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Ergonomic Risk Factors Involved in the Domain of Hairdressers Working in India: A Case Study of North India

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ABSTRACT: India's hairdressers are susceptible to musculoskeletal disorders (MSD) at workplace due to a number of factors, such as prolonged activities, awkward postures and holding scissors. The purpose of this case study is to examine the criticality of MSD among Indian hairdressers. A growing number of cosmetologists express discomfort with musculoskeletal diseases. Finding the risky areas where danger is present throughout a hairdresser's whole work cycle is the aim of this study. Additionally, it focuses on attention on the workplace-related problems that clients and staff of Indian hair salons confront as a result of present procedures. This research also covers a wide range of these salons in north India.

KEYWORDS: Physical Ergonomics; Musculoskeletal Injury; REBA; RULA

ABBREVIATIONS: WRMSDs: Work-Related Musculoskeletal Disorders; REBA: Rapid Entire Body Assessment; RULA: Rapid Upper Limb Assessment.

I. BACKGROUND

Work-related musculoskeletal disorders (WRMSDs) are a major global health concern that impact the movements of the human body and cause muscular problems in workers in service sectors [1]. Previous research has shown that an improper workstation layout and related equipment cause employees to assume inflexible positions for longer periods of time, which increases the risk of work-related musculoskeletal disorders (WRMSDs) [2]. These risk variables significantly diminish the employee productivity on the whole and lower the calibre of their output. This study is related to the Indian salon and barber sector. Despite the extraordinary technology and heavy globalization that followed, some barbers in rural India continue to cut hair under trees without giving any regard for personal cleanliness or livelihood comfort.

One source of income that depends only on human labour is hairstyling beneath trees [3]. It also illustrates how much room there is for design intervention. In order to satisfy customers, hairdressers must exert both mental and physical effort. Hairdressers and hairstylists face a variety of risks at work, including bad posture—such as extending the neck, twisted wrists, putting strain on muscles and standing for extended periods of time. Even in awkward circumstances, they must accurately use a range of tools to complete their work and ensure that the consumers are satisfied. A variety of worker segments, such as postmen, assembly line workers, call centre personnel, and other administrative staff, have been found to be at risk of developing WRMSDs [4–5].

Furthermore, because hair cutting is a trade that mostly employs members of marginalized communities, it is seen as taboo. This has led to the absence of workstation norms for the disadvantaged hairdressers. The majority of hairdressers in India operate out of unclean little businesses, and mechanization has not yet been adopted in this field. For a variety of reasons, young teenagers are employed in the majority of the fairly priced Indian salons and parlours for diverse jobs. However, the average age of hairdressers ranges from roughly 18 to 40 for both men and women. Over time, the consequences of poor posture can mount up, posing long-term health problems and potentially leading to musculoskeletal illnesses. [9]

II. CASE STUDY

The purpose of the case study was to find out how common musculoskeletal conditions are among hairdressers. Hairdressers used Rapid Upper Limb Analysis (RULA) and Rapid Entire Body Analysis (REBA) procedures to perform their work, according to an ergonomics analysis [3]. The primary purpose of both methods is to estimate the likelihood of musculoskeletal problems in order to evaluate the working postures in hair salons [7]. Two tasks for evaluation, hair wash and haircut were included in this study among many other activities and jobs on the salon floor. The majority of the tasks performed in salons are regulated before the hair wash. Every observation was made at a salon in Jaipur (Rajasthan), where a trend was noticed throughout the process [10].

III. HAIR WASH

One hair stylist does the initial stage prior to a haircut, which is washing and prepping the client's hair (Figure 1). The professionals working on this assignment needed to be observed for any deviations from the neutral or zero posture. Depending on the customer's preferences, the person uses his left hand to rinse or lather the product in their hair and his right hand to hold the shower head. In the conclusion, basic ergonomic concepts were taken into consideration while assessing the subjects' body posture using the REBA and RULA analyses [11]. To make sure that all the important body parts and positions are properly addressed, the evaluation has been broken up into three stages.

1. Arm and wrist analysis
2. Neck and trunk analysis
3. Lower body analysis



Figure 1: Hair wash

1. Arm and Wrist Analysis

The observation indicates that the upper arm was being employed at an angle ranging from 45° to 90°, with the shoulders lifted and not relaxed, as seen in Figure 2a. In addition to the static load provided by the shower head, the lower arms were additionally extended to grip the leather and emulsify the shampoo. Due to the nature of the activity and the equipment, there was a lot of twisting and bending and what appeared to be constant wrist movement [12]. Additionally, it forces the arms to move across the body's midline. The hair stylist experienced extreme strain and discomfort as a result of their arms and wrists being in non-zero positions and from their repetitive movements.

2. Neck and Trunk Analysis

With the observations during the task, the neck and spine were not aligned and excessive stress and the load was affecting the neck area (Figure 2b). The neck was being extended at +20°, along with being bent slightly to the side. This was mainly because of a lack of clearance and reach-ability. A slouching back and stress in the lower back also

felt due to poor posture.

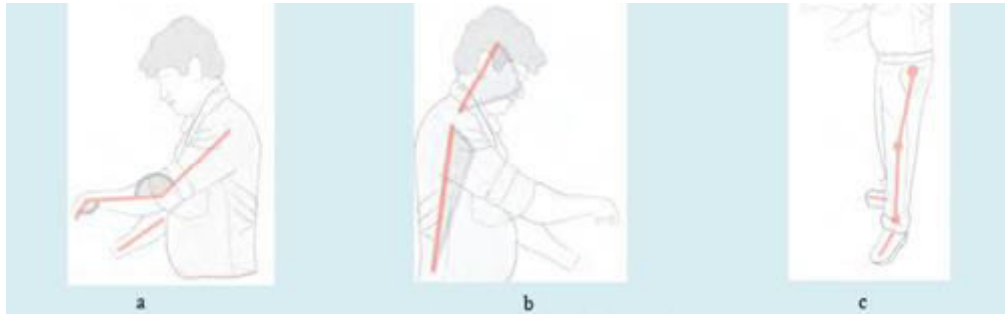


Figure 2: Posture analysis of hair wash

3. Lower Body analysis

As seen in Figure 2c, the person's body weight was not evenly distributed around the legs due to a lack of available support. Even standing for more than seven to eight minutes at a time may be a source of weariness and discomfort. He is also forced to stand in uncomfortable positions due of the limited clearance in his surroundings [13].

In summary, the employee struggled to maintain a neutral posture for his arms and wrists, maintain his torso in line with his back, and distribute his body weight evenly as a result of the lack of space. There was also a lack of knowledge regarding several joints' neutral postures. Limitations on movement of the body result in the use of excessive force and static load. The corresponding scores of REBA and RULA, after assessing the postures related to the hair wash, were found to be 11 and 7, respectively [14]. These values are at the extreme end of the range, indicating a very high level of risk associated with this scenario.

IV. HAIR CUT

The process's second and most noticeable step is the act of actually cutting hair. Significant departures from the fundamental neutral position were noted. The participants' relatively length hair took the hairdresser ten to twenty minutes to complete. The stylist's tools included combs, hairdryers, and other styling supplies in addition to the standard metal scissors. Numerous observations regarding posture were obtained throughout this evaluation, and the results of the REBA and RULA analyses were used to confirm them subsequently. The three observations of haircutting process are following.

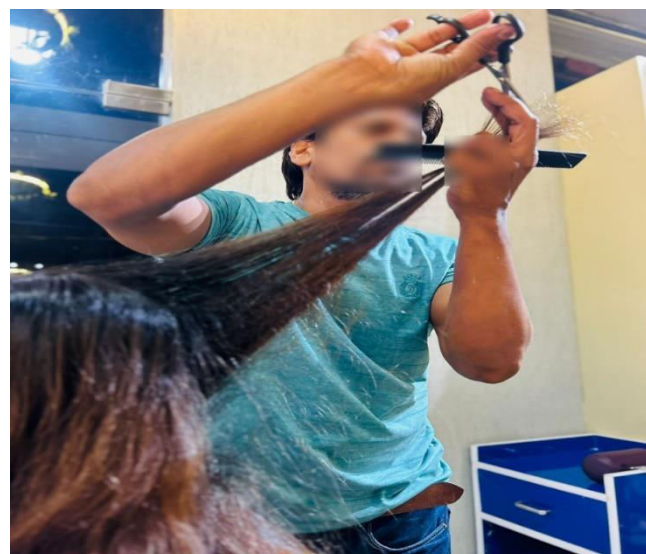


Figure 3: Hair-cut

a) Arm and Wrist Analysis

As seen in Figure 4a, the arms are positioned at an extreme angle of more than 90° with the shoulders lifted and the wrists flexed. Weariness is caused by the way the upper and lower arms are positioned, which produces a lot of static loads. The job's repetitious nature causes discomfort and fatigue. Although holding the comb and scissors lessens the tension on the neck, it is still not acceptable because the elbow, wrists, and shoulders are far from neutral.

b) Neck and Trunk Analysis

The neck is slightly twisted to one side and extended backward between 10° and 20°. Additionally, the trunk is extended backward, placing significant strain on the lower back. When getting a haircut, standing in this position for ten to fifteen minutes might cause a number of back-related MSDs. As can be seen in the picture (Figure 4b), the person's back is beginning to appear twisted.

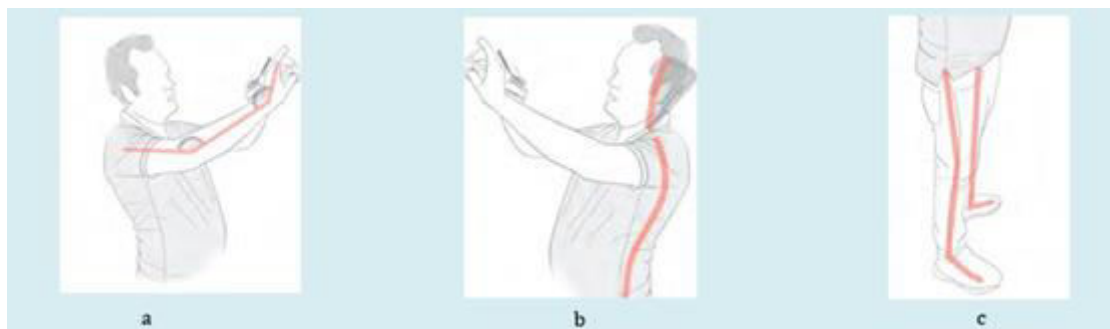


Figure 4: Posture analysis of hair cutting

c) Lower Body Analysis

Because there was no support, the person's body weight was not evenly distributed over their legs, as seen in Figure 4c. Standing for longer than seven to eight minutes at a time can cause weariness and pain. He is also forced to stand in uncomfortable positions due of the limited clearance in his surroundings [8].

In summary, the static stress placed on the wrists and arms is needless and intolerable. The arm joints are under excessive stress and are not in a neutral position. The worker must arch his back and apply pressure to his lower back while trying not to strain his neck. A musculoskeletal disease is the outcome of these postural habits, which also cause the wrists to bend at undesired angles. Experimental data shows that the matching RULA and REBA scores for the postures were 7 and 12, respectively. These scores represent the extremes of the distribution and indicate that these high-risk events require rapid attention [15].

V. CONCLUSION

This study's goal was to examine the ergonomic risks connected to the hairdressers' work when they wash and trim clients' hair. To do this, the REBA and RULA assessments were utilized. Based on the investigation, it was concluded that the hairdressers' bad working posture was largely caused by clearance in the workspace. They were forced to sacrifice their posture due to a lack of appropriate surroundings and equipment, which may not seem like a problem at first but eventually becomes a serious issue for the stylists. Additionally, it was noted that the workers adopted bad posture patterns and shaped themselves to fit the equipment accessible to them despite being acclimated to their surroundings.

The ergonomic risk associated with the previously described processes was evaluated with the use of the REBA and RULA analyses, and the results obtained in this case were on the high and low ends of the spectrum. For **the hair washing** procedure, the RULA score was 7, whereas the REBA score was 11. This indicates a very high risk, and it is advised that changes be made right away. The **hair cutting** procedure received a 12 on the REBA score and a 7 on the RULA process. This activity, like shampooing your hair, is extremely risky and needs to be changed right away. The striking resemblance between the risk levels and score indicates that the hairdressers' perspective gave the working environment zero consideration.



Increasing clearance would be the most important modification that could be made to the workstation to allow employees to move around freely and without being constrained. This would address the problem of employees being compelled to assume uncomfortable positions since there isn't enough room for them to move comfortably. The current set's shampoo stations were constructed uncomfortably near to one another. Because hairdressers work in physically demanding tasks, the workspace needs to be designed with their needs in mind. Since standing causes more discomfort than sitting does, standing chairs can also be used for more stationary jobs.

Better posture for the back and neck as well as appropriate weight distribution are guaranteed by the seats' support. With this technique, long-term, stationary procedures like shampooing and hair cutting can be significantly reduced in their physical difficulty. Equipment and tools with ergonomic designs will also aid in lowering ergonomic dangers. Salons can utilize ergonomic combs, dryers, showerheads, scissors, and other equipment to make sure that the extended use of these items by staff members doesn't cause harm or future health risks. Because of the new normal that we must adopt in the wake of the worldwide pandemic, the need for ergonomic workstations, equipment, and space for beauty parlours and salons has increased.

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