

## RESEARCH ARTICLE

# Incidence of Low Back Pain Among Janitorial Workers in Hulu Langat, Selangor

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## Abstract:

Low back pain (LBP) is a feeling of discomfort or stiffness in the lower back caused by poor work posture, lifting, bending, and other physically challenging tasks. It is one of the musculoskeletal disorders that has been well-studied in various occupational groups, such as farmers, medical staff, truck drivers, and janitors. This study explored the incidence of LBP and how demographic background influences the LBP among janitors in Hulu Langat, Selangor. A cross-sectional study was conducted among 120 janitorial workers in Hulu Langat, Selangor, aged between 25 and 44 years old that was collected through an online questionnaire. Respondents were assessed on a brief working background and the Malay-Standardized Nordic Musculoskeletal Questionnaire. More than half of janitorial workers, ranging 52 to 67 percents suffered LBP with most reported pain areas are at the neck, elbow, and lower back region of the body. To conclude, these body regions were significantly impacted during repetitive activities that involve lifting, flexing, and twisting the trunk during janitorial works. This shows the need to provide ergonomic education and training to improve the workers' awareness about appropriate work hazards and injuries, potentially reducing the deterioration of prolonged LBP and other occupational hazards among janitors.

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## 1. INTRODUCTION

Low back pain (LBP) is a discomfort, pain, or stiffness in the lower back caused by poor work postures, lifting, bending, and other physically challenging job tasks (Kovacs et al., 2003). Depending on the location of the lesion on the spine, this condition is a subset of back pain, defined as an acute or chronic intermittent pain that can transmit to the lower limbs or upper body parts (Yunoos & Dankoly, 2021). Furthermore, it affects the lumbar spine, the third area of the spinal column, also known as the backbone, that provides structural support, protects particular body tissues, supports body weight, and allows for waist bending, extending, and rotation (Alessa & Ning, 2018).

LBP is one of the most severe global public health issues (Erdem, Erken & Aydogan, 2018) which was found to be one of the musculoskeletal disorders that have been well-studied in a range of occupational groups, such as farmers, medical staff, truck drivers, and janitors (Omokhodion, Umar & Ogunnowo, 2000). Sanitation work is physically and mentally demanding, and it frequently exposes workers to physical and psychological dangers that raise the risk of job-related accidents (Teran & van Dommelen-Gonzalez,

2017). A study by Lim et al. (2021) reported that based on their multiple hazardous job duties and frequent non-fatal injuries, janitorial workers are one of the high-risk categories for developing work-related musculoskeletal disorders (WRMSDs).

Janitors are classified as elementary jobs in the Malaysia Standard Classification of Occupations (MASCO-13) since the workers undertake simple and routine chores that mainly demand handheld instruments and, in some cases, are considered physical exertion (Ministry of Human Resources, 2013). The tasks include sweeping, vacuum-cleaning floors and furniture, cleaning and disinfecting toilets and windows, and any other tasks that require manual performance. This exposes the janitorial workers to occupational risk and significant physical workload. Surprisingly, local news reported four out of five janitorial workers will experience LBP at some point in their lives due to usual work practices with improper handling and neglecting potential work hazards (The Star, 2020).

In addition, LBP was reported as the most common cause of activity limitation and work absenteeism among adult workers (Driscoll et al., 2014) and results in a vast medical

burden and significant financial expenses for individuals and employers (Hartvigsen et al., 2018). In Malaysia, there have also been an increasing number of cases among workers over the years. The Malaysian Social Security Organization (SOCSO) highlighted there were 14 occurrences of musculoskeletal disorder (MSD) affecting lower back pain documented in 2006, and in 2011, there were 268 cases (Murad et al., 2013). Selangor recorded the highest number of workers in elementary occupations in Malaysia (DOSM, 2020), which supports this study's being conducted in Hulu Langat, Selangor. Workers' safety and health may be in danger if they are unaware of potential ergonomic risk factors in their physical surroundings and work practice (Tee et al., 2017).

In terms of the work pattern of janitorial workers, lifting and carrying heavy objects (Gawde, 2018), awkward posture, psychosocial job demands and job dissatisfaction (Zahid et al., 2017), repetitive movement, and static workload (European Agency for Safety and Health at Work, 2008), have all been identified as significant risk factors for LBP. Other factors which are noted to be predictors of LBP too include not doing regular physical exercise, dissatisfaction with the working environment and culture (Beyen et al., 2013), duration of employment, pulling and pushing heavy loads, bending and working with twisted trunks (Zungu, 2015), alcohol consumption, and lack of rest (Wanamo et al., 2017). These findings indicate that janitors are statistically more likely to face an occupational injury, including LBP, due to their physically demanding jobs.

Naik & Khan (2020) also identified a postural risk of musculoskeletal disorders among mopping professionals in India, with musculoskeletal injuries occurring commonly in the right hand, shoulder and wrist, lower back, and left wrist and biceps regions. On top of that, Shukriah et al. (2017) studied musculoskeletal disorders in garage workers who performed vehicle maintenance in Malaysia. Based on the biomechanical findings, psychological, ergonomic, and demographic variables are significant causes of musculoskeletal injury. A high percentage of growth, pain, and discomfort were reported in the shoulders, neck, wrist/hand, feet, low back, and waist region. Plus, there is a strong correlation between LBP and repetitive labor, heavy lifting, and older age groups among workers in chemical fertilizer factories in Kedah (Yasin et al., 2020).

Therefore, this study was carried out to address the incidence of LBP and how demographic background influences the LBP among janitors in Hulu Langat, Selangor.

## 2. MATERIALS AND METHODS

A cross-sectional study design was adopted in this study to explore the incidence of LBP among janitorial workers in Hulu Langat, Selangor. The Malay-Standardized Nordic Musculoskeletal Questionnaire (M-SNMQ) (Amin et al., 2016) was utilized to obtain the incidence of LBP and pain in the body region affecting the workers, besides getting

several work characteristics that possibly influence this incidence.

Respondents were recruited by using a non-probability purposive sampling method. Purposive sampling was suitable for this study as inclusion and exclusion criteria were needed, which were selected janitorial workers who were employed in Hulu Langat, Selangor, aged 25 to 44 years old, and had been working as janitors for over 6 months. However, janitorial workers who were diagnosed with spinal deformities (such as excessive lumbar or cervical lordosis, increased thoracic kyphosis, and scoliosis), inflammatory disease, or had a history of traumatic injury affecting the musculoskeletal system, pregnant or at the post-menopausal stage have been excluded from enrolment.

The research process commenced by reaching out to various associations and janitor companies in Hulu Langat through email. These communications sought permission to conduct the study among their respective workers. Individuals who provided consent were given a set of self-reported questionnaires through a Google form link. The estimated time required to complete the questionnaire was 15 to 20 minutes, and the collection period was from December 2022 to April 2023.

Ethical approval was obtained from the Research Ethical Committee of Faculty of Health Sciences with reference number FERC/FSK/MR/2022/0272.

Data analysis Using SPSS version 23, demographic data and work information were analysed through descriptive analysis. A chi-square inferential statistical test was performed to determine the difference between the LBP and demographic factors such as gender, marital status, and body mass index, besides testing association in the incidence of low back pain by type of janitorial works with a significance value at  $p < 0.05$ .

## 3. RESULTS AND DISCUSSION

### 3.1. Demographic characteristics of respondents

Table 4.1 shows the demographic data of the participants. The participants were among 120 janitorial workers in Hulu Langat, Selangor. Among them, 73 (60.8%) were men and 47 (39.2%) were women. Respondents were categorized into four groups of body mass index, and 72 (60%) of them were in the overweight category, 28 (23.3%) were in normal weight, 15 (12.5%) were in the obese category, and only 5 (4.2%) were in the underweight group. More respondents ( $n = 83$ , 69.2%) were already married, whereas only 37 (30.8%) were single. The majority, 51.7% ( $n = 62$ ), had spent 4-6 years on the job, followed by 19.2% ( $n = 23$ ) who had spent 7-9 years on the job, 18.3% ( $n = 22$ ) who had spent 1-3 years on the job, and only 10.8% ( $n = 13$ ) who had spent 10 or more years on the job. Virtually, 88 (73.3%) worked more than 8 hours daily, and only 32 (26.7%) worked less than 8 hours daily. The mean age of the respondents was  $36 \pm 5$  years.

Table 1. Demographic characteristics of respondents

Variables		Frequency	Percentage (%)
Gender	Male	73	60.8
	Female	47	39.2
Body Mass Index (BMI)	Underweight	5	4.2
	Healthy	28	23.3
	Overweight	72	60.0
	Obesity	15	12.5
Marital status	Single	37	30.8
	Married	83	69.2
Years of working	1-3	22	18.3
	4-6	62	51.7
	7-9	23	19.2
	>10	13	10.8
Average working hours per day	<8 hours	32	26.7
	>8 hours	88	73.3
		Mean	SD
Age of respondents (in year)		36	5

**3.2. Prevalence of Low Back Pain among Janitorial Workers**

The incidence of LBP among janitorial workers in Hulu Langat, Selangor was reported as quite high incidence where more than half respondents reported the pain at almost all of body region were affected with the musculoskeletal complaints. Out of the nine body parts addressed in the questionnaire as illustrated in Table 2, the neck region had the highest complaint of musculoskeletal problems (n = 81, 67.5%), followed by the elbow (n = 76, 63.3%) and lower back (n = 71, 59.2%). Besides, more than half of the respondents experienced pain in the arm (n = 70, 58.3%). The upper back region and knee reported the same number of respondents (n = 69, 57.5%), respectively. 66 (55%) respondents experienced pain involving the leg, 63 (52.5%) involving the hip and thigh, and the shoulder region reported the lowest prevalence with 49 (40.8%) respondents.

This study indicated the prevalence of LBP was almost as high as the previous most reported pain experienced by janitorial workers, with 59.2% than the study by Wami et al. (2019) with 58.1% of LBP among housekeepers in Gondar town and 56% of LBP among hospital cleaners in Norway (Lasrado et al., 2014). In contrast, other studies among cleaners in Northwest Ethiopia (46.4%) and 28.5% of factory workers in Thailand reported slightly lower incidences than findings from this study (Tomita et al., 2010; Melese et al., 2020). The probable causes include differences in awareness and openness to questions, individual perceptions of pain, cultural differences, workloads, and participant incomes.

Another research done among cleaners at Mikelle University in Ethiopia (Chowdhury et al., 2023) revealed that LBP was the most prevalent among cleaners (34.8%), followed by wrist pain (17.4%). Time pressure, job experience, feeling exhausted, awkward posture, working hours per day, and working more than 2 hours in a sustained position were all

substantially associated with the pain. However, this study finding is lower when compared to a study conducted among Nigerian street cleaners (78.2%) and a study conducted among industrial workers in Dhaka City (62%), which are associated with incorrect body mechanics use, repetitive bending, and continuous long-term sitting risk (Cole & Grimshaw, 2003). One probable explanation is insufficient preventative training in the setting since only half of the workers (50.3%) who participated in the study received job-related health and safety training.

Table 2. Prevalence of musculoskeletal problems among janitorial workers in Hulu Langat, Selangor

Body parts	Frequency (n)	Prevalence (%)
Neck	81	67.5
Shoulder	49	40.8
Elbow	76	63.3
Arm	70	58.3
Upper back	69	57.5
Lower back	71	59.2
Hip and thigh	63	52.5
Knee	69	57.5
Leg	66	55.0

**3.3. The Relationship Between Incidence of Low Back Pain and Type of Janitorial Works**

Table 3 reveals the relationship between incidence of low back pain with the type of janitorial work through the chi-square test. There was a significant relationship on LBP incidence towards lifting work activity, with  $X^2(1, N=120) = 8.420, p = 0.004$ . Furthermore, this study found a relationship between the incidence of LBP and labor type of work that requires flexing the trunk ( $X^2(1, N = 120) = 15.832, p = <0.001$ ), as well as work that requires twisting the trunk,  $X^2(1, N = 120) = 17.581, p = <0.001$ . Finally, this study also discovered that the incidence of LBP had relationship between workers who performed repeated tasks and those who did not:  $X^2(1, N = 120) = 7.860, p = 0.005$ .

According to this study, lifting becomes statistically significant with the prevalence of LBP. This suggests that janitors whose jobs involve lifting are susceptible to developing MSDs, including LBP. This was supported by a study done in Nigeria explained that a typical lifting movement involves two distinct phases: a loading phase in which the subject exerts a vertical force on the object until it moves, and a lifting period in which the mass moves vertically. These lifting movements were frequently performed during janitor works among cleaner that has significant effect on LBP (Yunoos & Dankoly, 2021). Previous study indicated the maximum compressive and shearing pressures are experienced during the early phases of the loading phase, often within the first 0.2 to 0.4 seconds of the lift (Coenen et al., 2013).

During a lift, the body is affected by internal stresses caused by internal pressures, the tautness of surrounding musculature and other passive components, and external stresses caused by the weight of the body segments, the

length of the moment arms, and the load itself. To handle the load's and body parts' combined weight, the worker must generate sufficient internal force to stabilize the trunk and manipulate the load (Coenen et al., 2013). Thus, to lift bigger loads, workers must exert more compressive forces and pressure over the spine and adequate internal forces, putting them at risk of developing LBP.

Although occasionally performed, trunk flexion with a moderate hand load is unlikely to cause immediate injury to the employees' spinal structures. This study demonstrated a strong relationship between repetitive trunk flexion and LBP, consistent (Alessa & Ning, 2018). The human lumbar spine is anatomically divided into two categories of tissues: active tissues (e.g., the contractile component of muscles) and passive tissues (ligaments, fascia, discs, bone, and the non-contractile component of muscles). It has been discovered that during trunk bending, lumbar extensor contraction rapidly diminishes and stops when reaching the bottom range of motion (Ning et al., 2012).

This is related to the flexion relaxation phenomenon (Ning et al., 2012), which signals the complete transition of stress from lumbar active tissues to passive tissues (Shin, D'Souza & Liu, 2009) and is part of the load-sharing synergy between these two types of lumbar tissues. Various factors can influence this load-sharing synergy, including ligament creep produced by prolonged trunk bending (Maurer-Grubinger et al., 2021), the direction and speed of the trunk bending motion, and lumbar muscle exhaustion (Ning et al., 2012). As a result, prolonged and repetitive trunk flexion may cause microdamage to the spinal system, eventually leading to LBP over time (Alessa & Ning, 2018).

Aside from that, this study observed that janitorial workers involved in jobs that needed repetitive twisting of the trunk had a higher risk of experiencing low back discomfort than those who were not (Pataro & Fernandes, 2014; Shan et al., 2013). The possible reason might also be due to non-neutral body postures caused by the occupational twisting involved during cleaning activities such as vacuuming, which forces the erector spinal muscles to contract longer during anterior flexion and extension, reducing the tension ability of passive tissues in the low back area and indicating a higher risk of developing low back pain (Yunoos & Dankoly, 2021).

Table 3. Relationship of low back pain and types of janitorial work

Type of works	Incidence of LBP		X <sup>2</sup>	P-value
	Yes n (%)	No n (%)		
Lifting				
Yes	69(63.3)	40(36.7)	8.420(1)	0.004*
No	2(18.2)	9(81.8)		
Trunk Flex				
Yes	68(66.7)	34(33.3)	15.832(1)	<.001*
No	3(16.7)	15(83.3)		
Trunk twist				
Yes	68(67.3)	33(32.7)	17.581(1)	<.001*
No	3(15.8)	16(84.2)		
Repetitive works				

Yes	68(63.6)	39(36.4)	7.860(1)	0.005*
No	3(23.1)	10(76.9)		

Note: Significant value at p=0.05\*

### 3.4. Differences between Demographic Factors with Low Back Pain and Type of Janitorial Works

Table 4 reveals the chi-square test for the difference in the incidence of low back pain with demographic factors. There is a non-significant difference between the incidence of LBP and gender, with  $X^2(1, N = 120) = 2.100, p = 0.147$ , in which males (n = 47, 64.4%) show a higher prevalence than females (n = 24, 51.1%). Yunoos and Dankoly (2021) observed that males had a higher incidence of LBP than women depending on their capabilities. Men are more likely to be allocated to physically demanding duties such as lifting and gardening than women, who are more typically assigned to sweeping and sedentary home duties. On the contrary, Kahere and Ginindza (2021) discovered female adults in the South Africa (19.8%) had a greater incidence of chronic LBP than males (15.9%). Similar findings by the Spanish National Health Survey (de Pedro-Jiménez et al., 2022), which found that females had a greater prevalence of pain experience that resulted from a greater pain sensitivity among women and are more likely than men to suffer from chronic pain conditions.

Besides, this study found no significant difference between the incidence of LBP and marital status:  $X^2(1, N = 120) = 0.002, p = 0.965$ . However, the study of Arju et al. (2020) and Ibrahim et al. (2019) showed opposite findings where workers who were married were more likely to develop musculoskeletal disorders, including LBP. The likely cause might be related to their additional responsibility at home of doing household duties besides work demand as janitors. Housework is hazardous and needs a high level of energy compared to other occupational contexts. Arju et al. (2020) described housework entails repeated work and prolonged sitting or standing work in which muscles are contracted for extended periods of time may cause tremendous strain on the human body. Furthermore, excessive posture stretches the posterior longitudinal ligament and causes the pedicles to approach, putting pressure on the nerve roots and desensitizing mechanoreceptors, resulting in a loss of reflex, contraction of stabilizing muscles, and increased load on the spine, all of which contribute to LBP (Arju et al., 2020).

Lastly, for the differences between the LBP and body mass index (BMI), the test was not statistically significant with  $X^2(3, N = 120) = 1.350, p = 0.717$ , indicating no significant differences between BMI and the incidence of LBP. However, contra findings reported by Siddiqui et al. (2022), which discovered that the majority of LBP cases were found in the obese and overweight categories, besides, a high BMI has a two times greater chance of developing LBP than a person with a normal BMI (Perera et al., 2014). It was evidenced that the spine experiences a greater compressive force due to the increased mechanical load of janitorial work towards their back caused by obesity during various physical activities.

Table 4. Difference in the incidence of low back pain by demographic factors

Variables	Incidence of LBP		X <sup>2</sup>	P-value
	Yes	No		
Gender				
Male	47(64.4)	26(35.6)	2.100(1)	0.147
Female	24(51.1)	23(48.9)		
Marital status				
Single	22(59.5)	15(40.5)	0.002(1)	0.965
Married	49(59.0)	34(41.0)		
Body Mass Index				
Underweight	2(40.0)	3(60.0)	1.350(3)	0.717
Normal weight	16(57.1)	12(42.9)		
Overweight	45(62.5)	27(37.5)		
Obese	8(53.3)	7(46.7)		

#### 4. CONCLUSION

This study provides a greater understanding of the occupational hazards that janitorial workers encounter, which exposed them to developing musculoskeletal diseases that include LBP. More than half of janitorial workers suffered LBP with most reported at the neck, elbow, and lower back region of the body, which significantly impacted during repetitive activities that involve lifting, flexing, and twisting the trunk. This shows a need to provide ergonomic education and training to improve their awareness about appropriate work hazards and injuries, potentially reducing the deterioration of prolonged LBP and other occupational hazards among janitors. It also demonstrated the need for a global public health plan for LBP prevention, treatment, management, and research.

Meanwhile, the incidence of LBP is also significant during strenuous work such as lifting, flexing trunk, twisting trunk and repetitive janitorial works. In terms of the influence of demographic factors, this study proved that the gender, marital status and BMI were not significant to the incidence of LBP among janitors.

As the research progresses, it is suggested that future studies widen the scope by including a larger sample size. This adjustment would improve the study's representation of the janitorial workforce and raise the findings' generalizability to a broader population in Malaysia. In addition to the questionnaire, they may consider implementing a physical examination to verify the symptoms and pain stated by the respondents. Given that LBP emerged as a prominent issue in this study, additional research should also be considered into the prevalence of WRMSDs in other body parts. Exploring the occurrence of WRMSDs in regions like the neck, elbows, and arms would provide a more comprehensive understanding of the challenges janitorial workers face and contribute to developing targeted interventions.

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