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Work Posture Analysis Using Rula Method To Minimize Musculoskeletal Disorders Complaints Among Doctors At Pt Rusunda Medika Abadi

MUHAMAD RIZKI NUR ILLAHI, WINARNO

Faculty of Industrial Engineering Universitas Singaperbangsa Karawang
Email : 2010631140143@student.unsika.ac.id

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ABSTRACT

In the current industrial era, Indonesia is experiencing significant developments in the competition of goods and services. Business actors compete with each other to dominate market share, which drives them to develop innovations and improve productivity. The human factor is a key element in enhancing company performance, where effective management can improve efficiency and productivity. This research focuses on PT Rusunda Medika Abadi, a healthcare company specializing in male circumcision. The company faces challenges related to poor posture among doctors during procedures, caused by the use of manual techniques, which can lead to fatigue and musculoskeletal issues, ultimately affecting performance and workplace safety. This activity poses a risk of causing musculoskeletal disorders complaints among the workforce. Therefore, a posture analysis of the doctor was conducted to identify those risks and provide improvement suggestions. The Rapid Upper Limb Assessment (RULA). methods is used to assess the workers' posture during activities. The research results are expected to provide improvement recommendations in accordance with ergonomic and biomechanical principles, thereby enhancing worker performance and health as well as reducing the risk of injury.

Keywords: *Human Factors, Company Performance, Musculoskeletal Disorders, RULA, Ergonomics, PT Rusunda Medika Abadi.*

1. INTRODUCTION

The industry in Indonesia at this time is experiencing quite significant development each year. Especially the development of competition in goods or services, businesses compete with each other to dominate the market share they are focused on. In achieving these goals, there are many things that can be learned and applied to develop the business to be more innovative, productive, and highly competitive in order to achieve higher Input with relatively lower or optimal Output.

Therefore, via preventive, ergonomics in the workplace are crucial to enhancing employees' physical and mental health. Workplace injuries and illnesses brought on by poor work habits over an extended period of time might impact the musculoskeletal system's health or cause

lower back discomfort. pain brought on by back muscular injuries from non-static movements **(Andrian, 2013)**. Doctors are among the occupations most commonly impacted by low back pain due to their repetitive and continuous work over extended periods of time, as well as their immediate work environment **(Khan, Bath, Boden, Adebayo, & Trask, 2019)**. One of the conditions brought on by insufficient physical activity is low back pain (LBP) **(Adha, Bahri, & Mardhotila, 2020)**.

PT Rusunda Medika Abadi is a healthcare company that specializes in circumcision for men. This company still employs humans as labor for its operational activities, particularly in the circumcision process, where PT Rusunda Medika Abadi still applies manual material handling. This work activity is performed repeatedly with a relatively high load. This poses a risk to the health of workers, as well as the occurrence of musculoskeletal disorders among doctors. Based on this, it is necessary to conduct a posture analysis of doctors to identify the risk of musculoskeletal complaints that can affect work productivity, and to provide useful improvement suggestions to minimize the occurrence of musculoskeletal issues.

Therefore, this study uses the RULA (Rapid Upper Limb Assessment). This method is used to assess the posture of workers while performing their job activities **(Oesman, Irawan, & Wisnubroto, 2019)**. RULA evaluates the posture, style, and movements of a work activity related to the use of the upper body parts, while RULA is used to assess the posture of the neck, back, arms, wrists, and legs. Workers usually perform their tasks repeatedly and continuously. Therefore, the design of work methods must align with the doctor's body posture so that the workers can perform their tasks well and correctly according to the laws of ergonomics and biomechanics, thereby improving performance, worker health, and avoiding the possibility of injuries **(Rivero, Rodríguez, Pérez, Mar, & Juárez, 2015).**

1.2 Partner Problem

The Problems faced by our patners are as follows:
PT Rusunda Medika Abadi is a healthcare company engaged in circumcision for men. This company still employs humans as the workforce for its operational activities, particularly in the circumcision process, where PT Rusunda Medika Abadi still applies manual material handling. This work activity is performed repeatedly with a relatively high load. This poses a risk to the health of workers, as well as the occurrence of musculoskeletal disorders among doctors. Based on this, it is necessary to conduct a posture analysis of doctors to identify the risk of musculoskeletal complaints that can affect work productivity, and to provide useful improvement suggestions to minimize the occurrence of musculoskeletal issues.

1.3 Intention and Objectives

According to Ginting **Rosnani (2010)**, ergonomics is a systematic branch of science that utilizes information about human traits, abilities, and limitations in designing a work system, so that people can live and work within a good system to achieve the desired goals through effective, efficient, safe, and comfortable work **Taofik, I. M. &, & Mauluddin, Y (2015)**. Meanwhile, according to **(Sutalaksana, 1979)**, ergonomics is a systematic branch of science that utilizes information about human traits, abilities, and limitations to design a work system so that people can live and work within that system well, achieving the desired goals through that work effectively, safely, and comfortably **(Sokhibi, 2017).**

Rapid Upper Limb Assessment (RULA) is a research method for investigating disorders of the limbs. This method was designed by Lynn Mc Atamney and Nigel Corlett in 1993, providing a

calculation of the level of musculoskeletal load in a job that poses a risk to body parts from the abdomen to the neck or other limbs **(Ariani, 2010)**.
This method does not require special equipment in the assessment of neck, back, and upper arm postures. Each movement is given a predetermined score. RULA was developed as a method to detect work postures that are risk factors. The method is designed to assess workers and identify musculoskeletal loads that may cause disorders in the upper limbs **(Mariawati, Umyati, & Noorina, 2017)**.

Rapid Upper Limb Assessment is a method developed in the field of ergonomics that investigates and evaluates the working position performed by the upper body. Diagrams of body postures and four assessment tables are provided to evaluate dangerous working postures in such work cycles **(Wijayanti, Sugiyono, & Marlyana, 2019)**. The RULA method was introduced by Sue Hignett and Lynn McAtamney and published in the journal Applied Ergonomics. The RULA method allows for a joint analysis of the positions of the upper body parts (arms, forearms, and wrists), torso, neck, and legs.

2. IMPLEMENTATION METHOD

The location of our partners is in PT RUSUNDA Medika Abadi, Mediterania Building, Jl. Galuh Mas Raya No.5 Block I, Sukaharja, Telukjambe Timur, Karawang, West Java 41361 The method in this activity is the identification of needs and problems that occur for doctors while working. The chosen method is RULA.

2.1 Data Collection And Data Processing

Data collection was conducted through the observation of doctors at PT. Rusunda Medika Abadi, Karawang Regency. Data collection was carried out by taking photos of the working posture of circumcision doctors while they were working.

a. Respondent characteristics
The circumcision doctors are marked by male and female genders who come from Medika Abadi, Mediterania Building, Jl. Galuh Mas Raya No.5 Block I, Sukaharja, Telukjambe Timur, Karawang, West Java Province. Partners assist in identifying and providing the necessary information and data to support the success of service activities. The partner (doctor) is directly involved during the practice to acquire skills in using ergonomic workstations and in performing skeletal muscle stretching. The partner (doctor) uses the ergonomic workstation themselves and performs skeletal muscle stretching. Activities using direct fieldwork methods serve as an experience for the author, who is an Industrial Engineering student. Furthermore, to be more beneficial for the surrounding community in terms of health by interacting more closely through mass circumcision

Figure 1. Body Posture Activity of Dr. Alvin Robbani

Subjective musculoskeletal problems and work posture are the variables examined in this study. As seen in Figure 1, questionnaires were used in interviews to gather information on respondent characteristics such age, gender, and working hours. Work postures during tasks like hugging, planting, and harvesting are photographed as part of the tool used to collect work posture data. to use the RULA approach to examine work posture and a questionnaire to find subjective musculoskeletal symptoms.

2.2 Job Description

This study involves Doctors engaged in circumcision activities. This research is conducted to investigate and recommend improvements to the posture of Doctors who are at risk of injury while performing circumcision on Patients. When Doctors Perform Circumcision on Patients, the researchers take photos and videos from the left and right sides using a camera.

2.3 Equipment Used

In this research, there are measuring instruments or tools used during the PKM activity research.

1. This camera serves as a tool to take photos/videos of agricultural workers while they are lifting peat in the basement area.
2. Demographic Data Questionnaire

In addition to asking about the doctor's name, gender, age, height, weight, BMI, and experience, the Demographic Data Questionnaire also asks about any pain or illness the doctor may have had in the week before the research. The formula is used to compute the body mass index, or BMI.

BMI = Weight (Kg) : Height(m) X Height (m) .....(1)

Underweight or thinness is defined by the national bmi or imt categorization as having a BMI between 18.5-25.0, whereas obesity is defined as having a bmi greater than 25 (Bachrodin, 2012).

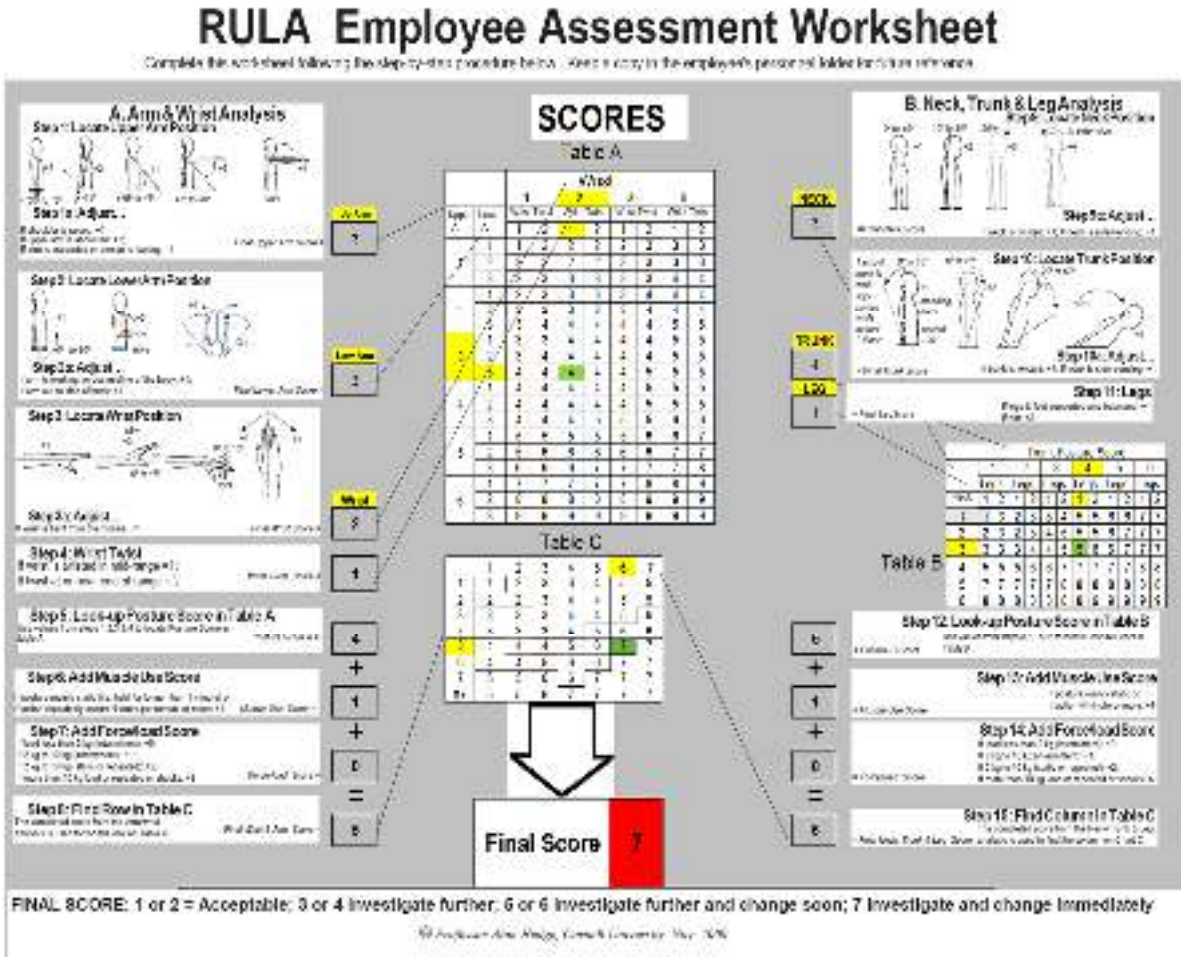
2.4 Worksheet RULA

In the village area of Napal, Seluma district, a farmer's body posture during planting is evaluated using a worksheet, also known as an RULA worksheet. There are values on the RULA worksheet that correspond to the degree of damage risk and the necessary course of action. The risk level is disregarded and no improvement is required if the RULA final score is 1. The 4 to 5 value is moderate and needs improvement, while the 2 to 3 value is low and can be improved. Since values 6 to 7 are high, progress can be done right away.

3. RESULT AND DISCUSSION

3.1 Body Posture Analysis Before Improvement

Table 1. Report Analysis of Posture Before Improvement



This section contains the results of body posture measurements using the Rapid Upper Limb Assessment (RULA) method, table 1 shows the posture of the farm worker before making improvement. On the Report Analysis of Posture Before Improvement table, score 7 is indicating that the posture is classified as high-risk and needs immediate correction.

Figure 2. Angle size determination

Using paint software, this angle size determination creates a line on particular areas, including the wrist, lower arm, arm, neck, and back. then uses Ergofellow software to calculate the angle size based on the angle marked on that portion, as illustrated in Figure 2.

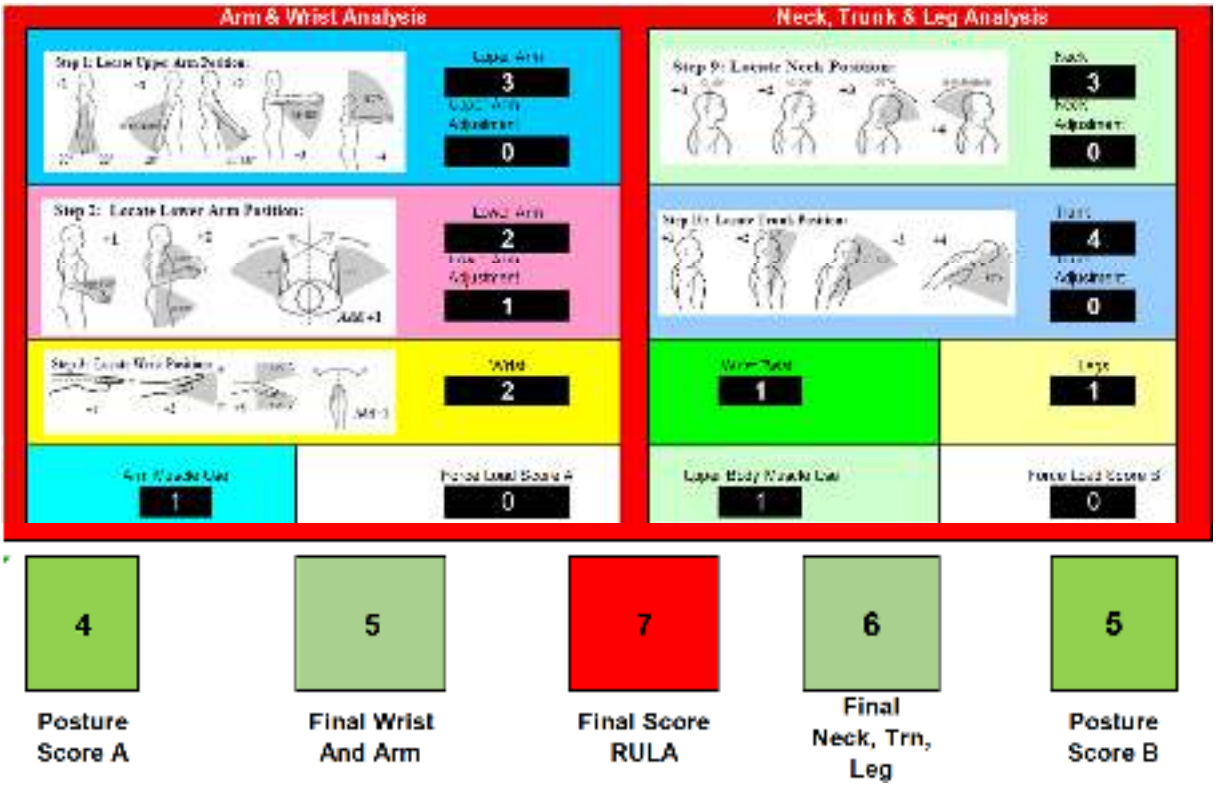


Figure 3. RULA Assessment Worksheet before making improvements

Figure 3 showed group A at step 1 and 2 which the score of the upper arm is 3 points, because the angle of position responders has a range of 45˚-90˚. The angle size on the lower arm of responders is 57.4˚so the score is 3 points. Figure 3 shows score 2 points for the hand wrist, because the angle size of the wrist is 7.8º . As seen in figure 3, the operator's wrist conditions are rotating at a medium distance, resulting in scores at the wrist's rotation position of 1 point. Positioning the upper and lower arms on table A while using wrist score and wrist twist yields this score. Step 5's score then equals one point. Step 6's score is 1, which is determined by the body's posture during statically working for more than ten minutes and doing four one-minute movements. According to its criteria, this score examines the load condition that the operator received. Because the operator got load circumstances that were less than 4.4 pounds, the score in step 7 is zero. The total of the points earned in steps five, six, and seven was used to calculate this score. Step 8's point is then three points. Because the respondent's angle on the throat portion is 25˚, Figure 3 displays a score of 2 points for the neck portion. The response angle size on the trunk is 55.2º, which results in a score of 4 points on the back. The total scores from groups A and B are shown in Figure 3, which leads to the ultimate RULA score before improvement of 7 points.

3.2 Working Posture Improvement With the Application of Auxiliary Padi Cutting Tool

Sitting posture, especially when sitting on a bench that does not support the shape of the spine, will cause faster fatigue and problems with the spine. Therefore, workers are expected to stand during their work process so that the risk of spinal problems and fatigue can be

reduced. Figure 4 and 5 shows design for a bed that can be adjusted in height according to the operator's height so that the operator can work standing upright without bending down or looking up slightly.

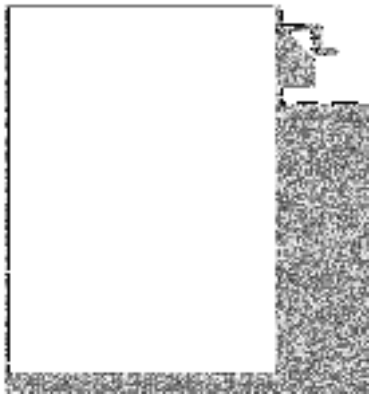


Figure 4. Bed Design Top View

Figure 5. Bed Design Front View

From the adjustment of the work system, a simulation of the adjustment of workers' postures was conducted. The simulation was carried out manually, considering workers in a standing position, using RULA.

3.3 Results of Working Posture Improvement with Rapid Upper Limb Assessment Method (RULA)

This section is about measuring posture with the Rapid Upper Limb Assessment method. (RULA). Figure 6 shows the posture of the peasant workers after repairs.

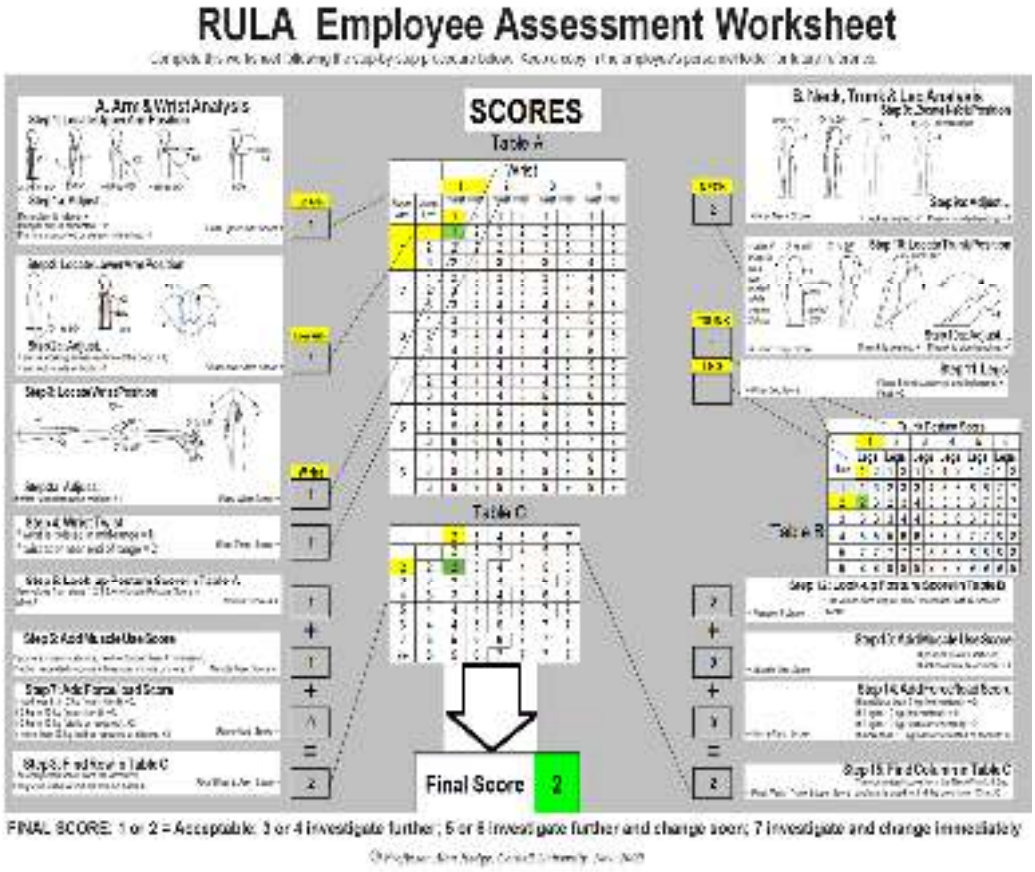


Figure 6. The Posture of The Peasant Workers After Improvement

On the The Posture of The Peasant Workers After Improvemen table the value is 2, indicating that the posture is included in the classification of low risk and allows for correction.

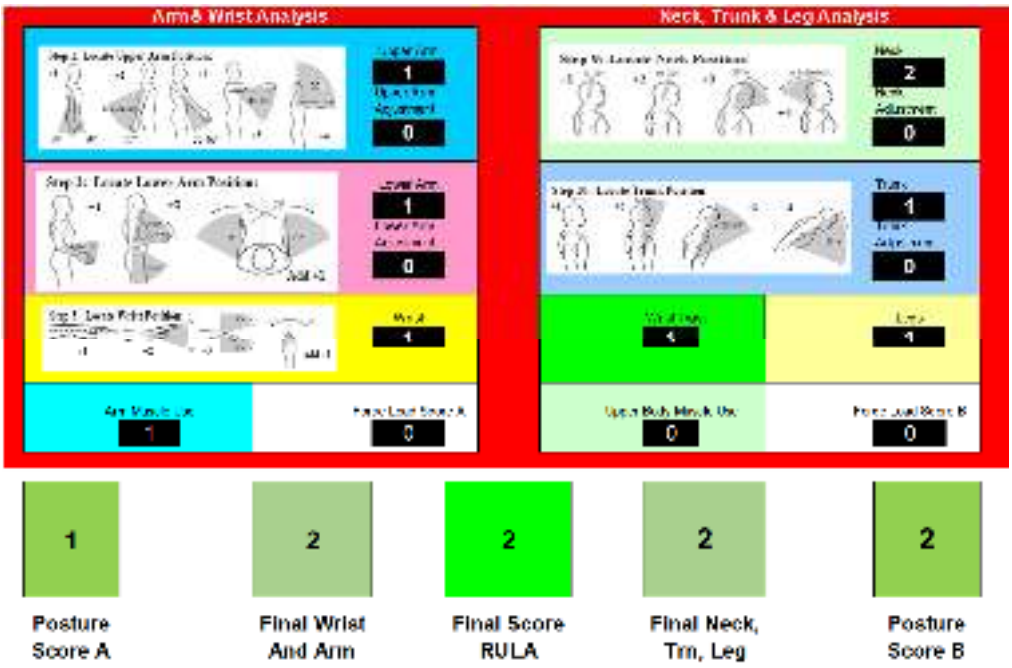


Figure 7. RULA Assessment Worksheet after improvement

Scores of the upper arm is 1 points as shown in figure 7, because the angle has a range of 20˚, that is 20˚. Scores the lower arm improvement is 0 because the operator does not have too much up or down movement, but there is an addition of +1, because of the operator's condition there is a sliding movement, then the score on this step 2 is 1 point. Scores the hand wrestling part of 1 point, because the angle is 0˚. Scores at the rotation position of the wrist of 1 point, because the operator's wrist conditions are rotating at medium distance. This score is obtained from positioning on table A between upper arm and lower arm with wrist score and wrist twist. Then the score on step 5 is equal to 1 point. This score is based on the posture of the body when working statically for > 10 minutes and 4x/1 minute movements, then the score on step 6 is 1. This score looks from the load condition received by the operator according to its standard. Then the score in step 7 is 0 because the load conditions received by operator is < 4.4 lbs. This score was obtained from the accumulation of points obtainé from step 5, step 6, and step 7. Then the point on step 8 is 2 points. The score on the neck is 2 points (figure 7), because the angle is 10^{o} , that is 10˚. Score on the back of 1 points, because the angle on the Figure 7 has a range of 20˚, that is 15.5^{o} . Figure 7 describes the scores obtained from the entire group A, and group B, thus resulting in a final RULA score of 2 points included in the classification is low risk and allows improvement.

4. CONCLUSIONS

The results of the work posture assessment on doctors using the RULA method indicate that immediate changes are necessary, with a RULA score of 7 indicating a high risk to health. Adjustment of the work system with the use of height-adjustable desks is proposed to allow doctors to work in a standing position, thereby reducing the risk of fatigue and spinal problems. Post-adjustment simulations show significant improvement, with the RULA score decreasing to 2. This underscores the importance of applying ergonomic principles to enhance worker performance and health, as well as to minimize the risk of injury.

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