Written safe work procedures and their impact on a culture of prevention

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ABSTRACT

The goal of this study was to evaluate how implementing written procedures for safe work (WPSW) affects the preventive culture among employees at a company involved in collecting and processing coffee, cocoa, and honey. The research used a quantitative method with an experimental design and a pre-experimental sub-design for explanation. The study's participants were the company's workers, who completed the NOSACQ-50 Nordic questionnaire to assess their preventive culture before and after the WPSW was put into practice across the three production processes. This study identified the risks associated with each process, established control measures to prevent accidents, and designed safer methods for each process. The findings showed that implementing WPSW significantly improved the preventive culture among workers, leading to the conclusion that ensuring safe work conditions and fostering a preventive culture enhances worker safety and health.

1. Introduction

Accidents and occupational diseases pose great challenges at the corporate level, so the employer must not only provide safe working conditions but also promote a preventive safety culture (Amirah et al., 2024). According to the International Labor Organization (ILO, 2023), it is estimated that some 2.3 million women and men around the world succumb to work-related accidents or diseases every year; this corresponds to over 6000 deaths every single day. Worldwide, there are around 340 million occupational accidents and 160 million victims of work-related illnesses annually. Therefore, the ILO recommends that the governments of its affiliates take regulatory actions to prevent the number of occupational accidents from increasing in their countries. In Peru, which reports the highest number of occupational accidents in Latin America, over 20,000 such incidents occur annually, particularly in construction, agribusiness, and manufacturing. These accidents, which saw a 73% increase in 2019, commonly include injuries from equipment misuse, entrapments, and falls. Additionally, accidents often

result from unnecessary physical exertion and repetitive movements. A smaller portion of workplace accidents involves falls from heights.

Taylor et al. (2011) described occupational safety and health (OSH) culture as relating to the cultural and informal elements of an organization. These elements can influence how OSH is viewed and managed within the organization, including whether individuals are aware of and respond to OSH concerns by behaving in a safe and healthy way (Afolabi et al., 2021). Within the context of OSH or preventive culture, informal organizational elements can have both positive and negative effects. This requires a holistic approach that considers not only organizational and cultural aspects but also other structures and process directions. However, it is crucial to understand that OSH is not solely about cultural aspects but encompasses a broader spectrum of considerations (Antonsen, 2017).

In addition to the formal aspects of OSH, it's important to recognize that workers bring their own beliefs, behaviors, and attitudes that influence how they perform their duties and manage risks. The concept of safety culture encompasses a set of practices and a mindset shared by organizational members aimed at controlling significant risks associated with their activities. According to ICSI (2018), this culture evolves over time through interactions among individuals. Rundmo (2001) suggested that a lack of understanding of the dangers related to their tasks and an inaccurate perception of risk are among the reasons why

workers engage in risky behaviors. They might not be aware that their actions are unsafe. However, Bohm and Harris (2010) argued that this explanation is incomplete because unsafe behaviors have also been observed even when workers accurately understand the risks involved.

Huang et al. (2019) stated that understanding how individuals perceive risk is crucial for shaping their behaviors, especially to prevent unsafe actions. Therefore, employers should use various strategies and engage in activities that effectively communicate with employees. This approach helps build a culture of safety where workers are not only aware of potential dangers and the risks associated with their tasks but are also encouraged and motivated to act safely. Employers should foster this safety culture by embedding values and policies in their management systems that minimize and control risks in all activities. A preventive culture in an organization helps it to be ready to handle and respond appropriately to any type of workplace accident. Understanding this culture among the employees reveals how much the company has structured its safety procedures and trained its employees on risk prevention, as noted by ICSI (2018).

The importance of front-line managers is crucial. They need enough flexibility to balance strict safety rules and adaptive safety management because they are directly involved in day-to-day operations.

Employee participation is highly valued, including their involvement in designing facilities, setting up procedures, providing feedback from operations, and reporting incidents. Efforts to enhance safety are appropriately acknowledged.

Top management's dedication is crucial for fostering a culture of prevention. Laws now require employers to prioritize health and safety measures for their workers, leading employers to employ various strategies such as occupational safety and health management systems, behavior-based safety, and different safety programs, including the written procedures for safe work (WPSW).

The study was conducted in an agricultural cooperative that processes coffee, cocoa, and honey. Like many small enterprises, this cooperative, aiming to maintain market competitiveness and productivity, often neglects essential worker safety and health aspects. They do the bare minimum required by law to avoid penalties from regulatory bodies. Generally, such companies lack systems, plans, or programs that ensure or promote workers' health and safety. Furthermore, workers' limited understanding of their rights, combined with their diverse beliefs and behaviors, makes them susceptible to hazards, leading to accidents during their tasks. Observations of the cooperative's three key processes revealed inadequate safety measures: no clear signage, undefined work areas, lack of personal protective equipment, and poorly maintained fire extinguishers. Interviews with workers and the production manager highlighted scant safety documentation and unrecorded accident occurrences, although they acknowledged frequent accidents, often due to improper machinery use, lack of personal protective equipment, and inconsistent task execution methods. A notable incident in 2018 involved a toaster engine exploding, causing significant damage and injuries due to entrapment. This underscores the need for clearly written safety procedures for each task across all production processes.

2. Related works

Preventive culture, also known as safety culture, is defined as the system of standards, behaviors, values, and outcomes related to the prevention of workplace hazards within an organization. It shapes the organization's actions in this area and includes fundamental beliefs and behaviors (Arévalo Serrate and Sanchez, 2018). It can be seen as part of the broader organizational culture that focuses on aspects of the workplace and its environment that influence the health and safety of employees (Fernández-Muñiz et al., 2007).

To foster a preventive culture, various components need to be coordinated to encourage safe behaviors among workers. To assess the effectiveness of a preventive culture, one should measure workers' behaviors. Zohar (2010) suggested that the safety climate within an organization can predict whether employees will behave safely or unsafely.

According to Arévalo Serrate and Sanchez (2018), the preventive culture in a company provides a framework for analyzing members' behavior and fundamental assumptions. It is shaped by each member of the organization.

Therefore, preventive culture encompasses a set of policies, values, and behaviors aimed at preventing workplace accidents and is actively promoted by an organization during its activities. The WPSW specifies standardized and safe methods for performing tasks. It outlines the hazards, risks, and control measures needed to ensure safety during these tasks. WPSW provide essential information to assist employees in performing tasks safely. They include the following elements:

1. Describing the methods of executing work.
2. Identifying tasks that pose risks to safety or the environment.
3. Outlining the specific risks associated with these tasks.
4. Detailing control measures to mitigate risks during work activities.
5. Explaining the implementation of these measures to ensure safe and environmentally responsible work practices.
6. Listing relevant legislation, standards, and codes that must be adhered to.
7. Describing the equipment used, the qualifications required by personnel, and the training necessary to conduct the work safely.
8. Highlighting the focus on the safety of the individual performing the tasks.

The WPSW document serves as a detailed and standardized guide on how to safely conduct work activities. It covers each step from beginning to end, identifies potential hazards, assesses risks, and outlines preventive measures for safe execution. The primary goal of WPSW is to ensure that tasks are carried out correctly and safely, covering all aspects from initiation to completion.

3. Methodology

The study employed an applied research methodology with a quantitative approach. It aimed to address issues related to preventive culture within a cooperative and to test the WPSW theory. To do this, it involved measuring variables related to both the theory and the preventive culture and applying statistical methods to assess the hypotheses. The research design was explanatory, utilizing a pre-experimental structure with a pre-test and post-test involving a single group. The participants consisted of workers from the cooperative. Data was gathered using document review, observation, and surveys, which helped in both implementing the WPSW theory and evaluating the preventive culture. The safety climate is an aspect of the preventive culture within an organization. To assess this, the Nordic NOSACQ-50 questionnaire, developed by the Norwegian Institute of Occupational Health (Kines et al., 2011), was used. This questionnaire includes 50 items spread across seven dimensions and has been utilized in various Nordic countries, including France, Germany, Italy, Portugal, Slovenia, and Spain. It was administered to a diverse group of employees from different sectors such as construction, food industry, day care, health and safety inspections, and airports, totaling 753, 288, and 160 participants, respectively. According to the NOSACQ-50, the safety climate scores are detailed in Table 1, ranging from below 2.40, indicating a very low safety climate, to 3.30, which suggests a good level of safety climate (Kines et al., 2011). The questionnaire mentioned is highly reliable for collecting data and provides a realistic and accurate depiction of the situation. According to Arévalo Serrate and Sanchez (2018), the NOSACQ-50 is an effective tool for assessment because it gathers opinions, attitudes, and perceptions from organization members. Its application helps in understanding the work environment from a safety perspective by analyzing the attitudes and perceptions of individuals. This understanding forms the foundation for predicting the future behaviors of the evaluated individuals, which could be key areas for improvement. The WPSW acts as an organizational tool that enhances work methods, ensuring that tasks across the three processes are

performed accurately, correctly, standardized, and safely.

Table 1: NOSACQ-50 scores

Scores above 3.30 indicate a good level of performance
Scores of 3.00 to 3.30 indicate a fairly good level with a slight need for improvement
Scores of 2.70 to 2.99 show a medium level with a need for improvement
Scores from 2.40 to 2.69 show a fairly low level with a need for improvement
Scores below 2.40 indicate a very low level with a great need for improvement

4. Results

The establishment of WPSW involved a methodical approach that included steps like identifying hazards assessing and managing risks for each task in the three processes evaluated. This approach also encompassed training, education, and raising health and safety awareness among workers, concluding with a performance evaluation.

The specific Written Safe Work Procedures developed and implemented are as follows:

1. WPSW for industrial coffee processing
2. WPSW for industrial cocoa processing
3. WPSW for industrial honey processing

These procedures were tailored to manage the tasks in each of the evaluated processes systematically and safely, adhering closely to the established safety measures and controls for each identified risk. During the implementation phase, a program supporting the WPSW was executed. This program included educational talks, training, and coaching to help workers adopt these new operational methods.

The implementation of the WPSW aimed to enhance the culture of prevention within the company by promoting standardized safety practices and reducing risks in the transformation operations of the evaluated processes.

4.1. Results with respect to specific objective 1

Examine the impact of implementing the WPSW on the cooperative's policy. Table 2 shows the status of corporate policy before and after the WPSW was put in place. It presents the scores for three important areas: management commitment, participation, and fair treatment. Initially, these scores were very low, highlighting a significant chance for enhancement.

After the WPSW was introduced, there were clear improvements in the scores for commitment, involvement, and fair treatment. These enhancements suggest a reasonably good awareness and comprehension of the cooperative's policies.

Table 2: Indicators of the cooperative's policies before and after the implementation of WPSW

Weather	Company policy			Company policy
	Management commitment	Management participation	Fair treatment	
Pre-test	2.09	2.06	2	2.05
Post-test	3.03	3.10	3.03	3.06

• Specific hypothesis 1

H0: The implementation of WPSW has no significant effect on the cooperative's policy.
Ha: The implementation of WPSW has a significant effect on the Cooperative's policy.

After conducting normality tests on the gathered data, the student's t-test was employed. The results show that the probability P(T≤t) at one end of the distribution is 0.00000020. Based on this, it is concluded that the implementation of WPSW significantly affects the cooperative's policy (Table 3).

4.2. Results with respect to specific objective 2

Examining the impact of WPSW implementation on cooperation and collective awareness among cooperative workers, Table 4 shows that before the WPSW was implemented, the levels of collective commitment and workers' awareness of risks (referred to as cooperation and collective awareness) were low, indicating a need for improvement. After the WPSW was designed and put

into practice, there was a notable improvement in these areas. The results show that the workers now have an average level of cooperation and awareness of collective issues.

• Specific hypothesis 2

H0: The implementation of WPSW has no significant effect on the cooperative's cooperation and collective consciousness.
Ha: The implementation of WPSW has a significant effect on cooperative cooperation and collective consciousness.

After normality tests were conducted on the gathered data, the Student's t-test was applied. The results show that the probability, P(T≤t), at one end of the distribution is 0.003349415 (Table 5). Consequently, the null hypothesis is rejected, and the research hypothesis is accepted, confirming that the implementation of WPSW significantly affects cooperation and collective awareness in the company.

Table 3: T-student hypothesis testing

	Before application	After application
Media and communications	23	39.5
Deviation	26.2222222	14.2777778
Remarks	10	10
Pearson correlation coefficient	0.62592015	
Hypothetical mean difference	0	
Degrees of freedom	9	
Statistics t	-12.9326161	
P(T<=t) one tail	0.00000020	
Critical value of t (one-tailed)	1.83311293	
Two-tailed P(T<=t)	4.0601E-07	
Critical value of t (two-tailed)	2.26215716	

Table 4: Indicators of cooperation and collective awareness before and after the WPSW implementation

Weather	Cooperation and collective conscience		Cooperation and collective conscience
	Collective commitment	Risk awareness	
Pre-test	2.20	2.53	2.36
Post-test	2.85	2.80	2.83

Table 5: Hypothesis test with T-student

	Before application	After application
Media and communications	17.9	23.2
Deviation	11.87777778	5.733333333
Remarks	10	10
Pearson correlation coefficient	-0.320452197	
Hypothetical mean difference	0	
Degrees of freedom	9	
Statistics t	-3.502338582	
P(T<=t) one tail	0.003349415	
Critical value of t (one-tailed)	1.833112933	
P(T<=t) two-tailed	0.006698831	
Critical value of t (two-tailed)	2.262157163	

4.3. Results with respect to specific objective 3

Determining the effect of WPSW implementation on the collective learning and confidence of the Cooperative's employees, Table 6 indicates that, prior to the implementation of WPSW, the ratings associated with collective learning and trust in prevention among workers (referred to as collective

learning and trust) were at a very low level, indicating a need for improvement.

After the design and implementation of the WPSW, there were notable advances in the results in terms of collective learning and trust in prevention among workers. These advances reflect a fairly good level of knowledge and understanding of collective learning and trust within the company.

Table 6: Indicators of learning and collective confidence before and after WPSW implementation

Weather	Learn collective trust		Learn collective trust
	Collective learning	Confidence in prevention	
Pre-test	2.43	2.39	2.41
Post-test	3.21	2.97	3.09

• Specific hypothesis 3

H0: The implementation of WPSW has no significant effect on collective learning and trust in the Cooperative.

Ha: The implementation of WPSW has a significant effect on learning and collective trust in the Cooperative.

After applying normality tests to the data collected, a Student's t-test was used (Table 7). The results indicate that the probability P(T≤t) at one end of the distribution is 0.00438506. Therefore, it is concluded that the implementation of WPSW has a significant effect on the collective learning and confidence of the cooperative's workers

Table 7: Hypothesis test with T-Student

	Before application	After application
Media and communications	24.3	30.5
Deviation	19.7888889	7.16666667
Remarks	10	10
Pearson correlation coefficient	-0.32188985	
Hypothetical mean difference	0	
Degrees of freedom	9	
Statistics t	-3.33207079	
P(T<=t) one tail	0.00438506	
Critical value of t (one-tailed)	1.83311293	
Two-tailed P(T<=t)	0.00877013	
Critical value of t (two-tailed)	2.26215716	

4.4. Results with respect to the general objective

Determine the effect of the implementation of WPSW on the preventive culture of the Cooperative's employees. Table 8 and Fig. 1 indicate that, prior to the implementation of WPSW, the results of the NOSACQ survey showed an index of 2.27. According to the interpretation of the NOSACQ questionnaire, this index represents a very low level of preventive culture and a great need for improvement.

However, after the implementation of the WPSW, the results obtained amounted to 2.99. According to the interpretation of the NOSACQ questionnaire, the preventive culture in the Cooperative is at a medium level and still requires improvement. This is understandable, considering that this is the first evaluation after implementation and understanding that it is a continuous and long-term process.

Table 8: Preventive culture indicators before and after the implementation of the WPSW

| Weather	Company Policy				Cooperation and collective conscience			Learn collective trust			Preventive culture
	Management commitment	Management participation	Fair treatment	Prom.	Collective commitment	Risk awareness	Prom.	Collective learning	Confidence in prevention	Prom.	
Pre-test	2.09	2.06	2	2.05	2.2	2.53	2.36	2.43	2.39	2.41	2.27
Post-test	3.03	3.1	3.03	3.06	2.85	2.8	2.83	3.21	2.97	3.09	2.99

Prom.: Promotion
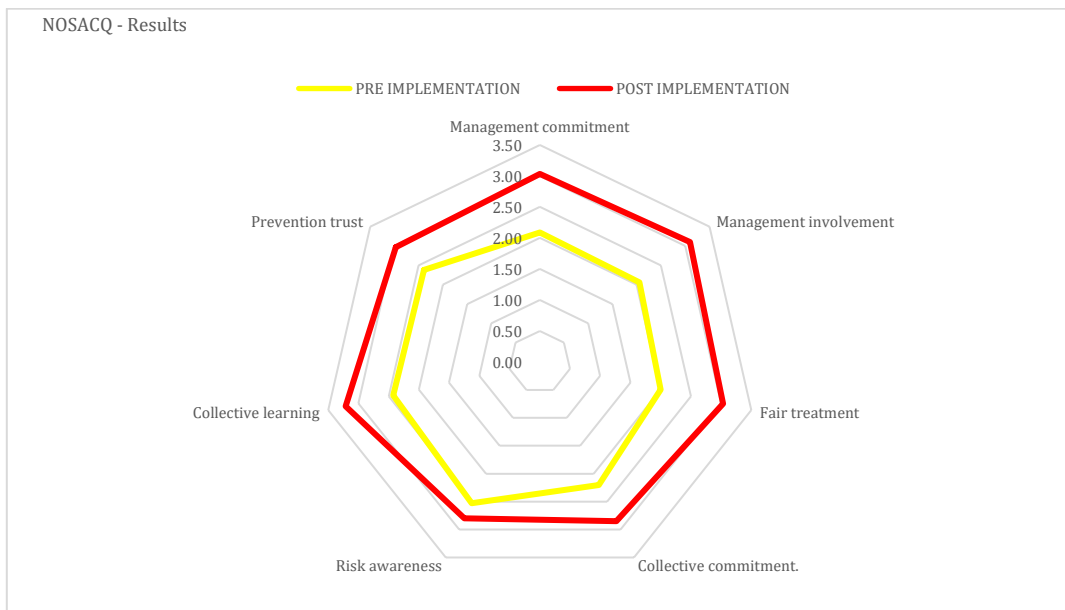
Fig. 1: Indicators of preventive culture before and after the WPSW implementation

• General hypothesis

H0: The implementation of WPSW does not have a significant effect on the preventive culture of the Cooperative's workers.

Ha: The implementation of the WPSW has a significant effect on the preventive culture of the Cooperative's employees.

Student's t-test has shown that the probability P(T≤t) is 0.0000055 at one end of the distribution. Therefore, it is concluded that the implementation of WPSW has a significant effect on the preventive culture of the workers of the cooperative (Table 9).

5. Discussion

This research highlights the implementation of the WPSW protocol across three different processes. It involved identifying hazards, assessing risks, and establishing control measures, which led to new methods of performing tasks. These changes necessitated training and coaching to ensure they were implemented and standardized effectively.

Additionally, this phase included equipping the workplace with necessary tools, safety materials, and implementing both group (such as signage and area boundaries) and individual safety measures.

The response from the workers was positive, indicating a growing understanding of the importance of a preventive safety culture and the application of WPSW protocols in their activities.

The research also examined specific goals related to the cooperative's policy changes post-WPSW implementation. Results showed significant improvements in management's commitment, involvement, and fairness, which were previously very low. These aspects improved substantially post-implementation. Similarly, cooperation and collective awareness, initially low, reached a moderate level, suggesting the need for further attention and strategies to enhance safety awareness and commitment among workers. Additionally, there was a notable increase in collective learning and trust, indicating that the WPSW implementation successfully boosted safety knowledge and trust among workers.

Table 9: Hypothesis test with T-student

	Before application	After application
Media and communications	65.2	93.2
Deviation	113.733333	10.4
Remarks	10	10
Pearson correlation coefficient	0.30885514	
Hypothetical mean difference	0	
Degrees of freedom	9	
Statistics t	-8.72918691	
P(T<=t) one tail	0.0000055	
Critical value of t (one-tailed)	1.83311293	
Two-tailed P(T<=t)	1.0955E-05	
Critical value of t (two-tailed)	2.26215716	

This research supports the general hypothesis that the WPSW significantly impacts preventive culture. The findings align with those of Vecchio-Sadus (2007). Vecchio-Sadus (2007) noted that clear and effective safety communication is crucial for enhancing knowledge and understanding, thereby preventing risky behaviors and strengthening safety culture. Vecchio-Sadus demonstrated that using communication as a tool significantly improved preventive culture. Similarly, in this study, communication plays a key role in assessing and fostering a preventive culture within the WPSW framework.

Farokhzadian et al. (2018) suggested that integrating safety culture within the cultural and organizational contexts of hospitals requires adjustments to suit the specific conditions of each institution. They emphasized the need for more efforts to build an effective and constructive safety culture across all organizational levels, including both administrative and healthcare staff. Although the focus of their research differs from this study, similar challenges emerge due to the complexities involved in fostering a preventive culture in any organization. Both formal and informal elements contribute to this complexity, with informal factors being harder to identify and address. Therefore, it is

essential to establish or implement strategies that promote the development of a preventive culture.

According to ICSI (2018), safety culture encompasses both a set of practices (ways of doing) and a mindset (ways of thinking) that are widely shared among the members of an organization to manage significant risks related to their activities. This research focuses on the practices (ways of doing) of each process in the implementation of WPSW, which significantly enhanced all dimensions of preventive culture among the workers of the Cooperative.

Preventive culture varies with the activities conducted by different organizations and changes over time as new technologies, processes, materials, and personnel are introduced. Regular assessments should be conducted using the NOSACQ-50 questionnaire. Arévalo Serrate and Sanchez (2018) describe this tool as both diagnostic and interventional, capable of evaluating and tracking the safety climate within an organization. The application of the NOSACQ-50 demonstrated changes in preventive culture before and after the WPSW implementation, confirming the effectiveness of this tool in enhancing the preventive culture.

The WPSW is a document that outlines safe work procedures and details the stages considered and

implemented in this research. These stages enabled workers to carry out their activities safely.

Among other aspects, it should be mentioned that the lack of occupational health and safety documentation in the cooperative led to the implementation of other important OSH documents.

6. Conclusions

The study indicates that implementing the WPSW program significantly enhanced the preventive culture at the cooperative. The statistical data reveals an increase in preventive safety culture scores from 2.27 (a very low level) to 2.99 (a medium level) after introducing the WPSW program, with a statistically significant p-value of 0.0000055, demonstrating clear improvement.

The effect of WPSW on the cooperative's policies was also substantial. Policies improved from a score of 2.05 (very low) to 3.06 (fairly good) following the WPSW implementation, with a p-value of 0.00000020, confirming the significant impact.

Moreover, the cooperative workers' collaboration and collective awareness saw growth post-WPSW implementation. Their scores rose from 2.36 (very low) to 2.83 (medium), with a p-value of 0.003349415, indicating a notable enhancement in their cooperation and collective consciousness.

Additionally, the application of WPSW significantly boosted collective learning and workers' confidence, with scores increasing from 2.41 (quite low) to 3.09 (quite good). The p-value of 0.00438506 supports the significant impact of WPSW on these aspects.

In summary, this research confirms that WPSW significantly improves various elements of the preventive culture at the cooperative, including company policy, worker cooperation, collective awareness, learning, and confidence. These findings underscore the importance of WPSW in fostering a preventive culture within organizations.

Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References

Afolabi FJ, de Beer P, and Haafkens JA (2021). Can occupational safety and health problems be prevented or not? Exploring the perception of informal automobile artisans in Nigeria. Safety Science, 135: 105097. https://doi.org/10.1016/j.ssci.2020.105097

Amirah NA, Him NF, Rashid A, Rasheed R, Zaliha TN, and Afthanorhan A (2024). Fostering a safety culture in manufacturing industry through safety behavior: A structural equation modelling approach. Journal of Safety and Sustainability. https://doi.org/10.1016/j.jsasus.2024.03.001

Antonsen S (2017). Safety culture: Theory, method and improvement. CRC Press, London, UK. https://doi.org/10.1201/9781315607498

Arévalo Serrate C and Sanchez A (2018). Cultura preventiva en la empresa: métodos de evaluación y mejora. Asesoría Jurídica y Prevención, Comunidad de Madrid, Madrid, Spain.

Bohm J and Harris D (2010). Risk perception and risk-taking behavior of construction site dumper drivers. International Journal of Occupational Safety and Ergonomics, 16(1): 55-67. https://doi.org/10.1080/10803548.2010.11076829 PMid:20331919

Farokhzadian J, Dehghan Nayeri N, and Borhani F (2018). The long way ahead to achieve an effective patient safety culture: Challenges perceived by nurses. BMC Health Services Research, 18: 654. https://doi.org/10.1186/s12913-018-3467-1 PMid:30134980 PMCid:PMC6106875

Fernández-Muñiz B, Montes-Peón JM, and Vázquez-Ordás CJ (2007). Safety culture: Analysis of the causal relationships between its key dimensions. Journal of Safety Research, 38(6): 627-641. https://doi.org/10.1016/j.jsr.2007.09.001 PMid:18054594

Huang L, Wu C, Wang B, Ouyang Q, and Lin H (2019). An unsafe behaviour formation mechanism based on risk perception. Human Factors and Ergonomics in Manufacturing and Service Industries, 29(2): 109-117. https://doi.org/10.1002/hfm.20762

ICSI (2018) Safety culture: From understanding to action. Institute for an Industrial Safety Culture, Toulouse, France.

ILO (2023). Home regions and countries Eastern Europe and central Asia areas of work occupational safety and health (OSH) world statistic. International Labour Organization, Geneva, Switzerland.

Kines P, Lappalainen J, Mikkelsen KL, Olsen E, Pousette A, Tharaldsen J, and Törner M (2011). Nordic safety climate questionnaire (NOSACQ-50): A new tool for diagnosing occupational safety climate. International Journal of Industrial Ergonomics, 41(6): 634-646. https://doi.org/10.1016/j.ergon.2011.08.004

Rundmo T (2001). Employee images of risk. Journal of Risk Research, 4(4): 393-404. https://doi.org/10.1080/136698701100653259

Taylor TN, Eeckeleaert L, Starren A, Scheppingen AV, Fox D, and Bruck C (2011). Occupational safety and health culture assessment-A review of main approaches and selected tools. European Agency for Safety and Health at Work, Bilbao, Spain.

Vecchio-Sadus AM (2007). Enhancing safety culture through effective communication. Safety Science Monitor, 11(3): 2.

Zohar D (2010). Thirty years of safety climate research: Reflections and future directions. Accident Analysis and Prevention, 42(5): 1517-1522. https://doi.org/10.1016/j.aap.2009.12.019 PMid:20538108