

Work-Related Low Back Pain Among Hotel Housekeeping Workers At Kuala Lumpur

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ABSTRACT

This study aims to identify and analyze the potential hazard and risk that causes low-back pain while cleaning the room and public area of the hotel using risk assessment. The Hazard Identification, Risk Assessment and Risk Control (HIRARC) were used in this study to determine potential hazard and risk that causes low-back pain while cleaning the room and public area of the hotel. In identifying the hazard, observation at the workplace, semi-structured interviews, and data from Human Resources Department were used. Five awkward postures from HIRARC using Rapid Upper-Limb Assessment (RULA) and Rapid Entire Body Assessment (REBA) methods with eighty housekeeping workers working in the respective area used as an input in risk assessment. The result shows that The most critical hazard was making/turning beds and transportation of beds activities where the highest risk can be explained (RV = 9). The risk to lower back and sprain, for example, the results of improper technique for manual handling and the medium-risk category (RV=6) is from mopping the wet floor and laundry activities, struck by the chemical containers that may cause external body injury (i.e., a sprain, torn ligaments or muscles, and broken bones). The low-risk category (RV=3) is collecting/ picking up sharp objects, which can cause back and upper limb pain due to repetition of work. The workers may feel discomfort and body aches. The worker was violent to staff also in the lowest risk category (RV=1). RULA assessment result states that all working postures (100%) have a high-risk level. Assessment of worker's posture is done by filling in the REBA assessment sheet for each activity. In the high-level cleaning activity, the neck is bent, given a score of 5. The upper arm is raised higher than the head, given a score of 4. The neck on the Mopping Wet Floor activity bends down, given a score of 2. REBA scores on were high-level cleaning, making/turning beds/mattresses, mopping the wet floor, transportation of beds, and toilet scrubbing cleaning activities were 13, 11, 12, 11, and 10 means that the posture of the worker's work has high risk to the musculoskeletal disorder.

Keywords:

Safety and health; risk matrix; Rapid Upper-Limb Assessment (RULA); Rapid Entire Body Assessment (REBA); hazard identification; risk assessment; Risk Control (HIRARC)

1. Introduction

Hotel is the leading sector of economic contributions of the tourism industry. One of the most crucial parts of a hotel operation is the housekeeping department. The housekeeping department is responsible for managing the cleanliness and sanitary hygiene of the hotel area. Housekeeper conducts housekeeping workers to maintain areas of hotel clean such as clean guestrooms, change

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bed linens, restock supplies, and provide turndown service when requested. These tasks are described as physically demanding careers, which are more likely exposed to ergonomic hazards. Housekeeping workers most likely experience injuries during working, which affect the productivity of work. Housekeeping tasks are constant, such as tidying, dusting, bed making, buffing, emptying garbage, vacuuming, and cleaning floors. The burden of work keeps increasing as they are required to carry or move tons of trash and used linen every day in a short period. This can cause many types of injury to be directly related to housekeeping tasks [1].

Musculoskeletal disorder (MSD), which includes back-related pain issues, can be described as related to muscle in the body of bones, various tissues, ligaments, and tendons. Most of the disorders associated with housekeeping staff are muscular-related such as bed-making duties. Job-like manual material handling in housekeeping requires bending, lifting, carrying, pushing, and frequently pulling throughout the day, often in awkward postures [2]. Ergonomics is defined from two Greek: "ergo" means work, and "nomoi" means natural laws. When combined, it means the work science and a person's relationship to that work. A service industry like the hotel sector is a service industry where guest experience and satisfaction are non-compromise which is necessary to maintain high standards at all-time [1]. These places a great deal of responsibility on the shoulders of housekeepers in a hotel environment and require them to respond to any situation while remaining invisible to guests and visitors. In performing such daily tasks, they tend to develop various health-related issues in the longer term. Different studies carried out internationally by specialized agencies have revealed the prevalence of various health and fitness problems in housekeepers due to their work-related arrangements at their workplaces. Furthermore, a very high proportion of these are related to MSD due to the lack of ergonomics in interior design and other spaces, procurement problems regarding furniture, fittings, installations, and the poor selection of clean tools and equipment [1]. Nowadays, hotels cannot afford to have any negative guest reviews of any of these critical elements.

Significant ergonomic hazards that may contribute to the development of Musculoskeletal Disorders (MSDs) are concerned with the postures adopted, the force and contact stress levels exerted, the repetition rates required, and working for long periods without a break. MSDs may occur if any ergonomic risk factors overload the musculoskeletal system, either alone or in a merger. MSDs are disorders and injuries that affect the human body's movement or musculoskeletal system include muscles, tendons, ligaments, nerves, discs, and blood vessels. The cleaning job in housekeeping tasks for room attendants is associated with a high prevalence of musculoskeletal disorders (MSD) involving the back and upper extremities[3]. The main product of hotels is accommodation; therefore, the Housekeeping Department has a significant role in any hotel operation. The housekeeper is responsible for preparing guestrooms for sale, guest laundry services, and the cleanliness of all public areas in the hotel. Close liaison between housekeeping and reception is essential so that rooms can be left as quickly as possible. Very often, guests will request, for example, extra blankets and cots. These are passed to the housekeeping department from the reception. Therefore, good communication between these two crucial departments is essential. In terms of staffing, housekeeping is usually one of the largest departments in the hotel. The housekeeping department in Kuala Lumpur is similar to every hotel, whether big, medium, or small. It needs an organizational structure to carry out its daily operations. It is used to help divide tasks, specify the job for each department, and delegate authority within and among departments. Practical job specifications will increase work productivity and efficiency. Each hotel organizes the workforce in different ways.

Public health concerns about occupation-related injuries and the burden of work internationally-related injuries have far-reaching consequences for individuals, families, society, and the economy. Too many health risks than other staff, hotel staff is more vulnerable to many health risks than other

staff in the hotel industry in various departments [4]. Studies have shown that housekeeping workers also work in undesirable conditions in addition to the high injury rate. Research into occupational injuries and illnesses in hotels has shown that such studies are very general and often do not consider vulnerable departments in hotel facilities. When lifting, the worker back works on a lever principle of a 10-to-one ratio to the object they are lifting. Bed-making duties, by nature, but the back in its weakest position, involve awkward lifting, twisting, and holding up the mattress while tucking in linens. Many of the motions used during bed-making tasks require the muscles to work simultaneously as they are being stretched, making them more susceptible to the risk of developing musculoskeletal disorders. Many mattresses in today's hotels are placed close to side walls and nightstands to complicate matters further, creating an even more awkward, dangerous, and strenuous lift. Repetitive-motion injuries occur gradually over a long period of repeated exposure to low-level harmful conditions. They can occur more quickly based on the exposure's rate, intensity, and severity [5].

There is a connection between the injuries to hotel housekeepers and turnover. This is because of the physical demands of the job requirements, and musculoskeletal injuries are the most common among hotel housekeepers. This suggests that hotel housekeepers rely on workers' compensation claims but limited research into these claims and their utility. It also suggests that modified work programs, namely light-duty, ergonomic modification of equipment, graded work exposure, and job coaching, are cost-effective. Hotel staff who are injured at work can benefit from modified work programs until they recover from injury. Given the working environment, which increases the stress of work among hotel staff, they must receive psychological assistance and be aware of the physical mechanisms of their work tasks [6]

There are some ways to improve the SOPs. These can be improved by implementing the key to a safe work environment. A Housekeeping SOP Checklist is used as a guide to ensure that the standard cleaning protocols set by an establishment are followed. The efforts of housekeeping speak for themselves. The result of sincere as well as faux housekeeping efforts is noticeable. The housekeeping staff needs to execute cleaning and maintenance tasks at various places inside the hotel. The most important task is the cleaning and maintaining of guest rooms and guest bathrooms. The guests assess the cleanliness in this area critically. By following the best cleaning and maintenance practices, the housekeeping staff can retain satisfied guests and generate new guests willing to repeat their hotel visits. This brings in more revenue to the hotel business. The housekeeping staff needs to structure the cleaning and maintenance procedures and follow them appropriately to perform guest satisfaction and work productivity together.

The cleaning of housekeeping work involves repetitive movement and uncomfortable posture, which can lead to ergonomic discomfort, contributing to MSD. Room attendants usually suffer MSDs with neck and muscle pain, most of the time suffering from back pain after pushing or pulling a cart or trolley carrying heavy loads. Housekeeping tasks among staff in hotel industries have repeatedly increased the risk of MSDs, especially in low back pain. Previous studies show that the health conditions of room attendants are worse than in the general national community and that the majority of room attendants have high injury rates associated with MSDs [3]. The current research covers the possible reasons for the minimum and maximum time required to clean guest rooms. This study will focus on the working conditions of the hotel staff, the ergonomic problems, and the prevalence of pain among the staff working in a hotel in Kuala Lumpur and fill in the gap in the literature by focusing on housekeeping staff with the measurement as mentioned above items. This research investigates the hazards that cause work-related low-back pain of housekeeping employees by using hazard identification analysis and risk assessment in the housekeeping department in the hotel in Kuala Lumpur.

Increasing awareness and give knowledge about health promotion among housekeeping workers. This study provided insight into the types of occupational risks and injuries in the hotel industry, particularly in housekeeping, preventive measures, and the effects of occupational hazards on staff performance. The study results will benefit all stakeholders in the hospitality industry by providing the information they need to help prevent occupational hazards, implement rehabilitation and insurance policies that will help care for the victims of occupational accidents. The study results will also be of assistance to other hospitality management researchers. Suitable preventive and rehabilitation measures are essential to improve employees' work performance in hotels, especially in budget hotels. However, their implementation will increase job performance and achieve business goals. They are promoting an ergonomic work environment at the workplace, driving the housekeeping workers to perform their daily tasks ergonomically and comfortably, and increasing the productivity and efficiency of the housekeeping workers, thus reducing absenteeism due to Work-Related LBP.

2. Methodology

2.1 Risk Assessment

Hazard Identification, Risk Assessment, and Risk Control (HIRARC) were selected as a tool to investigate work-related accidents at power plants in Malaysia [7]. Risks can be evaluated by dividing them into low, medium, high, and extreme levels, requiring control. HIRARC is a continuous process. Thus, systematic analysis the effectiveness of risk assessment and control measures is required.

Usually, hazard identification, estimation of exposure, and acceptability of the risk can be identified by risk assessment because they are served as a basis for controlling an insufferable hazard. Hazard identification can be seen from unsafe employee behavior, machinery design, chemicals use, work methods, and working environment. Identification of hazards for this cleaning process had been made by observation in the workplace, semi-structured interview with the four key informers who are an expert in the area and reviewing the publications including reports from law enforcement agencies. The observations had been carried out during working hours to identify the hazard and exposure through the flow of material, operation facilities, the process, the employee work patterns, and contamination or working environment. During the observations in the workplace, a total of four employees were interviewed using a semi-structured interview to obtain information related to the identification of hazards that have occurred and that may occur [8].

The risk assessment for the hotel cleaning involves steps of the cleaning process. It begins with polishing, vacuuming, scrubbing, mopping, shampooing, dusting, making beds. The risk assessment method used is Semi-Quantitative Risk Assessment for the quantitative used to differentiate levels of severity and likelihood[8]. A recent study has shown, two semi-quantitative risk assessment methods for occupational risk assessment are acknowledged in the literature. Based on risk matrices with two dimensions, namely, the frequency of an accident and the severity of its consequences [9]. The semi-quantitative analysis is the most preferred technique of stating the risk in the industry. Hence, the risk calculator and the semi-quantitative risk rating matrix can be identified as the most preferred methods for risk analysis. Semi-Quantitative Risk Assessment Method using risk equation as below:

$$\text{Risk (RV)} = \text{Severity (S)} \times \text{Likelihood (L)}$$

Severity is determined based on injury to health, damage to property, and environmental damage. The level and value of severity used in the risk assessment are shown in Table 1 While the

likelihood is based on the observation conducted to obtain information on individual hazard occurs. Levels and values of the likelihood used in the risk assessment are shown in Table 2 [10].

Table 1
 Level of severity, consequences, and severity value

Level of Severity	Consequences	Severity Value
Disaster	Many deaths, property damage, and production cannot be recovered	5
Fatality	Approximately one death, damage to property if the hazard occurs	4
Severe Injuries	Non-fatal injury, permanent disability	3
Minor Injuries	Cause disability but not permanent injury	2
Negligible injuries	Minimal bruises, wounds, the injury needs first aid treatment	1

Table 2
 Levels of likelihood, frequency, and likelihood value

Level of Likelihood	Frequency	Likelihood Value
Most likely	Most likely to occur	5
Likely	May occur and not unusual	4
Expected	May occur in the future	3
Rarely	Unknown to occur after several years	2
Unexpected	Practically impossible and never happened	1

The Semi-Quantitative Risk Assessment matrix table determines whether the risk value is low, medium, or high. Table 3 shows the Semi-Quantitative Risk Assessment matrix table. Based on Table 3, the green box (RV = 1- 4) shows the low-risk level, while the yellow box (RV = 6-10) shows that medium risk level and the red box (RV = 11-25) showed a high degree of the risk level [10].

From the observation, there is a possible unsafe condition and dangerous act that exposes the hazard in the hotel cleaning. The hazard that has been identified was assessed using the Risk Assessment Form. The most critical hazard was identified from cleaning activities where the highest risk can be explained (RV = 9).

Table 3
Likelihood and severity value

		LIKELIHOOD (L)					
		1 Unexpected	2 Rarely	3 Expected	4 Likely	5 Most Likely	
SEVERITY(S)	Negligible injuries	1	1	2	3	4	5
	Minor Injuries	2	2	4	6	8	10
	Severe Injuries	3	3	6	9	12	15
	Fatality	4	4	8	12	16	20
	Disaster	5	5	10	15	20	25

From the observation, there is a possible unsafe condition and dangerous act that exposes the hazard in the hotel cleaning. The hazard that has been identified was assessed using the Risk Assessment Form. The most critical hazard was identified from cleaning activities where the highest risk can be explained (RV = 9).

The medium-risk category (RV=8) is from scrubbing activities that may cause external body injury (i.e., a sprain, torn ligaments or muscles, and broken bones). Meanwhile, the lowest risk category (RV=4) is collecting, sorting, cleaning, drying, ironing, and folding. It can cause back and upper limb pain because of repetitive work. The workers may feel discomfort and body aches. The trolley cart hit the worker in the lowest risk category (RV=4), contract back or upper limb pain, and burn due to contact with a hot surface. Those may cause the least harm resulting from external body injury, cuts, torn and scratches, discomfort or body aches, and burning skins.

Apart from that, all of these risks from the highest, medium, and lowest risk categories have resulted in their current risk control, as given in Table 3. For example, to automatically stop the flatwork ironer if any non-flat object gets into it, provide training to the workers before starting working and paste warning signs on the outer surface of the dryer. These are crucial in order to prevent the problem from happening continuously.

2.2 Rapid Upper Limb Assessment (RULA)

The subjective survey on patients can acquire the information of hotel cleaner’s musculoskeletal pain. The ultrasonic waves and X-ray examination can reveal muscular trauma, bones and joints, and fractures. Medical instruments can recognize the situation musculoskeletal pain and related treatment and recovery will be offered. However, after the pain is relieved, hotel cleaners often experience musculoskeletal pain again. Hence, it is necessary to find the causes of their musculoskeletal pain and the correlation among hotel cleaners’ working pose, force, and musculoskeletal pain by RULA (Upper Limb Assessment) [11].

The MSDs Checklist revealed the risk factors of cleaning as the reference for medical personnel’s diagnosis and treatment. This study treated hot spring hotels and motel cleaners as the subjects. Based on the correlation between hotel cleaners’ musculoskeletal discomfort and RULA, subjective discomfort of neck, body and upper arm is significantly related to score of RULA. A comparison of hot spring hotel and motel cleaners’ work situations showed that the scores of different poses in RULA vary significantly when cleaning hot spring pools and bathtubs. This is due to different designs of hot

spring pools of hot spring hotels and Jacuzzis of motels. The cleaners may easily have musculoskeletal discomfort due to excessive force and bad poses, suggesting using long brushes to improve bad poses and excessive force [11].

According to the analytical result of MSDs, regarding raising mattresses and changing bed sheets and bedspreads, motels are more dangerous than hot spring hotels. Regarding the cleaning of bathtubs and hot spring pools, hot spring hotels are more dangerous than motels. RULA was developed to evaluate the exposure of individual workers to ergonomic risk factors associated with upper extremity MSD. The RULA ergonomic assessment tool considers biomechanical and postural load requirements of job tasks/demands on the neck, trunk, and upper extremities. A single-page worksheet is used to evaluate required body posture, force, and repetition. Based on the evaluations, scores are entered for each body region in section A for the arm and wrist and section B for the neck and trunk. After the data for each region is collected and scored, tables on the form are then used to compile the risk factor variables, generating a single score representing the level of MSD risk [11].

The RULA was designed for easy use without an advanced degree in ergonomics or expensive equipment. Using the RULA worksheet, the evaluator will assign a score for each of the following body regions: upper arm, lower arm, wrist, neck, trunk, and legs. After the data for each region is collected and scored, tables on the form are then used to compile the risk factor variables, generating a single score that represents the level of MSD risk as outlined below:

Table 4
Levels and Score of MSD

RULA Score	Level of MSD Risk
1 -2	Negligible risk, no action required
3 - 4	Low-risk change maybe needed
5 -6	Medium risk, further investigation, change soon
6 +	Very high risk, implement change now

Prepare for the assessment by interviewing the worker to understand the job tasks and demands and observe the worker's movements and postures during several work cycles. Selection of the postures to be evaluated should be based on 1) the most challenging postures and work tasks (based on worker interview and initial observation), 2) the posture sustained for the most prolonged time, or 3) the posture where the highest force loads occur. The RULA can be conducted quickly, so multiple positions and tasks within the work cycle can usually be evaluated without significant time and effort. When using RULA, only the right or left side is assessed at a time. After interviewing and observing the worker, the evaluator can determine if only one arm should be evaluated or if an assessment is needed for both sides.

2.3 Rapid Entire Body Assessment (REBA)

This ergonomic assessment tool uses a systematic process to evaluate whole-body postural MSD and risks associated with job tasks. A single-page worksheet is used to evaluate required or selected body posture, forceful exertions, type of movement or action, repetition, and coupling. REBA method was developed as a risk assessment method to provide an overall risk score that considers all the

body parts (trunk, legs, neck, shoulders, arms, and wrists) [12]. The overall score considers similar additional factors as Rapid Upper Limb Assessment (RULA), which was developed and the effect of hand coupling. This assessment produced the postural MSD risk levels (Negligible, low, medium, high, and very high risk), and the equipment used a video recording or picture of the respondents while performing tasks, a pen, and a REBA checklist. The analysis process only takes 27 + 16.2 minutes [12]. In this REBA method, the postures selected for assessment are selected based on: 1) the most challenging postures and work tasks based on interview and observation, 2) the posture sustained for the most extended period, or 3) the posture where the highest force loads occur. The outcome of REBA can be seen in Table 5 below, including their scores and risks levels [12].

The REBA was designed for easy use without an advanced degree in ergonomics or expensive equipment. The need is the worksheet and a pen, and on second thought, finish reading and studying this guide, and suppose a clipboard would help. Using the REBA worksheet, the evaluator will assign a score for each of the following body regions: wrists, forearms, elbows, shoulders, neck, trunk, back, legs, and knees. After the data for each region is collected and scored, tables on the form are then used to compile the risk factor variables, generating a single score that represents the level of MSD risk:

Table 5
 Levels and Score of MSD

REBA Score	MSD Risk Level
1	Negligible risk, no action required
2-3	Low-risk change may be needed
4-7	Medium risk, further the investigation, change soon
8-10	High risk, investigate and implement change
11+	Very high risk, implement change

Prepare for the assessment by interviewing the worker to understand the job tasks and demands and observe the worker's movements and postures during several work cycles. Selection of the postures to be evaluated should be based on 1) the most challenging postures and work tasks (based on worker interview and initial observation), 2) the posture sustained for the most prolonged time, or 3) the posture where the highest force loads occur. The REBA can be conducted quickly, so multiple positions and tasks within the work cycle can usually be evaluated without a significant time/effort. When using REBA, only the right or left side is assessed at a time. After interviewing and observing the worker, the evaluator can determine if only one arm should be evaluated or if an assessment is needed for both sides.

3. Results and Discussion

This chapter provides results and data analysis collected throughout the project. Eighty housekeeping workers completed the questionnaires. The total response rate was 100%, where there is 80 questionnaires were distributed. This section also describes the results of finding by identifying and observing potential hazard and risk that causes low-back pain while cleaning the room and public area of the hotel. HIRARC (Hazard Identification, Risk Assessment, Risk Control) was used

to identify any hazards that might cause danger to the worker, eliminate the risk, and remove the risk and implement risk control measures to minimize the risk. The possibility of level severity was enabled to come out as a preventive measure to ensure that the risk was adequately controlled while cleaning the room and public area of the hotel. Lastly, to review and maintain the implementation control measure to propose an improvement of SOP associated with risk assessment while cleaning the room and public area of the hotel [13].

In this study, hazards in the overall process were identified by HIRARC based on the Guideline of HIRARC by DOSH [10] together with Company's data from the HR and Security Department, interview, review, and study method. Workplace hazards must be identified by a sample of legislation, supporting codes of practice, guidance, and develop hazard checklist. Other methods are reviewing relevant Malaysian and international standards, other published information, and reviewing industrial or association guidance. OSHA 1994 recommends using engineering or work practice controls to eliminate hazards to the greatest extent possible depending on the hazards or workplace conditions [10].

Rapid Upper limb Assessment (RULA) was done to identify the awkward posture while cleaning the room and public area of the hotel. RULA method is used to determine the risk level of musculoskeletal disorders (MSDs) injury. The data required for this research are work elements and awkward work postures from each of these elements. Data collection methods are direct observation and video recording of the work activities performed by housekeeping workers at the hotel. Direct observation was conducted to know the work elements and understand the order. Video recording is done using a Closed Circuit TV (CCTV) to document the details of posture and movement on each work element, and then some selected awkward postures will be analyzed further using the RULA method. Five activities are identified as the most ergonomic risk: making/turning beds/mattresses, mopping wet floors, transporting beds, scrubbing the toilet, and manual handling/lifting.

Rapid Entire Body Assessment (REBA) is an ergonomic assessment tool that systematically evaluates whole-body postural MSD and risks associated with job tasks. A single-page worksheet is used to evaluate required or selected body posture, forceful exertions, type of movement or action, repetition, and coupling. Using the REBA worksheet, the score is assigned for each of the following body regions: wrists, forearms, elbows, shoulders, neck, trunk, back, legs, and knees. After the data for each region is collected and scored, tables on the form are then used to compile the risk factor variables, generating a single score representing the level of MSD risk.

There are potentially unsafe conditions and dangerous acts that expose the hazard to the hotel while cleaning the room and public area from the observation. The hazard identified was assessed using the Risk Assessment Form, as shown in Table 1.6. The most critical hazard was identified from making/turning beds and transportation of beds where the highest risk can be explained (RV = 9). The risk to lower back and sprain, such as an improper technique for manual handling, can cause permanent low back pain.

The medium-risk category (RV=6) is from mopping the wet floor and laundry activities, for example, struck by the chemical containers that may cause external body injury (i.e., a sprain, torn ligaments or muscles, and broken bones). Meanwhile, the low-risk category (RV=3) is collecting/picking up sharp objects. It can cause back and upper limb pain because of repetitive work. The workers may feel discomfort and body aches. The worker was violent to staff in the lowest risk category (RV=1), apart from contract back or upper limb pain and burn due to repetitive work. Those may cause the least harm resulting from external body injury, cuts, torn and scratches, discomfort or body aches, and burning skins.

Therefore, these risk categories from the highest, medium, and lowest risk have resulted in their current risk control, as shown in Table 6. For example, to manual handling, to provide training to the

workers before start working. These are crucial in order to prevent the problem from happening continuously.

Table 6

The risk identified from data collection

Type of Risk/Hazard	No.	Description	*L	*S	Risk Rating (*Lx*S)
Safety (Acute Impact)	1.	Making/Turning Beds/Mattress	3	3	Medium (9)
	2.	Manual handling (Lifting, handling guest's luggage)	3	3	Medium (9)
	3.	Transportation of Beds	3	3	Medium (9)
	4.	High level cleaning	2	4	Medium (8)
	5.	Toilet Scrubbing/Cleaning	2	4	Medium (8)
	6.	Emptying bins/ashtrays	2	3	Medium (6)
	7.	General cleaning (eg vacuum cleaning)	2	3	Medium (6)
	8.	Laundry (eg transfer of dirty linen)	2	3	Medium (6)
	9.	Mopping wet floor	2	3	Medium (6)
	10.	Collecting/picking up sharp objects	1	4	Low (4)
	11.	Slips and trip	1	4	Low (4)
	12.	Portable electrical appliances	1	3	Low (3)
	13.	Work at height including use of ladders (low risk environment)	3	1	Low (3)
	14.	Use of cleaning chemicals	2	1	Low (2)
	15.	Violent to staff	1	1	Low (1)

*L: Likelihood * S: Severity

RULA assessment result of the five working postures on cleaning the room and public area of the hotel. Based on the data collection that has been done, five awkward postures were found and will be analyzed further using the RULA method. Here are the results of the RULA assessment for those five awkward postures. Table 7 shows the RULA Assessment results for those postures. Working posture has been assessed using the RULA method can also be grouped based on its risk level, as shown in Table 8. The result showed that those risks range from low to high levels, and none of them have the minimum risk level. RULA assessment result states that all working postures (100%) have a high-risk level.

The observation results clearly showed that the workers primarily work within extreme awkward postures or near the extreme range of motion during working hours. There are awkward postures while high-level cleaning, making/turning beds/mattresses, mopping the wet floor, transportation of beds, and toilet scrubbing cleaning. There are four awkward postures during working activities: elbow, wrist, shoulder, and back postures. Hence, the repetition when working in awkward postures contributes to stress on muscles and joints and

leads to fatigue. The housekeeping workers are exposed to extra hazards because of generally longer working hours. Another contributing element in the present discovery of intensive care is fatigue [14].

Table 7
 RULA Assessment Results for 5 Awkward Postures

Posture	Work Activity	RULA Score	Risk Level
1	High Level Cleaning	7	High
2	Making/Turning Beds/Mattress	7	High
3	Mopping Wet Floor	7	High
4	Transportation Of Beds	7	High
5	Toilet Scrubbing/Cleaning	7	High

Table 8
 Working Postures Grouping Based on Its Risk Level

Action Level	Risk Level	Explanation	Posture Number	Total	Percent %
1	Low	Safe and acceptable	-	-	-
2	Medium	Investigation and changes may be required	-	-	-
3	High	Investigation and changes required soon	-	-	-
4	Low	Investigation and changes required immediately	1,2,3,4,5	5	100

This study was carried out on 80 housekeeping workers, of which were room attendants and public area workers focusing on five working postures on cleaning the room and public area of the hotel. The working postures were high-level cleaning, making/turning beds/mattresses, mopping the wet floor, transporting beds, and toilet scrubbing cleaning. According to REBA, the risk level of developing MSDs and the priority of needed corrective actions are shown in Table 9.

Assessment of worker's posture is done by filling in the REBA assessment sheet for each activity. Table 9 illustrates the results of the posture assessment sheet with REBA. In the high-level cleaning activity, the neck is bent at the top of the corner 300, given a score of 5. The upper arm is raised higher than the head and forms an angle of 1100, given a score of 4. The neck on the Mopping Wet Floor activity bends down about 250, so given a score of 2. REBA scores on were high-level cleaning, making/turning beds/mattresses, mopping the wet floor, transportation of beds, and toilet scrubbing cleaning activities were 13, 11, 12, 11, and 10 the worker's work has high risk to the musculoskeletal disorder. All of the activities need to be investigated and implemented changes/improvements. This activity needs further investigation, and changes can be made immediately.

Table 9
 The Result of Posture Assessment Sheet of Body with REBA

Parameters	High Level Cleaning	Making/Turning Beds/Mattress	Mopping Wet Floor	Transportation Of Beds	Toilet Scrubbing/Cleaning
Neck	5	2	2	2	2
Trunk	5	3	5	3	3
Legs	4	4	2	4	4
Table A Posture	9	7	9	7	7
Force/Load	2	1	0	1	1
SCORE A	11	8	9	8	8
Upper Arm Position	4	2	2	2	2
Lower Arm Position	2	2	2	2	2
Wrist Position	3	2	2	2	2
Table B Posture Score	7	3	3	3	3
Coupling Score	3	2	2	2	2
SCORE B	10	5	5	5	5
Activity Score	1	1	2	1	1
Table C	12	10	10	10	9
REBA SCORE	13	11	12	11	10
RISK LEVEL	High	High	High	High	High

As the present study results indicate, most cases of the discomfort of body parts due to pain, discomfort, stiff and numbness were related to the waist. Due to inappropriate posture, workers feel pain in their body parts. To eliminate, this study needs new work facilities to assist workers' activities. Besides, it is necessary to improve the working method to minimize their complaints. The REBA (Rapid Entire Body Assessment) is a posture-based analysis system responsive to musculoskeletal risks in various tasks, particularly for assessing working postures in the hospitality sector and other service industries. The classification of postures is derived from body part diagrams. The REBA is a method for estimating the risks of entire body WMSDs,

gives a quick and logical assessment of the complete body postural risks to a worker, and is appropriate for evaluating tasks where postures are dynamic, static, or gross changes in a position take place.

The design of REBA is very similar to that of the RULA method, and special attention is devoted to the external load acting on the trunk, neck, and legs and to the worker-load coupling using the upper limbs. Postures of individual body parts are observed, and postural scores increase when postures diverge from the neutral position. Group A includes the trunk, neck, and legs, while group B includes upper and lower arms and wrists. Other items, including the load, handled, couplings with the load, and physical activity, are specifically scored and then processed into a single combined risk score using a table provided. These scores are summed up to give one score for each observation, which can then be compared to tables stating risk at five levels, leading to the necessity of actions [15].

4. Conclusion

The purpose of this study is to identify the potential hazard and risk that causes low-back pain during cleaning the room and public area of the hotel and analyze the risk assessment associated with low-back pain while cleaning the room and public area of the hotel. This study aims to propose an improvement of SOP associated with risk assessment while cleaning the room and public area of the hotel. This study provided insight into the types of occupational risks and injuries in the hotel industry, particularly in housekeeping, preventive measures, and the effects of occupational hazards on staff performance [15]. All of the activities need to be investigated and implemented changes/improvements. This activity needs further investigation, and changes can be made immediately. The analysis has shown that the current SOP was insufficient to ensure a safer workplace due to inefficient preventive measures to control the hazards. For example, for making or turning beds, an excellent working posture must implement to avoid worker injuries. The appropriate risk control was isolation, engineering controls, administrative controls, and personal protective equipment. This study may help employers be more proactive in ensuring the safety and health of workers.

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