

Ergonomic Risk Analysis with Reba and Rula Methods in Women's Hairdresser

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Abstract

In working environments, the body takes position according to the work and processes. The deviation of the body from its normal posture, the strain on the limbs, overstretching, burden-bearing and prolonged standing work factors, and the lack of time between these unsuitable situations can result in work-related diseases. Today, using ergonomic risk analysis to determine the situations; the strain levels of the body parts of the employees, and the risk dimensions of the work and procedures are determined. In this context, hairdressers in the service sector are at risk in terms of ergonomic risk factors and musculoskeletal disorders due to their work-related duties. In this study, during the services provided by a female hairdresser, risk analyses were made in terms of ergonomics, and REBA and RULA methods were used. 8 basic operations performed in the hairdressing salon were evaluated, 2 transactions were determined as high risk and 6 transactions were determined as medium risk. According to the results of the study, suggestions were made to the hairdresser owner.

Keywords: Ergonomic Risk Analysis, Musculoskeletal System Disorders, Hairdresser, REBA, RULA.

Kadın Kuaföründe Reba ve Rula Yöntemleri ile Ergonomik Risk Analizi

Öz

Çalışma ortamlarında vücut yapılan iş ve işlemlere göre pozisyon almaktadır. Vücudun normal duruşundan sapması, uzuvların zorlanması, aşırı gerilmesi, yük taşınması ve uzun süreli ayakta çalışma faktörleri ve bu uygun olmayan durumların arasındaki zaman yetersizliği işe bağlı hastalıkları doğurabilir. Günümüzde bu durumların tespiti için ergonomik risk analizleri kullanılarak çalışanların vücut uzuvlarının zorlanma dereceleri ile yapılan iş ve işlemlerin risk boyutları belirlenmektedir. Bu kapsamda hizmet sektöründe olan kuaförler, işle ilgili görevleri nedeniyle ergonomik risk faktörleri ve kas iskelet sistemi bozuklukları açısından risk altında olan bir meslek grubudur. Bu çalışmada bir kadın kuaföründe verilen hizmetler esnasında ergonomik açıdan risk analizleri yapılmış, REBA ve RULA yöntemleri kullanılmıştır. Kuaför salonunda gerçekleştirilen 8 temel işlem değerlendirilmiş, 2 işlem yüksek riskli, 6 işlem orta riskli olarak tespit edilmiştir. Çalışma sonucuna göre kuaför sahibine önerilerde bulunulmuştur.

Anahtar Kelimeler Ergonomik Risk Analizi, Kas İskelet Sistemi Rahatsızlıkları, Kuaför, REBA, RULA.

1. INTRODUCTION

Ergonomics - the word "work science" is derived from the Greek ergon (work) and nomos (laws). According to the definition of the International Ergonomics Association (IEA), ergonomics is a scientific discipline related to understanding the interactions between

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humans and other elements of the system. It is the profession that implements the theory, method, and principles in a way that maintains human well-being and general performance at the most appropriate level (IEA, 2021). Ergonomics; is a science that improves the quality of life of people, ensures harmony between work and employees and enables people to adapt their lives to human beings. In this context, ergonomics has two main objectives. These are increasing efficiency and protecting employee health (Karadağ, 1994; Kır, 2015).

One of the factors threatening the health and safety of employees in workplaces is ergonomic risk factors. Among these factors; there are psychosocial and organizational risk factors, posture, repetitive movements, and workplace risk factors due to load (force), environmental risk factors such as noise, thermal comfort, vibration, and anthropometric risk factors originating from the person running the work (Murrel, 1971).

Women's hairdressing is included in the "Social and personal services" sector according to the National Occupational Standards announced by the Turkish Vocational Qualifications Authority (TVQA) in 2016 (TVQA, 2021), in the main group of "Other service activities" according to the Statistical Classification of Economic Activities in the European Community (SCEAEC) "Other beauty salons" (SCEAEC, 2021) and classified as a "Dangerous" workplace according to the Regulation of Workplace Hazard Classes on Occupational Health and Safety (RWHC, 2012).

Hairdressers are an occupational group that is at risk for ergonomic risk factors and musculoskeletal disorders due to their work-related duties. Because they make a lot of repetitive movements by using their upper limbs and they serve by working standing for long periods. It is necessary to determine the working conditions under which hairdressers are in, repetitive body movements, and working positions to improve the hairdressing service and to demonstrate the approaches required to increase the health and productivity of the employees in terms of ergonomics. In this context, it is important to examine and analyze the body postures while working in the places where hairdressing service is provided with scientific methods, to make improvements with the necessary arrangements, and to contribute to the reduction of musculoskeletal system diseases (MSD).



Figure 1. Examples of Improper Posture Experienced During Routine Procedures in Hairdressers (https://at.dk/media/3176/frisoer_drejbog_basis_1016_rs.pdf).

Seen in employees, affecting soft tissues, muscles, ligaments, tendons, and discs which can develop in an acute/chronic form depending on the lifestyle, age, activity level, and occupation type, have an important share in occupational diseases today, can progress with motion restriction, work-related pain and disability situations are called work-related MSD (Felekoğlu and Taşan, 2017). MSD comes from ordinary movements such as holding, flexing, gripping, straightening, reaching, and bending (CCOHS, 2021; Akay et al., 2003). These common movements are not harmful in the usual activities of daily life. What makes

these movements harmful is the continuous repetition of the movements, their speed, and the lack of time between two movements for recovery (CCOHS, 2021; Esen et al., 2013). In case the necessary improvements are not made despite such difficulties and the problems are ignored, the increase in MSD cannot be prevented. This increase creates inefficiency and even losses in the workforce, which causes cost and time loss. Due to this importance, ergonomic arrangements have gained importance to minimize MSD in recent times (Kahya and Söylemez, 2019).

Ergonomics science has a very important role in ensuring occupational health and safety in workplaces. Determining which postures during work are riskier for the health of employees is an important area of ergonomics (Santos et al., 2007). The appropriateness of working postures enables the reduction of MSD and effective control of work performance (Mattila et al., 1993).

There are several different methods for assessing the risk of MSD that may develop due to the level of physical strain that employees are exposed to. These are Unloading related methods (Revised NIOSH Lifting Equation, Snook Tables, Lowering, Pushing, Pulling and Transport Model), Observation/survey-based methods (RULA, REBA, OWAS, JSI, QEC, OCRA, Cornell MSD Questionnaire), Computational biomechanical measures (Goniometer, Inclinator, Potentiometric Electrogoniometer, and Flexible Goniometer). Among these methods, the easiest and most cost-effective methods are the methods based on the questionnaire, the most reliable and accurate but costly one is numerical biomechanical measurements and the most widely used methods are the methods related to lifting the load and the methods based on observation (Esen and Fiğlalı, 2013; Kır, 2015; Kahya and Söylemez, 2019). In the scientific literature, methods based on observation and questionnaires are still frequently used to determine ergonomic risk dimensions in many jobs and processes.

In Aydemir Acar's study with women hairdressers in Denizli province, 9 procedures were analyzed with the RULA method, and make-up, eyebrow shaping, and hand and foot care (manicure or pedicure) were found to be the most ergonomically risky procedures. Hair straightening (blow-drying), hair cutting, and coloring are in the high/very high-risk operations category; hair styling and hair drying are also identified as low/medium risk procedures (Aydemir Acar, 2020). Mahdavi et al. observed 1032 working postures with the REBA method in women hairdressers in Iran, in terms of ergonomics, 46% of working postures were high-risk, 34.4% medium-risk, 14.9% very high-risk, and 5.1% were identified as low risk (Mahdavi et al., 2014). In a study conducted by Hokmabadi et al. in 2011 with 50 people working in hairdressers using the REBA method, the effects of the right and left parts of the body during working postures were evaluated, 4% low level, 56-76% medium level, 30-16% high level, 10-4% a very high level of risk has been identified (Hokmabadi et al., 2012). In the study by Yarandi et al. in which 80 barbers were included in Karaj, an ergonomic risk analysis was performed using the REBA method, and 28.7% of the working postures were found to be low and 71.3% moderately risky (Yarandi et al., 2018). In a study in which the occupational pain status was questioned in 220 hairdressers in Brazil, according to the procedures performed, the areas with the most pain were determined as shoulders, neck, and back, respectively. In the same study, the comfort of the neck, body, and shoulders during serving was questioned, and most of the hairdressers stated that their neck, body, and shoulders were working in an uncomfortable position (Mussi and Gouveia, 2008). In a study by Mermer et al. in Bornova, İzmir, where the working conditions of women hairdressers and health problems that may arise from the profession were investigated, 60% of the participants were on the spine-back, 59.1% on the neck, 57.7% on the shoulders, 46.1% of them stated that they had pain in the waist and 42.1% in the wrists, 81.7% stated that they constantly worked standing up and as a result of the study, it was determined that

the hairdressers had the most ergonomic and psychological burden-related health problems (Mermer et al, 2014).

Based on the scientific literature review, it is aimed to determine the upper limb and body strains experienced during the service delivery in a female hairdresser using REBA and RULA methods and to present suggestions.

2. METHOD

In this study, in a female hairdresser serving in Giresun province, posture disorders experienced during service delivery were observed and ergonomic risk analyzes were carried out with REBA and RULA methods. A person is working in the hairdresser and the hairdressing staff provides services such as blow dryer, hair styling, washing, cutting, eyebrow shaping, drying, coloring, hand, and foot care. Each service served has been recorded in photographs and videos. Video recording was closed after viewing the basic service made in the process. The recorded postures were analyzed and the results were added to the study. The methods used in the study are explained below.

2.1. Rapid Upper Limb Assessment (RULA)

RULA was developed by Lynn Mc Atamney and E Nigel Corlett. This method is an ergonomic analysis method that does not require special equipment to provide a rapid assessment, developed for use in ergonomics researches of workplaces, where work-related upper extremity disorders are reported. It analyzes neck, trunk, and upper extremity postures depending on the external loads the body is subjected to (Mc Atamney and Nigel Corlett, 1993). In the RULA method, the risk score is determined by giving points to the postures, taking into account the momentary posture of the neck, trunk, and upper extremity during the stance to be analyzed. In the RULA method, scoring is carried out in two stages.

In the first stage; "Upper Arm Score", "Lower Arm Score", "Wrist Point" and "Wrist Twist Score" are replaced in table 1, and "Posture Score (Score A)" is obtained.

Upper arm movements and scores; "0° - 20° extension / 0° - 20° flexing" 1 point", "> 20° extension, 20°-45° flexing" 2 points, "45° - 90° flexing" 3 points and "> 90° flexing" 4 points, consists of options. In addition, 1 point is added to the upper arm score if the "Shoulder is elevated" in the working posture, 1 point is added if the "Arm is abducted" and 1 point is subtracted if the "Arm is supported or the person is leaning". Lower arm movements and scores; "60° - 100° flexing" 1 point and "< 60° flexing or > 100° flexing" 2 points consists of options. In addition, 1 is added to the lower arm score, "If the arm is on the middle axis of the body or its right and left". Wrist movements and scores; "0° neutral position" 1 point, "0° - 15° flexing / 0° - 15° extension" 2 points and "> 15° flexing / > 15° extension" 3 points consists of options. In addition, 1 point is added to the wrist score if "The wrist is bent away from the middle axis to the right and left". Wrist twist and scores; "1 point if "Mid-range of twist" and 2 points if "Excessively twist" consists of options.

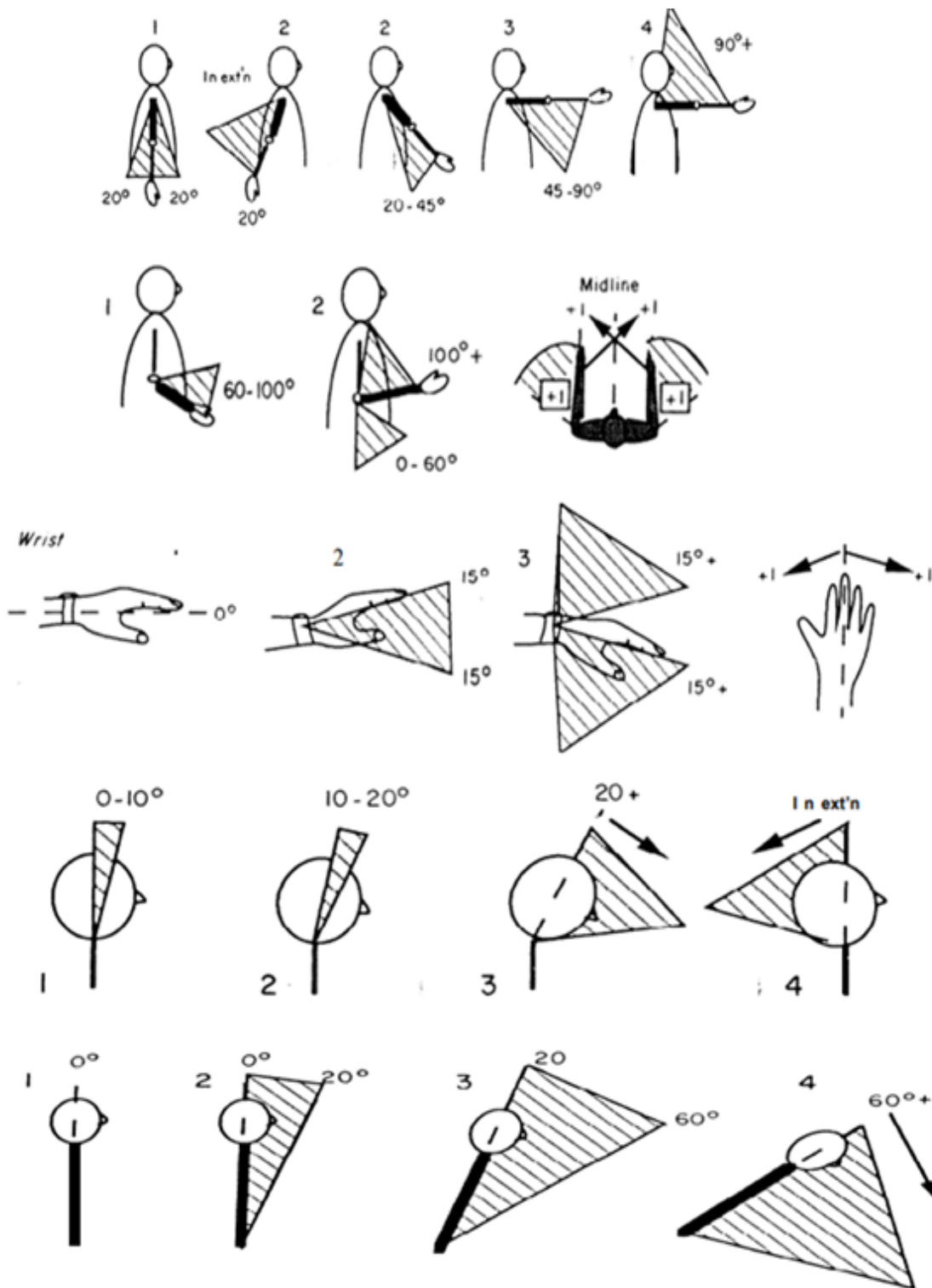


Figure 2. Upper and Lower Arm, Wrist, Neck and Body Scoring Indicators (McAtamney and Nigel Corlett, 1993).

Table 1. RULA Method Table A

Table A		Wrist Point							
		1		2		3		4	
Upper Arm Score	Lower Arm Score	Wrist Twist		Wrist Twist		Wrist Twist		Wrist Twist	
		1	2	1	2	1	2	1	2
1	1	1	2	2	2	2	3	3	3
	2	2	2	2	2	3	3	3	3
	3	2	3	3	3	3	3	4	4
2	1	2	3	3	3	3	4	4	4
	2	3	3	3	3	3	4	4	4
	3	3	4	4	4	4	4	5	5
3	1	3	3	4	4	4	4	4	5
	2	3	4	4	4	4	4	5	5
	3	4	4	4	4	4	5	5	5
4	1	4	4	4	4	4	5	5	5
	2	4	4	4	4	4	5	5	5
	3	4	4	4	5	5	5	6	6
5	1	5	5	5	5	5	6	6	7
	2	5	6	6	6	6	7	7	7
	3	6	6	6	7	7	7	7	8
6	1	7	7	7	7	7	8	8	9
	2	8	8	8	8	8	9	9	9
	3	9	9	9	9	9	9	9	9

As the last part of the first stage of the RULA Method the following equation is used;

$$\text{Point A} + \text{Muscle Use Point} + \text{Force / Load Point} = \text{Point C} \quad (1)$$

One of two statuses is chosen for Muscle Use Points: 1 point if "The posture is mostly static" or 1 point "If the movement is repeated 4 times a minute".

One of four states is chosen for Force / Load Point: Load; 0 point if "Less than 2 kg (intermittent)", 1 point if "2 kg to 10 kg (intermittent)", 2 points if "2 kg to 10 kg (static or repeated)" and 3 points "More than 10 kg (static or repeated)" or if there is load, repetitive motion or shock.

In the second stage; "Neck Score", "Trunk Score" and "Leg Score" are placed in table 2, and "Posture Score (Score B)" is obtained.

Neck movements and scores; "0°-10° flexing" 1 point, "10°-20° flexing" 2 points, "> 20° flexing" 3 points and "> 20° extension" 4 points consists of options. In addition, 1 point is added to the neck score, "If there is a twisting or side twisting in the neck". Trunk movements and scores; "Neutral-straight stance" 1 point, "0°-20 flexion" 2 points, "20°-60° flexing" 3 points and "> 60° flexing" 4 points consists of options. In addition, 1 point is added to the trunk movement score, if there is a twisting or side-bending of the trunk. Leg/foot movements and scores; 1 point if "Legs and feet are well supported and body weight is evenly distributed" and if "The legs and feet are not supported or the weight is unevenly balanced" 2 points consists of options.

Table 2.RULA Method Table B

Neck Point	Trunk Point											
	1		2		3		4		5		6	
	Legs		Legs		Legs		Legs		Legs		Legs	
	1	2	1	2	1	2	1	2	1	2	1	2
1	1	3	2	3	3	4	5	5	6	6	7	7
2	2	3	2	3	4	5	5	5	6	7	7	7
3	3	3	3	4	4	5	5	6	6	7	7	7
4	5	5	5	6	6	7	7	7	7	7	8	8
5	7	7	7	7	7	8	8	8	8	8	8	8
6	8	8	8	8	8	8	8	9	9	9	9	9

As the last part of the second stage of the RULA Method the following equation is used; Point B + Muscle Use Point + Force / Load Point = Point D (2)
 Score C and Score D are placed in Table 3 and the RULA score of the analyzed posture is found.

Table 3.RULA Method Table C

Table C		Neck, Body, Leg Points						
		1	2	3	4	5	6	7+
Wrist / Arm Points	1	1	2	3	3	4	5	5
	2	2	2	3	4	4	5	5
	3	3	3	3	4	4	5	6
	4	3	3	3	4	5	6	6
	5	4	4	4	5	6	7	7
	6	4	4	5	6	6	7	7
	7	5	5	6	6	7	7	7
	8+	5	5	6	7	7	7	7

Table 4. RULA Method Result Action Levels

Measure Level	RULA Score	Risk Level	Prevention
1	1-2	Negligible	Acceptable posture
2	3-4	Low	More research and changes needed
3	5-6	Middle	Research and change needed in a short time
4	≥ 7	High	Immediate improvement needed

2.2. Rapid Entire Body Assessment (REBA):

REBA is an analysis method in which the whole body is evaluated quickly and systematically and the risks related to the possible posture experienced in the employees are determined. It is specifically designed to be sensitive to the unpredictable type of work posture found in healthcare and other service sectors (Hignett and McAtamney, 2000). In the REBA method, the risk score is determined by giving points to the postures, taking into account the momentary posture of the neck, trunk, legs, upper arm, and lower arm during the stance to be analyzed. Scoring in the REBA method is carried out in three stages.

In the first stage; the neck, body, and leg analyzes of the posture are made. Body posture The "Stance Point" is placed in Table 5 by giving points according to the angular values and the shape of the posture.

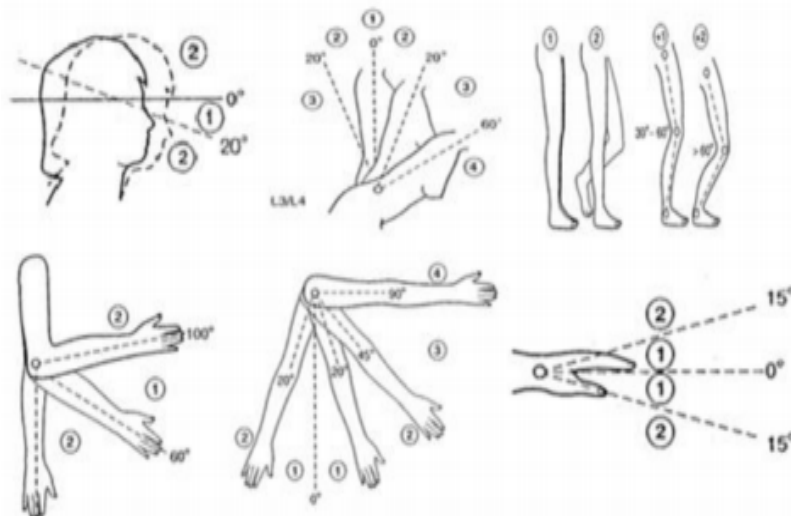


Figure 3. Neck, Trunk, Leg, Upper and Lower Arm, and Wrist Scoring Indicators (Hignett and McAtamney, 2000).

Neck movements and scores; "0°-20° flexing" 1 point and "> 20° flexing or extension" 2 points consists of options. In addition, 1 point is added to the neck score for "If there is a twisting or side flexed in the neck".

Leg movements and scores; "If there is a load on both legs, walking or sitting" 1 point and "If there is a load on one leg or if there is unbalanced posture" 2 points consist of the options. In addition, 1 point is added to the leg score if "The knees flexing between 30°-60°" and if "The knees flexing more than 60° (excluding sitting)" 2 points are added.

Trunk movements and points; "Upright posture" 1 point, "0°-20° flexing / 0°-20° extension" 2 points, "20°-60° flexing / > 20° extension" 3 points and "> 60° flexing" 4 point consists of options. In addition, 1 point is added to the trunk score for "If there is a flexing movement in the trunk" or 1 point "If there is a side flexed movement in the trunk".

As the last part of the first stage of the REBA Method the following equation is used;
Stance Score + Force / Load Score = Score A (3)

Table 5.REBA Method Table A

Table A	Neck												
		1				2				3			
	Legs	1	2	3	4	1	2	3	4	1	2	3	4
Trunk	1	1	2	3	4	1	2	3	4	3	3	5	6
	2	2	3	4	5	3	4	5	6	4	5	6	7
	3	2	4	5	6	4	5	6	7	5	6	7	8
	4	4	5	6	7	5	6	7	8	6	7	8	9
	5	5	6	7	8	6	7	8	9	7	8	9	9

One of three states is chosen for Force / Load Score: Force / Load; "<5 kg" 0 points, "5-10 kg" 1 point, "> 10 kg" 2 points, and if there is a "Shock or rapid build-up of force" +1 point is added.

In the second stage; "Arm and Wrist Analyzes" is made, it is placed in Table 6 and Score B is obtained.

Lower arm movements and scores; "60 -100° flexing" 1 point and "< 60° flexing or >100° flexing" 2 points consists of options.

Upper arm movements and scores; "0°-20° extension / 0°-20° flexing" 1 point, "20°-45° flexing / > 20° flexing" 2 points, "45°-90° flexing" 3 points and ">90° flexing" 4 points consists of options. Also to the upper arm score; 1 point is added for "If the shoulders are raised", 1 point is added "If the arm is abducted or rotated" or 1 point is subtracted "If the arms are supported or if posture is gravity-assisted".

Wrist movements and scores; "0°-15° extension / 0°-15° flexing" 1 point and ">15° flexing / >15° extension" 2 points consists of options. In addition, 1 point is added to the wrist score "If the wrist is deviated or twisted".

Table 6. REBA Method Table B

Table B	Lower Arm Score						
		1			2		
	Wrist Point	1	2	3	1	2	3
Upper Arm Score	1	1	2	2	1	2	3
	2	1	2	3	2	3	4
	3	3	4	5	4	5	5
	4	4	5	5	5	6	7
	5	6	7	8	7	8	8
	6	7	8	8	8	9	9

As the last part of the second stage of the REBA Method the following equation is used;
 Table B Score + Coupling Score = Score B (4)
 One of four conditions is chosen for the Coupling Score: "Well-fitting handle and a mid-range, power grip" 0 points, "The handgrip is acceptable but not ideal, it is supported by another part of the body" 1 point, "Handgrip is unacceptable but possible (weak)" 2 points and "No handle, no way to support holding with hand or body" 3 points.

In the third stage; Score A and Score B values obtained in the first and second stages are replaced in Table 7 and Table C Score is obtained.

Table 7. REBA Method Table C

Score A	Table C											
	Score B											
	1	2	3	4	5	6	7	8	9	10	11	12
1	1	1	1	2	3	3	4	5	6	7	7	7
2	1	2	2	3	4	4	5	6	6	7	7	8
3	2	3	3	3	4	5	6	7	7	8	8	8
4	3	4	4	4	5	6	7	8	8	9	9	9
5	4	4	4	5	6	7	8	8	9	9	9	9
6	6	6	6	7	8	8	9	9	10	10	10	10
7	7	7	7	8	9	9	9	10	10	11	11	11
8	8	8	8	9	10	10	10	10	10	11	11	11
9	9	9	9	10	10	10	11	11	11	12	12	12
10	10	10	10	11	11	11	11	12	12	12	12	12
11	11	11	11	11	12	12	12	12	12	12	12	12
12	12	12	12	12	12	12	12	12	12	12	12	12

As the last part of the third stage of the REBA Method the following equation is used;

Table C Score + Activity Score = REBA Score (5)

One of three conditions is chosen for the Activity Score; "If one or more organs stay in the same position for more than a minute" 1 point, "If there is repeated small range actions (not including walking)" 1 point and "If there is a rapid change in posture" 1 point.

Table 8. REBA Risk Decision Matrix

Measure Level	REBA Score	Risk Level	Prevention
0	1	Negligible	None necessary
1	2-3	Low	May be necessary
2	4-7	Medium	Necessary
3	8-10	High	Necessary soon
4	11-15	Very High	Necessary now

The main goal of the study is; during the service provision in the working environment, it is to ensure that the constantly repetitive unsuitable is detected and to create safer working environments with simple and preventive measures. In this way, it may be possible to ensure the satisfaction of the service provider, to prevent work-related accidents and injuries and the related workforce losses.

Before starting the study, the decision of the Ethics Committee of Giresun University Social Sciences Science and Engineering Studies Ethics Committee was taken, dated 12.03.2021 and numbered 08/11, and written permission was taken from the owner of the business where the study was conducted. At the same time, verbal and written consent was obtained from the people who came to the business for service, without taking photographs and videos required for ergonomic analysis to observe the privacy conditions of the service users, the photographs were not included in the study. Study data were collected between 15.03.2021-31.03.2021 and the conditions for the coronavirus pandemic were complied with.

3. RESULTS

In the hairdressing salon where the study was conducted, 8 basic operations were evaluated, the scores of the sub-operations were collected, the average scores were taken and the basic operation scores were calculated. The RULA method was used for the basic hand and foot care procedure, and the REBA method was used for the other basic operations.

Table 9. Analysis Results

Basic Operations	Sub-Operations	REBA Score
Blow Drying	Washing the hair	6
	Combing the hair	8
	Drying the hair	7
	Blow drying of the hair	8
Average Score		7,25
Hair Styling (1)	Combing the hair	8
	Styling with a straightener	4
Average Score		6
Hair Styling (2)	Washing the hair	6
	Combing the hair	8
	Drying the hair	7
	Applying lotion to the hair	2
	Styling with a straightener	4
Average Score		5,40
Hair Washing	Washing the hair	6
	Combing the hair	8
	Drying the hair	7
Average Score		7
Cutting Hair	Washing the hair	6
	Combing the hair	8
	Styling the hair	4
	Applying lotion to the hair	2
	Blow drying of the hair	8
Average Score		5,60
Eyebrow Shaping	Combing the eyebrow	7
	Cutting the eyebrow	9
	Removing the eyebrow	8
	Cleaning the eyebrow	8
Average Score		8
Hair Coloring	Dyeing the hair	9
	Washing the hair	6
	Drying the hair	7
	Applying lotion to the hair	2
Average Score		6
		RULA Score
	Filing of nails	7
	Pushing back cuticles	8

Hand and Foot Care	Soaking nails in water	4
	Cutting cuticles	8
	Polishing nails	6
	Coloring of nails	7
	Hand and foot massage	6
Average Score		6,57

According to the data in Table 9; while providing services in blow-drying, hair styling 1 and 2, hair washing, haircutting, and hair coloring, the body is at moderate risk, and action should be taken.

While providing services in eyebrow shaping and hand and foot care; the body is at high risk. Immediate improvement should be made for the strains that the upper limbs are exposed to in hand and foot care and measures should be taken soon for the strains of the whole body in eyebrow shaping.

4. DISCUSSION AND CONCLUSION

Posture; normal alignment (configuration) of the body, trunk, head, legs, and arm in space, working posture is as well; positioning of the head, body, trunk, legs, and arms according to the characteristics of the job. Improper working postures are defined as the deviation of one or more limbs from normal-neutral body posture (Akay et al., 2003; Baş and Yapıcı, 2020; Haslegrave, 1994). This study; in a female hairdresser serving in Giresun province, it was aimed to determine inappropriate postures that cause difficulties during working with the ergonomic risk analysis methods REBA and RULA. According to the results obtained;

Blow-drying, hair styling 1 and 2, hair washing, hair cutting, and hair coloring services are medium risk. Among these services, the most difficult sub-processes for employees are; hair drying (REBA: 8), combing the hair (REBA: 8), and dyeing the hair (REBA: 9). It is necessary to take measures to protect the health status of the employees, increase productivity and prevent possible MSD. For this, the design of the workplace, the placement of tools and equipment should be in a way that provides a comfortable working posture. Risk size and exposure can be reduced by using adjustable waist and back-supported stools, especially for services that require standing for a long time.

Eyebrow shaping service is high risk. In the eyebrow shaping service, the sub-operations of cutting the eyebrows (REBA: 9), removing the eyebrow, and cleaning the eyebrow (REBA: 8) are the sub-operations that employees the most difficult. While performing these operations, the body position of the employee is in a constant state of bending. Improvement should be made immediately for the strains to which the upper limbs are subjected. For this, the seats in which the service user sits should be able to be upgraded, employees should prefer flat-soled shoes when shaping eyebrows and the risk and extent of exposure can be reduced with the use of footstools.

Hand and foot care service is high risk. In this service, which has been completed with 7 sub-processes, all sub-processes other than soaking the nails in water are very difficult for the limbs of the employees. Improvements and measures should be taken immediately for these processes. Manicure and pedicure tables designed for hand and foot care services and adjustable waist and back supported stools can be used to reduce the risk size and exposure.

MSD is the main part of occupational diseases in the workplace. Prevention from such diseases depends on the evaluation and improvement of work posture using ergonomic job analysis methods. For this, ergonomics should be given more importance to hairdressers in

occupational health and safety services, employees should be informed about correct sitting and holding, body exercises, work breaks. At the same time, increasing the number of employees will reduce the impact during service delivery.

As a result, making improvements will reduce the MSD situation, create safer working environments, prevent work-related accidents and injuries and related labor losses, and increase efficiency and profitability in the enterprise.

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