
Factors Associated With Low Back Pain Complaints Among Warehouse Workers At PT. X In 2026

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Abstract

Low Back Pain (LBP) is one of the most common musculoskeletal disorders experienced by warehouse workers due to manual handling activities, non-ergonomic working postures, and repetitive physical workloads. This condition may reduce work productivity and negatively affect workers' health. This study aimed to determine the factors associated with Low Back Pain complaints among warehouse workers at PT. X in 2026. This quantitative study employed a cross-sectional design. The study population consisted of 81 warehouse workers, all of whom were included as the research sample using a total sampling technique. Data were collected using the Nordic Body Map (NBM) questionnaire to identify Low Back Pain complaints, while working posture was assessed using the Rapid Entire Body Assessment (REBA) method. Data were analyzed using univariate and bivariate analyses with the Chi-Square test at a 95% confidence level ($\alpha = 0.05$). The findings indicated that most warehouse workers experienced Low Back Pain complaints. Bivariate analysis showed that age and length of employment were significantly associated with Low Back Pain complaints ($p < 0.05$), whereas working duration was not significantly associated with Low Back Pain ($p > 0.05$). The REBA assessment revealed that most work activities were classified as having moderate to high ergonomic risk, indicating the need for corrective ergonomic interventions. It can be concluded that age and length of employment are factors associated with Low Back Pain complaints among warehouse workers at PT. X. The company is recommended to implement ergonomic programs, provide manual handling aids, and conduct regular ergonomic training and working posture evaluations to reduce the risk of Low Back Pain.

Keywords: Low Back Pain, Warehouse Workers, Ergonomics, Nordic Body Map, REBA.

INTRODUCTION

Low Back Pain (LBP), or lower back pain, is a painful condition experienced in the lower back region, particularly in the lumbosacral area. The pain may be localized or radiate to other parts of the body and may be caused by various factors, including mechanical disorders, degenerative processes, inflammation, trauma, and psychosocial factors (Afifah, 2025). Low Back Pain is one of the most commonly reported complaints, with an incidence rate of up to 49%. Among workers experiencing pain complaints, only approximately 10–20% seek healthcare services to manage their pain, while the majority, approximately 80–90%, report taking no measures to alleviate the pain they experience (Mayang, 2025). Low Back Pain can reduce human productivity, with approximately 50–80% of workers worldwide having experienced lower back pain. Nearly one-third of individuals have experienced some form of lower back pain during their lifetime. Low Back Pain is considered the second most common condition after influenza that causes individuals to frequently seek medical attention, thereby adversely affecting socioeconomic conditions through reduced working days and decreased productivity (Afifah, 2025).

The World Health Organization (WHO) in 2023 stated that musculoskeletal conditions are the second leading cause of disability worldwide, with lower back pain being the leading cause of disability globally. Based on the Global Burden of Disease (GBD) Study, the prevalence of musculoskeletal conditions, based on age and diagnosis, indicates that approximately 20–30% of the world's population experience health problems associated with musculoskeletal conditions. These conditions contribute to a substantial burden of disability worldwide (World Health Organization, 2023).

According to the Indonesian Ministry of Manpower, based on reports from BPJS Ketenagakerjaan, a total of 462,241 occupational accidents were recorded in Indonesia throughout 2024. Musculoskeletal Disorders (MSDs) accounted for approximately 30–40%, or 161,784 cases, of all occupational diseases among manual industrial workers. This category of ergonomics-related occupational diseases specifically refers to musculoskeletal disorders resulting from non-ergonomic physical activities, such as manually lifting, moving, or carrying heavy loads, which are commonly referred to as manual handling in occupational safety. Repetitive manual handling activities performed with improper postures are known to be major causes of various musculoskeletal injuries among workers. Back injuries, particularly lower back pain or Low Back Pain, are among the most frequently reported complaints among workers engaged in manual material-handling tasks (Kemnaker RI, 2024).

According to data from BPJS Kesehatan (2023), the number of musculoskeletal disorder cases in Indonesia has shown an increasing trend in recent years. A total of 21,063 cases were recorded in 2020, increasing to 27,785 cases in 2021 and continuing to rise to 41,621 cases in 2023. This increase indicates that musculoskeletal disorders remain a significant health problem requiring serious attention, particularly in relation to occupational risk factors and the implementation of ergonomic practices in the workplace. According to a study conducted by Septian (2023) among workers in Bekasi, 43.4% of workers were found to have a high risk of developing Low Back Pain, indicating that lower back pain complaints remain a significant occupational health issue in the industrial sector.

According to the Indonesian Ministry of Manpower, based on reports from BPJS Ketenagakerjaan, a total of 462,241 occupational accidents were recorded in Indonesia throughout 2024. Musculoskeletal Disorders (MSDs) accounted for approximately 30–40%, or 161,784 cases, of all occupational diseases among manual industrial workers. This category of ergonomics-related occupational diseases specifically refers to musculoskeletal disorders resulting from non-ergonomic physical activities, such as manually lifting, moving, or carrying heavy loads, which are commonly referred to as manual handling in occupational safety. Repetitive manual handling activities performed with improper postures are known to be major causes of various musculoskeletal injuries among workers. Back injuries, particularly lower back pain or Low Back Pain, are among the most frequently reported complaints among workers engaged in manual material-handling tasks (Kemnaker RI, 2024).

Low Back Pain (LBP) can affect individuals of all age groups, including both younger and older adults, although its prevalence tends to increase from the productive working-age population to older age groups. In the workplace, Low Back Pain is one of the health problems frequently experienced by workers and may result in reduced productivity and loss of working time. This condition affects not only individual health but also workers' ability to perform their occupational activities, potentially resulting in substantial economic losses globally (International Labour Organization, 2019). A study by Afifah (2025) demonstrated that length of employment and working duration are significantly associated with the occurrence of Low Back Pain. Length of employment reflects the period during which an individual has been engaged in work activities, whereas prolonged working duration may increase the risk of Low Back Pain due to accumulated workload, repetitive activities, and non-ergonomic working postures. The study also explained that excessive working hours cause the muscles supporting the spine to contract continuously, particularly when ergonomic aspects are neglected. This condition increases pressure on the spine, induces muscle fatigue, and contributes to lower back pain.

In addition, musculoskeletal complaints are influenced by various factors originating from both occupational and individual characteristics. Occupational factors include non-

ergonomic working postures, excessive workloads, and repetitive activities, whereas individual factors include age, sex, length of employment, and awkward body postures among workers. Therefore, attention to both aspects is essential in efforts to prevent musculoskeletal disorders in the workplace. The findings of Afifah (2025) further emphasize that occupational factors, such as poor working posture, prolonged working duration, and manual handling activities, including lifting, pushing, and carrying loads, contribute to an increased risk of Low Back Pain by placing excessive stress on the muscles and lumbar spine. Therefore, the implementation of ergonomic principles in the workplace is an important measure for preventing musculoskeletal disorders among workers.

PT. X, through its X Indonesia service, is a company engaged in logistics and goods delivery services that was established as part of the development of e-commerce in Indonesia. PT. X focuses on providing fast, safe, and integrated parcel delivery services through the X Indonesia digital platform, thereby meeting the needs of efficient goods distribution. The warehouse operations of PT. X include goods receiving (inbound), sorting, temporary storage, and shipment (outbound) to various destinations. All of these processes are conducted in warehouse facilities using a structured work system supported by skilled workers and modern logistics technologies, such as barcode systems and digital tracking, to ensure the accuracy and efficiency of distribution.

To support 24-hour operations, workers operate under a three-shift system consisting of morning, afternoon, and night shifts, with an average working duration of approximately 10 hours per shift. During double-date promotional periods, workers may work for up to 12 hours per shift, allowing warehouse operations to continue efficiently and continuously.

Warehouse workers perform manual handling activities when lifting sacks containing packages and loading them into or unloading them from container trucks during the goods receiving (inbound) process through to the delivery (outbound) process. Repetitive movements are also performed during the sorting process. These manual handling activities are carried out for prolonged periods, which may increase the risk of workers developing musculoskeletal disorders, particularly Low Back Pain.

Based on a preliminary study involving field observations, interviews, and the administration of the Nordic Body Map (NBM) questionnaire among warehouse workers at PT. X, the researchers conducted interviews and distributed questionnaires on April 21, 2026, at 6:20 p.m. Western Indonesia Time (WIB), to 16 respondents. The results showed that 13 workers (81.25%) experienced lower back pain complaints, while 3 workers (18.75%) did not experience lower back pain. Among the 13 workers who experienced lower back pain complaints, 7 workers (53.85%) reported mild pain, 4 workers (30.77%) reported moderate pain, and 2 workers (15.38%) reported severe pain. The impacts experienced by respondents with lower back pain varied, including difficulty sleeping, difficulty concentrating, and difficulty resting. Some respondents also reported testicular pain, which may indicate a risk of hernia; however, they chose to continue working. To date, the Cibitung Hub Warehouse has not been equipped with assistive devices for manual handling activities, and PT. X has not established programs or policies specifically aimed at preventing ergonomic hazards. If these manual handling activities continue without ergonomic controls, they may contribute to the occurrence of Low Back Pain, resulting in restricted worker mobility, reduced productivity, increased risk of occupational accidents, and deterioration in workers' health.

Based on existing theories and previous studies, several factors are suspected to be associated with Low Back Pain among workers engaged in manual handling activities. However, this study focuses on age, length of employment, and working duration because these three factors are considered the most relevant to the characteristics of warehouse

workers at PT. X. Therefore, the study is entitled “Factors Associated with Low Back Pain Complaints Among Workers at PT. X in 2026.”

RESEARCH METHODS

This study employed a quantitative method with a cross-sectional design. Primary data were collected through interviews and questionnaires covering age, length of employment, working duration, working posture assessed using the Rapid Entire Body Assessment (REBA), and Low Back Pain complaints assessed using the Nordic Body Map (NBM). The study population consisted of 81 warehouse workers at PT. X in 2026, with a sample of 68 respondents determined using the Slovin formula with a 5% margin of error. The 16 respondents who participated in the preliminary study were retained as part of the study sample; therefore, an additional 52 respondents were required.

Sampling was conducted based on inclusion and exclusion criteria. The inclusion criteria were active warehouse workers assigned to operational/manual handling activities, willing to participate as respondents, and able to complete the questionnaire. Workers who were on leave or sick and those who did not complete the questionnaire were excluded. Data were analyzed using univariate analysis to determine the frequency distribution of each variable and bivariate analysis to examine the associations between age, length of employment, and working duration.

RESULTS AND DISCUSSION

Univariate Analysis
Description of Low Back Pain Complaints Among Warehouse Workers at PT. X in 2026

The univariate analysis of the frequency distribution of warehouse workers based on suspected Low Back Pain complaints at PT. X in 2026 is presented in the following table.

Table 1. Description of Low Back Pain Complaints Among Warehouse Workers at PT. X in 2026

Low Back Pain Complaints	Frequency	Percentage
Not at Risk	17	32.7%
At Risk (Mild, Moderate, High)	35	67.3%
Total	52	100%
Age	Frequency	Percentage
< 26 years	29	55.8%
> 26 years	23	44.2%
Total	52	100%
Length of Employment	Frequency	Percentage
< 3 years	32	61.5%
> 3 years	20	38.5%
Total	52	100%
Working Duration	Frequency	Percentage
9 hours	21	40.4%
12 hours	31	59.6%
Total	52	100.0%
Working Posture	Frequency	Percentage
Low Risk	9	17.31%
Moderate, High, and Very High Risk	43	80.77%
Total	52	100.0%

Based on Table 1, among the 52 warehouse workers, 17 workers (32.7%) were categorized as not being at risk of Low Back Pain, while 35 workers (67.3%) were categorized as being at risk (mild, moderate, or high). Regarding age, 29 workers (55.8%) were aged <26 years, while 23 workers (44.2%) were aged >26 years. Regarding length of

employment, 32 workers (61.5%) had worked for <3 years, while 20 workers (38.5%) had worked for >3 years. Regarding working duration, 21 workers (40.4%) worked 9 hours per day, while 31 workers (59.6%) worked 12 hours per day. Regarding working posture, 9 workers (17.31%) were classified as having low ergonomic risk, while 43 workers (80.77%) were classified as having moderate to very high ergonomic risk.

Bivariate Analysis

Analysis of the Association Between Age and Low Back Pain Complaints Among Warehouse Workers at PT. X in 2026

Based on the results of the study, data regarding the association between age and Low Back Pain complaints among workers were obtained. The cross-tabulation between age and Low Back Pain complaints is presented in the following table.

Table 2. Analysis of the Association Between Age and Low Back Pain Complaints Among Warehouse Workers at PT. X in 2026

Age	Not at Risk n (%)		At Risk (Mild, Moderate, High) (%)		Total		P Value	PR (95% CI)
	N	Percentage	N	Percentage	N	Percentage		
< 26 Years	14	48.30%	15	51.70%	29	100%	0,017	1.68
> 26 Years	3	13.00%	20	87.00%	23	100%		(1.15–2.45)
Total	17	32.70%	35	67.30%	52	100%		

Based on the analysis presented in Table 2, among workers aged <26 years, 15 workers (51.7%) experienced Low Back Pain complaints, while 14 workers (48.3%) did not experience such complaints. Among workers aged >26 years, 20 workers (87.0%) experienced Low Back Pain complaints, while 3 workers (13.0%) did not.

The Pearson chi-square test showed a p-value of 0.017 ($p < 0.05$), indicating a statistically significant association between age and Low Back Pain complaints among warehouse workers at PT. X in 2026.

The Prevalence Ratio (PR) of 1.68 (95% CI: 1.15–2.45) indicates that workers aged >26 years had a 1.68-fold higher prevalence of Low Back Pain complaints compared with workers aged <26 years.

Analysis of the Association Between Length of Employment and Low Back Pain Complaints Among Warehouse Workers at PT. X in 2026

Based on the results of the study, data regarding the association between length of employment and Low Back Pain complaints among workers were obtained. The cross-tabulation between length of employment and Low Back Pain complaints is presented in the following table.

Table 3. Analysis of the Association Between Length of Employment and Low Back Pain Complaints Among Warehouse Workers at PT. X in 2026

Length of Employment	Not at Risk n (%)		At Risk (Mild, Moderate, High) (%)		Total		P Value	PR (95% CI)
	N	Percentage	N	Percentage	N	Percentage		
< 3 years	15	34.40%	17	65.60%	32	100%	0,014	1.69
>3 years	2	10.00%	18	90.00%	20	100%		1.19–2.39
Total	17	32.70%	35	67.30%	52	100%		

Based on Table 3, among workers with a length of employment of <3 years, 17 workers (65.6%) experienced Low Back Pain complaints, while 15 workers (34.4%) did not. Meanwhile, among workers with a length of employment of >3 years, 18 workers (90.0%) experienced Low Back Pain complaints, while 2 workers (10.0%) did not.

The Pearson chi-square test showed a p-value of 0.014 ($p < 0.05$). Therefore, there was a statistically significant association between length of employment and Low Back Pain complaints among warehouse workers at PT. X in 2026.

The Prevalence Ratio (PR) of 1.69 (95% CI: 1.19–2.39) indicates that workers with a length of employment of >3 years had a 1.69-fold higher prevalence of Low Back Pain complaints compared with workers with a length of employment of <3 years.

Analysis of the Association Between Working Duration and Low Back Pain Complaints Among Warehouse Workers at PT. X in 2026

Based on the results of the study, data regarding the association between working duration and Low Back Pain complaints among workers were obtained. The cross-tabulation between working duration and Low Back Pain complaints is presented in the following table.

Table 4. Analysis of the Association Between Working Duration and Low Back Pain Complaints Among Warehouse Workers at PT. X in 2026

Working Duration	Not at Risk n (%)		At Risk (Mild, Moderate, High) (%)		Total		P Value	PR (95% CI)
	N	Percentage	N	Percentage	N	Percentage		
9 hours	7	33.30%	14	66.70%	21	100%	0,935	1.02
12 hours	10	32.30%	21	67.70%	31	100%		(0.75–1.38)
Total	17	32.70%	35	67.30%	52	100%		

Based on Table 4, among workers with a working duration of 9 hours, 14 workers (66.7%) experienced Low Back Pain complaints, while 7 workers (33.3%) did not. Meanwhile, among workers with a working duration of 12 hours, 21 workers (67.7%) experienced Low Back Pain complaints, while 10 workers (32.3%) did not.

The Pearson chi-square test showed a p-value of 0.935 ($p > 0.05$), indicating that there was no statistically significant association between working duration and Low Back Pain complaints among warehouse workers at PT. X in 2026.

The Prevalence Ratio (PR) of 1.02 (95% CI: 0.75–1.38) indicates that workers with a working duration of 12 hours had a 1.02-fold prevalence of Low Back Pain complaints compared with workers who worked for 9 hours.

Analysis of the Association Between Working Posture and Low Back Pain Complaints Using the REBA Method Among Warehouse Workers at PT. X in 2026

In the univariate analysis of the frequency distribution of warehouse workers based on working posture assessed using the Rapid Entire Body Assessment (REBA) method at PT. X in 2026, warehouse workers were divided into two work sections, namely small-package sorting and large-package sorting, as presented in the following tables.

Table 5. REBA Scores of Workers in the Small-Package Sorting Section at PT. X in 2026

Score REBA Pekerja Bagian Sorting Paket Kecil			
No.	Number of Complaint Level	REBA Score	Risk Level
1	3	3	Low Risk
2	3	3	Low Risk
3	3	3	Low Risk
4	3	3	Low Risk
5	3	3	Low Risk
6	3	3	Low Risk
7	4	5	Moderate Risk
8	4	5	Moderate Risk
9	4	5	Moderate Risk
10	4	5	Moderate Risk
11	4	5	Moderate Risk
12	4	5	Moderate Risk
13	4	5	Moderate Risk
14	4	5	Moderate Risk
15	4	5	Moderate Risk
16	4	5	Moderate Risk
17	4	5	Moderate Risk
18	5	6	Moderate Risk
19	5	6	Moderate Risk

20	5	6	Moderate Risk
21	5	6	Moderate Risk
22	5	6	Moderate Risk
23	5	6	Moderate Risk
24	5	7	Moderate Risk
25	5	7	Moderate Risk
26	5	7	Moderate Risk
27	6	7	Moderate Risk
28	6	7	Moderate Risk
29	6	7	Moderate Risk
30	6	7	Moderate Risk

Based on Table 5, among workers in the small-package sorting section, 6 workers (20%) had a REBA score categorized as low risk, while 24 workers (80%) had a REBA score categorized as moderate risk.

Table 6. REBA Scores of Workers in the Large-Package Sorting Section at PT. X in 2026

Score REBA Pekerja Bagian Sorting Paket Besar			
No.	Number of Complaint Level	REBA Score	Risk Level
1	3	3	Low Risk
2	3	3	Low Risk
3	3	3	Low Risk
4	3	3	Low Risk
5	5	6	Moderate Risk
6	6	7	Moderate Risk
7	4	5	Moderate Risk
8	5	6	Moderate Risk
9	4	5	Moderate Risk
10	5	6	Moderate Risk
11	4	5	Moderate Risk
12	5	6	Moderate Risk
13	4	5	Moderate Risk
14	6	7	Moderate Risk
15	5	6	Moderate Risk
16	4	5	Moderate Risk
17	7	8	High Risk
18	7	9	High Risk
19	7	8	High Risk
20	6	8	High Risk
21	7	9	High Risk
22	7	11	Very High Risk

Based on Table 6, workers in the large-package sorting section had varying REBA scores. Four workers (18.18%) had scores categorized as low risk, 10 workers (45.45%) had scores categorized as moderate risk, 7 workers (31.82%) had scores categorized as high risk, and 1 worker (4.55%) had a score categorized as very high risk.

Discussion

Association Between Age and Low Back Pain Complaints Among Warehouse Workers at PT. X in 2026

Based on the bivariate analysis, there was a statistically significant association between age and Low Back Pain complaints among warehouse workers at PT. X in 2026, as indicated by a p-value < 0.05.

This finding is consistent with a study conducted by Purwati (2023), which found a significant association between age and Low Back Pain (LBP) complaints, with a p-value of 0.017. The findings indicated that as age increases, the risk and severity of LBP complaints also tend to increase. This finding provides further evidence that age is an important individual risk factor for LBP, particularly among workers engaged in manual handling activities and exposed to non-ergonomic working postures.

According to Tarwaka (2015), increasing age is associated with declines in physical capacity, muscle strength, tissue elasticity, and the body's cellular regenerative capacity. These conditions may increase the risk of musculoskeletal disorders, including Low Back Pain, particularly when workers perform repetitive manual handling activities, maintain non-ergonomic working postures, and lift loads for prolonged periods. Nevertheless, age is not the only factor influencing the occurrence of Low Back Pain complaints, as other factors may also contribute, including length of employment, working duration, working posture, workload, and individual physical conditions.

Association Between Length of Employment and Low Back Pain Complaints Among Warehouse Workers at PT. X in 2026

Based on the bivariate analysis, there was a statistically significant association between length of employment and Low Back Pain complaints among warehouse workers at PT. X in 2026, with a $p\text{-value} < 0.05$.

This finding is consistent with a study conducted by Purwati (2023), which found a highly significant association between length of employment and Low Back Pain (LBP) complaints, with a $p\text{-value}$ of 0.014. The findings indicated that the longer a person has been employed, the greater the risk and severity of LBP complaints. In that study, workers with a length of employment of >5 years were predominantly categorized as experiencing moderate disability (46.9%) and high disability (46.9%), whereas workers with a length of employment of <5 years mostly experienced mild complaints (44.4%). These findings provide further evidence that length of employment is one of the important risk factors for LBP, particularly among workers engaged in manual handling activities and exposed to non-ergonomic working postures.

The findings of this study are also supported by the theory proposed by Tarwaka (2015), which states that length of employment refers to the duration for which an individual has worked in a particular occupation. Therefore, the longer a person works, the longer the worker is exposed to various risk factors in the work environment. Continuous exposure, such as lifting loads, maintaining non-ergonomic working postures, performing repetitive movements, and standing for prolonged periods, may cause muscle fatigue and increase the risk of musculoskeletal disorders, including Low Back Pain.

Association Between Working Duration and Low Back Pain Complaints Among Warehouse Workers at PT. X in 2026

Based on the bivariate analysis, there was no statistically significant association between working duration and Low Back Pain complaints among warehouse workers at PT. X in 2026, with a $p\text{-value} > 0.05$ ($p = 0.935$).

This finding is consistent with a study conducted by Handayani (2022), which found no significant association between working duration and Low Back Pain (LBP) complaints among operators at PT. Kutai Bara Abadi, with a $p\text{-value}$ of 0.699 ($p > 0.05$). This finding may be explained by the possibility that workers did not perform manual handling activities continuously throughout the entire working period. During their shifts, workers also performed various other activities, such as walking to the sorting area, changing work positions, scanning goods, waiting for inbound/outbound trucks to arrive, and coordinating with coworkers. These variations in activities resulted in periodic changes in body posture, thereby reducing prolonged exposure to static postures, which is one of the risk factors for musculoskeletal disorders.

These findings further indicate that other factors, such as age, length of employment, or working posture, may play a more prominent role in contributing to LBP complaints than working duration itself.

In this study, the absence of a significant association between working duration and Low Back Pain complaints may be attributed to the fact that although some workers worked

for 12 hours, they still received rest periods according to company policy, namely approximately 1 hour for regular shifts and 1.5 hours for 12-hour shifts. In addition, based on field observations, work activities in the warehouse were not performed continuously at the same intensity throughout the working period. Workers engaged in various activities, including goods receiving (inbound), package sorting, and goods dispatch (outbound), resulting in intervals that may reduce static loading on the musculoskeletal system.

Relationship Between Working Posture and Low Back Pain Complaints Among Warehouse Workers at PT. X in 2026

According to Tarwaka (2015), working posture refers to the position or body posture adopted by workers when performing a work activity involving the coordination of various body parts, including the neck, back, arms, wrists, and legs. An ergonomic working posture is a body position that is close to a neutral posture, thereby minimizing the load on the musculoskeletal system. In contrast, a non-ergonomic working posture can increase mechanical stress on the muscles, joints, ligaments, and spine, thereby increasing the risk of musculoskeletal disorders, including lower back pain. Working postures that are performed unnaturally, maintained for prolonged periods, repeated frequently, or accompanied by lifting loads may increase the risk of musculoskeletal complaints.

Based on observations using the Rapid Entire Body Assessment (REBA) method, it was found that most work activities in the warehouse of PT. X had ergonomic risk levels ranging from moderate to very high. The inbound process received a REBA score of 8, categorized as high risk, indicating that workers performed package lifting and handling activities while bending, twisting their bodies, and supporting loads. Therefore, corrective measures are required in the near future.

During the sorting of small packages, a REBA score of 6 was obtained, which falls into the moderate-risk category. This risk arises because workers perform repetitive sorting activities while standing for relatively long periods and continuously reaching for packages. Although the risk level is lower than that of other activities, this condition still requires evaluation to prevent musculoskeletal disorders.

The highest level of risk was identified during the sorting of large packages, which obtained a REBA score of 11 and was categorized as very high risk. The high score was attributed to workers frequently lifting and moving large packages while bending and twisting their bodies, thereby placing considerable stress on the lower back and upper extremities. This condition indicates that ergonomic corrective measures need to be implemented immediately to reduce the risk of work-related injuries.

Furthermore, the outbound activity obtained a REBA score of 10, which was categorized as high risk. This activity involves moving and arranging packages into distribution vehicles, requiring workers to repeatedly lift, push, pull, and twist their bodies. These working postures increase the load on the musculoskeletal system, particularly in the lower back, shoulders, and lower extremities.

Based on the findings, it can be concluded that the working postures of warehouse workers at PT. X tend to be non-ergonomic, with ergonomic risk levels predominantly ranging from moderate to very high according to the REBA method. These conditions indicate that work activities involving manual handling, such as lifting, moving, sorting, pushing, and pulling packages, have the potential to increase the load on the musculoskeletal system, particularly in the lower back region. Therefore, the implementation of ergonomic principles through improvements in working posture, the use of proper manual handling techniques, provision of lifting aids, and appropriate arrangements of working and rest periods is necessary to reduce the risk of Low Back Pain complaints among warehouse workers at PT. X.

CONCLUSION

Based on the results of the study regarding factors associated with Low Back Pain among warehouse workers at PT. X in 2026, the following conclusions can be drawn:

1. Description of Low Back Pain Complaints: The majority of warehouse workers at PT. X experienced Low Back Pain complaints, with 35 workers (67.3%) categorized as being at risk (mild, moderate, or high), while 17 workers (32.7%) were categorized as not at risk.
2. Description of Age: The majority of warehouse workers at PT. X were aged <26 years, comprising 29 workers (55.8%), while 23 workers (44.2%) were aged ≥ 26 years.
3. Description of Length of Employment: The majority of warehouse workers at PT. X had a length of employment of <3 years, comprising 32 workers (61.5%), while 20 workers (38.5%) had a length of employment of ≥ 3 years.
4. Description of Working Duration: The majority of warehouse workers at PT. X had a working duration of 12 hours per day, comprising 31 workers (59.6%), while 21 workers (40.4%) had a working duration of 9 hours per day.
5. Description of Working Posture: Based on observations using the REBA method, all work activities in the warehouse of PT. X had varying levels of ergonomic risk, ranging from moderate to very high. The large-package sorting activity had the highest REBA score (11), categorized as very high risk, while the small-package sorting activity had the lowest score (6), categorized as moderate risk.
6. Association Between Age and Low Back Pain: There was a statistically significant association between age and Low Back Pain complaints among warehouse workers at PT. X in 2026 (p-value = 0.017; PR = 1.68; 95% CI: 1.15–2.45). Workers aged ≥ 26 years had a 1.68-fold higher prevalence of Low Back Pain complaints compared with workers aged <26 years.
7. Association Between Length of Employment and Low Back Pain: There was a statistically significant association between length of employment and Low Back Pain complaints among warehouse workers at PT. X in 2026 (p-value = 0.014; PR = 1.69; 95% CI: 1.19–2.39). Workers with a length of employment of ≥ 3 years had a 1.69-fold higher prevalence of Low Back Pain complaints compared with workers with a length of employment of <3 years.
8. Association Between Working Duration and Low Back Pain: There was no statistically significant association between working duration and Low Back Pain complaints among warehouse workers at PT. X in 2026 (p-value = 0.935; PR = 1.02; 95% CI: 0.75–1.38).

Association Between Working Posture and Low Back Pain: Based on observations using the REBA method, all work activities in the warehouse of PT. X had ergonomic risk levels ranging from moderate to very high. Therefore, non-ergonomic working postures may increase the risk of Low Back Pain complaints among warehouse workers.

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