Indonesian Journal of Global Health Research
Volume 7 Number 2, April 2025
e-ISSN 2715-1972; p-ISSN 2714-9749
http://jurnal.globalhealthsciencegroup.com/index.php/IJGHR

THE ASSOCIATION OF NON-CONFORMANCE TOWARD UNSAFE ACT AND CONDITION IN MILLS PT XYZ: THE CORRELATIONAL STUDY

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ABSTRACT
The issue of workplace safety is a critical concern globally, particularly in high-risk industries such as manufacturing and milling. Using quantitative methods. This study aims to investigate the relationship between non-compliance with safety protocols and the prevalence of unsafe acts and conditions across 37 mills at PT XYZ, which includes 14 paper buyer mills, 13 paper pulp mills, and 10 paper tissue mills. We collected data in May from secondary sources such as safety records and incident reports and then used the Statistical Package for the Social Sciences (SPSS) for analysis. We performed normality tests prior to conducting correlation analyses to ensure the appropriateness of the applied statistical methods. The study of Mill PT XYZ (N=37) found weak negative correlations between non-conformance and unsafe conditions (-0.292, p=0.80) and unsafe acts (0.140, p=0.410). This means that non-conformance does not have a big effect on unsafe behaviors. In the Paper Buyer Mills (N=14), correlations are weakly positive for unsafe conditions (0.127, p=0.666) and weakly negative for unsafe acts (-0.402, p=0.154), both lacking significance. For the Paper Pulp Mills (N=13), weak negative correlations of -0.366 (p=0.219) and -0.455 (p=0.118) also show no significance. The Paper Tissue Mills (N=10) have a moderately negative correlation of -0.599 (p=0.067), which points to a possible link between higher non-conformance and unsafe conditions. However, the correlation with unsafe acts (0.238, p=0.508) is still weak, which makes it challenging to draw firm conclusions.

Keywords: non-conformance; unsafe act; unsafe condition

How to cite (in APA style)
Hakim, M. I., Wiguna, P. A., Wijaya, E. S., & Kurnia, R. (2025). The Association of Non-Conformance Toward Unsafe Act and Condition in Mills PT XYZ: The Correlational Study. Indonesian Journal of Global Health Research, 7(2), 317-328. https://doi.org/10.37287/ijghr.v7i2.5184.

INTRODUCTION

Workplace safety, as defined by Beus et al. (2016), refers to the likelihood of physical harm occurring in a work environment, whether immediately or over time. Jule (2020) emphasizes that ensuring workplace safety is a shared responsibility between all employees and management, with top executives playing a crucial role in fostering a culture where employees feel secure expressing safety concerns. This focus on safety not only helps prevent accidents but also promotes confidence and open communication, leading to a more efficient workplace. The International Labour Organization (ILO) reports that work-related illnesses account for the majority of the 2.6 million deaths annually due to occupational hazards, alongside an additional 330,000 fatalities from work-related accidents each year, highlighting the urgent need for organizations to prioritize safety measures (Mutegi, 2023). Roosmiati et al. (2024) argue that the losses incurred can include injuries, pain, and even death. Meanwhile, the European Employee Productivity Institute noted in 2019 that insufficient safety protocols can inhibit employee's productivity, resulting in decreased efficiency and increased operational costs. This relationship between safety and productivity is critical; when employees feel unsafe, their focus and morale diminish, ultimately affecting their performance and the organization's success. Organizations that prioritize safety tend to experience lower rates of workplace incidents, fostering a positive work environment and enhancing employee morale and loyalty. It is inline with Curcuruto et al. (2023), a commitment to safety not only reduces the likelihood of accidents but also cultivates a culture

of trust and responsibility among employees, encouraging them to engage in safe practices and adhere to safety protocols.

Furthermore, workplace safety is essential in the manufacturing and milling industries. According to Matos and Cardoso (2024), workers in the milling industry face many job-related dangers. Cheng et al. (2023) explain that changes in the work environment can create new hazards and make existing risks even worse. Hence, a strong safety culture is essential to mitigate hazards and ensure compliance with safety rules. Organizations that prioritize safety experience fewer accidents, which in turn boosts employee morale and loyalty. O'Toole's (2002) research supports this, revealing a close relationship between management's commitment to safety and employees' perceptions of the safety system. Besides, within the domain of workplace safety, two critical factors contributing to accidents are unsafe acts and unsafe conditions (Irkas et al., 2020). Unsafe acts can result from inadequate training or a workplace culture that does not emphasize safety (Xie et al., 2023). In addition, it can negatively impact both workers and the organization (Irwansyah and Widanarko, 2024). Conversely, unsafe conditions refer to environmental hazards that elevate the risk of accidents. Examples include poorly maintained equipment, insufficient safety signage, and hazardous work environments. Also, Mubarokah et al. (2024) convey that unsafe conditions are situations that endanger oneself, others, or local facilities and infrastructure. Besides, Non-conformance refers to mistakes or deviations that have been identified as not following established rules or standards (Id et al., 2013). It can lead to the delivery of products or services that are not of excellent quality (Moso and Olanrewaju, 2024). Addressing noncompliance is essential because it directly affects both safety compliance and quality assurance.

There are certain research finding associated with the study. Firstly, Larasatie et al. (2022) studied the correlation between unsafe actions and work accidents among furniture workers in Jepara Regency, finding a significant relationship. Key unsafe actions included not using personal protective equipment (PPE) (25.7%) and distractions (16.5%), while unsafe conditions were mainly disorganized workspaces (95.4%) and excessive noise (88.1%). The study highlights the need for improved safety awareness and training. Secondly, Putri et al. (2023) evaluated the STOP (Safety Training Observation Program) at a Coal-Fired Power Plant in East Java. Their observational study showed an increase in observers from 639 in 2020 to 2,321 in 2021. Despite this, unsafe acts rose from 4,212 (1.51%) in 2020 to 8,226 (1.65%) in 2021, and unsafe conditions from 1,878 (2.56%) to 2,512 (1.71%). This indicates that increased observations did not significantly reduce unsafe behaviors. Thirdly, Es'haghi et al. (2020) explored unsafe behaviors in the mining industry, identifying 14 factors influencing these actions through observations and interviews. Their analysis revealed that inadequate supervision was the most significant factor affecting unsafe behaviors, with inadequate training as a key intermediary. These insights are valuable for policymakers aiming to enhance workplace safety. Fourthly, Meng et al. (2021) emphasized the contribution of unsafe behaviors to construction site accidents and reviewed methodologies for detecting these behaviors. They highlighted advancements in motion data analysis and real-time tracking systems, noting that integrating technologies like Building Information Modeling (BIM) and convolutional neural networks (CNN) can improve safety performance and behavior recognition. Lastly, Wang et al. (2020) addressed the high incidence of coal mine accidents in China linked to unsafe human behaviors. They developed a group dynamics model to evaluate factors influencing these behaviors and found that proactive measures to correct unsafe actions were more effective than reactive ones. This research underscores the importance of addressing unsafe behaviors to enhance safety in coal mining operations.

The existing literature highlights significant correlations between unsafe actions and workplace accidents across various industries, such as the furniture sector in Jepara Regency (Larasatie et al., 2022) and the mining industry (Es'haghi et al., 2020), emphasizing the critical role of safety training and supervision in mitigating unsafe behaviors. However, while studies like those by Putri et al. (2023) and Meng et al. (2021) have explored the effectiveness of safety observation programs and technological advancements in detecting unsafe behaviors, they only focus on specific sectors without a comprehensive analysis of how non-conformance to safety protocols interacts with unsafe acts and conditions in a broader context. Furthermore, Wang et al. (2020) underline the importance of proactive measures in addressing unsafe behaviors, yet there remains a lack of empirical research that systematically examines the interplay between non-conformance and unsafe acts within the operational framework of manufacturing mills.

The study, "THE ASSOCIATION NON-CONFORMANCE TOWARD UNSAFE ACTS AND CONDITION IN MILLS PT XYZ: THE CORRELATIONAL STUDY," examines the impact of noncompliance with safety rules on unsafe acts and conditions in PT XYZ's 37 paper mills, encompassing paper, pulp, and tissue mills. This study is vital because it looks at safety in high-risk industries and shows how following safety rules can improve productivity and employee morale. With so many work-related injuries and illnesses around the world, the findings could help create better safety policies and practices in various industries and make a significant global impact. This research seeks to bridge the gap between theoretical safety practices and their practical application in real-world settings. By examining how safety rule violations lead to unsafe actions and conditions, the research aims to find patterns that can help improve safety measures and ensure better compliance with safety protocols.

METHOD

The study examines the relationship between non-compliance and the occurrence of unsafe acts and conditions in PT XYZ's 37 mills (14 paper mills, 13 pulp mills, and 10 tissue mills). Using quantitative methods, data collected in May from internal reporting systems, safety inspections, and employee feedback through checklists and incident reports are analyzed. We identify unsafe conditions (such as poor housekeeping, lack of machine guarding) and unsafe acts (such as ignoring safety procedures, not using PPE). We assess non-compliance by investigating reported unsafe conditions and acts and conducting compliance audits. We use SPSS (Statistical Package for the Social Sciences) for statistical analysis, which includes correlation and normality tests. Before conducting a correlation analysis, it was essential to perform a normality test to assess the distribution of the data. This step determined the appropriate correlational test (Mishra et al., 2019). To ensure the validity of the results, Pearson's correlation coefficient was applied for normally distributed data and Spearman's rank correlation coefficient for non-normally distributed data (Yanti and Akhri, 2022).

RESULT

Table 1. presents data from PT XYZ, which consists of (37 mills) categorized into three types: paper buyer mills, paper pulp mills, and paper tissue mills. It includes three key metrics for each mill: non-conformance, which refers to the number of instances where safety protocols were not followed; unsafe conditions, indicating the number of hazardous environments or equipment posing risks to employees; and unsafe acts, representing the number of unsafe actions taken by employees that could increase the risk of accidents or injuries. The data is broken down by mill type, showing specific counts for each metric across the different mills, listed from A to K1.

Table 1.
Mills PT XYZ (n=37)

Mills	Buyer	Non-conformance	Unsafe Condition	Unsafe Act
A	Paper	155	422	12
B	Pulp	198	437	78
C	Paper	115	585	100
D	Pulp	134	668	81
E	Pulp	130	655	4
F	Tissue	77	765	35
G	Paper	165	603	88
H	Paper	163	891	29
I	Paper	150	547	63
J	Pulp	138	1000	73
K	Pulp	79	725	22
L	Paper	129	429	48
M	Paper	133	386	0
N	Pulp	110	696	19
O	Paper	142	555	42
P	Tissue	170	743	13
Q	Pulp	244	695	99
R	Paper	159	585	7
S	Paper	163	431	37
T	Tissue	146	297	54
U	Paper	54	511	93
V	Paper	149	771	7
W	Tissue	153	643	85
X	Tissue	273	351	50
Y	Tissue	140	635	21
Z	Pulp	165	677	64
A1	Paper	148	423	56
B1	Paper	92	631	32
C1	Pulp	207	612	52
D1	Pulp	188	371	38
E1	Tissue	105	712	70
F1	Tissue	97	791	32
G1	Pulp	125	1000	31
H1	Tissue	159	277	68
I1	Pulp	189	818	54
J1	Tissue	245	469	74
K1	Pulp	70	737	72

Table 2.
Paper Buyer Mills PT XYZ (n=14)

Mills	Buyer	Non-conformance	Unsafe Condition	Unsafe Act
A	Paper	155	422	12
C	Paper	115	585	100
G	Paper	165	603	88
H	Paper	163	891	29
I	Paper	150	547	63
L	Paper	129	429	48
M	Paper	133	386	0
O	Paper	142	555	42
R	Paper	159	585	7
S	Paper	163	431	37
U	Paper	54	511	93
V	Paper	149	771	7

A1	Paper	148	423	56
B1	Paper	92	631	32

Table 2, Paper Buyers (14 mills) shows that Mill G had the highest non-conformance at 165, while Mill U had the lowest at 54. Mill H reported the highest unsafe conditions at 891, with Mill M having the lowest at 386. For unsafe acts, Mill C led with 100, whereas Mill M recorded none.

Table 3.
Pulp Buyer Mills PT XYZ (n=13)

Mills	Buyer	Non-conformance	Unsafe Condition	Unsafe Act
B	Pulp	198	437	78
D	Pulp	134	668	81
E	Pulp	130	655	4
J	Pulp	138	1000	73
K	Pulp	79	725	22
N	Pulp	110	696	19
Q	Pulp	244	695	99
Z	Pulp	165	677	64
C1	Pulp	207	612	52
D1	Pulp	188	371	38
G1	Pulp	125	1000	31
I1	Pulp	189	818	54
K1	Pulp	70	737	72

Table 3: Pulp Buyers (13 mills) indicates Mill Q had the highest non-conformance at 244, and Mill K1 the lowest at 70. Unsafe conditions peaked at 1000 in both Mill J and G1, while Mill D1 had the lowest at 371. Mill B reported the highest unsafe acts at 78, compared to Mill E's low of 4.

Table 4.
Tissue Buyer Mills PT XYZ (n=10)

Mills	Buyer	Non-conformance	Unsafe Condition	Unsafe Act
F	Tissue	77	765	35
P	Tissue	170	743	13
T	Tissue	146	297	54
W	Tissue	153	643	85
X	Tissue	273	351	50
Y	Tissue	140	635	21
E1	Tissue	105	712	70
F1	Tissue	97	791	32
H1	Tissue	159	277	68
J1	Tissue	245	469	74

Table 4, Tissue Buyers (10 mills) reveals Mill X with the highest non-conformance at 273, and Mill F1 with the lowest at 97. Unsafe conditions were highest at Mill F (765) and lowest at Mill H1 (277). Mill W had the most unsafe acts at 85, while Mill P had the fewest at 13.

Table 5.
Normality Test of Mills PT XYZ (n=37)

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig	Statistic	df	Sig
Non-Conformance	.141	37	.061	.964	37	.275
Unsafe Condition	.100	37	.200	.976	37	.579
Unsafe act	.078	37	.200	.966	37	.316

Table 5 presents the results of normality tests for non-conformance, unsafe conditions, and unsafe acts in PT XYZ mills, utilizing the Kolmogorov-Smirnov and Shapiro-Wilk tests.

All p-values exceed 0.05: 0.061 and 0.275 for non-conformance, 0.200 and 0.579 for unsafe conditions, and 0.200 and 0.316 for unsafe acts. This suggests that the data is normally distributed, permitting the use of parametric statistical methods for further analyses.

Table 6.
Normality Test of Paper Buyer Mills PT XYZ (n=14)

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig	Statistic	df	Sig
Non-Conformance	.209	14	.200	.814	14	.007
Unsafe Condition	.164	14	.099	.895	14	.094
Unsafe act	.124	14	.200	.933	14	.341

Table 6 displays the results of normality tests for non-conformance, unsafe conditions, and unsafe acts in Paper Buyer Mill PT XYZ mills, using the Kolmogorov-Smirnov and Shapiro-Wilk tests. All p-values are above 0.05, with values of 0.200 and 0.07 for non-conformance, 0.099 and 0.094 for unsafe conditions, and 0.200 and 0.341 for unsafe acts. These results indicate that the data is normally distributed, allowing for the application of parametric statistical methods in subsequent analyses.

Table 7.
Normality Test of Pulp Buyer Mills PT XYZ (n=13)

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig	Statistic	df	Sig
Non-Conformance	.209	13	.200	.968	13	.874
Unsafe Condition	.164	13	.200	.921	13	.259
Unsafe act	.124	13	.200	.968	13	.871

Table 7 shows the results of normality tests for non-conformance, unsafe conditions, and unsafe acts in the Paper Buyer Mill PT XYZ mills, using the Kolmogorov-Smirnov and Shapiro-Wilk tests. All p-values are above 0.05, specifically 0.200 and 0.874 for non-conformance, 0.200 and 0.259 for unsafe conditions, and 0.200 and 0.871 for unsafe acts. These results indicate that the data is normally distributed, allowing for the use of parametric statistical methods in further analyses.

Table 8.
Normality Test of Tissue Buyer Mills PT XYZ (n=10)

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig	Statistic	df	Sig
Non-Conformance	.214	10	.200	.915	10	.318
Unsafe Condition	.230	10	.144	.868	10	.096
Unsafe act	.168	10	.200	.954	10	.715

Table 8 presents the results of normality tests conducted on non-conformance, unsafe conditions, and unsafe acts in the Paper Buyer Mill PT XYZ mills, utilizing the Kolmogorov-Smirnov and Shapiro-Wilk tests. The p-values obtained from these tests are all greater than 0.05, specifically 0.200 and 0.318 for non-conformance, 0.144 and 0.96 for unsafe conditions, and 0.200 and 0.715 for unsafe acts. These results suggest that the data follows a normal distribution, indicating that it is appropriate to use parametric statistical methods for any further analyses.

Table 9.
Pearson Correlation of Mills PT XYZ (n=37)

		Non-Conformance	Unsafe Condition	Unsafe Act
Non-Conformance	Pearson Correlation	1	-.292	.140
	Sig. (2-tailed)		0.80	.410
	N	37	37	37
Unsafe Condition	Pearson Correlation	-.292	1	-.080
	Sig. (2-tailed)	0.80		.639
	N	37	37	37
Unsafe Act	Pearson Correlation	140	-.080	1
	Sig. (2-tailed)	410	.639	
	N	37	37	37

Table 9, revealing a weak negative correlation of -0.292 between non-conformance and unsafe conditions, with a non-significant p-value of 0.80. The correlation with unsafe acts is a very weak positive (0.140) and also not significant (p=0.410).

Table 10.
Pearson Correlation of Paper Buyer Mills PT XYZ (n=14)

		Non-Conformance	Unsafe Condition	Unsafe Act
Non-Conformance	Pearson Correlation	1	.127	-.402
	Sig. (2-tailed)		.666	.154
	N	14	14	14
Unsafe Condition	Pearson Correlation	.127	1	-.051
	Sig. (2-tailed)	.666		.864
	N	14	14	14
Unsafe Act	Pearson Correlation	-.402	-.402	1
	Sig. (2-tailed)	.154	.154	
	N	14	14	14

Table 10, indicating a weak positive correlation of 0.127 with unsafe conditions (p=0.666) and a weak negative correlation of -0.402 with unsafe acts (p=0.154), both not significant.

Table 11.
Pearson Correlation of Pulp Buyer Mills PT XYZ (n=13)

		Non-Conformance	Unsafe Condition	Unsafe Act
Non-Conformance	Pearson Correlation	1	-.366	-.455
	Sig. (2-tailed)		.219	.118
	N	13	13	13
Unsafe Condition	Pearson Correlation		1	-.019
	Sig. (2-tailed)			.951
	N	13	13	13
Unsafe Act	Pearson Correlation		-.019	1
	Sig. (2-tailed)		.951	
	N	13	13	13

Table 11, showing a weak negative correlation of -0.366 with unsafe conditions (p=0.219) and -0.455 with unsafe acts (p=0.118), neither significant.

Table 12.
Pearson Correlation of Tissue Buyer Mills (n=10)

		Non-Conformance	Unsafe Condition	Unsafe Act
Non-Conformance	Pearson Correlation	1	-.599	-.238
	Sig. (2-tailed)		.067	.508
	N	10	10	10
Unsafe Condition	Pearson Correlation	-.599	1	-.442
	Sig. (2-tailed)	.067		.224
	N	10	10	10
Unsafe Act	Pearson Correlation	.238		1
	Sig. (2-tailed)	.508	-.224	
	N	10	10	10

Table 12 analyzes the Pearson correlation for Tissue Buyer Mills (n=10), showing a moderate negative correlation of -0.599 between non-conformance and unsafe conditions, nearing significance (p=0.067). In contrast, the correlation between non-conformance and unsafe acts is weak (0.238) and not significant (p=0.508).

DISCUSSION

Buyer Mills PT XYZ

Table 9 shows the results of a correlation analysis conducted at Mills PT XYZ with a sample size of 37, revealing a weak negative correlation between non-conformance and unsafe

conditions. Additionally, the correlation between non-conformance and unsafe acts is very weak and also not significant. To address the weak correlations found in the analysis at Mills PT XYZ, a comprehensive problem-solving approach is essential. Leventhal and Cameron (1987) suggest that action plans should integrate safety steps into daily routines, emphasizing the need for improved understanding of safety regulations among workers to reduce unsafe actions. Li et al. (2021) support this by highlighting that awareness of formal rules can correct unsafe acts arising from misunderstandings. Additionally, Thyer et al. (2008) argue that empowering workers through support rather than strict rule enforcement is crucial, as non-conformance does not automatically lead to unsafe behaviors. Yuliana and Ardhyaksa (2019) further indicate that workers are more likely to report unsafe conditions than unsafe actions, pointing to a significant issue that could lead to accidents if unaddressed. Wibowo and Santoso (2024) emphasize the importance of understanding specific threats to make informed decisions about safety measures. By focusing on enhancing rule comprehension, fostering a supportive environment, and prioritizing the rectification of unsafe conditions, Mills PT XYZ can create a safer workplace and effectively reduce risks.

Paper Buyer Mills PT XYZ

The findings from Table 10 indicate a weak positive correlation between unsafe conditions and non-conformance, as well as a weak negative correlation with unsafe acts, both lacking statistical significance. This suggests that while some relationship may exist, it is insufficient to draw definitive conclusions. According to Ariwati et al. (2024), the complexity of safety in mills necessitates further research to understand the interactions and cumulative effects that hinder the identification of hazards, leading to a lack of corrective actions. The interplay between unsafe actions and conditions complicates the identification of safety issues and the implementation of effective measures. Supporting this, Irkas et al. (2020) found a similarly weak positive correlation between unsafe conditions and work accidents, indicating that the relationship is not robust enough for conclusive insights. To address these weak correlations, Yuan et al. (2022) recommend enhancing safety training to improve safety attitudes, which are vital for reducing unsafe behaviors. Additionally, fostering a positive institutional environment can encourage safe practices and promote worker engagement in safety discussions, aiding in hazard identification. Irawati (2020) further emphasizes that proper use of safety equipment is crucial in reducing accidents. Additionally, Basri and Pirmah (2023) emphasize the importance of enhancing safety training to improve safety attitudes. These findings align with the importance of proper safety practices and equipment usage in reducing accidents. By implementing these strategies, Mills PT XYZ can work towards improving safety metrics and effectively mitigating risks.

Pulp Buyer Mills PT XYZ

An analysis of the relationships between non-conformance, unsafe conditions, and unsafe acts (Table 11) reveals weak negative correlations, none of which achieve statistical significance, suggesting a potential association between these variables; however, the relationships are insufficiently robust to draw definitive conclusions, reflecting the complexities inherent in safety dynamics within Pulp Buyer Mills. Supporting this observation, Winarni et al. (2024) identified a negative relationship between the Safety Management System (SMK3) and unsafe actions in the maritime industry, which similarly lacked statistical significance. Consequently, while trends may be present, the evidence does not convincingly establish that unsafe conditions and acts significantly influence safety outcomes. Furthermore, Yogama et al. (2023) highlight that low reporting frequency often arises from workers' reluctance to address safety issues, indicating that insufficient engagement in reporting may contribute to the observed weak correlations. To mitigate these challenges, the implementation of a Behavior-Based Safety (BBS) approach is recommended, which involves forming a BBS leadership

team, defining key unsafe behaviors, and providing training to engage employees in the observation and reporting of unsafe practices (Yue and Yanyan, 2018). A structured observation process, coupled with immediate feedback, will reinforce safe behaviors, while systematic data collection will facilitate the assessment of BBS effectiveness. Encouraging open communication and securing management support will foster a positive safety culture, and regular program reviews will ensure continuous improvement, ultimately enhancing safety dynamics within the organization. The Generalized Unsafety Theory of Stress (GUTS) emphasizes that enhancing the perception of safety can mitigate stress-related disorders, suggesting that therapists should focus on factors promoting this perception rather than merely addressing stressors (Brosschot et al., 2018). Implementing a Behavior-Based Safety (BBS) approach within organizations aligns with this principle by fostering a culture of safety through positive reinforcement, open communication, and supportive networks, ultimately enhancing employee well-being. In line with the statement of Listyandini and Suwandi (2019), the company should improve workers' skills and knowledge by providing OHS (Occupational Safety and Health) training and encouraging safety talks to increase safe actions.

Tissue Buyer Mills PT XYZ

Table 12 shows a moderately negative correlation between non-conformance and unsafe conditions, suggesting that higher non-compliance may be associated with fewer unsafe conditions. However, the weak correlation with unsafe acts limits the ability to draw firm conclusions. This finding is supported by Richards (2009), who noted that when workers do not follow safety procedures, it can lead to near-miss events, but these situations don't always result in actual injuries, indicating that non-compliance doesn't always lead to unsafe conditions. Similarly, Rahmawati et al. (2022) found no significant link between unsafe conditions and work accidents, meaning that just because conditions are unsafe, it doesn't necessarily mean that accidents will happen. Luo (2020) emphasized the crucial role of leadership in promoting safety, as good leaders can help ensure that safety rules are followed and that workers receive proper training, which can reduce unsafe behaviors. Additionally, Melati et al. (2024) pointed out that a lack of safety knowledge can lead to risky behaviors, underscoring the need for better training and communication about safety practices. Lastly, Baldissone et al. (2019) stressed the importance of collecting data on non-compliance to improve safety measures. Collectively, these studies support the interpretation of the findings in table 12.

CONCLUSION

PT XYZ's mills' safety metrics research reveals critical insights into the dynamics of safety violations, particularly concerning non-conformance, unsafe conditions, and unsafe acts. The findings indicate that the data collected from the mills generally follows a normal distribution, as evidenced by the p-values exceeding the 0.05 threshold for the normality tests, which is essential for applying parametric statistical methods and enhancing the reliability of the analyses performed. Despite this normal distribution, the correlations observed between non-conformance, unsafe conditions, and unsafe acts were weak and statistically insignificant, suggesting that while some relationships may exist, they are not strong enough to draw definitive conclusions about their interdependencies. The study emphasizes the necessity for further research to explore the intricate dynamics of safety in mills, as indicated by previous studies showing similar weak correlations in various sectors. Recommendations for improving safety include enhancing safety training, fostering a positive safety culture, and implementing Behavior-Based Safety (BBS) approaches to engage employees in safety practices. Additionally, the importance of leadership in promoting adherence to safety protocols and the need for better communication and training regarding safety practices are underscored.

Overall, while the data collected follows a normal distribution, the weak correlations observed suggest that more comprehensive strategies and further empirical research are needed to effectively address safety violations and improve safety outcomes in PT XYZ's operations. By focusing on these areas, the organization can work towards enhancing its safety metrics and mitigating risks more effectively.

ACKNOWLEDGEMENTS

The author would like to thank Dr Moewardi Hospital, Universitas Muhammadiyah Surakarta, the Research Ethics Committee of Dr Moewardi Hospital Surakarta for approving this research with Number: 2.240/IX/HREC/2024 and several parties who have helped and provided support in this study.

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