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Occupational Health and Safety Culture is Associated with Unsafe Behavior in Airline X Airside Workers at I Gusti Ngurah Rai International Airport Denpasar

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Abstract
Introduction: *Workplace accidents among airside workers—such as being struck by luggage—remain common in the aviation industry. Unsafe behavior is often influenced by the occupational health and safety (OHS) culture adopted by workers.* ***Objective:*** *This study aimed to examine the association between OHS culture perception and unsafe behavior among airside workers of Airline X at I Gusti Ngurah Rai International Airport, Denpasar.* ***Method:*** *A cross-sectional study was conducted from December 2022 to January 2023 using a self-administered questionnaire. The sample consisted of 98 airside workers from the Lion Air Group, selected through total sampling. Variables measured included OHS culture, top management commitment, OHS rules and procedures, communication, worker competence, involvement, and work environment. Data were analyzed using simple and multiple logistic regression.* ***Results and Discussion:*** *A total of 32.7% of workers had a poor perception of OHS culture, and 52% exhibited unsafe behavior. Multiple logistic regression showed that OHS rules and procedures (AOR=7.59; 95% CI=1.4–44.75; p=0.013) and worker involvement (AOR=31.54; 95% CI=6.61–150.37; p<0.001) were significantly associated with unsafe behavior.* ***Conclusion:*** *Strengthening OHS rules and encouraging active worker involvement are essential strategies to reduce unsafe behavior among airside workers in the aviation sector.*

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Introduction

In the 21st century, the number of workplace accidents worldwide has increased drastically, with approximately 2.78 million workers dying each year due to work accidents and related diseases (ILO, 2018). More than 380,000 work accidents (13.7%) occurred, causing 270 million people to be injured in Indonesia (Yudhawan, 2017), a developing country with an industry that relies on human power; the incidence of work accidents remains high. Data from BPJS Employment shows a significant increase in work accident cases from 123,040 cases in 2017 to 234,270 cases in 2021 (BPJS Ketenagakerjaan, 2021). Unsafe conditions and unsafe behavior can cause work accidents. One way to minimize unsafe behavior is by implementing an OHS program in the workplace (Askhary A, 2017).

Law No. 13 of 2003 requires worker protection in OHS, essential for occupational health and safety. Work accidents can cause property damage, production disruption, injury, and even death (Mulyono & Septiana, 2014). In this context, companies must have quality Human Resources (HR). Training, strict selection, incentives, and OHS programs are vital in achieving the company's vision (Sonia, 2021). Through implementing an OHS program, companies can minimize unsafe conditions and unsafe behavior, which are the leading causes of work accidents (Askhary A, 2017).

OHS culture is formed through attitudes, values, beliefs, norms, and worker perceptions of health, safety, and safe behavior in production. Indonesia is developing a national OHS program for 2019-2024 to improve work safety (Yusvita, 2021). Essential factors forming OHS culture include top management commitment, OHS rules and procedures, communication, worker competence, worker involvement, and work environment (Christina, 2012).

Based on the domino theory, there are five factors related to accidents, and one of the most critical factors is unsafe behavior (Heinrich, 1980). Unsafe behavior is individual behavior that deviates from agreed procedures and can cause accidents or incidents. Such behavior as acting recklessly, not complying with safety equipment, ignoring hazards, working with damaged equipment, and violating rules can cause severe accidents and security risks. In addition, behaviors such as joking while working, lack of totality in work, and bringing personal problems to the workplace can also harm safety and health (Bird, 1990).

Empirical studies show that factors such as OHS culture, top management commitment, communication, OHS competence, and worker involvement are related to unsafe behavior (Bilqis, 2021), (Juwitasari, 2016), (Azhari, 2021). In the aviation industry, where air transportation services are increasing, OHS rules and procedures, worker involvement, and OHS culture are also crucial in reducing unsafe behavior (Juwitasari, 2016).

Airline X is an airline company that oversees four low-cost airlines and has the most flight routes in Indonesia. In May 2022, Airline X operated an average of 449 daily flights with 269 scheduled routes and 211 charter routes to 41 domestic and 20 international destinations (Widya, 2022). The company's operations involve workers in the landside area (domestic and international terminals) and airside, who work together to support the flight's success (Lion Air, 2023).

Activities in the airside area have potential hazards and risk of work accidents (Rizkiana, 2017). External factors, such as noise, heat, vibration, lighting, air, and temperature, and internal factors, such as appropriate personal protective equipment, sufficient knowledge and skills, and safe behavior, can affect work safety. These factors

can contribute to minor or severe injuries, exposure to hazardous substances, irritation, respiratory disorders, musculoskeletal disorders, and the risk of collision with other operational equipment (Syafitri, 2021).

I Gusti Ngurah Rai International Airport in Denpasar, is one of the international airports, and Bali remains a popular tourist destination. The number of flights and types of aircraft at this airport is expected to increase due to the high number of tourist visits. Air transport traffic statistics in April 2022 showed a 91% increase in passengers compared to the same period in 2021. In 2022, this airport served as many as 585,123 passengers; in 2021, it served only 307,107 passengers (PT Angkasa Pura 1, 2022).

Based on a preliminary study conducted at Airline X at I Gusti Ngurah Rai Airport, Denpasar, OHS-related incidents caused by unsafe behavior became the main priority. The airside workers, including cabin crew, face specific risks such as noise and working conditions related to the airport environment. Incidents that occurred include the fainting of cabin crew after landing, positive alcohol test results exceeding the company's limit for aircraft crew, minor injuries due to being hit by luggage by ground handling staff, femur fractures of aircraft pilots due to falling from shuttle car crew, and radius bone fractures of a ground staff due to falling from the aircraft stairs due to miscommunication. Work accidents and health risks remain high in the aviation work environment, including at airports.

Research on OHS culture and unsafe behavior is often conducted in the construction industry and strategic projects such as mining. However, similar research on airside workers of Airline X at I Gusti Ngurah Rai International Airport, Denpasar, has never been done. Therefore, this research is essential to identify and analyze OHS cultural factors related to unsafe behavior.

Method

A cross-sectional study was conducted at the office of Airline X at I Gusti Ngurah Rai International Airport, Denpasar, from August 2022 to February 2023. The research population was all airside workers of Airline X at I Gusti Ngurah Rai International Airport, Denpasar, totaling 104 people. The research sample was airside workers of Airline X at I Gusti Ngurah Rai International Airport, Denpasar, with permanent employment status and a more than one-year working period. The research sample was 98 people who were selected by total sampling.

The questionnaire on unsafe behavior and OHS culture was adopted from previous research. The questionnaire consists of 50 statement items that describe sociodemographic characteristics, including age, gender, education, work experience, OHS culture, including top management commitment, OHS rules and procedures, worker communication, worker competence, worker involvement, working conditions and environment, and unsafe behavior of airside workers. A data scale of 1-4 was used to assess OHS culture and unsafe behavior. The data scale for assessing OHS culture ranged from "disagree" to "strongly agree," while for assessing unsafe behavior, it went from "never" to "always." Each score was summed up and then categorized into poor and good OHS culture and unsafe and safe behavior, with the median as the cut-off point.

Data processing was done with the Statistical Product and Service Solutions (SPSS) software version 25. Descriptive analysis determined the frequency distribution by displaying the percentage and proportion of respondent characteristics. Simple logistic regression was used to assess the association of each independent variable to the dependent variable that meets the criteria (p-value ≤ 0.25). Subsequently, variables that

meet the criteria are included in the modeling with a multiple logistic regression test using the backward method. The adjusted odds ratio assesses the magnitude of the risk of unsafe behavior events. In contrast, the p-value is used to see the significant association of independent variables with the dependent variable. Ethical permission was obtained from the Health Research Ethics Commission of the Faculty of Medicine, Udayana University, with number 3147/UN14.2.2.VII.14/LT/2022 dated December 22, 2022.

Result and Discussion

1. Results

The overview of sociodemographic characteristics, OHS culture, and unsafe behavior in airside workers shows that the majority of airside workers are aged ≤ 34 years (79.6%), male (81.6%), high school educated (68.4%), have work experience ≥ 10 years (39.8%) and behave unsafely (52%). The highest component of OHS culture is worker competence (85.7%), while the lowest is worker involvement (46.9%). The sociodemographic characteristics are presented in Table 1.

Sociodemographic factors (age, gender, education, and work experience) are not related to unsafe behavior in airside workers of Airline X at I Gusti Ngurah Rai International Airport, Denpasar (Table 2), with a probability value greater than the significance level (0.05).

Table 1
Frequency distribution of sociodemographic characteristics, OHS culture and unsafe behaviors (n=98)

Variables	Frequency (n)	Proportion (%)
Age (Median± IQR, Min-Max)	(27 ± 11. 19-46)	
≤ 34 Years	78	79.6
≥ 35 Years	20	20.4
Gender		
Male	80	81.6
Female	18	18.4
Education		
High School	67	68.4
Diploma	11	11.2
Bachelor	20	20.4
Work Experience (Median ± IQR, Min-Max)	(4 ± 6. 1-20)	
1-5 years	37	37.8
6-9 years	22	22.4
≥ 10 Years	39	39.8
Unsafe Behavior		
Yes	51	52.0
No	47	48.0
OHS Culture		
Top management commitment		
Not good	29	29.6
Good	69	70.6
OHS regulations and procedures		
Not good	31	31.4
Good	67	68.4
Communication		
Not good	23	23.5
Good	75	76.5
Worker competency		
Not good	14	14.3
Good	84	85.7

Variables	Frequency (n)	Proportion (%)
Worker involvement		
Not good	52	53.1
Good	46	46.9
Work environment		
Not good	16	16.3
Good	82	83.7

Table 2
The association between sociodemographic factors and unsafe behavior of airside workers (N=98)

Sociodemographics Variables	Behavior				Crude OR	95% CI		p
	Unsafe		Safe			Lower	Upper	
	n	%	n	%				
Age								
< 34 Years	41	52.6	37	47.4	0.53	0.08	3.22	0.493
≥ 35 Years	10	52.0	10	50.0	Ref			
Gender								
Male	41	51.2	39	48.8	1.10	0.36	3.24	0.856
Female	10	55.6	8	44.4	Ref			
Education								
High School	34	50.7	33	49.3	2.17	0.35	13.34	0.400
Diploma	6	54.5	5	45.5	2.06	0.26	16.25	0.492
Bachelor	11	55.0	9	45.0	Ref			
Work Experience								
1-5 Year	17	45.9	20	54.1	0.841	0.32	2.18	0.722
6-10 Years	14	63.6	8	36.4	1.716	0.54	5.36	0.353
> 10 Years	20	51.3	19	48.7	Ref			

The results of this study indicate that the top management commitment and OHS regulations/procedures are significantly related to unsafe behavior among airside workers of Airline X at I Gusti Ngurah Rai International Airport, Denpasar (Table 3). Airside workers feel the lack of top management commitment and OHS regulations/procedures increases the risk of unsafe behavior. However, there is no significant association between worker communication/competence and unsafe behavior. Meanwhile, worker involvement and working conditions/environment are also significantly related to unsafe behavior. Airside workers believe that a lack of worker involvement and poor working conditions/environment increase the risk of unsafe behavior.

Multiple logistic regression analysis using the backward conditional method shows that top management commitment, worker competence, and working conditions/environment are not related to the unsafe behavior of airside workers (Table 4). The variables that are independently associated with the unsafe behavior of airside workers are OHS regulations and procedures (AOR=7.59, 95% CI=1.41-44.75, p-value=0.019), and worker involvement (AOR=31.54, 95% CI=6.61-150.37, p-value=0.000).

Table 3
Association between OHS culture components and unsafe behavior among airside workers (N=98)

Variables	Behavior				Crude OR	95% CI		P Value
	Unsafe		Safe			Lower	Upper	
	n	%	n	%				
Top Management Commitment								
Not good	23	79.3	6	20.7	5.96	2.15	16.54	**0.001**
Good	27	39.1	42	60.9	Ref			
Rules and Procedures								
Not good	28	90.3	3	9.7	19.09	5.22	69.71	**<0.001**
Good	22	32.8	45	67.2	Ref			
Communication								
Not good	13	56.5	10	43.5	1.33	0.52	3.42	0.547
Good	37	49.3	38	50.7	Ref			
Worker Competency								
Not as good	10	71.4	4	28.6	2.75	0.79	9.46	0.109
Good	40	47.6	44	52.4	Ref			
Worker involvement								
Not as good	43	93.5	3	6.5	92.14	22.37	39.53	**<0.001**
Good	7	13.5	45	86.5	Ref			
Work Environment								
Not as good	15	93.8	1	6.3	20.14	2.53	15.97	**0.004**
Good	35	42.7	47	57.3	Ref			

Table 4
Results of multiple logistic regression analysis of general OHS culture with unsafe behavior in airside workers (N=98)

Variables	Initial Model			Final Model		
	AOR	95% CI	P Value	AOR	95% CI	P Value
Top management commitment						
Not as good	2.12	0.29-15.22	0.452			
Good	Ref					
OHS regulations and procedures						
Not as good	8.35	1.43-48.71	**0.018**	8.77	1.41-44.75	**0.013**
Good	Ref			Ref		
Worker Competency						
Not as good	0.64	0.05- 7.23	0.724			
Good	Ref					
Worker involvement						
Not as good	23.35	4.09-133.17	**< 0.001**	62.95	14.41-27.37	**< 0.001**
Good	Ref			Ref		
Working conditions and environment						
Not as good	4.53	0.17-119.53	0.365			
Good	Ref					

2. Discussion

This study found that OHS culture components, including OHS rules and procedures and the level of worker involvement, significantly influence airside workers' unsafe behavior. Good and strict OHS rules and procedures can significantly influence airside workers' unsafe behavior at X Airlines at I Gusti Ngurah Rai International Airport, Denpasar. The OHS rules and procedures serve as a guide and reference for workers in carrying out their tasks safely(Uchroński, 2020). When these rules and procedures are not applied consistently, workers violate the rules and engage in unsafe behavior. Therefore, compliance with the OHS rules and procedures is vital in maintaining safety in the work environment(Aksorn & Hadikusumo, 2008).

In addition, the level of worker involvement also significantly influences airside workers' unsafe behavior at X Airlines. When workers feel involved and responsible for maintaining their and their co-workers' safety, they are more likely to adopt safe behavior(Naji et al., 2021). Worker involvement involves active participation, awareness, and commitment to the safety practices implemented in the work environment. By increasing worker involvement, awareness of the importance of safety will be built, and they will play a more active role in preventing unsafe behavior(Syed-Yahya, Idris, & Noblet, 2022).

Several previous studies conducted abroad have found results that align with this study's findings regarding the influence of OHS culture components on airside workers' unsafe behavior. For example, a study by Christian et al. found that implementing clear OHS rules and procedures and active worker involvement is negatively associated with unsafe workplace behavior (Christian, Bradley, Wallace, & Burke, 2009).

Furthermore, a study conducted by Nielsen and colleagues also found that workers' behavior related to OHS was influenced by the safety culture that existed in the workplace. Rules and procedures that were applied consistently and worker involvement in OHS decision-making could reduce unsafe behavior(Nielsen & Abildgaard, 2013). Then, a study conducted by one of the research institutes at the University of Adelaide showed that cultural factors such as group norms, communication, and worker participation in developing OHS rules were related to safe behavior in the workplace(The University of Adelaide, 2018).

The research conducted by Zohar and colleagues also supports these findings. The study shows that a strong safety culture, which involves clear rules and procedures and management support, can reduce unsafe behavior and increase safety in the workplace(Dov, 2008). Furthermore, research conducted by Muhanna Alnoaimi from the University of Central Florida found that effective communication, worker participation in OHS decision-making, and consistently applied rules positively associated with workers' safe behavior(Alnoaimi, 2015).

These studies consistently provide evidence that OHS culture components, including OHS rules and procedures and the level of worker involvement, play a crucial role in shaping safe or unsafe behavior in the workplace. These findings support your research on the influence of OHS culture components on airside workers' unsafe behavior.

On the other hand, other OHS culture components, including top management commitment, worker competence, and working conditions/environment, do not influence airside workers' unsafe behavior. There are several reasons why OHS culture components such as top management commitment, worker competence, working conditions, and the work environment may not directly influence airside workers' unsafe behavior.

Top management's commitment to OHS is essential in creating a strong safety culture. However, its influence on unsafe behavior may be more indirect(Neal, Griffin, & Hart, 2020). For example, top management's commitment can influence the allocation of resources to implement OHS programs, promote a safety culture, and create policies that support safety(Abdullah, 2020). However, its impact on individual behavior may occur through factors such as role modeling and social influence(Christian et al., 2009).

Worker competence is also an important factor in OHS. Although worker competence in OHS is important, its influence on unsafe behavior can be more complex(Griffin, Neal, & Parker, 2017). Worker competence may influence their ability to follow OHS procedures correctly, but unsafe behavior can also be influenced by other psychological, social, and situational factors(Christian et al., 2009).

In addition, safe and supportive working conditions and environments are also important in creating a positive safety culture. However, their influence on unsafe behavior may be more indirect(Lundell & Marcham, 2018). For example, poor working conditions or an unsafe environment can affect worker stress, fatigue, or job dissatisfaction, contributing to unsafe behavior. However, their impact may also be influenced by other factors, such as group norms or individual factors(Hofmann & Morgeson, 2019).

This study also found that sociodemographic characteristics (including age, gender, education, and work experience) are unrelated to unsafe behavior in airside workers. Unsafe behavior in airside workers is not directly related to sociodemographic characteristics such as age, gender, education, and work experience.

Individual variability is a major factor in unsafe behavior, and sociodemographic characteristics only provide a general picture of the individual (Dov, 2008). Psychological factors such as risk perception, motivation, knowledge, and attitudes toward safety also influence safety behavior, and these factors do not directly depend on the individual's sociodemographic characteristics(Hofmann, Morgeson, & Gerras, 2020).

In addition, work environment factors such as safety culture, incentive systems, supervision, and company policies also play a crucial role in safety behavior, which is not directly related to the individual's sociodemographic characteristics(Dov, 2008). Social influences, such as social norms and peer group influence, can also affect individual behavior(Cialdini, Kallgren, & Reno, 2021).

Therefore, unsafe behavior can vary among individuals with similar sociodemographic characteristics due to differences in psychological factors, work environment, and social influences they face. The implications of this study are the need for efforts in creating OHS rules and procedures, refining OHS rules and procedures periodically following the latest developments in science and technology, applying heavy sanctions if rules and procedures are violated, and increasing worker participation in creating or modifying workflows while staying within a safe corridor so that the company and passengers are not disadvantaged and this research is limited to low-cost carriers.

This study has several limitations. First, the measurement of unsafe behavior and OHS culture is based on the perceptions of respondents, especially questions related to contexts outside of workers, such as other leaders or directors. Further observation was not conducted to gain a deeper understanding. Second, the researcher cannot control other bias factors that affect the unsafe behavior of airside workers, such as OHS supervision, work motivation, work stress, conflicts among workers, physical problems, and skill mismatches.

Conclusion

Most airside workers have the following characteristics: age ≤ 34 years, male, high school education, work experience ≥ 10 years, and unsafe behavior. The most substantial component of OHS culture is worker competence, while worker involvement is the lowest. Factors related to unsafe behavior in airside workers are OHS rules and procedures and worker involvement. However, sociodemographic characteristics and OHS culture components such as top management commitment, working conditions/environment, communication, and worker competence have no association with unsafe behavior in airside workers. The company should involve workers in forming OHS-related rules and procedures and continuously update these policies following the challenges and problems that arise in the aviation industry.

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AUTHOR'S CONTRIBUTION

IKJA is responsible for developing research methods, collecting data, and drafting research papers. Meanwhile, IMKD and NMSN supervise data collection and provide direction regarding the development of research methods.

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CONFLICT OF INTERESTS

The authors declare no conflict of interest in this research.

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