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Assessing the Organizational Impact of ISO 45001 Implementation: Occupational Health and Safety Outcomes: A Case Study of NCA Rouiba

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ARTICLE INFO	ABSTRACT
	This study investigates the influence of ISO 45001:2018 adoption on Occupational Health and Safety (OHS) management at New Algerian Cannery (NCA) Rouiba, a leading non-alcoholic beverage manufacturer. Through a survey of 100 employees spanning managerial, supervisory, and operational levels, the research evaluates safety performance enhancements following certification. Results demonstrate that ISO 45001 implementation has substantially improved OHS outcomes, including reduced accident rates and strengthened preventive measures. Training participation data reveals varying engagement levels: highest in chemical handling (30%), general workplace safety (20%), and first aid (20%), with moderate involvement in ISO 45001 awareness (15%). Notably lower participation in risk identification (7%) and Behavioral-Based Safety training (5%) highlights critical gaps in safety education. Employee perceptions reflect progress, with 95% reporting improved hazard recognition and 85% noting better risk documentation. However, only 41% of the workforce has received formal OHS training, and chemical spill response preparedness remains alarmingly low (4%). While ISO 45001 has effectively institutionalized preventive strategies and fostered greater safety engagement, persistent deficiencies in training coverage and emergency preparedness indicate the need for targeted interventions. The study concludes that sustained efforts are required to cultivate a truly robust, proactive safety culture at NCA Rouiba. **Keywords:** Impact, ISO 45001, Implementation, Heath and Safety Management.

INTRODUCTION

Occupational accidents and work-related diseases result in about 6,300 fatalities per day, constituting a significant burden on organizations and society as a whole. This concerning number highlights the pressing necessity for improved occupational health and safety (OHS) management strategies to mitigate accidents and morbidity (Zimolong & Elke, 2006; Liu et al., 2020). An essential measure in this regard is adopting ISO 45001, which organizations may follow to enhance health and safety standards. Modern occupational health and safety management systems methodologies emphasize the importance of personal knowledge about workplace and daily hazards. Employers are responsible for identifying risks associated with work processes, implementing procedures to eliminate or minimize such risks, and educating employees about any remaining hazards (Pouliakas & Theodossiou, 2013; Díaz-Cabrera et al., 2010). The implementation of ISO 45001 is expected to bring about significant improvements in workplace safety, leading to a reduction in occupational accidents and illnesses. This standard establishes a systematic framework for occupational health and safety management, promoting a proactive risk identification and reduction methodology (Nag et al., 2020; Marhavilas et al., 2022). ISO 45001 seeks to improve overall workplace safety performance by promoting a culture of safety awareness and ongoing enhancement. Its execution necessitates dedication from all organizational tiers, from senior management to individual employees, to foster a safer and healthier workplace (Morgado et al., 2019; Dilokwattanakul et al., 2023). The development of

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occupational health and safety (OHS) has traditionally focused on reducing accidents related to the use of technology in work processes, and it has evolved over specific eras (Badri et al., 2018 ; Botti et al., 2022). There is a significant increase in the use of risk management theory across different levels and activities, even considering low-probability catastrophic events due to their potentially severe societal consequences. This risk-based approach now includes other areas such as land use planning, construction of new facilities, transportation of hazardous materials, and other operations with significant potential social impact (Nocco & Stulz, 2006 ; Krause & Tse, 2016). This shift indicates a growing recognition of the need to anticipate and mitigate even unlikely events with far-reaching consequences, integrating risk management principles into various occupational and public safety aspects (Paape & Speklé, 2012; Settembre-Blundo et al., 2021). This progression reflects an increased emphasis on proactive risk assessment and management to enhance workplace and public safety across various industries. Protecting individuals in the workplace is rooted in the Declaration of Fundamental Rights and Freedoms and goes beyond just preserving life and health (Li et al., 2015 ; Hauke et al., 2020). It involves safeguarding workers and others from the adverse effects of labour and the work environment, considering all relevant factors associated with employment. This includes establishing favourable working conditions, promoting employee well-being, ensuring social and legal protections for individuals, and conserving material assets, labour, and the environment (Noroozi & Taherian, 2023 ; Briamonte et al., 2024). Regarding employee protection, it is essential to consider factors such as stress, pressure, job monotony, working environment, interpersonal interactions, workplace facilities, and fair compensation. The European Union's health and safety policy is underpinned by a comprehensive approach, as seen in the 'Community strategy '. This strategy advocates for the integration of all aspects of labour, from physical conditions to social and legal protections (Randall, 2001). It's this holistic view that has led to the wider implementation of integrated management systems. In this regard, the ISO 45001:2018 standard serves as a significant resource. It offers a comprehensive methodological framework for implementing an efficient occupational health and safety (OHS) management system (Marhavilas et al., 2022; Dilokwattanakul et al., 2023). By adhering to its stipulations, organisations can avert accidents and occupational illnesses, enhance overall efficiency, and guarantee a healthy and safe workplace (Lourenço et al., 2019; Musungwa & Kowe, 2022). This research study investigates the effects of the ISO 45001:2018 standard on occupational health and safety management. The standard provides guidelines for identifying hazards, assessing risks, and implementing control measures. There is limited research on the impact of ISO 45001 in the Algerian context, specifically in the food sector. This study aims to fill this gap by examining the influence of the ISO 45001 standard on enhancing health and safety at work in the NCA-Rouiba food company, which specializes in non-alcoholic beverage production. The research question addressed is: What are the contributions of the ISO 45001:2018 standard to occupational health and safety management within the NCA Rouiba company?

METHODOLOGY

The agri-food company NCA Rouiba boasts an excellent organizational structure and offers a wide range of products certified to ISO standards. It demonstrates a strong commitment to quality, food safety, environmental protection, and worker health and safety through rigorous production and control processes. This commitment is further evidenced by the acquisition of several internationally recognized certifications, notably ISO 9001:2015 for quality management, ISO 14001:2015 for environmental management, ISO 26000 for social responsibility (implemented in 2011), and ISO 22000 for food safety management (achieved in January 2013 after two years of dedicated effort). The ISO 22000 certification in particular reinforces NCA Rouiba's commitment to its clients and consumers by providing an additional quality guarantee for its diverse product range. Collectively, these certifications reflect NCA Rouiba's dedication to continuous improvement and adherence to international standards across various operational aspects.

The data collection for this study was carried out in two phases. The first phase involved developing questionnaires, while the second phase included on-site observations at NCA Rouiba and evaluation of company data. To verify our initial hypotheses, we used stratified random sampling to create two questionnaires targeting three professional categories: Managers, Supervisors, and Operational staff. These questionnaires were distributed to a sample of 100 employees out of a total workforce of 434 (table 1), ensuring representation across all levels of the organization. The first questionnaire, aimed at managers, was designed to measure their level of involvement in occupational health and safety (OHS) and their perception of safety since the implementation of ISO 45001 at NCA Rouiba. The second

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questionnaire was intended for supervisors and operational staff. Both questionnaires aimed to assess safety improvements since the implementation of ISO 45001 at NCA Rouiba, considering that NCA was committed to OHS even before ISO 45001 requirements were established. This assessment was done through various variables such as safety instructions, OHS communication methods, and the use of personal protective equipment. This approach has allowed us to gather comprehensive data on the impact of implementing ISO 45001 from various perspectives within the company.

Table 1. Distribution of the socio-professional population surveyed at NCA Rouiba.

Socio-professional Category	Population	Sample	Percentage relative to total population (%)	Percentage of sample relative to total sample (%)
Managers	130	20	30	4.6
Supervisors	168	44	38.7	10.13
Operational staff	136	36	31.33	8.4
Total	434	100	100	23.13

The initial questionnaire, directed at managers, assessed their commitment to occupational health and safety (OHS) and their perception of safety following the adoption of ISO 45001 at NCA Rouiba. This specific questionnaire was essential for gathering targeted information relevant to the "Managers" group, including their involvement in safety behaviour visits and identifying and assessing risks. The second questionnaire was designed for supervisors and operational staff. Both questionnaires aimed to evaluate the improvements in safety following the adoption of ISO 45001 at NCA Rouiba, recognizing that the company had already been committed to health and safety at work before implementing the ISO 45001 standards. This evaluation was conducted using various criteria, including safety protocols, health and safety communication strategies, and the use of personal protective equipment.

RESULTS

Descriptive information about the food company NCA Rouiba

Table 2 summarizes the results for the main characteristics of the NCA Rouiba agri-food company and the managers of its various agri-food businesses.

Table 2. Profile of Managers and Staff in the NCA Rouiba Food Industry.

Variable	Category	Frequency	Percentage
Age	20-29 years	5	5%
	30-39 years	16	16%
	40-49 years	44	44%
	Over 50 years	35	35%
Seniority	Less than 1 year	4	4%
	1-5 years	7	7%
	6-9 years	10	10%
	10-19 years	48	48%

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	Over 20 years	31	31%
Socio-professional Categories	Manager	20	20%
	Supervisor	44	44%
	Operational staff	36	36%

The sample data shows a wide range of ages, with the majority (79%) of participants being 40 years old and over. This result suggests that the participants have significant professional experience and maturity, which could enhance the application of ISO 45001. Regarding tenure, 89% of the sample had over 5 years of experience, while 79% had more than 10 years with the organization, indicating employee stability and a comprehensive understanding of safety protocols and hazards. This long-term view provides unique insights into the evolution of workplace safety culture before and after adopting ISO 45001. The socio-professional categories are 44% supervisory personnel, 36% operational personnel, and 20% managerial workers, providing diverse jobs and responsibilities within the organization. This diverse composition offers multiple perspectives on the impact of ISO 45001 on workplace safety culture.

Managerial participation in ISO 45001

In the following section, we will highlight the active and visible participation of managers at all levels within the Occupational Health and Safety Management System (OHSMS) under ISO 45001. Figure 1 shows essential findings regarding management involvement in occupational health and safety (OHS) practices after implementing ISO 45001. This section examines the active and visible involvement of managers in employee training within the framework of the Occupational Health and Safety Management System (OHSMS) under ISO 45001. The figure illustrates participation in various training programs, with the highest engagement observed in chemical handling certification, workplace safety, first aid, and ISO 45001 training, demonstrating a strong commitment to workplace safety and regulatory compliance. Conversely, risk identification and assessment, chemical product certification, and Behavioral-Based Safety (BBS) visits exhibit lower participation rates, suggesting areas where managerial engagement requires further reinforcement. Notably, occupational hazard recognition remains one of the least addressed aspects, underscoring the need for enhanced focus on risk awareness and assessment initiatives. The figure further indicates that chemical handling certification accounts for approximately 30% of total training sessions, reflecting strong engagement in hazardous material management. Workplace safety and first aid each represent 20%, highlighting a commitment to emergency preparedness, while ISO 45001 training constitutes 15%, emphasizing compliance with international safety standards. Moderate participation is noted in firefighting (12%) and working at heights (10%), reflecting attention to high-risk activities. However, lower engagement in risk identification (7%), chemical product certification (5%), and BBS visits (5%) suggests gaps in proactive safety management. Similarly, workplace risks, work permits, and Health and Safety Committee participation, each below 7%, indicate potential deficiencies in risk prevention strategies. Overall, while training efforts prioritize certification and emergency preparedness, greater emphasis on hazard recognition and risk assessment is essential to strengthening workplace safety culture and promoting a proactive risk management approach.
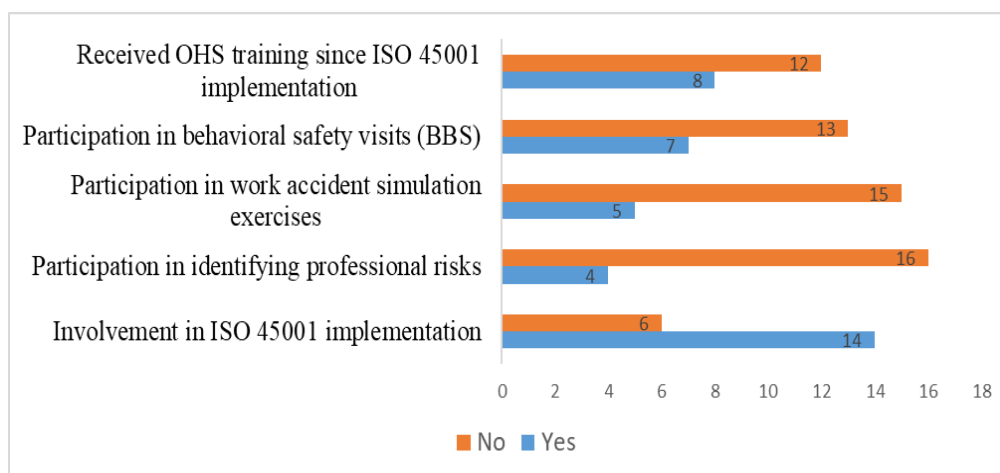
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Figure 1. Managers' Perceptions and Involvement in ISO 45001 Implementation

Occupational health and safety training

In the upcoming section, we will showcase how managers actively and visibly participate in training staff for the Occupational Health and Safety Management System (OHSMS) in accordance with ISO 45001 (Figure 2). From this figure, eight out of twenty managers have undergone OHS training since adopting ISO 45001, accounting for 40% of all participants. This finding suggests that a significant number of managers have taken part. In general, participation in training represents the highest percentage of managerial involvement. Nonetheless, recognizing occupational hazards remains the domain with minimal management engagement and needs specific focus.

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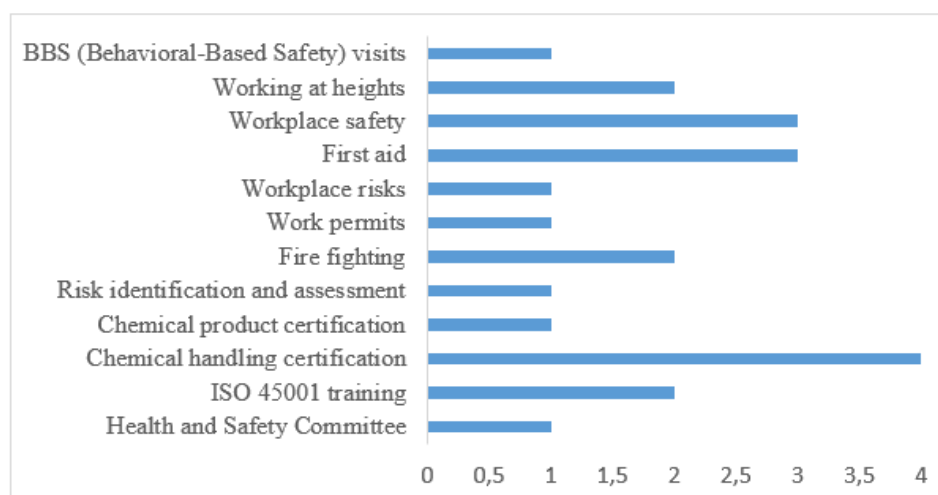
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Figure 2. Occupational Health and Safety Training Participation by NCA Rouiba Managers.

Managers' perspectives on enhancing workplace safety

This section analyzes managers' views on workplace safety improvements following the adoption of the Occupational Health and Safety Management System (OHSMS) under ISO 45001 (see Figure 3). This figure indicates a strong positive perception, with the majority of managers affirming improvements in key safety aspects. Notably, 95% of managers acknowledge that ISO 45001 has enhanced the identification and assessment of occupational risks, emphasizing its role in proactive hazard management. Similarly, 85% confirm that risks are now better documented and communicated to employees, ensuring greater transparency and awareness. Additionally, 80% of managers report that more effective preventive measures have been implemented since the adoption of ISO 45001, reinforcing the system's contribution to risk mitigation. 90% recognize that employee participation is considered in decision-making related to risk prevention, suggesting that the standard has fostered a more inclusive safety culture. Moreover, 85% of managers agree that employees are now more encouraged to express their opinions and provide suggestions on health and safety matters, reflecting an improvement in safety communication and engagement. Furthermore, 88% believe that employees have become more aware of health and safety issues, indicating a strengthened safety mindset across the organization. Overall, the data suggests that ISO 45001 has led to substantial enhancements in workplace safety, promoting risk awareness, preventive action, and employee involvement. However, the 5% to 20% of managers who responded negatively highlight areas that still require attention, necessitating further evaluation to ensure comprehensive and sustained safety improvements.
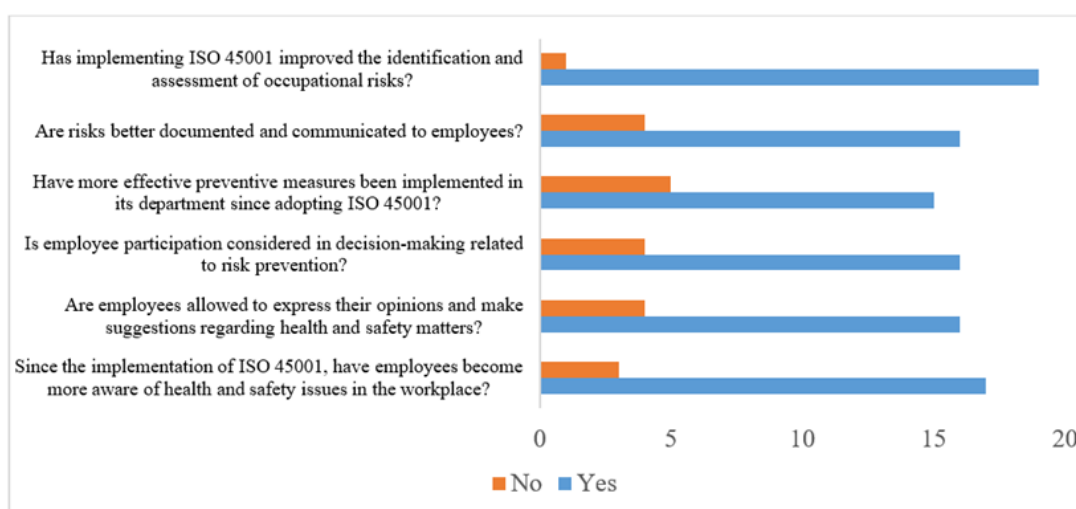

Figure 3. Managers' perceptions of enhancements in workplace safety.

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Employees' Perception of Workplace Safety Improvements

The subsequent section examines employees' perspectives on improvements in workplace safety following the implementation of the Occupational Health and Safety Management System (see Figure 4). According to the findings, a significant majority, 89% of respondents, believe that the ISO 45001 standard has positively impacted health and safety within the company, while 11% do not perceive a positive effect from the implementation of this standard. An overwhelming majority of 75 respondents feel that safety is a paramount priority within the company, corroborated by an impressive 93.75% who affirm that safety is paramount at NCA Rouiba. The general sense of safety at work has reportedly improved for 85% of respondents since adopting ISO 45001, suggesting that the company's safety efforts are having a tangible impact on employee well-being. Moreover, 83.75% of respondents feel better informed about the specific occupational risks associated with their roles and the preventive measures in place. A similar proportion, 85%, attest that the company considers employees' opinions in safety-related decision-making. Additionally, 86.25% of respondents observe more frequent awareness campaigns about good safety practices since the standard's implementation. Finally, the same majority perceives a strengthened commitment from management towards safety, indicating a shift towards a proactive and prioritized approach to safety by the leadership.
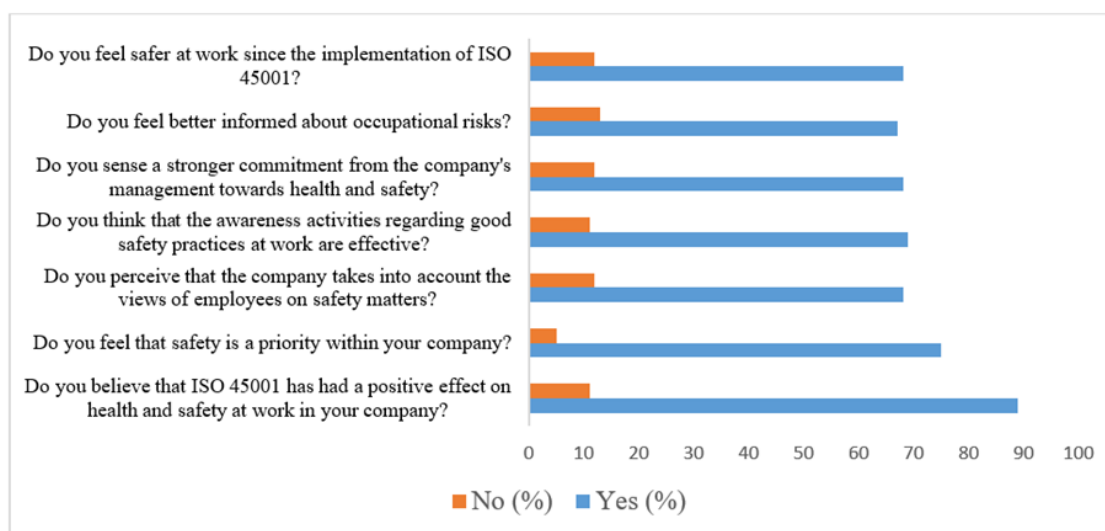

Figure 4. Employees' responses concerning the impact of the ISO 45001 standard on OHS within the company.

Preventive Measures for OHS in NCA Rouiba

In the following section, we will outline the preventive measures that have been put in place to manage occupational risks as part of the occupational health and safety management system at the NCA Rouiba food company. The results presented in Figure 5 highlight the distribution of safety simulation exercises conducted at NCA Rouiba and the overall participation in Occupational Health and Safety (OHS) training. As shown in Figure 5(a), the majority of the simulations focused on firefighting (67%), followed by first aid (20%), evacuation with civil protection (9%), and chemical spill response (4%). This distribution indicates a strong emphasis on fire safety preparedness. However, lower participation in chemical spill response suggests potential gaps in handling hazardous materials. Figure 5(b) illustrates that only 41% of employees have completed OHS training, while 59% have not undergone such training. This suggests a need for greater efforts in promoting workplace safety education and ensuring comprehensive participation across all employees. Enhancing training participation could significantly improve safety awareness and risk management at NCA Rouiba.
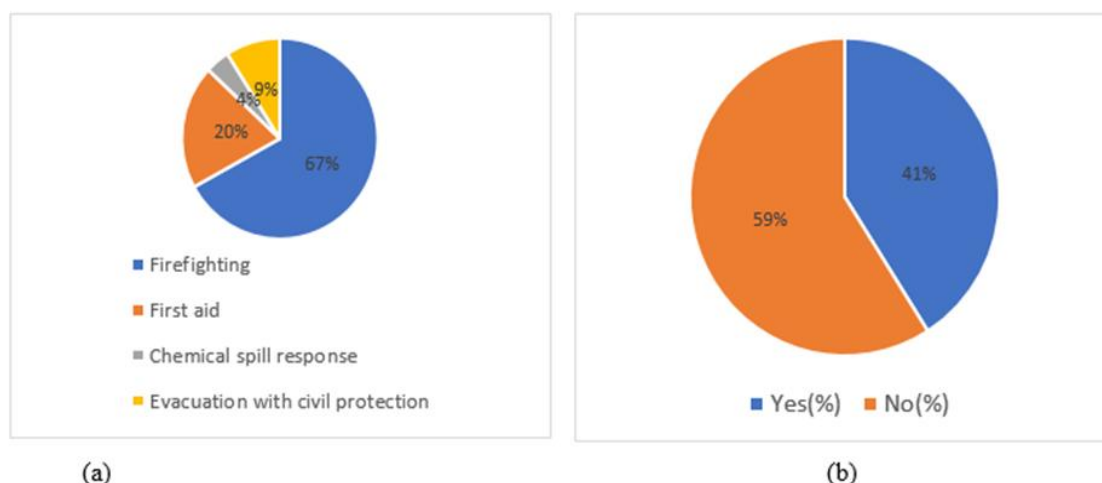
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(a)   (b)

Figure 5. a)   Types of Safety Simulation Exercises at NCA Rouiba   and b) Total number of employees who have taken OHS training courses

The results presented in Figure 6 illustrate employee participation in various Occupational Health and Safety (OHS) training programs. The most attended session was first aid training, with the highest participation at approximately 13 employees (30%), followed closely by firefighting exercises with around 11 employees (25%). Training on working at heights (7 employees, 16%) and handling various chemical products (6 employees, 14%) also saw moderate engagement, indicating awareness of specific workplace risks. However, participation in electrical clearance (3 employees, 7%) and hygiene, health, and safety training (2 employees, 5%) was relatively low, suggesting gaps in these crucial areas. Work permits training recorded the lowest engagement at only 1 employee (2%), highlighting a potential need for further emphasis on regulatory compliance. The high attendance in emergency response training, such as first aid and firefighting, reflects a strong focus on immediate hazard mitigation. Nevertheless, efforts should be made to improve engagement in other safety areas to ensure comprehensive risk management within the organization. Strengthening training participation across all categories will contribute to a more robust safety culture.
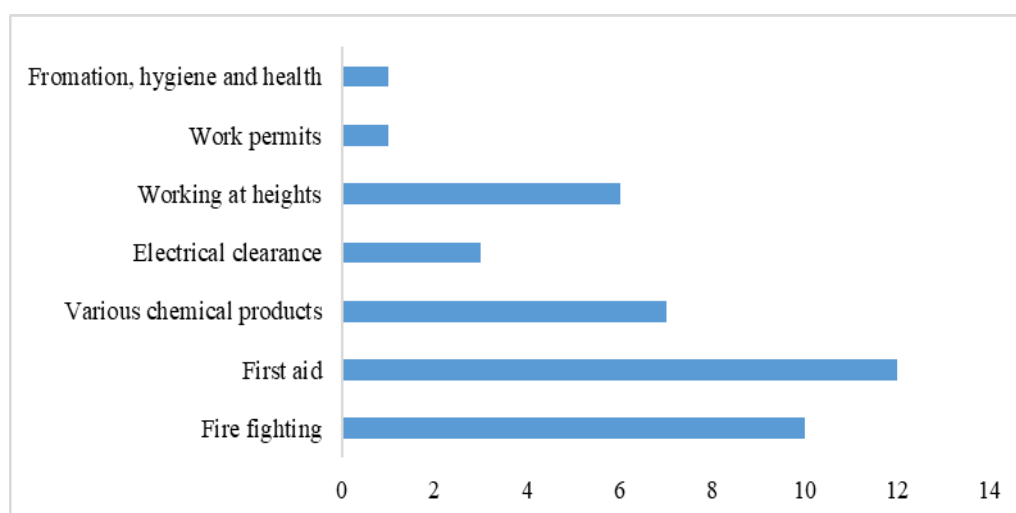

Figure 6. Employee training on the Occupational Health and Safety (OHS) system.

Occupational Health and Safety formation:

The figure 7 presents the distribution of executive participation in various Occupational Health and Safety (OHS) training programs following the implementation of ISO 45001. The highest participation is observed in *Authorization for Handling Chemical Products*, indicating a strong focus on chemical safety. *Workplace Safety* and *Fire Safety and Prevention* also show significant engagement, reflecting awareness of fundamental safety measures. However,

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lower participation is noted in *Risk Identification and Assessment*, *BBS (Behavior-Based Safety) Inspection*, and *Occupational Hazards*, suggesting a gap in proactive risk management. The limited involvement in *CPHS (Committee for Health and Safety at Work)* and *Work Permits* implies that executive engagement in policy and regulatory aspects of workplace safety remains low. These findings highlight the need for a more balanced training approach to ensure comprehensive OHS preparedness.

Since the implementation of the ISO 45001 standard, 8 out of 20 executives (40% of respondents) have received Occupational Health and Safety (OHS) training, indicating a significant level of engagement. Among the various training programs, overall participation by executives is highest in OHS-related training. However, risk identification remains the area with the lowest engagement, highlighting the need for greater attention. The graph titled *"Various Training Programs Attended by Executives"* illustrates the frequency of training received across different OHS domains following the adoption of ISO 45001. It demonstrates a positive involvement of executives in OHS training, with the highest participation observed in *"Authorization Training for Handling Chemical Products"*, followed by *"Workplace Safety Training"*. Other training programs have been attended less frequently.
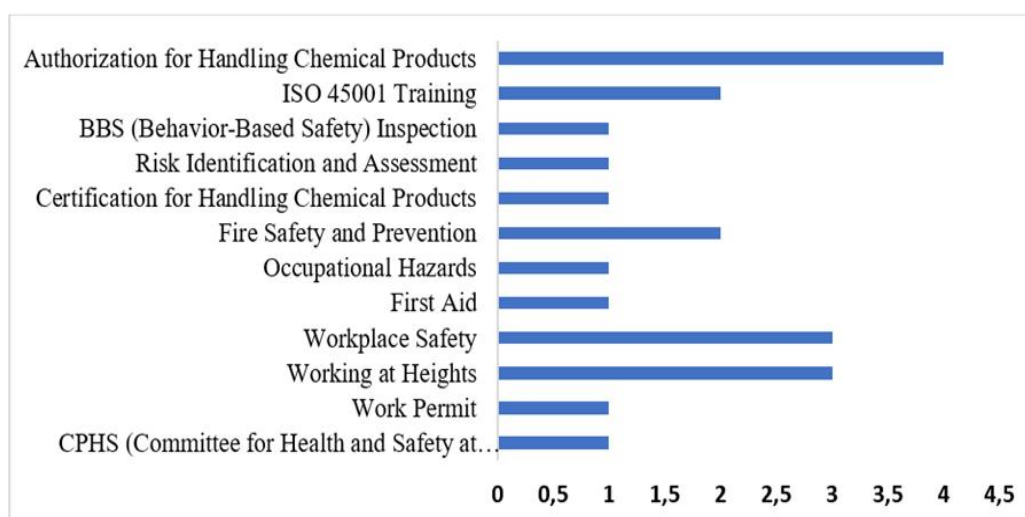

Figure 7: Executive Participation in Occupational Health and Safety Training Following ISO 45001 Implementation.

Employees' Perception of Safety Improvement :

This axis examines employees' perceptions regarding the improvement of workplace safety following the implementation of the Occupational Health and Safety Management System. Figure 8 (a) illustrates employee responses on the impact of the ISO 45001 standard on occupational health and safety (OHS) within the company. According to the results, the majority (89%) of respondents believe that ISO 45001 has had a positive effect on health and safety in the organization, while 11% do not perceive a positive impact. Figure 8 (b) presents the responses of 80 employees regarding the prioritization of safety at NCA Rouiba. An overwhelming majority—75 respondents—indicated that they consider safety an absolute priority within the company, reflecting a remarkable approval rate of 93.75% among participants who affirm the critical importance of safety at NCA Rouiba.
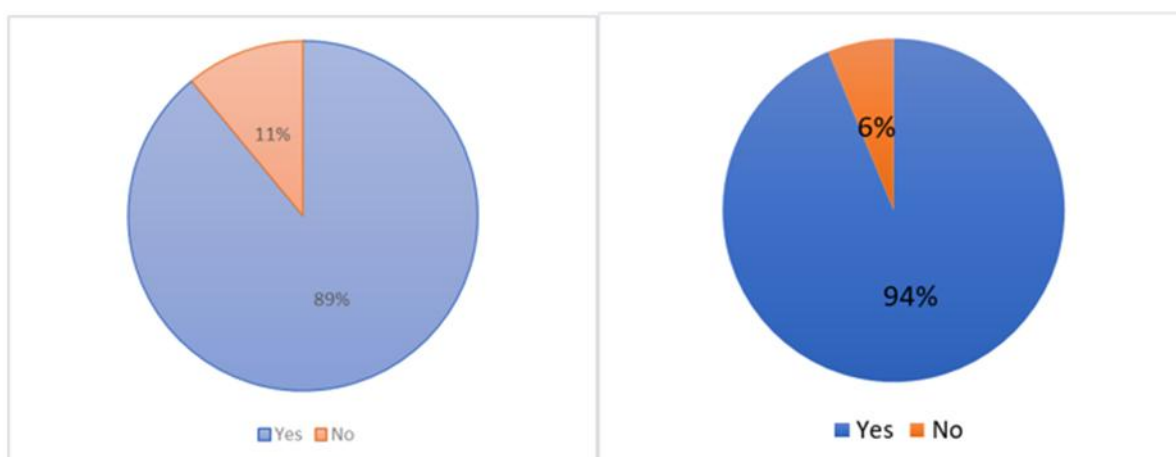
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Figure 8 : a) Do you believe that ISO 45001 has had a positive impact on occupational health and safety in your company? And b) Do you feel that safety is a priority in your company?
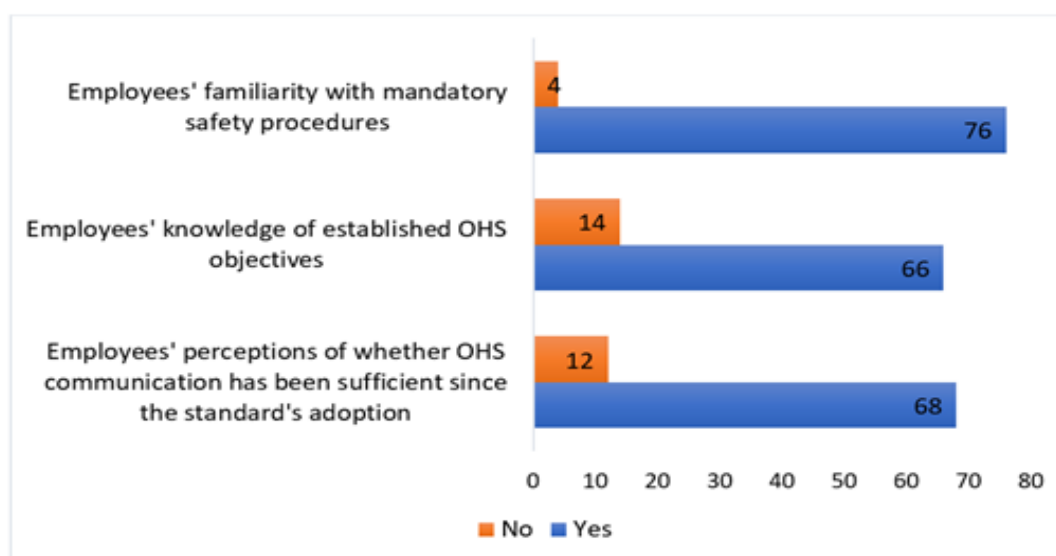

Figure 9: The survey responses concerning the communication channels used for Occupational Health and Safety (OHS) information dissemination.

The Figure 9 indicates overwhelmingly positive employee perceptions regarding OHS communication under the new management system, with 85% affirming sufficient safety communication, 82.5% demonstrating awareness of OHS objectives, and 95% reporting familiarity with safety procedures. While these high percentages reflect successful implementation of ISO 45001's communication requirements, the remaining gaps (15%, 17.5%, and 5% respectively) reveal opportunities for improvement in message dissemination and training comprehensiveness. The near-universal familiarity with safety procedures (95%) suggests particularly effective procedural training, whereas the comparatively lower awareness of OHS objectives (82.5%) may indicate a need for more targeted communication strategies. These findings collectively demonstrate strong organizational compliance with ISO 45001 standards while highlighting specific areas where minor enhancements could achieve full workforce alignment. The results confirm that the safety management system has been largely successful in raising awareness, though continued efforts should address the small but persistent knowledge gaps among employees.

DISCUSSION

Although managerial participation in ISO 45001 initially showed strong commitment to implementing the standard, engagement in specific OHS activities declined over time, highlighting potential gaps between policy and practice.

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This aligns with recent studies on the challenges of implementing ISO 45001 (Ghahramani, 2016; Domínguez et al., 2023). The significant involvement during the initial implementation demonstrates a strong commitment from management, which is critical for effectively implementing an OHS management system. However, reduced participation in specific activities indicates ongoing issues with leadership involvement. Only four managers identified professional hazards despite ISO 45001's emphasis on proactive hazard identification and risk assessment (Darabont et al., 2017). The limited participation in behavioural safety visits and work accident simulations suggests the potential for improvement in fostering a strong safety culture (Da Silva & Amaral, 2019). Following the implementation, only eight managers underwent OHS training, potentially leading to deficiencies in continuous learning and improvement, which are fundamental aspects of ISO 45001 (Madsen et al., 2020). The gap between initial implementation engagement and sustained participation may indicate challenges in fully integrating OHS management into daily operations, which Ramos et al., (2020) deemed essential for realizing the full benefits of ISO 45001 (Ramos et al., 2020). The findings highlight the need for increased managerial involvement in effective safety protocols and ongoing occupational health and safety education to leverage the benefits of ISO 45001 fully.

The analysis of managerial training frequencies provides valuable insights into the implementation of ISO 45001 and OHS practices within the organization. The high frequency of chemical handling certification training underscores a strong focus on chemical safety, aligning with research highlighting chemical hazards as a major concern across industries (Morrow et al., 2021). Similarly, the emphasis on workplace safety training reflects ISO 45001's core principle of fostering a preventive safety culture (Muñoz-Pascual et al., 2020), while first aid and firefighting training reinforce the organization's commitment to emergency preparedness (Haas & Yorio, 2016). The integration of risk identification and assessment training aligns with ISO 45001's risk-based approach (Darabont et al., 2017), and the inclusion of behavioral safety visits training suggests efforts to incorporate proven strategies for improving safety outcomes (Guo et al., 2020). The broad scope of training topics indicates a comprehensive approach to OHS, consistent with ISO 45001 recommendations (ISO, 2018). However, lower training frequencies in work permits and workplace risk assessments may highlight potential gaps requiring greater emphasis (Fernández-Muñiz et al., 2018). Overall, the training profile suggests a proactive OHS management strategy, reinforcing ISO 45001's focus on leadership engagement and continuous improvement, while also pointing to areas for a more balanced training distribution.

The implementation of ISO 45001 has introduced systematic methods for identifying and mitigating hazards, reinforcing workplace safety as a structured and proactive process (Coze, 2005; McNamara, 2014). One of the key benefits of the standard is its role in fostering transparent risk communication, ensuring that employees are well-informed about potential dangers and the necessary safety protocols (Kohl, 2020; Bautista-Bernal et al., 2024). This aligns with ISO 45001's emphasis on open dialogue and risk awareness, which is essential for building a strong safety culture. Furthermore, the standard promotes preventive measures over reactive responses, shifting the organization's safety management approach towards proactive risk mitigation (Asbury, 2021; Claxton et al., 2022). This strategic shift reduces workplace incidents by emphasizing risk anticipation rather than post-incident corrections. Additionally, ISO 45001 encourages employee involvement in safety-related decision-making, reinforcing a participatory approach where workers actively contribute to health and safety strategies. This enhances ownership and accountability, which are fundamental to a sustainable safety culture. Another significant aspect of ISO 45001 is its role in continuous safety education and awareness, leading to a workforce that is consistently engaged in occupational health and safety practices. Regular communication and training contribute to the development of a safety-oriented organizational culture, ensuring that safety remains a core value rather than a mere compliance requirement (Majumdar, 2019; Kabiesz & Tutak, 2024). Overall, ISO 45001 has had a transformative impact on organizational procedures and safety culture, reinforcing structured safety practices, enhancing risk communication, and strengthening employee engagement. These improvements demonstrate the standard's effectiveness in aligning management strategies with practical safety outcomes, fostering a more resilient and safety-conscious workplace.

The implementation of an Occupational Health and Safety Management System (OHSMS), particularly ISO 45001, has contributed to a holistic enhancement of workplace safety culture and practices. This improvement stems from the structured and systematic approach enforced by the standard, which prioritizes continuous improvement, risk prevention, and active employee participation. By providing a comprehensive framework for hazard identification,

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risk assessment, and control measures, ISO 45001 strengthens overall safety performance while fostering a workforce that is more aware of and engaged in occupational health and safety. Research supports these benefits, with Morgado et al. (2019) noting that organizations adopting ISO 45001 experience enhanced hazard identification and risk assessment procedures, leading to a greater sense of security among employees. Furthermore, the standard's emphasis on leadership commitment and workforce involvement plays a pivotal role in cultivating a strong safety culture. Bautista-Bernal et al. (2024) found that companies implementing ISO 45001 and similar OHSMS frameworks frequently report improvements in safety culture, resulting in increased employee awareness and more positive perceptions of workplace safety initiatives. Overall, the integration of ISO 45001 not only improves safety management processes but also fosters a proactive and participatory safety culture, reinforcing employees' trust in organizational safety measures and promoting a sustained commitment to workplace well-being.

The training approach at NCA Rouiba reflects a strong emphasis on disaster preparedness, particularly in fire-fighting and first-aid training, aligning with research highlighting the importance of effective occupational health and safety (OHS) management systems (Haas & Yorio, 2016). Additionally, the prioritization of training on chemical hazards acknowledges the significant risks posed by chemical exposure in the workplace, as supported by Morrow et al. (2021). Task-specific training, such as working at heights and electrical safety, demonstrates awareness of critical hazards, reinforcing the need for specialized safety measures (Li et al., 2015). However, the limited focus on systemic OHS management strategies, particularly in areas like work permits and health and hygiene training, suggests opportunities for improvement. Strengthening these aspects could enhance the organization's overall compliance with ISO 45001 standards and promote a more comprehensive safety culture (Morgado et al., 2019). Moreover, the gap in employee participation in OHS training raises concerns about training accessibility, prioritization, and resource allocation. Several factors, such as recent ISO 45001 implementation, communication effectiveness, and employee engagement, may influence these disparities. Given the established link between comprehensive safety training and improved workplace safety outcomes (Robson et al., 2012), addressing these gaps through enhanced training policies and broader employee involvement could strengthen OHS practices and reduce workplace risks.

The findings demonstrate a strongly positive perception among employees regarding safety improvements after adopting ISO 45001, with **89% acknowledging its beneficial impact** on occupational health and safety (OHS). This aligns with existing literature (Fernández-Muñiz et al., 2018; Génesis et al., 2022) indicating that ISO 45001 enhances safety culture by standardizing risk management, increasing employee engagement, and fostering continuous improvement. The high approval rate suggests successful internalization of safety policies, a critical factor in reducing workplace accidents (Vinodkumar & Bhasi, 2010). Furthermore, **93.75% of employees view safety as an absolute priority**, reinforcing studies (Zanko & Dawson, 2012; Robson et al., 2012) that link management commitment under ISO 45001 to stronger safety climates. The 11% who perceived no improvement may reflect variability in departmental implementation or communication gaps—a known challenge in OHS management systems (Hasle & Zwetsloot, 2011).

The data reveals significant success in OHS communication following ISO 45001 adoption, with 85% of employees affirming sufficient safety communication. This aligns with research by Zwetsloot et al. (2020) in Safety Science, demonstrating that ISO 45001's structured communication requirements enhance information flow and employee engagement in safety matters. The 95% familiarity with safety procedures particularly supports findings by Fernández-Muñiz et al. (2018) that standardized OHS management systems significantly improve procedural knowledge retention. However, the 17.5% gap in OHS objectives awareness echoes concerns raised by Hasle and Zwetsloot (2011) regarding potential disconnects between management systems and worker understanding. This suggests that while operational procedures are well-communicated, strategic safety objectives may require more targeted dissemination methods. The 15% reporting insufficient communication matches patterns identified by Nielsen (2014) in organizations undergoing safety management transitions, where certain employee groups may be less reached by conventional communication channels.

CONCLUSION

In the context of our research, we have explored fundamental concepts related to Occupational Health and Safety, the ISO 45001:2018 standard, and risk prevention in the workplace. For the practical case study, we conducted an investigation within NCA Rouiba to assess the impact of the ISO 45001:2018 standard on Occupational Health and

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Safety management and to propose improvement actions. Implementing ISO 45001:2018 at NCA Rouiba enhances workplace safety by reducing accidents, reinforcing safety measures, and ensuring compliance with Algerian regulations. Firstly, our analysis demonstrated that the adoption of the ISO 45001 standard led to a significant improvement in Occupational Health and Safety (OHS) performance indicators. This was reflected in a notable reduction in the number, severity, and frequency of workplace accidents. These results highlight the effectiveness of the preventive measures implemented by the company. Furthermore, the findings revealed that not only were existing preventive measures reinforced, but new measures were also adopted following the implementation of the ISO 45001 standard. This underscores the positive impact of the standard on the continuous improvement of professional risk prevention practices within the company. Moreover, our investigation showed a positive perception among employees regarding the enhancement of workplace safety since the implementation of the ISO 45001 standard. The results of the administered questionnaires confirmed that the actions taken have contributed to strengthening employees' trust in their work environment concerning safety. The adoption of ISO 45001 has undeniably contributed to improving OHS management at NCA Rouiba. The structured, rigorous approach imposed by the standard has enabled the company to reinforce its preventive measures, involve its employees more effectively and create a safer, healthier working environment for all. The progress made by NCA Rouiba in terms of OHS is very promising, and it is essential to pursue continuous improvement efforts to maintain and reinforce these achievements and aim for excellence in workplace safety.

Acknowledgment

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