanirrohim  
Assalamualaikum Wr Wb  
Good morning and best wishes

The Honorable, Rector of University of Jember  
The Honorable, Dean Faculty of Nursing, University of Jember  
The Honorable, All Speaker of the International Nursing Conference  
The Honorable, Guests  
The Honorable, Conference Committee  
Dear All, All Participants of the conference

Thank God we praise the presence of Allah SWT, because of the blessing and grace, we all can be present in this place, in order to attend the International Nursing Conference. Solawat and greetings may still be delegated to the Great Prophet Muhammad SAW.

Ladies and Gentlemen,  
As the beginning of this speech, I would like to say welcome to the third international nursing conference, with the theme " Optimizing the Role of Nursing and Health Professionals to Enhance the Health Care Quality in the New Normal Era".

In the era of globalization, nursing and healthcare are affected in a unique way. Although the important tenets of health remain unchanged, the evolutions of nursing knowledge are far beyond than previously thought to be. The advancement of technology has enabled human to find more curative possibilities and the latest in nursing process or medical therapy. Nevertheless, more work needs to be done due to new challenges in the era of industrial revolution and unstable economic climate. A more comprehensive approach is needed in order to adapt and improve the healthcare system. Today, health is not only the absence of illness but also the presence of wellness especially in the New Normal Era of COVID 19.

4<sup>th</sup> IANC 2020 aims to enhance health care quality amongst healthcare professional, scientist, practitioners and students by being a platform to share and disseminate knowledge, updates, research findings and experience for the benefit of mankind.

4<sup>th</sup> IANC 2020 will focus on multiple range of topics in nursing, medicine, surgery, science, health management and alternative medicine. It will include but not limited to these major areas: 1). Nursing: Medical and surgical nursing (Adult), Emergency and critical nursing, Gerontological nursing, Community nursing, Family health nursing, Mental health nursing, Pediatric nursing, Maternity nursing, Nursing leadership and management, Complementary and Alternative Medicine (CAM) in nursing, Education in nursing. 2). Clinical Sciences: Dentistry, pharmacology, toxicology, immunology, medical and surgical nursing. 3). Health sciences Nutrition, population health, community health, epidemiology and health prevention, biostatistics.

To answer that question on November 26, 2020, we will discuss enhance the Health Care Quality in the New Normal Era with speakers from 5 countries namely:

1. Prof. Rozzano Locsin, Ph.D, RN, FAAN (Tokushima University, Japan)

2. Prof. Lin Perry, RN., MSc., Ph.D (University of Technology Sydney, Australia)
3. Assist. Prof. Dr. Samoraphop Banharak (Khon Kaen University, Thailand)
4. Dr Jane Brooks, PhD, RN SFHEA (The University of Manchester, UK)
5. Ns. Anisah Ardiana, M.Kep., PhD (Faculty of Nursing, Universitas Jember, Indonesia)

Ladies and Gentlemen

This conference is attended by students, health department delegates, academics, hospital and community clinic practitioners with a total of 350 participants.

This event can be held because of the support and efforts of all parties. Therefore, I would like to thank the Rector of University of Jember, Head of School of Nursing- University of Jember, Indonesian National Nurses Association (INNA) or PPNI, and all the committees who have worked hard to carry out this activity. I also thank to the sponsors who have worked with us so that this event run as expected. Amen.

We as the committee, apologize if there is any inconvenience during this event. Our hope that this activity can increase our knowledge that benefits all of us. Amen.

Before I end my speech, I want to say "when we interpret that today is an ordinary day, then we will come out of this room as an ordinary people, but when we interpret that today is a very extraordinary day, then we will come out of this room as a very wonderful person ".  
Finally, please enjoy this conference, may Allah SWT always gives blessings to all of us.  
Amen

Wassalamualaikum Wr. Wb.

Chairperson

Ns. Kholid Rosyidi Muhammad Nur, MNS



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# The 4<sup>th</sup> International Agronursing Conference

“Optimizing The Role of Nursing and Health Professionals to  
Enhance Health Care Quality in The New Normal Era”

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## RISK ANALYSIS OF THE OCCUPATIONAL AND HEALTH SAFETY USING HAZARD IDENTIFICATION, RISK ASSESSMENT AND RISK CONTROL (HIRARC) METHOD IN THE UNIVERSITY OF MUHAMMADIYAH JEMBER

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### ABSTRACT

**Background:** University of Muhammadiyah Jember has the potential and risk of dangers, so the launching of the Occupational and Health Safety program in this office area is something that needs to be carried out, in order to create a healthy, safe and comfortable office and the realization of healthy, safe, fit, performing and productive employees. Hazard Identification, Risk Assessment and Risk Control is one of the ways to identify potential dangers in any kind of job activities. **Purpose:** This research is held to analyze the risk of work accident by using HIRARC method. **Methods:** This research uses descriptive qualitative research method. The qualitative method is used to describe the condition, to identify and recognize the work accident analysis. **Results:** The findings show that hazard in the job activity is identified as chemical, mechanical, physical, electrical, ergonomic, biological, psychosocial and environmental hazards. The risk assessment which is held denotes that there are 6 high risk, 13 medium risk and 4 low risk. **Conclusion:** Risk control that can be applied are engineering controls, administrative and personal protective equipment to reduce unsafe action and unsafe condition. HIRARC method which has been applied at the University of Muhammadiyah Jember proves that work activities in the office has a risk that should be controlled.

**Keywords:** *Occupational and Health Safety; HIRARC; Work Accident; Office*

### BACKGROUND

Occupational and Health Safety in the office is occupational safety and health in the office area are all activities to ensure and protect the safety and health of employees through efforts to prevent occupational accidents and diseases due to work in the office (PMK, 2016). The government's goal of launching OHS in office areas is

to create a healthy, safe and comfortable office for the creation of healthy, safe, fit, performing and productive employees.

Data from the Central Statistics Agency in 2018 stated that the total workforce was 133.94 million, 127.07 million people working in the formal and informal sectors, while 6.87 million others were unemployed. Among them are formal workers in the industrial and office sectors. Based on exposure to hazard risks, the industrial sector will be exposed to mild to severe potential hazards, while the office sector is exposed to mild to moderate potential hazards.

In this era, occupational safety and health is a must for work organizers to increase productivity. The maintenance of good occupational health will minimize the number of morbidity, absenteeism, disabilities and work accidents, so that healthy and productive workers will be realized. Work accidents in the office sector can occur as a result of several potential hazards in the work environment, including physical, chemical, biological, ergonomic, psychosocial, mechanical, electrical, waste and disaster hazards.

Potential hazards in the work environment can be identified by using the HIRARC (Hazard Identification, Risk Assessment and Risk Analysis) method. HIRARC is a process of determining the priority of occupational accident risk level control so that it can classify the potential hazards into high, medium and low risks. This process will later facilitate the evaluation process (Department of Occupational Safety and Health, 2008).

Riskesdas 2018 data states that the prevalence of non-communicable diseases has increased if it compared to 2013. These diseases include cancer, stroke, chronic kidney disease, diabetes mellitus and hypertension. The increase of non-communicable diseases is related to lifestyle, such as smoking, alcoholic drinking, inadequate physical activity, and minimal consumption of vegetables and fruits. Increasing the level of education and professional workers in Indonesia will increase the number of office workers. Sedentary behavior or lack of physical activity is synonymous with office workers. Therefore, increasing the implementation of occupational safety and health in each institution or agency is something that must be developed and improved (Presidential Instruction No.1, 2017).

Until now, University of Muhammadiyah Jember has not conducted a risk analysis yet, so that the researcher is interested in conducting risk analysis to determine the potential hazards of office workers and its control plan. The OHS risk analysis uses the HIRARC method which is expected to be able to control the existing risks, so that the healthy, fit and productive workers in providing services also can be expected.

## **METHODS**

This research used a qualitative method with a descriptive design. The work area chosen is a work area that has a potential hazard. The main informants of this research are the main leaders, represented by the head of the quality assurance agency, the head of the bureau, the dean, the head of the laboratory, the laboratory assistant and the head of security. Informants were selected by using purposive sampling. Sources of data in this research are primary data and secondary data. Primary data were obtained through interviews and observations by using the HIRARC method. Secondary data were obtained from study of supporting documents.

## RESULTS

### Hazard Identification

The first stage of HIRARC is hazard identification. The results of hazard identification at the University of Muhammadiyah Jember are presented in the following table:

Table 1. Hazard Identification of the General Administration Unit in the University of Muhammadiyah Jember

No	PROCESS	HAZARD	RISK	CONSEQUENCES
1	Sweeping (floor)	- Dust - Un ergonomic broom	- Inhaled - Contact with mucosa membrane (eyes, nose and mouth) - Fatigue	- Respiratory disorder - Konjungtivitis - Irritation - Low back pain and the joints
2	Floor moping	- Chemical agent from floor desinfectan - Slippery floor - Moping technique - Equipment	- Spilled - Misuse - Slip on - Fall down - Joint pain	- Intoxication - Muculoskeletal disorder
3	Washing floor moping equipment	- Chemical agent from floor desinfectan - Microorganism - Body language	- Exposure of chemical agent - Microorganism exposure - Not ergonomic	- Dermatitis - Irritation - Muculoskeletal disorder
4	Cleaning the furniture	- The way of cleaning (stand up, tiptoe, using portable stair) - Microorganism (virus, bacteria, germs) - Chemical agent	- Not ergonomic - Fall down - Microorganism exposure - Chemical exposure	- Muculoskeletal disorder - GIT disorder
5	Cutting grass	- Sharp equipment	- In touch with sharp equipment. - Dust	- Injury - Respiratory disorder
6	Electrical instalation	- Electric current - Sparks	- Fall down - Electric shock - Short circuit	- Muculoskeletal disorder - Burn injury - Fire - Death
7	Manual handling	- Body position - Body weight bearing - Height	- Dislocate - Increasing intra abdominal pressure - Fall down	- Muculoskeletal disorder - LBP - Hernia
8	Working with many tools and equipment	Work equipment (dimention, shape and design)	- Fatigue - Injury	- Work related musculoskeletal disorders (WMSDs) - Low back pain

				- Tension headache - Frozen shoulder
9	Maintain environment security	- Sun light - Working out door - Interaction with many people - Foreigners	- Dazzled - Hot air exposure - Microorganism exposure - Crime	- Headache - Dehidration - Respiratory disorder - Physical harassment
10	Work in 2-4 <sup>th</sup> floor	Height	- Fall down	- Fatigue - Dislocation - Fracture
11	Working indoor	Earthquake	- Wrong direction - Fall down - Squeezed	- Hit by an object - Fracture

Table 2. Hazard Identification of the Laboratorium Unit in the University of Muhammadiyah Jember

No	PROCESS	HAZARD	RISK	CONSEQUENCES
<b>Nursing Laboratorium</b>				
1	Preparing practicum that uses chemicals agent	- Chemical agent	- Wrong reagent - Inhaled - Hit by the hand - Swallowed	- Explosion - Shortness of breath - Dermatitis - Burn injury - Intoxication
2	Preparing practicum that uses sharp equipment	- sharp equipment - Used needles	- Injury - Punctured	- Infection - Contagious disease
3	Preparing practicum that uses electrical	- Electric current - Sparks	- Fall down - Electric shock - Short circuit	- Muculoskeletal disorder - Burn injury - Fire - Death
4	Preparing practicum related to invasive procedures	- Medical waste	- Microorganism exposure	- Contagious disease
<b>Basic Laboratorium</b>				
1	Preparing practicum	- Chemical agent  - Electric current - Sparks	- Wrong reagent - Inhaled - Hit by the hand - Swallowed  - Fall down - Electric shock - Short circuit	- Explosion - Shortness of breath - Dermatitis - Burn injury - Intoxication  - Muculoskeletal disorder - Burn injury - Fire - Death
<b>Computer Laboratorium</b>				
1	Preparing practicum	- Computer - Electric current	- Microorganism exposure - Short circuit	- Respiratory/ GIT disorder - Burn injury



Table 3. Hazard Identification of the Computer Laboratorium Unit in the University of Muhammadiyah Jember

No	PROCESS	HAZARD	RISK	CONSEQUENCES
1	Teaching and learning process and administration	- Electric current - Electronics equipment	- Electric shok - Short circuit	- Muculoskeletal disorder - Burn injury - Fire - Death
2	Work with computer	Radiation	- Photokeratitis - Eyestrain - Increased radiation	- Eyes iritaton - Melatonin hormone disorder - Asthenopia - Cataract - Nausea - Vominiting - Headache
3	Work with electronic equipment	- Electric current - Electronics equipment	- Electric shok - Short circuit	- Muculoskeletal disorder - Burn injury - Fire - Death
4	Work indoor with air conditioner	- AC - Aspergilus	- Spreading disease	- Respiratory disorder - Aspergilosis
5	Manual writing and reading	Not ergonomic postion	- Fatigue - Injury	- Work related musculoskeletal disorders (WMSDs) - Low back pain - Tension headache - Frozen shoulder
6	Academic service	- Working hours - Work load - Fatigue	- Stress related work	- Performance degradation - Motivation degradation - Service quality degradation

### RISK ASSESSMENT

Risk assessment is carried out to evaluate the amount of risk and impact that will be caused. The results of the risk assessment at the work unit at the University of Muhammadiyah Jember are as follows:

Table 4. Risk Assessment of the General Administration Unit in the University of Muhammadiyah Jember

No	PROCESS	HAZARD	RISK	CONSEQUENCES	L	S	RR
1	Maintain environment security	- Sun light - Working door - Interaction with many people - Foreigners	- Dazzled - Hot air exposure - Microorganism exposure - Crime	- Headache - Dehidration - Respiratory disorder - Physical harassment	4	4	16

2	Cleaning the furniture	<ul style="list-style-type: none"> <li>- The way of cleaning (stand up, tiptoe, using portable stair)</li> <li>- Microorganism (virus, bacteria, germs)</li> <li>- Chemical agent</li> </ul>	<ul style="list-style-type: none"> <li>- Not ergonomic</li> <li>- Fall down</li> <li>- Microorganism exposure</li> <li>- Chemical exposure</li> </ul>	<ul style="list-style-type: none"> <li>- Muculoskeletal disorder</li> <li>- GIT disorder</li> </ul>	4	3	12
3	Electrical instalation	<ul style="list-style-type: none"> <li>- Electric current</li> <li>- Sparks</li> </ul>	<ul style="list-style-type: none"> <li>- Fall down</li> <li>- Electric shock</li> <li>- Short circuit</li> </ul>	<ul style="list-style-type: none"> <li>- Muculoskeletal disorder</li> <li>- Burn injury</li> <li>- Fire</li> <li>- Death</li> </ul>	3	4	12
4	Floor moping	<ul style="list-style-type: none"> <li>- Chemical agent from floor desinfectan</li> <li>- Slippery floor</li> <li>- Moping technique</li> <li>- Equipment</li> </ul>	<ul style="list-style-type: none"> <li>- Spilled</li> <li>- Misuse</li> <li>- Slip on</li> <li>- Fall down</li> <li>- Joint pain</li> </ul>	<ul style="list-style-type: none"> <li>- Intoxication</li> <li>- Muculoskeletal disorder</li> </ul>	4	2	8
5	Manual handling	<ul style="list-style-type: none"> <li>- Body position</li> <li>- Body weight bearing</li> <li>- Height</li> </ul>	<ul style="list-style-type: none"> <li>- Dislocate</li> <li>- Increasing intra abdominal pressure</li> <li>- Fall down</li> </ul>	<ul style="list-style-type: none"> <li>- Muculoskeletal disorder</li> <li>- LBP</li> <li>- Hernia</li> </ul>	4	2	8
6	Work in 2-4 <sup>th</sup> floor	Height	<ul style="list-style-type: none"> <li>- Fall down</li> </ul>	<ul style="list-style-type: none"> <li>- Fatigue</li> <li>- Dislocation</li> <li>- Fracture</li> </ul>	2	4	8
7	Working indoor	Earthquake	<ul style="list-style-type: none"> <li>- Wrong direction</li> <li>- Fall down</li> <li>- Squeezed</li> </ul>	<ul style="list-style-type: none"> <li>- Hit by an object</li> <li>- Fracture</li> </ul>	2	4	8
8	Cutting grass	<ul style="list-style-type: none"> <li>- Sharp equipment</li> </ul>	<ul style="list-style-type: none"> <li>- In touch with sharp equipment.</li> <li>- Dust</li> </ul>	<ul style="list-style-type: none"> <li>- Injury</li> <li>- Respiratory disorder</li> </ul>	3	2	6
9	Working with many tools and equipment	Work equipment (dimention, shape and design)	<ul style="list-style-type: none"> <li>- Fatigue</li> <li>- Injury</li> </ul>	<ul style="list-style-type: none"> <li>- Work related musculoskeletal disorders (WMSDs)</li> <li>- Low back pain</li> <li>- Tension headache</li> <li>- Frozen shoulder</li> </ul>	3	2	6
10	Sweeping (floor)	<ul style="list-style-type: none"> <li>- Dust</li> <li>- Un ergonomic broom</li> </ul>	<ul style="list-style-type: none"> <li>- Inhaled</li> <li>- Contact with mucosa membrane (eyes, nose and mouth)</li> <li>- Fatigue</li> </ul>	<ul style="list-style-type: none"> <li>- Respiratory disorder</li> <li>- Konjungtivitis</li> <li>- Irritation</li> <li>- Low back pain and the joints</li> </ul>	4	1	4
11	Washing floor moping equipment	<ul style="list-style-type: none"> <li>- Chemical agent from floor desinfectan</li> <li>- Microorganism</li> <li>- Body language</li> </ul>	<ul style="list-style-type: none"> <li>- Exposure of chemical agent</li> <li>- Microorganism exposure</li> <li>- Not ergonomic</li> </ul>	<ul style="list-style-type: none"> <li>- Dermatitis</li> <li>- Irritation</li> <li>- Muculoskeletal disorder</li> </ul>	4	1	4

Table 5. Risk Assessment of the Laboratorium Unit in the University of Muhammadiyah Jember

No	PROCESS	HAZARD	RISK	CONSEQUENCES	L	S	RR
<b>Nursing Laboratorium</b>							
1	Preparing practicum that uses sharp equipment	- sharp equipment - Used needles	- Injury - Punctured	- Infection - Contagious disease	3	4	12
2	Preparing practicum that uses electrical	- Electric current - Sparks	- Fall down - Electric shock - Short circuit	- Muculoskeletal disorder - Burn injury - Fire - Death	3	3	9
3	Preparing practicum related to invasive procedures	- Medical waste	- Microorganism exposure	- Contagious disease	3	3	9
4	Preparing practicum that uses chemicals agent	- Chemical agent	- Wrong reagent - Inhaled - Hit by the hand - Swallowed	- Explosion - Shortness of breath - Dermatitis - Burn injury - Intoxication	3	2	6
<b>Basic Laboratorium</b>							
1	Preparing practicum	- Chemical agent	- Wrong reagent - Inhaled - Hit by the hand - Swallowed	- Explosion - Shortness of breath - Dermatitis - Burn injury - Intoxication	3	2	6
		- Electric current - Sparks	- Fall down - Electric shock - Short circuit	- Muculoskeletal disorder - Burn injury - Fire - Death	1	4	4
<b>Computer Laboratorium</b>							
1	Preparing practicum	- Computer - Electric current	- Microorganism exposure - Short circuit	- Respiratory/ GIT disorder - Burn injury	1	4	4

Table 6. Risk Assessment of the Staffing Unit in the University of Muhammadiyah Jember

No	PROCESS	HAZARD	RISK	CONSEQUENCES	L	S	RR
1	Work indoor with air conditioner	- AC - Aspergillus	- Spreading disease	- Respiratory disorder - Aspergilosis	4	3	12
2	Manual writing and reading	Not ergonomic postion	- Fatigue - Injury	- Work related musculoskeletal disorders (WMSDs) - Low back pain - Tension	4	3	12

				headache - Frozen shoulder				
3	Academic service	- Working hours - Work load - Fatigue	- Stress related work	- Performance degradation - Motivation degradation - Service quality degradation	3	3	9	
4	Work with computer	Radiation	- Photokeratitis - Eyestrain - Increased radiation	- Eyes irritatiton - Melatonin hormone disorder - Asthenopia - Cataract - Nausea - Vominiting - Headache	4	2	8	
5	Teaching and learning process and administration	- Electric current - Electronics equipment	- Electric shok - Short circuit	- Muculoskeletal disorder - Burn injury - Fire - Death	2	3	6	

L : Likelihood

S : Severity

RR : Risk Rating

Table 7. Risk Control of the General Administration Unit in the University of Muhammadiyah Jember

No	PROCESS	HAZARD	RISK	CONSEQUENCES	RR	CONTROL
1	Maintain environment security	- Sun light - Working out door - Interaction with many people - Foreigners	- Dazzled - Hot air exposure - Microorganism exposure - Crime	- Headache - Dehidration - Respiratory disorder - Physical harassment	16	- Provides sun glasses - Wearing face mask - Obtaining hand hygiene - Provides fire fighter training - Provides tools for self defence (recommended punches/ weapon) - Adjusting work shift - Provides metal detector
2	Cleaning the furniture	- The way of cleaning (stand up, tiptoe, using portable stair) - Microorganism (virus, bacteria, germs) - Chemical agent	- Not ergonomic - Fall down - Microorganism exposure - Chemical exposure	- Muculoskeletal disorder - GIT disorder	12	- Use an adjustable cleaning tools - Wearing gloves - Wearing face mask - Wearing head protection (helmet, hat) - Obtaining hand hygiene
3	Electrical instalation	- Electric current - Sparks	- Fall down - Electric shock - Short circuit	- Muculoskeletal disorder - Burn injury - Fire - Death	12	- Cable control regularly - Wearing personal protective equipment - Provides fire extinguisher
4	Floor	- Chemical	- Spilled	- Intoxication	8	- Provides a cabinet for



	moping	agent from floor disinfectant - Slippery floor - Moping technique - Equipment	- Misuse - Slip on - Fall down - Joint pain	- Muculoskeletal disorder		storing chemical agent - Labeling clearly - Expired date control of disinfectant - Applying signs of danger and hazardous agent
5	Manual handling	- Body position - Body weight bearing - Height	- Dislocation - Increasing intra abdominal pressure - Fall down	- Muculoskeletal disorder - LBP - Hernia	8	- Providing lifting tools - Perform routine inspection on the safety of stairs - Socialization of SOP and lifting technique and ergonomic concept
6	Work in 2-4 <sup>th</sup> floor	Height	- Fall down	- Fatigue - Dislocation - Fracture	8	- Lakukan inspeksi rutin pada keamanan anak tangga - Memasang rambu keselamatan
7	Working indoor	Earthquake	- Wrong direction - Fall down - Squeezed	- Hit by an object - Fracture	8	- Applying signs of evacuation - Conducting a disaster emergency response simulation
8	Cutting grass	- Sharp equipment	- In touch with sharp equipment - Dust	- Injury - Respiratory disorder	6	- Put on boots - Put on mask - Wearing cloth gloves - Arrange SOP for all tools and equipments
9	Working with many tools and equipment	Work equipment (dimention, shape and design)	- Fatigue - Injury	- Work related musculoskeletal disorders (WMSDs) - Low back pain - Tension headache - Frozen shoulder	6	- Provides ergonomic furniture - Cover the computer screen with a screen safer - Schedule breaks every 2-4 hours between work hours
10	Sweeping (floor)	- Dust - Un ergonomic broom	- Inhaled - Contact with mucosa membrane (eyes, nose and mouth) - Fatigue	- Respiratory disorder - Konjungtivitis - Irritation - Low back pain and the joints	4	- Wearing a mask while sweeping - Provides a light weight broom, easy to handle and use
11	Washing floor moping equipment	- Chemical agent from floor disinfectant - Microorganism - Body language	- Exposure of chemical agent - Microorganism exposure - Not ergonomic	- Dermatitis - Irritation - Muculoskeletal disorder	4	- Put on mask - Wearing long rubber gloves - Using a safe mop (avoid hold the mop when washing) - Apply hand hygiene

Table 8. Risk Control of the Laboratorium Unit in the University of Muhammadiyah  
Jember

N	PROCESS	HAZARD	RISK	CONSEQUENCES	RR	CONTROL
<b>Nursing Laboratorium</b>						
1	Preparing practicum that uses sharp equipment	- sharp equipment - Used needles	- Injury - Punctured	- Infection - Contagious disease	12	- Make a standard operational procedures - Provide a sharp container - Apply hand hygiene
2	Preparing practicum that uses electrical	- Electric current - Sparks	- Fall down - Electric shock - Short circuit	- Muculoskeletal disorder - Burn injury - Fire - Death	9	- Put up SOP for the use of tools on each electronic device - Perform routine controls - Turn on electronic device every day (even if not in use) - Provide and ensure that fire extinguisher can be used
3	Preparing practicum related to invasive procedures	- Medical waste	- Microorganism exposure	- Contagious disease	9	- Creating MOU for medical waste and toxic hazardous materials waste control - Create SOP for medical waste disposal - Apply hand hygiene - Decontaminate room and furniture after use
4	Preparing practicum that uses chemicals agent	- Chemical agent	- Wrong reagent - Inhaled - Hit by the hand - Swallowed	- Explosion - Shortness of breath - Dermatitis - Burn injury - Intoxication	6	- Separating chemicals agent according to their specification - MSDS must be available - Labeling must be clear - Provide fire extinguisher - Wearing PPE when contact - Provide a first aid kit - Decontaminate the room after use
<b>Basic Laboratorium</b>						
1	Preparing practicum	- Chemical agent	- Wrong reagent - Inhaled - Hit by the hand - Swallowed	- Explosion - Shortness of breath - Dermatitis - Burn injury - Intoxication	6	- Separating chemicals agent according to their specification - MSDS must be available - Labeling must be clear - Provide fire extinguisher - Wearing PPE when contact - Provide a first aid kit - Decontaminate the room after use
		- Electric current - Sparks	- Fall down - Electric shock - Short	- Muculoskeletal disorder - Burn injury - Fire - Death	4	- Put up SOP for the use of tools on each electronic device - Perform routine controls - Turn on electronic

			circuit					device every day (even if not in use) - Provide and ensure that fire extinguisher can be used
<b>Computer Laboratorium</b>								
1	Preparing practicum	- Computer - Electric current	- Microorganism exposure - Short circuit	- Respiratory/ GIT - Burn injury	4			- Apply keyboard protector - Decontaminate the equipment and room after use - Put up SOP for the use of tools on each electronic device - Perform routine controls - Turn on electronic device every day (even if not in use) - Provide and ensure that fire extinguisher can be used

Table 9. Risk Control of the Staffing Unit in the University of Muhammadiyah Jember

No	PROCESS	HAZARD	RISK	CONSEQUENCES	RR	CONTROL
1	Work indoor with air conditioner	- AC - Aspergillus	- Spreading disease	- Respiratory disorder - Aspergilosis	12	- Put on face mask - Perform regular maintenance of the AC - AC maintenance control card monitoring - Consuming immunobooster
2	Manual writing and reading	Not ergonomic position	- Fatigue - Injury	- Work related musculoskeletal disorders (WMSDs) - Low back pain - Tension headache - Frozen shoulder	12	- Provides an ergonomic chair and table - Cover the computer screen with a screen safer - Schedule breaks every 2-4 hours between work hours
3	Academic service	- Working hours - Work load - Fatigue	- Stress related work	- Performance degradation - Motivation degradation - Service quality degradation	9	- Enforcement of reward and punishment - Rescheduling work hours - Rolling work place - Socialization of SOP and job descriptions
4	Work with computer	Radiation	- Photokeratitis - Eyestrain - Increased radiation	- Eyes irritation - Melatonin hormone disorder - Asthenopia - Cataract - Nausea - Vomiting - Headache	8	- Apply a screen protector - Make a schedule of rest - Upgrading the type of computer - Setting up the computer with the back facing the wall
5	Teaching and learning process	- Electric current	- Electric shock	- Musculoskeletal disorder	6	- Apply keyboard protector

	and administration	- Electronics equipment	- Short circuit	- Burn injury - Fire - Death		- Decontaminate the equipment and room after use - Put up SOP for the use of tools on each electronic device - Perform routine controls - Turn on electronic device every day (even if not in use) - Provide and ensure that fire extinguisher can be used
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## DISCUSSION

The results of hazard identification in the work unit of the general administration, laboratories and personnel unit at Muhammadiyah University of Jember stated that there were sources of danger in the types of chemical, mechanical, physical, electrical, ergonomic, biological, psychosocial and environmental. This is in accordance with Baskoro's research (2015) which states that there are types of hazards in the form of physical, chemical, ergonomic and psychosocial hazards at the Faculty of Health, University of Indonesia. Physical, chemical and biomechanical hazards related to ergonomics (Permenkes No 48, 2016).

Potential hazards in offices include chemical hazards which is found to be potentially exposed to staff working in laboratories as well as cleaners, namely detergents, disinfectants, dust from markers and corrosive tools and some chemical reagents. Chemicals continuously used causing irritation, intoxication, diseases of the skin, eyes and respiratory tract. As port d'entree is toxic to the human body in three ways, namely inhalation, digestion and skin (Sujoso, 2012). Storage of reagents in a laboratory that is not standardized, does not have a Material Safety Data Sheet (MSDS) is also a risk of unwanted things, such as explosion and fire. Making SOP and labeling of each chemical with MSDS is very necessary to avoid undesirable things. The controls which is carried out to reduce potential hazards and risks are engineering control, administrative control and the use of appropriate PPE (Kumara, 2019).

The mechanical hazards were found in lawn mowers, stairs and floors. Open mower has potential hazard for worker, where the blade can come off and injure the worker. Slippery floors and stairs and safety rubber on stairs can be source of mechanical hazards.

The activity of going up and down stairs is a physical activity that is commonly carried out by all staff and is considered to be healthier. This is in accordance with Suwarni and Ramadhani's research, 2019 which states that the activity of going up and down stairs can support body fitness. However, some stairs are not in accordance with safety standards so that there is a potential for fatigue and accidents (near miss). To reduce and avoid this incident, the stairs must be made as comfortable as possible in accordance with existing standards, because ideally when the stairs are passed by the user, they will not feel difficult or tired (Saputra, 2020).

Physical hazards are potential hazards that cause health problems for exposed workers (Sujoso, 2012). In the office world, radiation exposure from computer use has the potential to be an actual risk. Based on the results of the interview, it was found that eye disorders were common among both administrative staff and lecturers as a



result of prolonged computer use. The effect of the length of exposure to this monitor also plays a major role in existing complaints. This is in line with research by Bhandari et.al which states that someone who works in front of a computer screen > 4 hours continuously has a 26-fold risk of suffering from Computer Vision Syndrome (CVS) compared to individuals who also work in front of a computer screen for <4 hours continuously.

The daytime break is used only for prayer and lunch then returning to work in front of computer screen. The demands of work lead to a reduced frequency of eye breaks, so multiple short breaks are more efficient than one-time long breaks. Responding to this problem, the American Academy of Ophthalmology provides tips to avoid eye distraction while working, including installing a screen protector to reduce glare, follow the 20-20-20 rule, which is every 20 minutes of work, shift your view from the monitor to an object 20 feet away (six meters) for 20 seconds.

Office areas cannot be separated from electrical equipments. Electrical hazard signals result from electric currents and sparks or short circuits. Fire problems are often based on short circuits, human errors, flammable materials and inaccurate selection of electrical installation equipment (Hambaly, Setiawati, & Majid, 2018)

Ergonomic hazards based on the risk assessment and existing staff, are found in the form of fatigue when carrying goods from the 1st floor to 4th floor or vice versa. Complaints of back pain, shoulder and sprains / dislocations are the most common complaints caused by this activity. In some rooms, there are complaints in the form of a table mismatch with chairs, tables that are too high and chairs that cannot adjust, causing fatigue in the limbs involved (hands, arms, back and legs). Sitting and typing for a long time and manual handling can cause musculoskeletal disorders, such as low back pain. This is in accordance with the results of research conducted by Dewi (2017) that unnatural work posture for a long time will cause complaints of pain in body parts, fatigue, product defects and even physical defects.

The biological hazard that occurs as a result of contact with body fluids is needle stick injury which can be a big problem if the used needle contains pathogenic microorganisms, such as hepatitis or HIV. The most staffs at risk here are laboratory assistants in the nursing laboratory. Another biological hazard is air pollution, where the exposure comes from rooms that use air conditioning. Non-routine air conditioning treatment will cause the air to contain microorganisms and cause respiratory diseases, such as work-related asthma (Sujoso, 2012). The presence of vector animals (cockroaches and rats) as well as cats in the work area will also affect the cleanliness and health of workers. The identified psychosocial hazards are the setting of working and rest hours which are actually in accordance with standards, but it has not applied yet, especially the extra attention for night shift workers related to the schedule of changing shifts. Workload exceeds the work capacity of some staff will cause decreased or poor work performance. Work done in a monotonous manner will also lead to boredom, which in turn leads to a decrease in worker productivity. Researcher's recommendations related to psychosocial hazards are reviewing work hours and rest time arrangements, reviewing work productivity, dividing work in order the workload is evenly distributed among all staff so that no one feels the burden is heavier than others and provides education to workers regarding safety and occupational health (Simbolon, 2018).

Environmental hazards at Muhammadiyah University of Jember exist in several work units located on the 4th floor, where the height is a source of danger that affects musculoskeletal disorders. Working at a height requires preventive action so that all work activities can be carried out safely, so risk management / risk management is

needed (HSE, 2017). To avoid musculoskeletal disorders, workers should pay attention to posture when going up and down stairs.

Based on the results of the risk assessment, there are 6 high-risk activity processes, 13 medium-risk activity processes and 4 low-risk activity processes. Evaluation needs to be done whether the existing risk is acceptable or not, referring to the risk criteria established by the management of the organization. Acceptable risk is often termed as low as reasonably practicable, where the lowest level of risk is reasonable (Ramli, 2013). The risks are found within acceptable limits, so control measures must be taken.

The risk control is carried out for all hazards which are found in the hazard identification process by considering the risk ratings to determine the control priorities. Possible risk controls are engineering, administrative and personal protective equipment. This is in line with the theory of risk control that needs to be done to minimize and / or eliminate the risk of work accidents through the stages of elimination, substitution, engineering, administrative and personal protective equipment (Ramli, 2013).

## CONCLUSION

Hazard identification in 11 activity processes in the general administration unit are found 21 potential hazards. In the laboratory unit, there are 6 activity processes with 11 potential hazards and in the personnel unit, 6 activity processes with 9 potential hazards are found.

There is the risk assessment in the work unit of the general administration division with a risk rating of 16, which is the activity of maintaining security in the campus environment that inherent in security duties. The highest risk rating with a value of 12 in laboratory units is found in nursing laboratories, namely in the process of preparing practicum activities using sharp tools / objects. While the risk assessment in the personnel unit, the highest risk rating with a value of 12 was found in working in the room using air conditioning and also in writing / typing on computers.

Risk control is determined based on the risk categories. The red zone is a high risk that must be controlled by eliminating the risk of hazards. Yellow zone where the risk is acceptable if security has been implemented and the green zone does not need control, but still adheres to SOP and the use of personal protective equipment. Implementing a work safety and health system that has been accommodated in Permenkes No. 48 of 2016 concerning office safety and health standards, including occupational safety, occupational health, office work environment health and office ergonomics.

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Faculty of Nursing  
UNIVERSITAS JEMBER

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# CERTIFICATE

NO:6012/UN25.1.14/SP/2020

is awarded to

**Dwi Yunita Haryanti**

As Oral Presenter

in the 4<sup>th</sup> International Agronursing Conference

*“Optimizing the Role of Nursing and Health Professional to Enhance Health Care Quality in the New Normal Era”*

November, 24<sup>th</sup> 2020 Jember- East Java - Indonesia

Accreditated based on degree of Indonesian National Nurses Association (PPNI) No. 1183/DPP.PPNI/SK/K.S/X/2020

Speaker : 5 SKP  
Committe/moderator : 4 SKP  
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# 4<sup>th</sup> International Agronursing Conference

Optimizing the Role of Nursing and Health Professionals to Enhance  
The Health Care Quality in the New Normal Era

No	Topics	Duration
1	Topic 1 : "Nursing for the New World: in the Time of COVID and Post-COVID"	60 Minutes
2	Topic 2 : "Technological Competency as Caring in Nursing in the New Normal Era"	60 Minutes
3	Topic 3 : "Caring for the elderly in a New Normal Era"	60 Minutes
4	Topic 4 : "Postgraduate Research in a COVID world: Challenges, Strategies and Opportunities"	90 Minutes
5	Topic 5 : "Performing Community Services as One of Indonesia Higher Education Pillars in The New Normal Era"	90 Minutes
<b>Total</b>		<b>360 Minutes</b>





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**Ns. DWI YUNITA H, S.Kep., M.Kes**

**As Participant**

**in the 4<sup>th</sup> International Agronursing Conference**

*“Optimizing the Role of Nursing and Health Professional to Enhance Health Care Quality in the New Normal Era”*

November, 24<sup>th</sup> 2020 Jember- East Java - Indonesia

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Speaker : 5 SKP  
Committe/moderator : 4 SKP  
Participant : 4 SKP



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# 4<sup>th</sup> International Agronursing Conference

Optimizing the Role of Nursing and Health Professionals to Enhance  
The Health Care Quality in the New Normal Era

No	Topics	Duration
1	Topic 1 : "Nursing for the New World: in the Time of COVID and Post-COVID"	60 Minutes
2	Topic 2 : "Technological Competency as Caring in Nursing in the New Normal Era"	60 Minutes
3	Topic 3 : "Caring for the elderly in a New Normal Era"	60 Minutes
4	Topic 4 : "Postgraduate Research in a COVID world: Challenges, Strategies and Opportunities"	90 Minutes
5	Topic 5 : "Performing Community Services as One of Indonesia Higher Education Pillars in The New Normal Era"	90 Minutes
<b>Total</b>		<b>360 Minutes</b>

# RISK ANALYSIS OF THE OCCUPATIONAL AND HEALTH SAFETY USING HAZARD IDENTIFICATION, RISK ASSESSMENT AND RISK CONTROL (HIRARC) METHOD IN THE UNIVERSITY OF MUHAMMADIYAH JEMBER

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by Dwi Yunita Haryanti

## The 4<sup>th</sup> International Agronursing Conference

### “Optimizing The Role of Nursing and Health Professionals to Enhance Health Care Quality in The New Normal Era”

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## RISK ANALYSIS OF THE OCCUPATIONAL AND HEALTH SAFETY USING HAZARD IDENTIFICATION, RISK ASSESSMENT AND RISK CONTROL (HIRARC) METHOD IN THE UNIVERSITY OF MUHAMMADIYAH JEMBER

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### ABSTRACT

**Background:** University of Muhammadiyah Jember has the potential and risk of dangers, so the launching of the Occupational and Health Safety program in this office area is something that needs to be carried out, in order to create a healthy, safe and comfortable office and the realization of healthy, safe, fit, performing and productive employees. Hazard Identification, Risk Assessment and Risk Control is one of the ways to identify potential dangers in any kind of job activities. **Purpose:** This research is held to analyze the risk of work accident by using HIRARC method. **Methods:** This research uses descriptive qualitative research method. The qualitative method is used to describe the condition, to identify and recognize the work accident analysis. **Results:** The findings show that hazard in the job activity is identified as chemical, mechanical, physical, electrical, ergonomic, biological, psychosocial and environmental hazards. The risk assessment which is held denotes that there are 6 high risk, 13 medium risk and 4 low risk. **Conclusion:** Risk control that can be applied are engineering controls, administrative and personal protective equipment to reduce unsafe action and unsafe condition. HIRARC method which has been applied at the University of Muhammadiyah Jember proves that work activities in the office has a risk that should be controlled.

**Keywords:** Occupational and Health Safety; HIRARC; Work Accident; Office

### BACKGROUND

Occupational and Health Safety in the office is occupational safety and health in the office area are all activities to ensure and protect the safety and health of employees through efforts to prevent occupational accidents and diseases due to work in the office (PMK, 2016). The government's goal of launching OHS in office areas is



to create a healthy, safe and comfortable office for the creation of healthy, safe, fit, performing and productive employees.

Data from the Central Statistics Agency in 2018 stated that the total workforce was 133.94 million, 127.07 million people working in the formal and informal sectors, while 6.87 million others were unemployed. Among them are formal workers in the industrial and office sectors. Based on exposure to hazard risks, the industrial sector will be exposed to mild to severe potential hazards, while the office sector is exposed to mild to moderate potential hazards.

In this era, occupational safety and health is a must for work organizers to increase productivity. The maintenance of good occupational health will minimize the number of morbidity, absenteeism, disabilities and work accidents, so that healthy and productive workers will be realized. Work accidents in the office sector can occur as a result of several potential hazards in the work environment, including physical, chemical, biological, ergonomic, psychosocial, mechanical, electrical, waste and disaster hazards.

Potential hazards in the work environment can be identified by using the HIRARC (Hazard Identification, Risk Assessment and Risk Analysis) method. HIRARC is a process of determining the priority of occupational accident risk level control so that it can classify the potential hazards into high, medium and low risks. This process will later facilitate the evaluation process (Department of Occupational Safety and Health, 2008).

Riskesdas 2018 data states that the prevalence of non-communicable diseases has increased if it compared to 2013. These diseases include cancer, stroke, chronic kidney disease, diabetes mellitus and hypertension. The increase of non-communicable diseases is related to lifestyle, such as smoking, alcoholic drinking, inadequate physical activity, and minimal consumption of vegetables and fruits. Increasing the level of education and professional workers in Indonesia will increase the number of office workers. Sedentary behavior or lack of physical activity is synonymous with office workers. Therefore, increasing the implementation of occupational safety and health in each institution or agency is something that must be developed and improved (Presidential Instruction No.1, 2017).

Until now, University of Muhammadiyah Jember has not conducted a risk analysis yet, so that the researcher is interested in conducting risk analysis to determine the potential hazards of office workers and its control plan. The OHS risk analysis uses the HIRARC method which is expected to be able to control the existing risks, so that the healthy, fit and productive workers in providing services also can be expected.

## METHODS

This research used a qualitative method with a descriptive design. The work area chosen is a work area that has a potential hazard. The main informants of this research are the main leaders, represented by the head of the quality assurance agency, the head of the bureau, the dean, the head of the laboratory, the laboratory assistant and the head of security. Informants were selected by using purposive sampling. Sources of data in this research are primary data and secondary data. Primary data were obtained through interviews and observations by using the HIRARC method. Secondary data were obtained from study of supporting documents.

## RESULTS

### Hazard Identification

The first stage of HIRARC is hazard identification. The results of hazard identification at the University of Muhammadiyah Jember are presented in the following table:

**Table 1.** Hazard Identification of the General Administration Unit in the University of Muhammadiyah Jember

No	PROCESS	HAZARD	RISK	CONSEQUENCES
1	Sweeping (floor)	- Dust - Un ergonomic broom	- Inhaled - Contact with mucosa membrane (eyes, nose and mouth) - Fatigue	- Respiratory disorder - Konjungtivitis - Irritation - Low back pain and the joints
2	Floor moping	- Chemical agent from floor disinfectan - Slippery floor - Moping technique - Equipment	- Spilled - Misuse - Slip on - Fall down - Joint pain	- Intoxication - Muculoskeletal disorder
3	Washing floor moping equipment	- Chemical agent from floor disinfectan - Microorganism - Body language	- Exposure of chemical agent - Microorganism exposure - Not ergonomic	- Dermatitis - Irritation - Muculoskeletal disorder
4	Cleaning the furniture	- The way of cleaning (stand up, tiptoe, using portable stair) - Microorganism (virus, bacteria, germs) - Chemical agent	- Not ergonomic - Fall down - Microorganism exposure - Chemical exposure	- Muculoskeletal disorder - GIT disorder
5	Cutting grass	- Sharp equipment	- In touch with sharp equipment. - Dust	- Injury - Respiratory disorder
6	Electrical instalation	- Electric current - Sparks	- Fall down - Electric shock - Short circuit	- Muculoskeletal disorder - Burn injury - Fire - Death
7	Manual handling	- Body position - Body weight bearing - Height	- Dislocate - Increasing abdominal pressure - Fall down	- Muculoskeletal disorder - LBP - Hernia
8	Working with many tools and equipment	Work equipment (dimention, shape and design)	- Fatigue - Injury	- Work related musculoskeletal disorders (WMSDs) - Low back pain



				- Tension headache
				- Frozen shoulder
9	Maintain environment security	- Sun light - Working out door - Interaction with many people - Foreigners	- Dazzled - Hot air exposure - Microorganism exposure - Crime	- Headache - Dehydration - Respiratory disorder - Physical harassment
10	Work in 2-4 <sup>th</sup> floor	Height	- Fall down	- Fatigue - Dislocation - Fracture
11	Working indoor	Earthquake	- Wrong direction - Fall down - Squeezed	- Hit by an object - Fracture

Table 2. Hazard Identification of the Laboratorium Unit in the University of Muhammadiyah Jember

No	PROCESS	HAZARD	RISK	CONSEQUENCES
<b>Nursing Laboratorium</b>				
1	Preparing practicum that uses chemicals agent	- Chemical agent	- Wrong reagent - Inhaled - Hit by the hand - Swallowed	- Explosion - Shortness of breath - Dermatitis - Burn injury - Intoxication
2	Preparing practicum that uses sharp equipment	- sharp equipment - Used needles	- Injury - Punctured	- Infection - Contagious disease
3	Preparing practicum that uses electrical	- Electric current - Sparks	- Fall down - Electric shock - Short circuit	- Muculoskeletal disorder - Burn injury - Fire - Death
4	Preparing practicum related to invasive procedures	- Medical waste	- Microorganism exposure	- Contagious disease
<b>Basic Laboratorium</b>				
1	Preparing practicum	- Chemical agent  - Electric current - Sparks	- Wrong reagent - Inhaled - Hit by the hand - Swallowed  - Fall down - Electric shock - Short circuit	- Explosion - Shortness of breath - Dermatitis - Burn injury - Intoxication  - Muculoskeletal disorder - Burn injury - Fire - Death
<b>Computer Laboratorium</b>				
1	Preparing practicum	- Computer - Electric current	- Microorganism exposure - Short circuit	- Respiratory/ GIT disorder - Burn injury

Table 3. Hazard Identification of the Computer Laboratorium Unit in the University of Muhammadiyah Jember

No	PROCESS	HAZARD	RISK	CONSEQUENCES
1	Teaching and learning process and administration	- Electric current - Electronics equipment	- Electric shok - Short circuit	- Muculoskeletal disorder - Burn injury - Fire - Death
2	Work computer	Radiation	- Photokeratitis - Eyestrain - Increased radiation	- Eyes iritaton - Melatonin hormone disorder - Asthenopia - Cataract - Nausea - Vominiting - Headache
3	Work electronic equipment	- Electric current - Electronics equipment	- Electric shok - Short circuit	- Muculoskeletal disorder - Burn injury - Fire - Death
4	Work indoor air conditioner	- AC - Aspergillus	- Spreading disease	- Respiratory disorder - Aspergilosis
5	Manual writing and reading	Not ergonomic postion	- Fatigue - Injury	- Work related musculoskeletal disorders (WMSDs) - Low back pain - Tension headache - Frozen shoulder
6	Academic service	- Working hours - Work load - Fatigue	- Stress related work	- Performance degradation - Motivation degradation - Service quality degradation

### RISK ASSESSMENT

Risk assessment is carried out to evaluate the amount of risk and impact that will be caused. The results of the risk assessment at the work unit at the University of Muhammadiyah Jember are as follows:

Table 4. Risk Assessment of the General Administration Unit in the University of Muhammadiyah Jember

No	PROCESS	HAZARD	RISK	CONSEQUENCES	L	S	RR
1	Maintain environment security	- Sun light - Working door - Interaction with many people - Foreigners	- Dazzled - Hot air exposure - Microorganism exposure - Crime	- Headache - Dehidration - Respiratory disorder - Physical harassment	4	4	16

2	Cleaning the furniture	<ul style="list-style-type: none"> <li>- The way of cleaning (stand up, tiptoe, using portable stair)</li> <li>- Microorganism (virus, bacteria, germs)</li> <li>- Chemical agent</li> </ul>	<ul style="list-style-type: none"> <li>- Not ergonomic</li> <li>- Fall down</li> <li>- Microorganism exposure</li> <li>- Chemical exposure</li> </ul>	<ul style="list-style-type: none"> <li>- Muculoskeletal dissorder</li> <li>- GIT dissorder</li> </ul>	4	3	12
3	Electrical instalation	<ul style="list-style-type: none"> <li>- Electric current</li> <li>- Sparks</li> </ul>	<ul style="list-style-type: none"> <li>- Fall down</li> <li>- Electric shock</li> <li>- Short circuit</li> </ul>	<ul style="list-style-type: none"> <li>- Muculoskeletal dissorder</li> <li>- Burn injury</li> <li>- Fire</li> <li>- Death</li> </ul>	3	4	12
4	Floor moping	<ul style="list-style-type: none"> <li>- Chemical agent from floor desinfectan</li> <li>- Slippery floor</li> <li>- Moping technique</li> <li>- Equipment</li> </ul>	<ul style="list-style-type: none"> <li>- Spilled</li> <li>- Misuse</li> <li>- Slip on</li> <li>- Fall down</li> <li>- Joint pain</li> </ul>	<ul style="list-style-type: none"> <li>- Intoxication</li> <li>- Muculoskeletal dissorder</li> </ul>	4	2	8
5	Manual handling	<ul style="list-style-type: none"> <li>- Body position</li> <li>- Body weight bearing</li> <li>- Height</li> </ul>	<ul style="list-style-type: none"> <li>- Dislocate</li> <li>- Increasing intra abdominal pressure</li> <li>- Fall down</li> </ul>	<ul style="list-style-type: none"> <li>- Muculoskeletal dissorder</li> <li>- LBP</li> <li>- Hernia</li> </ul>	4	2	8
6	Work in 2-4 <sup>th</sup> floor	Height	<ul style="list-style-type: none"> <li>- Fall down</li> </ul>	<ul style="list-style-type: none"> <li>- Fatigue</li> <li>- Dislocation</li> <li>- Fracture</li> </ul>	2	4	8
7	Working indoor	Earthquake	<ul style="list-style-type: none"> <li>- Wrong direction</li> <li>- Fall down</li> <li>- Squeezed</li> </ul>	<ul style="list-style-type: none"> <li>- Hit by an object</li> <li>- Fracture</li> </ul>	2	4	8
8	Cutting grass	Sharp equipment	<ul style="list-style-type: none"> <li>- In touch with sharp equipment.</li> <li>- Dust</li> </ul>	<ul style="list-style-type: none"> <li>- Injury</li> <li>- Respiratory dissorder</li> </ul>	3	2	6
9	Working with many tools and equipment	Work equipment (dimention, shape and design)	<ul style="list-style-type: none"> <li>- Fatigue</li> <li>- Injury</li> </ul>	<ul style="list-style-type: none"> <li>- Work related musculoskeletal disorders (WMSDs)</li> <li>- Low back pain</li> <li>- Tension headache</li> <li>- Frozen shoulder</li> </ul>	3	2	6
10	Sweeping (floor)	<ul style="list-style-type: none"> <li>- Dust</li> <li>- Un ergonomic broom</li> </ul>	<ul style="list-style-type: none"> <li>- Inhaled</li> <li>- Contact with mucosa membrane (eyes, nose and mouth)</li> <li>- Fatigue</li> </ul>	<ul style="list-style-type: none"> <li>- Respiratory dissorder</li> <li>- Konjungtivitis</li> <li>- Irritation</li> <li>- Low back pain and the joints</li> </ul>	4	1	4
11	Washing floor moping equipment	<ul style="list-style-type: none"> <li>- Chemical agent from floor desinfectan</li> <li>- Microorganism</li> <li>- Body language</li> </ul>	<ul style="list-style-type: none"> <li>- Exposure of chemical agent</li> <li>- Microorganism exposure</li> <li>- Not ergonomic</li> </ul>	<ul style="list-style-type: none"> <li>- Dermatitis</li> <li>- Irritation</li> <li>- Muculoskeletal dissorder</li> </ul>	4	1	4

Table 5. Risk Assessment of the Laboratorium Unit in the University of Muhammadiyah Jember

No	PROCESS	HAZARD	RISK	CONSEQUENCES	L	S	RR
<b>Nursing Laboratorium</b>							
1	Preparing practicum that uses sharp equipment	- sharp equipment - Used needles	- Injury - Punctured	- Infection - Contagious disease	3	4	12
2	Preparing practicum that uses electrical	- Electric current - Sparks	- Fall down - Electric shock - Short circuit	- Muculoskeletal disorder - Burn injury - Fire - Death	3	3	9
3	Preparing practicum related to invasive procedures	- Medical waste	- Microorganism exposure	- Contagious disease	3	3	9
4	Preparing practicum that uses chemicals agent	- Chemical agent	- Wrong reagent - Inhaled - Hit by the hand - Swallowed	- Explosion - Shortness of breath - Dermatitis - Burn injury - Intoxication	3	2	6
<b>Basic Laboratorium</b>							
1	Preparing practicum	- Chemical agent	- Wrong reagent - Inhaled - Hit by the hand - Swallowed	- Explosion - Shortness of breath - Dermatitis - Burn injury - Intoxication	3	2	6
		- Electric current - Sparks	- Fall down - Electric shock - Short circuit	- Muculoskeletal disorder - Burn injury - Fire - Death	1	4	4
<b>Computer Laboratorium</b>							
1	Preparing practicum	- Computer - Electric current	- Microorganism exposure - Short circuit	- Respiratory/ disorder - Burn injury	GIT 1	4	4

Table 6. Risk Assessment of the Staffing Unit in the University of Muhammadiyah Jember

No	PROCESS	HAZARD	RISK	CONSEQUENCES	L	S	RR
1	Work indoor with air conditioner	- AC - Aspergillus	- Spreading disease	- Respiratory disorder - Aspergillus	4	3	12
2	Manual writing and reading	Not ergonomic position	- Fatigue - Injury	- Work related musculoskeletal disorders (WMSDs) - Low back pain - Tension	4	3	12

					headache - Frozen shoulder			
3	Academic service	- Working hours - Work load - Fatigue	- Stress related work	- Performance degradation - Motivation degradation - Service quality degradation	3	3	9	
4	Work with computer	Radiation	- Photokeratitis - Eyestrain - Increased radiation	- Eyes iritaiton - Melatonin hormone disorder - Asthenopia - Cataract - Nausea - Vominiting - Headache	4	2	8	
5	Teaching and learning process and administration	- Electric current - Electronics equipment	- Electric shok - Short circuit	- Muculoskeletal disorder - Burn injury - Fire - Death	2	3	6	

L : Likelihood

S : Severity

RR : Risk Rating

Table 7. Risk Control of the General Administration Unit in the University of Muhammadiyah Jember

No	PROCESS	HAZARD	RISK	CONSEQUENCES	RR	CONTROL
1	Maintain environment security	- Sun light - Working out door - Interaction with many people - Foreigners	- Dazzled - Hot air exposure - Microorganism exposure - Crime	- Headache - Dehidration - Respiratory disorder - Physical harassment	16	- Provides sun glasses - Wearing face mask - Obtaining hand hygiene - Provides fire fighter training - Provides tools for self defence (recommended punches/ weapon) - Adjusting work shift - Provides metal detector
2	Cleaning the furniture	- The way of cleaning (stand up, tiptoe, using portable stair) - Microorganism (virus, bacteria, germs) - Chemical agent	- Not ergonomic - Fall down - Microorganism exposure - Chemical exposure	- Muculoskeletal disorder - GIT disorder	12	- Use an adjustable cleaning tools - Wearing gloves - Wearing face mask - Wearing head protection (helmet, hat) - Obtaining hand hygiene
3	Electrical instalation	- Electric current - Sparks	- Fall down - Electric shock - Short circuit	- Muculoskeletal disorder - Burn injury - Fire - Death	12	- Cable control regularly - Wearing personal protective equipment - Provides fire extinguisher
4	Floor	- Chemical	- Spilled	- Intoxication	8	- Provides a cabinet for

	moping agent from floor desinfectan	- Slippery floor - Moping technique - Equipment	- Misuse - Slip on - Fall down - Joint pain	- Muculoskeletal disorder		- storing chemical agent - Labeling clearly - Expired date control of desinfectant - Applying signs of danger and hazardous agent
5	Manual handling	- Body position - Body weight bearing - Height	- Dislocation - Increasing intra abdominal pressure - Fall down	- Muculoskeletal disorder - LBP - Hernia	8	- Providing lifting tools - Perform routine inspection on the safety of stairs - Socialization of SOP and lifting technique and ergonomic concept
6	Work in 2-4 <sup>th</sup> floor	Height	- Fall down	- Fatigue - Dislocation - Fracture	8	- Lakukan inspeksi rutin pada keamanan anak tangga - Memasang rambu keselamatan
7	Working indoor	Earthquake	- Wrong direction - Fall down - Squeezed	- Hit by an object - Fracture	8	- Applying signs of evacuation - Conducting a disaster emergency response simulation
8	Cutting grass	- Sharp equipment	- In touch with sharp equipment - Dust	- Injury - Respiratory disorder	6	- Put on boots - Put on mask - Wearing cloth gloves - Arrange SOP for all tools and equipments
9	Working with many tools and equipment	Work equipment (dimention, shape and design)	- Fatigue - Injury	- Work related musculoskeletal disorders (WMSDs) - Low back pain - Tension headache - Frozen shoulder	6	- Provides ergonomic furniture - Cover the computer screen with a screen safer - Schedule breaks every 2-4 hours between work hours
10	Sweeping (floor)	- Dust - Un ergonomic broom	- Inhaled - Contact with mucosa membrane (eyes, nose and mouth) - Fatigue	- Respiratory disorder - Konjungtivitis - Irritation - Low back pain and the joints	4	- Wearing a mask while sweeping - Provides a light weight broom, easy to handle and use
11	Washing floor moping equipment	- Chemical agent from floor desinfectan - Microorganism - Body language	- Exposure of chemical agent - Microorganism exposure - Not ergonomic	- Dermatitis - Irritation - Muculoskeletal disorder	4	- Put on mask - Wearing long rubber gloves - Using a safe mop (avoid hold the mop when washing) - Apply hand hygiene



Table 8. Risk Control of the Laboratorium Unit in the University of Muhammadiyah Jember

N	PROCESS	HAZARD	RISK	CONSEQUENCES	RR	CONTROL
<b>Nursing Laboratorium</b>						
1	Preparing practicum that uses sharp equipment	- sharp equipment - Used needles	- Injury - Punctured	- Infection - Contagious disease	12	- Make a standard operational procedures - Provide a sharp container - Apply hand hygiene
2	Preparing practicum that uses electrical	- Electric current - Sparks	- Fall down - Electric shock - Short circuit	- Muculoskeletal disorder - Burn injury - Fire - Death	9	- Put up SOP for the use of tools on each electronic device - Perform routine controls - Turn on electronic device every day (even if not in use) - Provide and ensure that fire extinguisher can be used
3	Preparing practicum related to invasive procedures	- Medical waste	- Microorganism exposure	- Contagious disease	9	- Creating MOU for medical waste and toxic hazardous materials waste control - Create SOP for medical waste disposal - Apply hand hygiene - Decontaminate room and furniture after use
4	Preparing practicum that uses chemicals agent	- Chemical agent	- Wrong reagent - Inhaled - Hit by the hand - Swallowed	- Explosion - Shortness of breath - Dermatitis - Burn injury - Intoxication	6	- Separating chemicals agent according to their specification - MSDS must be available - Labeling must be clear - Provide fire extinguisher - Wearing PPE when contact - Provide a first aid kit - Decontaminate the room after use
<b>Basic Laboratorium</b>						
1	Preparing practicum	- Chemical agent	- Wrong reagent - Inhaled - Hit by the hand - Swallowed	- Explosion - Shortness of breath - Dermatitis - Burn injury - Intoxication	6	- Separating chemicals agent according to their specification - MSDS must be available - Labeling must be clear - Provide fire extinguisher - Wearing PPE when contact - Provide a first aid kit - Decontaminate the room after use
		- Electric current - Sparks	- Fall down - Electric shock - Short	- Muculoskeletal disorder - Burn injury - Fire - Death	4	- Put up SOP for the use of tools on each electronic device - Perform routine controls - Turn on electronic

	circuit						device every day (even if not in use) - Provide and ensure that fire extinguisher can be used
<b>Computer Laboratorium</b>							
1	Preparing practicum	- Computer - Electric current	- Microorganism exposure - Short circuit	- Respiratory/dissorder - Burn injury	GIT	4	- Apply keyboard protector - Decontaminate the equipment and room after use - Put up SOP for the use of tools on each electronic device - Perform routine controls - Turn on electronic device every day (even if not in use) - Provide and ensure that fire extinguisher can be used

Table 9. Risk Control of the Staffing Unit in the University of Muhammadiyah Jember

No	PROCESS	HAZARD	RISK	CONSEQUENCES	RR	CONTROL
1	Work indoor with air conditioner	- AC - Aspergillus	- Spreading disease	- Respiratory disorder - Aspergilosis	12	- Put on face mask - Perform regular maintenance of the AC - AC maintenance control card monitoring - Consuming immunobooster
2	Manual writing and reading	Not ergonomic position	- Fatigue - Injury	- Work related musculoskeletal disorders (WMSDs) - Low back pain - Tension headache - Frozen shoulder	12	- Provides an ergonomic chair and table - Cover the computer screen with a screen safer - Schedule breaks every 2-4 hours between work hours
3	Academic service	- Working hours - Work load - Fatigue	- Stress related work	- Performance degradation - Motivation degradation - Service quality degradation	9	- Enforcement of reward and punishment - Rescheduling work hours - Rolling work place - Socialization of SOP and job descriptions
4	Work with computer	Radiation	- Photokeratitis - Eyestrain - Increased radiation	- Eyes irritation - Melatonin hormone disorder - Asthenopia - Cataract - Nausea - Vomiting - Headache	8	- Apply a screen protector - Make a schedule of rest - Upgrading the type of computer - Setting up the computer with the back facing the wall
5	Teaching and learning process	- Electric current	- Electric shock	- Musculoskeletal disorder	6	- Apply keyboard protector

	and administration	- Electronics equipment	- Short circuit	- Burn injury - Fire - Death		- Decontaminate the equipment and room after use - Put up SOP for the use of tools on each electronic device - Perform routine controls - Turn on electronic device every day (even if not in use) - Provide and ensure that fire extinguisher can be used
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## DISCUSSION

The results of hazard identification in the work unit of the general administration, laboratories and personnel unit at Muhammadiyah University of Jember stated that there were sources of danger in the types of chemical, mechanical, physical, electrical, ergonomic, biological, psychosocial and environmental. This is in accordance with Baskoro's research (2015) which states that there are types of hazards in the form of physical, chemical, ergonomic and psychosocial hazards at the Faculty of Health, University of Indonesia. Physical, chemical and biomechanical hazards related to ergonomics (Permenkes No 48, 2016).

Potential hazards in offices include chemical hazards which is found to be potentially exposed to staff working in laboratories as well as cleaners, namely detergents, disinfectants, dust from markers and corrosive tools and some chemical reagents. Chemicals continuously used causing irritation, intoxication, diseases of the skin, eyes and respiratory tract. As port d'entree is toxic to the human body in three ways, namely inhalation, digestion and skin (Sujoso, 2012). Storage of reagents in a laboratory that is not standardized, does not have a Material Safety Data Sheet (MSDS) is also a risk of unwanted things, such as explosion and fire. Making SOP and labeling of each chemical with MSDS is very necessary to avoid undesirable things. The controls which is carried out to reduce potential hazards and risks are engineering control, administrative control and the use of appropriate PPE (Kumara, 2019).

The mechanical hazards were found in lawn mowers, stairs and floors. Open mower has potential hazard for worker, where the blade can come off and injure the worker. Slippery floors and stairs and safety rubber on stairs can be source of mechanical hazards.

The activity of going up and down stairs is a physical activity that is commonly carried out by all staff and is considered to be healthier. This is in accordance with Suwarni and Ramadhani's research, 2019 which states that the activity of going up and down stairs can support body fitness. However, some stairs are not in accordance with safety standards so that there is a potential for fatigue and accidents (near miss). To reduce and avoid this incident, the stairs must be made as comfortable as possible in accordance with existing standards, because ideally when the stairs are passed by the user, they will not feel difficult or tired (Saputra, 2020).

Physical hazards are potential hazards that cause health problems for exposed workers (Sujoso, 2012). In the office world, radiation exposure from computer use has the potential to be an actual risk. Based on the results of the interview, it was found that eye disorders were common among both administrative staff and lecturers as a

result of prolonged computer use. The effect of the length of exposure to this monitor also plays a major role in existing complaints. This is in line with research by Bhandari et.al which states that someone who works in front of a computer screen > 4 hours continuously has a 26-fold risk of suffering from Computer Vision Syndrome (CVS) compared to individuals who also work in front of a computer screen for <4 hours continuously.

The daytime break is used only for prayer and lunch then returning to work in front of computer screen. The demands of work lead to a reduced frequency of eye breaks, so multiple short breaks are more efficient than one-time long breaks. Responding to this problem, the American Academy of Ophthalmology provides tips to avoid eye distraction while working, including installing a screen protector to reduce glare, follow the 20-20-20 rule, which is every 20 minutes of work, shift your view from the monitor to an object 20 feet away (six meters) for 20 seconds.

Office areas cannot be separated from electrical equipments. Electrical hazard signals result from electric currents and sparks or short circuits. Fire problems are often based on short circuits, human errors, flammable materials and inaccurate selection of electrical installation equipment (Hambaly, Setiawati, & Majid, 2018)

Ergonomic hazards based on the risk assessment and existing staff, are found in the form of fatigue when carrying goods from the 1st floor to 4th floor or vice versa. Complaints of back pain, shoulder and sprains / dislocations are the most common complaints caused by this activity. In some rooms, there are complaints in the form of a table mismatch with chairs, tables that are too high and chairs that cannot adjust, causing fatigue in the limbs involved (hands, arms, back and legs). Sitting and typing for a long time and manual handling can cause musculoskeletal disorders, such as low back pain. This is in accordance with the results of research conducted by Dewi (2017) that unnatural work posture for a long time will cause complaints of pain in body parts, fatigue, product defects and even physical defects.

The biological hazard that occurs as a result of contact with body fluids is needle stick injury which can be a big problem if the used needle contains pathogenic microorganisms, such as hepatitis or HIV. The most staffs at risk here are laboratory assistants in the nursing laboratory. Another biological hazard is air pollution, where the exposure comes from rooms that use air conditioning. Non-routine air conditioning treatment will cause the air to contain microorganisms and cause respiratory diseases, such as work-related asthma (Sujoso, 2012). The presence of vector animals (cockroaches and rats) as well as cats in the work area will also affect the cleanliness and health of workers. The identified psychosocial hazards are the setting of working and rest hours which are actually in accordance with standards, but it has not applied yet, especially the extra attention for night shift workers related to the schedule of changing shifts. Workload exceeds the work capacity of some staff will cause decreased or poor work performance. Work done in a monotonous manner will also lead to boredom, which in turn leads to a decrease in worker productivity. Researcher's recommendations related to psychosocial hazards are reviewing work hours and rest time arrangements, reviewing work productivity, dividing work in order the workload is evenly distributed among all staff so that no one feels the burden is heavier than others and provides education to workers regarding safety and occupational health (Simbolon, 2018).

Environmental hazards at Muhammadiyah University of Jember exist in several work units located on the 4th floor, where the height is a source of danger that affects musculoskeletal disorders. Working at a height requires preventive action so that all work activities can be carried out safely, so risk management / risk management is

needed (HSE, 2017). To avoid musculoskeletal disorders, workers should pay attention to posture when going up and down stairs.

Based on the results of the risk assessment, there are 6 high-risk activity processes, 13 medium-risk activity processes and 4 low-risk activity processes. Evaluation needs to be done whether the existing risk is acceptable or not, referring to the risk criteria established by the management of the organization. Acceptable risk is often termed as low as reasonably practicable, where the lowest level of risk is reasonable (Ramli, 2013). The risks are found within acceptable limits, so control measures must be taken.

The risk control is carried out for all hazards which are found in the hazard identification process by considering the risk ratings to determine the control priorities. Possible risk controls are engineering, administrative and personal protective equipment. This is in line with the theory of risk control that needs to be done to minimize and / or eliminate the risk of work accidents through the stages of elimination, substitution, engineering, administrative and personal protective equipment (Ramli, 2013).

## CONCLUSION

Hazard identification in 11 activity processes in the general administration unit are found 21 potential hazards. In the laboratory unit, there are 6 activity processes with 11 potential hazards and in the personnel unit, 6 activity processes with 9 potential hazards are found.

There is the risk assessment in the work unit of the general administration division with a risk rating of 16, which is the activity of maintaining security in the campus environment that inherent in security duties. The highest risk rating with a value of 12 in laboratory units is found in nursing laboratories, namely in the process of preparing practicum activities using sharp tools / objects. While the risk assessment in the personnel unit, the highest risk rating with a value of 12 was found in working in the room using air conditioning and also in writing / typing on computers.

Risk control is determined based on the risk categories. The red zone is a high risk that must be controlled by eliminating the risk of hazards. Yellow zone where the risk is acceptable if security has been implemented and the green zone does not need control, but still adheres to SOP and the use of personal protective equipment. Implementing a work safety and health system that has been accommodated in Permenkes No. 48 of 2016 concerning office safety and health standards, including occupational safety, occupational health, office work environment health and office ergonomics.

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