Manuscript 1054

Evaluation of Occupational Health and Safety Knowledge, Attitudes, and Practices of Workers at North Refineries Company

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ORIGINAL STUDY

Evaluation of Occupational Health and Safety Knowledge, Attitudes, and Practices of Workers at North Refineries Company

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ABSTRACT

Safety is crucial in the oil and gas refinery industry for production and distribution. Companies must ensure a workplace free from common injuries and protected against serious incidents. This paper evaluates employees' knowledge, attitudes, practices, and workplace environment at North Refineries Company (Baiji). A descriptive cross-sectional study was conducted from September 10, 2024, to September 20, 2025, involving 480 employees (378 workers and 102 managers). Data were collected through face-to-face interviews and analysed using SPSS version 24. North Refineries Company (Baiji). workers scored 72.49 % on general knowledge and 96.83% on attitudes, but only 53.97% on safe behaviour. Division managers reported health support measures at 84.31% (healthy) and long-term health effects at 58% (healthy), while 45% indicated a lack of regular screenings as unhealthy, and nearly 44% noted unhealthy work-related health problems. In conclusion, this study has determined that oil sector workers must follow a sequential safety protocol to protect themselves and equipment and increase production.

1. Introduction

An occupational hazard is something unpleasant that you may suffer or experience as a result of doing your job or hobby. Employers must keep their workplaces safe from dangers, according to the Occupational Safety and Health Administration (OSHA). OSHA suggests using manufacturing or work practice controls to lower risks as much as possible, depending on the workplace and the risks involved [1]. Even though safety and health laws have improved, the oil and gas industry still need more updating [2]. The Petroleum (Safety Measures) Act of 1984 sets rules for moving, storing, and handling petroleum, but it doesn't specify the most important safety rules for oil and gas operations [3]. The oil and gas industries are an important economic sector.

Safety in the workplace is a vital issue that needs to be taken seriously. To safeguard themselves against mishaps or injuries, every employee should be aware of the occupational health and safety organization [4]. Occupational health and safety systems impact production costs, time, and product quality. It directly affects all workers, both those who work on the raw materials and those who work on the finishing process. In the internal system companies the workers are among the company's assets that should be protected, and they should be assured they can work efficiently and productively. Refining is the process of turning one complicated mix of hydrocarbons into another hydrocarbon products. It takes a lot of knowledge, control, and skill to carefully and precisely turn crude oil into fuels and gases at high temperatures and [5].

This is done with vessels, equipment, and piping under pressure that can break down. People who work with compound procedures and are experts in health and safety find and implement safe ways to work and the proper safety gear. These safety measures could include hard hats, safety glasses, safety shoes, hearing protection, respiratory protection, and, if necessary, fire-resistant clothing [5]. Oil and gas projects are at high risk due to the adoption of complex technology, involvement of multiple parties, and other factors. The oil and gas industry is often vulnerable to risks and hazards, but it mitigates these risks by applying risk management tools and techniques, thereby enhancing employee and organizational safety [6] According to social security premium statistics, 97.4% of the 18,916 workplace accidents that happened in Iran in 2014 were men, and 2.6% were women. These numbers apply only to people with insurance. Most experts think that human mistakes or unsafe actions are the leading causes of accidents [7].

Despite improvements in occupational health and [6] safety (OHS) over the past century, the rate of occupational accidents has steadily increased. An estimated 6.9 million worker injuries occurred in the European Union in 2006 and 8.5 million in the United States in 2007. Each year, there are about 317 million nonfatal work-related injuries and 321,000 work-related deaths around the world (151 workers are hurt on the job every 15 seconds) [8]. In the Basrah Oil Company, 134 workers died in two years, with crude death rates of 243.93 and 226.03 per 100000, respectively, for the years 2017 and 2018 [9]. An analysis of numerous major accident cases has confirmed that safety culture plays a significant role in creating a safe work environment. Because of this, we need to recognize it as a very important factor influencing the development of business competencies in every organization and actively manage its growth and development. An appropriate safety culture creates the basic preconditions for long-term productivity and employee health protection, manifesting in increased competence for employers, employees, and the state. On the other hand, it creates a safer work environment for employees [9]. The OSHA says workers must protect themselves from workplace hazards. PPE is gear people wear to protect themselves from various dangers. PPE includes items such as gloves, hard hats, eye and foot protection, earplugs, muffs, and body suits [10]. The disparity between employees' awareness and actual safety practices in high-risk sectors, such as oil refineries, constitutes a significant obstacle to (OHS) management. Unsafe behaviors are still common. The disparity in OHS knowledge, attitudes, and practices

necessitates an analysis of the factors influencing safety performance in industrial settings [11].

It looks at how well workers understand safety rules and practices, how they feel about safety, and how these factors affect what they do at work. By examining these aspects, the study seeks to identify gaps in safety culture and propose actionable recommendations to enhance OHS performance in the refinery industry [12]. Even though the people who work at the (NRC) in Iraq know a lot about (OHS) and consider it necessary, many still engage in dangerous practices. This means that people understand the safety rules but don't always follow them, which could put their health and safety at work in danger [13]. The problem lies in understanding why workers, despite having substantial knowledge and favorable attitudes toward OHS, do not always translate this into safe work practices [14]. This work aimed to identify the demographic distribution of the respondents' sample at the North Refineries company. Evaluate how the levels of workers' knowledge, attitudes, and practices about OHS are explain how much the workers at (NRC) know about OHS rules, procedures, and safety practices. Look into how workers feel about health and safety at work, including their perceptions of workplace safety. Identify how refinery workers respond to safety issues and determine how standard unsafe practices are. Make suggestions to make the workplace safer and prevent unsafe behavior [15].

This work aimed to identify the demographic distribution of the respondents' sample at the NRC Baiji. Evaluate how the levels of workers' knowledge, attitudes, and practices about OHS are. Explain how much the workers at NRC Baiji know about OHS rules, procedures, and safety practices. Look into how workers feel about health and safety at work, including their perceptions of workplace safety. Identify how refinery workers respond to safety issues and determine how standard unsafe practices are. Make suggestions to make the workplace safer and prevent unsafe behaviour.

2. Methodology of work

The study was a descriptive cross-sectional study done at NRC-Baiji from September 10, 2024 to September 20, 2025, around one year.

2.1. Materials

The sample number for this study is 480 employees, including 378 from different departments of (NRC). The sample was selected using simple random

sampling. Workers were asked to participate by filling out a questionnaire that the investigator explained to them in their departments. Another 102 division managers were approached to conduct a face-to-face interview at the workplace and were asked to participate by completing the interview form, as explained by the investigator. All data collected up to August 2025. The questionnaire and interview form, were translated from English into Arabic to simplify terminology and sentence structure.

2.2. Data collection

For data collection, the investigator uses two forms: a semi-structured questionnaire consisting of 40 questions, administered to 378 workers randomly selected from the (NRC), divided into four parts.

1. This part describes the demographic characteristics of the study respondents, including six questions: age, sex, department, job title, work duration, and educational level.
2. Include workers' knowledge about (OHS). Ten closed-ended questions (Yes/No) assessed the workers' understanding of work hazards and the use of PPE, with a maximum score of 10 points. Responses were scored and classified using the following thresholds: high knowledge (mean score $\geq$ 0.75), medium knowledge (0.50 < mean score > 0.75), and low knowledge (mean score $\leq$ 0.5).
3. Include workers' attitudes towards (OHS). Nine closed-ended questions (5-point Likert scale) assessed the workers' attitudes towards company policy, low, and the extent to which they engage in unsafe practices, with a maximum score of 45 points. Responses were scored and classified using the following thresholds: positive attitudes (mean score $\geq$ 3.5) and negative attitudes (mean score $\leq$ 3.5).
4. Include workers' behaviors regarding (OHS). Fifteen closed-ended questions (Yes/No) assessed workers' engagement in safe and unsafe practices, with a maximum score of 13 points.

An observational interview form consists of 28 closed- and open-ended questions to collect data from managers of 102 divisions at NRC to assess managerial knowledge, attitudes, and practices regarding (OHS), and to evaluate the workplace environment and employees' health and safety conditions. It is divided into five parts.

a) Include five closed-ended questions (Yes/No) assessing division managers' knowledge of (OHS). Responses were scored and classified using the

following thresholds: high knowledge (mean score $\geq$ 0.75), medium knowledge (0.50 < mean score > 0.75), and low knowledge (mean score $\leq$ 0.5).
b) Include five closed-ended 5-point Likert scale questions to assess division managers' attitudes regarding (OHS). Responses were scored and classified using the following thresholds: positive attitudes (mean score $\geq$ 3.5) and negative attitudes (mean score $\leq$ 3.5).
c) Include six closed-ended questions (Yes/No) to evaluate division managers' engagement in safe work behavior regarding (OHS). Responses were scored and classified using the following thresholds: safe behavior (mean score $\geq$ 0.5) and unsafe behavior (mean score $\leq$ 0.5).
d) Include six closed-ended (Yes/No) questions assessing division managers' evaluation of workplace environment and safety support at (NRC) Baiji. Responses were scored and classified using the following thresholds: safe workplace environment (mean score $\geq$ 0.5) and unsafe workplace environment (mean score $\leq$ 0.5).
e) Include four closed-ended questions (Yes/No) to demonstrate division managers' assessment of workers' health and safety conditions at (NRC). Responses were scored and classified using the following thresholds: healthy and safe (mean score $\geq$ 0.5) and unhealthy and unsafe (mean score $\leq$ 0.5).

2.3. Statistical analysis

We used version 24 of the Statistical Package for the Social Sciences (SPSS) to analyze data on knowledge, attitudes, and safety practices in (OHS). The results were shown as numbers and percentages (%), as well as average scores and standard deviations (SD).

3. Results and discussions

3.1. The effect of demographic variables of the study workers

Table 1 presents demographic variables, including age, education level, knowledge level, attitudes, and worker behaviours. Although reports indicate satisfactory working conditions and adequate equipment, and that employees have a high level of knowledge (72.49%) and positive attitudes (96.83%) towards (OHS) 46.03% of respondents still engage in unsafe behaviors at work. The study offers a comprehensive analysis of workers' demographics, knowledge, attitudes, behaviors, and perceptions regarding safety in a refinery. People are well aware of (OHS) rules, yet unsafe behaviors and health problems remain common. Most respondents were men (88.10%), and

Table 1. Frequency distribution of demographic characteristics of workers, knowledge, attitude, and behavior.

Variables	Groups	Frequency	Percentages
Gender	Male	333	88.10%
	Female	45	11.90%
	Total	378	100%
Age (years)	18–25	39	10.32%
	26–35	73	19.31%
	36–45	154	40.74%
	46–55	99	26.19%
	56 and above	13	3.44%
	Total	378	100%
Educational level	Primary	42	11.11%
	Intermediate	41	10.85%
	Secondary	48	12.70%
	Diploma	80	21.16%
	Bachelor's and above	167	44.18%
	Total	378	100%
Job duration (year)	< 1 year	20	5.29%
	1–3 years	36	9.52%
	4–6 years	23	6.09%
	7–10 years	35	9.26%
	More than 10 years	264	69.84%
	Total	378	100%
Level of knowledge	Low	26	6.88%
	Medium	78	20.63%
	High	274	72.49%
	Total	378	100%
Attitude level	Positive	366	96.83%
	Negative	12	3.17%
	Total	378	100%
Behavioral level	Safe	204	53.97%
	Unsafe	174	46.03%
	Total	378	100%

department has no female employees. The Administration department has the largest representation at 31.12%, followed closely by Safety at 24.44%. Additionally, the Maintenance department employs 20% of the women. Therefore, the oil industry need men more than women, and the women mostly employed to perform roles in general office work, public relations, and administrative and secretarial duties [17].

3.2. Knowledge overall score and subclass score

Table 2 presents workers' responses to 10 questions on their understanding of (OHS). The average scores for all questions surpassed 0.60, indicating that most participants demonstrated strong knowledge of OHS. The areas with the highest recognition included identifying workplace threats (96.30%), knowing the locations of fire extinguishers, emergency exits, and assembly points (96.30%), and understanding safety signs and labels used in the workplace (96.03%). Each of these areas achieved an average score of 0.96. Additionally, a significant number of respondents (92.30%, MS = 0.92) were aware of the company's OHS rules and procedures, while 91.80% (MS = 0.92) knew whom to contact in case of an OHS emergency. Furthermore, 84% of workers reported understanding how to use PPE correctly (MS = 0.85), and 80% stated they knew how to report an OHS incident (MS = 0.80). However, knowledge was less clear concerning the frequency of OHS training sessions (71.43%, MS = 0.71), emergency response plans for the business (66.40%, MS = 0.66), and specific hazard-related training for job activities (62.20%, MS = 0.62). These data highlight areas that require further attention. While the overall responses suggest that workers

only 11.90% were women. The majority of sample responded was male in oil and gas companies [16], with a majority aged 36–45 (40.74%). It's important to note that 72.49% of employees showed a strong understanding of OHS. Fig. 1 shows that the operations
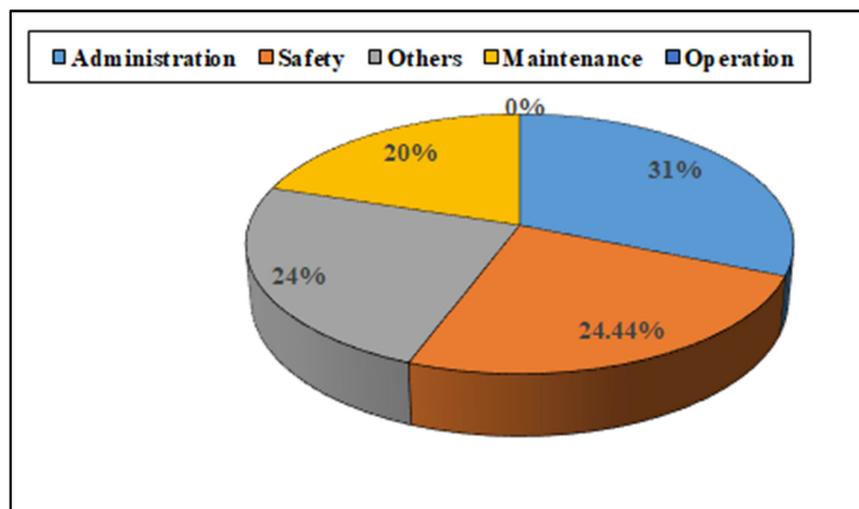

Fig. 1. Frequency distribution of female sample according to department of work.

Table 2. Knowledge questions mean score of workers.

Items	Yes		No		Mean Score	
	F	%	F	%	MS	S
How familiar are you with the company's Occupational Health and Safety (OHS) policies and procedures?	349	92.30%	29	7.70%	0.92	High
Can you identify the hazards associated with your workplace?	364	96.30%	14	3.70%	0.96	High
Do you know the location of emergency exits, fire extinguishers, and assembly points in your workplace?	364	96.30%	14	3.70%	0.96	High
Have you received training on the use of proper personal protective equipment (PPE)?	321	84.92%	57	15.08%	0.85	High
Do you understand the safety signs and labels used in your workplace?	363	96.03%	15	3.97%	0.96	High
How often does the company conduct OHS training sessions?	270	71.43%	108	28.57%	0.71	Medium
Have you been informed about the company's emergency response plan?	251	66.40%	127	33.60%	0.66	Medium
Do you know the correct procedure to report an occupational health and safety (OHS) incident?	304	80.42%	74	19.58%	0.80	High
Have you received specific training related to the hazards associated with your job tasks?	235	62.20%	143	37.80%	0.62	Medium
Do you know whom to contact in case of an OHS-related emergency at your workplace?	347	91.80%	31	8.20%	0.92	High

Table 3. Division managers' knowledge regarding occupational health and safety.

Items	Yes		No		Mean score	
	F	%	F	%	Mean	Score
Are you familiar with the occupational health and safety policies of the Northern Refineries Company?	81	79.41%	21	20.59%	0.79	High
Have you received any formal training in occupational health and safety? If yes, how often?	98	96.08%	4	3.92%	0.96	High
Are you familiar with emergency procedures in the event of an accident or work-related health incident?	96	94.12%	6	5.88%	0.94	High
Do you know the location of the nearest safety equipment (e.g., a fire extinguisher or first-aid kit) in your work area?	94	92.16%	8	7.84%	0.92	High
Can you list some potential health and safety hazards related to your role?	100	98.03	2	1.97%	0.98	High

possess considerable knowledge of OHS, additional training focused on job-specific hazards and emergencies could further enhance workplace safety. These results align with study that found the importance of training workers in the performance management of safety practices across companies [18]. Most employees are familiar with the company's OHS rules and procedures, including emergency protocols and the locations of fire extinguishers and exits. This indicates that they have a solid grasp of safety measures, which is essential for maintaining a safe workplace. However, there are some areas where people don't know enough, especially regarding how often OHS training sessions occur (71.43%) and specific job-related hazards (62.20%) [19].

Table 3 shows how much (NRC) division managers know about OHS (OHS). The managers' average scores are above 0.79, indicating satisfactory comprehension of OHS principles. The participants who scored highest (98.03%, MS = 0.98) were those who could clearly explain workplace health and safety issues. After them were people who had taken official OHS training and scored 96.08% (MS = 0.96) and people who knew what to do in case of an acci-

dent or health problem, who scored 94.12% (MS = 0.94). Furthermore, 92.16% of managers knew where to obtain safety gear, such as fire extinguishers and first-aid kits (MS = 0.92). But just 79.41% (MS = 0.79) demonstrated a proper understanding of the company's OHS guidelines. Most managers have a strong knowledge of OHS, but some may need more specific training. In general, the results indicate that division managers have a thorough understanding of OHS concerns, which is essential for being a competent safety leader and maintaining a safe workplace. However, gaining a better understanding of official policies could help individuals adhere to and monitor the rules. This finding disagree with [20].

3.3. Attitudes overall score and subclass score

Table 4: shows how workers at the (NRC) feel about (OHS) standards. The results show that most employees have a positive attitude toward workplace safety, with all mean scores above 3.38 and most above 4.00 on a 5-point scale. The belief that OHS requirements are crucial for personal safety at work received the

Table 4. Attitude questions mean score of workers.

Items	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Mean Score Mean	SD	Score
How important do you believe OHS standards are to your safety at work?	325 86.0%	46 12.2%	7 1.9%	– 0.0%	– 0.0%	4.84	0.414	Positive
Do you feel that the company prioritizes your safety and health at work?	218 57.7%	127 33.6%	28 7.4%	4 1.1%	1 0.3%	4.47	0.703	Positive
How confident are you in the effectiveness of the current OHS measures in your workplace?	203 53.7%	150 39.7%	24 6.3%	1 0.3%	– 0.0%	4.47	0.627	Positive
To what extent do you agree with the statement: "I am encouraged to report unsafe conditions or behaviors?	195 51.6%	152 40.2%	29 7.7%	2 0.5%	– 0.0%	4.43	0.657	Positive
Do you believe that management takes your feedback on OHS issues seriously?	163 43.1%	171 45.2%	40 10.6%	4 1.1%	– 0.0%	4.30	0.699	Positive
To what extent do you agree with the following statement: "Management is committed to maintaining a safe work environment"?	213 56.3%	140 37.0%	22 5.8%	3 0.8%	– 0.0%	4.49	0.644	Positive
How confident are you that you can refuse to perform unsafe work without negative consequences?	194 51.3%	128 33.9%	41 10.8%	10 2.6%	5 1.3%	4.31	0.867	Positive
How often do you feel pressured to complete tasks at the expense of safety?	95 25.1%	88 23.3%	101 26.7%	54 14.3%	40 10.6%	3.38	1.290	Positive
Do you believe that safety violations at your workplace are taken seriously and addressed effectively?	127 33.6%	197 52.1%	44 11.6%	5 1.3%	5 1.3%	4.15	0.779	Positive

Table 5. Attitudes of division managers regarding to occupational health and safety.

Items	Strongly agree	Agree	neutral	Disagree	Strongly Disagree	Mean score Mean	Score
To what extent do you agree with importance of occupational health, safety in your daily work activities?	69 67.64%	14 13.74%	10 9.80%	5 4.90%	4 3.92%	4.36	Positive
Do you think management prioritizes health and safety in the company?	54 52.94%	34 33.34%	11 10.78%	3 2.94%	0 0.00%	4.36	Positive
Do you agree that following health and safety regulations improves your work performance?	43 42.16%	40 39.22%	10 9.80%	5 4.90%	4 3.92%	4.11	Positive
How confident are you in your ability to report unsafe conditions or hazards to your supervisors?	65 63.73%	22 21.58%	10 9.80%	4 3.90%	1 0.98%	4.43	Positive
How much do you agree with the company's assessment of its efforts to enhance safety culture within the refinery?	66 64.71%	24 23.53%	8 7.84%	3 2.94%	1 0.98%	4.80	Positive

highest score (mean = 4.84, SD = 0.414), with 98.2% of workers either strongly agreeing or agreeing. Following this, beliefs about management's commitment to ensuring a safe workplace scored highly (mean = 4.49, SD = 0.644), along with confidence in the effectiveness of current OHS measures (mean = 4.47, SD = 0.627). Employees also reported that the company cares about their health and safety (mean = 4.47, SD = 0.703) and encourages them to report unsafe conditions (mean = 4.43, SD = 0.657). Additionally, a majority of respondents agreed that management takes OHS feedback seriously (mean = 4.30, SD = 0.699) and that they could refuse risky work without facing repercussions (mean = 4.31, SD = 0.867). The mean score of 3.38 (SD = 1.290) was the lowest, but it still showed a positive feeling. This was because people felt pressured to finish tasks at the expense of safety. This data indicates that, although attitudes towards safety are predominantly positive, a significant number of workers encounter conflicting demands between productivity and safety regulations. The results show that the workers have a strong safety culture because they trust that management is committed to safety and that the current procedures work. Dealing with workload pressures that put safety at risk could make this positive culture even stronger. All these findings make the workers have a high level of Knowledge. Attitudes towards OHS were overwhelmingly positive, with most respondents strongly agreeing that OHS standards are crucial for their personal safety (mean = 4.84). Workers expressed confidence in the company's commitment to safety, with 96.83% holding a positive view of their employer's efforts. However, the lowest attitude score (mean = 3.38) was associated with a sense of pressure to complete tasks at the expense of safety. This satisfied outcome is agree with the finding of study [21].

Table 5 shows that most division managers thought the (OHS) rules were good enough for all five groups.

Table 6. Behavior questions mean score of workers.

Items	Yes		No		Mean Score	
	F	%	F	%	MS	S
How often do you use PPE while working?	286	75.66%	93	24.34%	0.76	Safe
Have you ever reported safety hazard or unsafe condition at work?	215	56.87%	163	43.13%	0.57	Unsafe
If yes, was the issue addressed promptly?	214	56.61%	164	43.39%	0.57	Unsafe
How frequently do you participate in safety drills (fire drills, evacuation drill)?	214	56.61%	164	43.39%	0.57	Unsafe
Do you follow the company's OHS guidelines when performing your job duties?	337	89.15%	41	10.85%	0.89	Safe
Have you ever experienced or witnessed on accident at work?	196	51.85%	182	48.15%	0.52	Unsafe
If yes, did the incident follow the proper reporting and response procedures?	201	53.17%	177	46.83%	0.53	Unsafe
Do you feel that you need additional training or resources to improve your adherence to OHS standards?	287	75.92%	91	24.08%	0.76	Safe
Have you ever refused to perform a task due to safety concerns?	162	42.86%	216	57.14%	0.43	Unsafe
How often do you remind colleagues to follow OHS procedures?	301	79.63%	77	20.37%	0.80	Safe
Have you actively participated in OHS meetings or discussions?	323	85.45%	55	14.55%	0.85	Safe
Do you feel that near-miss incidents (unsafe situations that could have caused harm) are reported correctly in your workplace?	300	79.36%	78	20.64%	0.79	Safe
If you witness an unsafe act, what action do you take?	365	96.56%	13	3.44%	0.97	Safe

The ratings ranged from 4.11 to 4.80, which is higher than the 3.0 minimum required to be polite. A lot of people agreed with the statement "The company is working to improve the refinery's safety culture," which got an average score of 4.80. This shows that they thought the management was doing everything it could to keep the workers safe. The two measures were "Confidence in reporting unsafe conditions to supervisors" (MS = 4.43) and "Agreement on the importance of OHS in daily work activities" (MS = 4.36). People believe that (OHS) is important for running a business every day and that internal reporting systems are effective. The people who answered thought that "management prioritization of health and safety" was important and gave it a score of 4.36. This proof reveals that management is concerned about safety. The statement "Following health and safety rules improves work performance" got the lowest score (MS = 4.11), but it was still good. These results align with other study [21].

3.4. Behavioral overall score and subclass mean score

Table 6 indicates that most workers felt safe in their work environment regarding (OHS). Specifically, 12 of 13 items were perceived as secure (MS > 0.50). The action of intervening when witnessing someone engaging in harmful behavior had the highest level of compliance (MS = 0.97; 96.56% of respondents affirmed this). "Following OHS guidelines when performing job duties" (MS = 0.89; 89.15% affirmative responses) and "Active participation in OHS meetings or discussions" (MS = 0.85; 85.45% affirmative responses) were closely ranked. Other effective safety practices included "Reminding coworkers to follow OHS rules" (MS = 0.80), "Accurate documentation

of near-miss incidents" (MS = 0.79), and "Regular use of PPE" (MS = 0.76). The scores for safety drills, hazard reporting, and adherence to appropriate reporting steps for accidents fell within an acceptable range (MS = 0.57, 0.52). However, these behaviors were not rated as favorably as the top responses. The only concerning behavior was "Refusing to perform a task due to safety concerns" (MS = 0.43; 57.14 %). This suggests that workers may hesitate to stop harmful activities due to fears of job loss, feelings of powerlessness, or uncertainty regarding the consequences of cessation. This finding agree with the Iranian study [22]. Overall, these results indicate that employees generally promote a positive culture of adherence to (OHS) regulations, particularly in proactively addressing safety issues and managing hazards. It is important to encourage individuals to exercise their right to refuse unsafe work. This suggests that while workers generally support safety standards, the pressure to meet production demands can undermine their commitment to OHS under tight deadlines. This conflict between productivity and safety is a key area that needs to be addressed through better management practices and more balanced workload expectations. In terms of practices, workers generally adhered closely to safety protocols [20]. A large majority of respondents (89.2%) reported following OHS guidelines during their duties, and 79.63% reminded colleagues to do the same. However, when it came to refusing unsafe work (MS = 0.43), a significant number of workers (57.14%) indicated that they would not stop unsafe tasks.

Fig. 2 illustrates the main reasons workers struggle to adhere to (OHS) rules in the workplace. The most significant issue identified is insufficient training, which hinders workers' ability to comprehend and follow safety requirements. Additionally, the lack
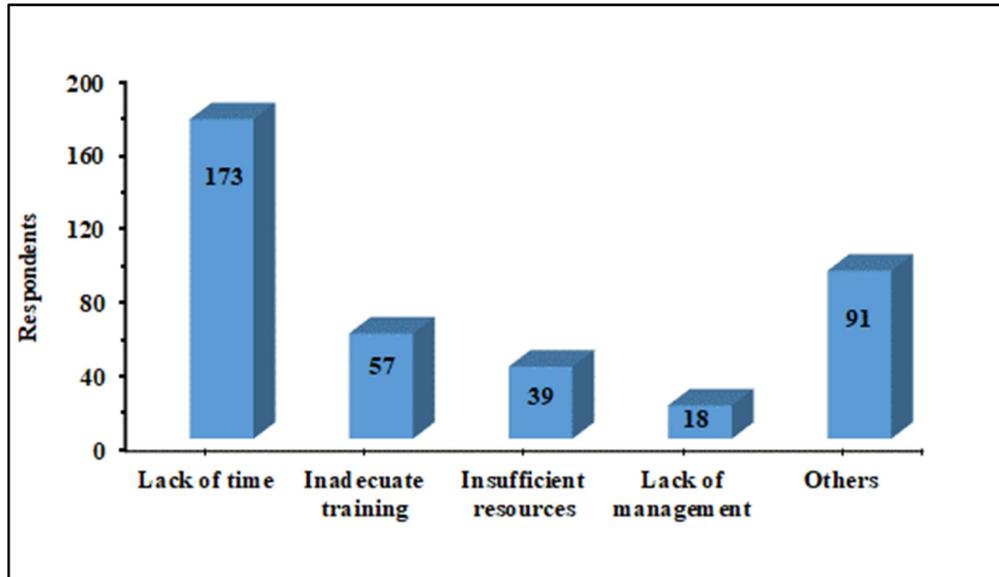
Fig. 2. Barriers preventing workers from complying with OHS standards in workplace.

Fig. 3. Additional needs of workers to adhere to OHS standards.

of safety gear and resources demonstrates that workers frequently fail to comply with OHS regulations in practical situations. Workers also tend to violate safety rules due to concerns about workload and time constraints. Furthermore, management's failure to verify or enforce guidelines indicates that supervisors are not meeting their responsibilities. Lastly, workers have voiced fears of punishment or negative repercussions for reporting hazardous conditions to others, suggesting that open discussions about safety issues may be limited in the workplace [23].

Fig. 3 illustrates the additional measures that workers indicated they needed to enhance their compliance with (OHS) regulations at work. The majority of workers emphasized that more frequent and improved safety training was the most critical requirement. This graph underscores the importance of keeping staff informed about new regulations and educating them on safe practices. Another significant need identified was for adequate, high-quality PPE. This feedback reflects concerns regarding accessibility and the effectiveness of PPE in performing daily tasks. Workers also expressed that communication between managers and employees should be more transparent. Such an improvement would enable workers to report hazards and provide timely

Table 7. Safety practices of division managers regarding OHS.

Items	Yes		No				
	F	%	F	%	Total %	Mean	Score
Do you use PPE while performing your duties?	89	87.25%	13	12.75%	100%	0.87	Safe
Have you ever encountered a situation in which you or your colleagues violated safety protocols?	21	20.59%	81	79.41%	100%	0.79	Safe
Was lack of time the reason you or your colleagues violated safety protocols at work?	11	52.38%	10	47.62%	20.59%	0.52	Unsafe
Did you participate in safety drills or emergency procedures?	93	91.18&	9	8.82%	100%	0.91	Safe
Is reporting a potential accident to the relevant party the first step to address it?	57	61.29%	36	38.71%	91.18%	0.61	Unsafe
Do you agree that adhering to OHS measures at your workplace is the guarantee of your personal safety?	85	83.33%	17	16.67%	!100%	0.83	Safe

Table 8. Workplace environmental and support.

Items	Yes		No		Mean Score		
	F	%	F	%	Mean	Total %	Score
Are you satisfied with the availability and quality of the safety equipment provided?	99	97.06%	3	2.94%	0.97	100%	Safe
Do you feel there is open communication between workers and management regarding safety issues?	98	96.08%	4	3.92%	0.96	100%	Safe
Do supervisors check or discuss compliance with safety standards with you or your team?	88	86.27%	14	13.73%	0.86	100%	Safe
Have you ever experienced or witnessed a work accident at the refinery?	44	43.14%	58	56.86%	0.57	100%	Unsafe
Does the researcher agree that the employee or his colleagues' actions were correct when they were exposed to or witnessed an accident at work?	40	90.91%	4	9.09%	0.82	43.14%	Safe
Do you believe the current safety policies and practices are adequate for your business?	92	90.20%	10	9.80%	0.90	100%	Safe

input on safety matters. Additionally, several employees urged management to demonstrate a more substantial commitment to enforcing safety regulations. To foster a culture of safety, this highlights the need for more effective leadership. Lastly, improving working conditions and increasing worker comfort could help reduce risks and promote better health [24].

When asked about adherence to (OHS) requirements, division managers responded as shown in Table 7. The results indicate that managers generally follow safety rules, suggesting a strong safety culture among supervisors. A significant majority of division managers (87.25%) reported always using PPE while on the job. The high mean score of 0.87 reflects their commitment to safe practices. Most managers (79.41%) stated that neither they nor their coworkers had violated any safety rules, indicating effective compliance with safety protocols. However, over half (52.38%) of those who admitted to breaking the rules cited insufficient time as the reason, highlighting that time constraints can hinder full adherence to safety regulations. Additionally, with a mean score of 0.91, 91.18% of individuals participated in safety drills and emergency procedures, suggesting active engagement in preparedness activities. 61% of managers believed that reporting potential accidents as the first

step demonstrated their ability to manage incidents effectively. Furthermore, 83.33% of managers felt that complying with OHS laws ensured their safety, indicating their trust in the effectiveness of safety measures. This finding is agree with suggestion in the Iranian study who found that mean score of safe behavior 30% of workers are not suitable, which can cause more occupational accidents [20].

3.5. Workplace environment safety support subclasses score

Table 8 summarizes individuals' perceptions of their occupations and the support they receive for (OHS). The findings indicate that the workplace generally cultivates a positive environment, which is essential for maintaining employee health and safety. A notably high mean score of 0.97 reflects that a significant majority (97.06%) expressed satisfaction with the company's safety equipment, indicating that the workplace is secure and well-equipped with necessary resources. Furthermore, 96.08% of respondents reported that management and employees engage in open discussions about safety concerns, supported by an average score of 0.96. Additionally, a mean score of 0.86 for supervisory oversight reveals

Table 9. Health and safety of employees.

Items	Yes		No		Mean Score	
	F	%	F	%	MS	S
Have you experienced any health problems that you believe are related to your work environment?	45	44.12%	57	55.88%	0.42	Unhealthy
Are the measures the company takes to maintain your physical and mental health at work sufficient?	86	88.31%	16	15.69%	0.84	Healthy
Have you undergone two or more occupational health screenings or health assessments at your company?	46	45.10%	56	54.90%	0.45	Unhealthy
Do you think working at the refinery affects your long-term health? Why or why not?	60	85.82%	42	41.18%	0.58	Healthy

that 86.27% of respondents have observed managers routinely checking on employees or teams to ensure compliance with safety standards, thereby enhancing safety awareness. Only 43.14% of respondents reported having either experienced or witnessed a refinery accident. However, in 90.91% of these instances, employees or coworkers deemed the responses to be appropriate (mean score = 0.82). This suggests that safety measures are effective in preventing and managing incidents. Lastly, a mean score of 0.90 indicates that most respondents (90.20%) believe the current safety rules and procedures are adequate for ensuring safety. possibly due to concerns about job security or fear of negative repercussions. This reluctance to refuse unsafe work is a critical issue that needs to be addressed by fostering an environment where workers feel supported and empowered to prioritize safety without fear of retaliation. The workplace environment was generally rated as supportive of safety, with high satisfaction regarding the availability and quality of safety equipment (mean = 0.97) and open communication between workers and management (mean = 0.96) [25].

3.6. Employees' health and safety conditions

Table 9 examines how the work environment affects employee health and how effectively the company's efforts to protect both physical and mental health are working. Approximately 44.12% of employees reported health issues they associate with their work environment, resulting in an average score of 0.42. This finding indicates that there are health problems at work, making this item unhealthy and suggesting a possible area of concern. In contrast, a substantial majority (88.31%) felt that the company's efforts to support their physical and mental health at work were adequate. A mean score of 0.84 shows that the company is doing a good job of keeping workers safe and healthy. But only 45.10% of respondents reported having had 2 or more occupational health screenings or assessments, with a mean score of 0.45. This number shows that things are not going well, which means work-related health problems need to

be checked more often and evaluated. Also, most workers (85.82%) think that working at the refinery could hurt their long-term health. However, their average score of 0.58 indicates that this is a healthy way of thinking. This awareness highlights workers' recognition of potential long-term occupational health risks, which may encourage adherence to safety protocols. However, there were concerns about insufficient health screenings (mean = 0.45), suggesting that workers may not be receiving adequate health assessments to monitor the long-term effects of their work environment. Additionally, a significant proportion of workers (44.12%) reported experiencing work-related health problems, underscoring the need for more proactive health surveillance and preventive measures.

Fig. 4 shows the leading suggestions from division managers on how to make the workplace safer and healthier for workers. We ordered the suggestions by how often people mentioned them. The most common suggestion for improvement was to give workers modern PPE. Many managers stressed the need for workers to have the latest PPE to stay safe. The second most common recommendation was to offer medical and therapeutic services, underscoring the importance of accessible health care and workplace support to address health issues promptly. Another prevalent suggestion was to increase training, reflecting the managers' recognition of the need for ongoing education and skill development to ensure compliance with safety regulations and create a safer workplace. Furthermore, the mention of current management support brings home the importance of active management involvement in health and safety initiatives. The managers also identified advanced sensors as essential technological tools for early hazard identification and accident prevention. Also, it was thought that involving workers in safety activities was important; getting employees involved in safety programs can help create a stronger safety culture. Finally, a smaller group of managers discussed the possibility of further improvements. These could include specific or localized ideas to improve workplace safety. Division managers proposed several enhancements, including
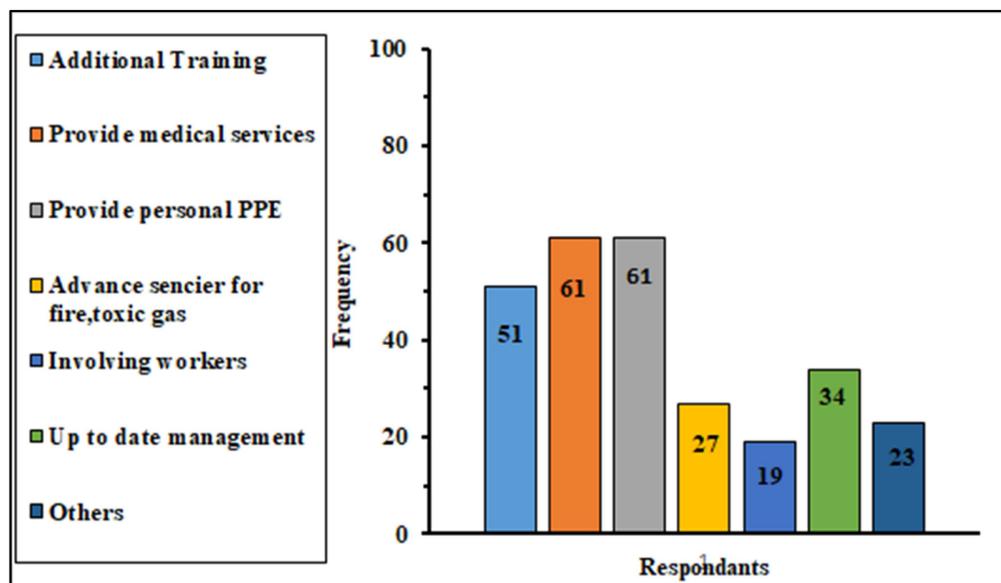
Fig. 4. Improvements suggested by division managers to improve the workplace environment.

providing modern PPE (61 responses), increasing medical services (61 responses), and conducting more frequent safety training (51 responses).

These suggestions align with the workers' needs, particularly regarding enhanced PPE and training, which were identified as critical factors in improving compliance with OHS standards. Stronger management support and employee participation in safety initiatives were also emphasized as critical to enhancing the refinery's safety culture. Lastly, the study highlights various strategies that could help mitigate or curb environmental health and safety impacts [18].

4. Conclusion

In this work assessment of knowledge, attitudes, and behaviors of workers regarding occupational health and safety at NRC has been done successfully. In conclusion, the workers are primarily male, young, and well educated and demonstrate sound knowledge and attitudes despite engaging in unsafe practices. Improve Occupational health and safety (OHS) training on specific hazards and implement a health issue follow-up protocol, including access to mental health and occupational physicians. The study reveals a generally positive safety culture within the refinery, with high levels of knowledge and positive attitudes towards OHS. However, unsafe practices, especially when it comes to refusing unsafe work, and worries about health problems associated with the workplace continue to be significant obstacles. To make workplaces even safer, it's essential to keep training

employees, improve health monitoring, and address the pressure workers feel to prioritize productivity over safety. A stronger, long-lasting safety culture, in which management and employees share a dedication to maintaining a safe and healthy workplace, will result from bolstering these areas. This work recommended to enhance workplace safety, it is crucial to increase both the frequency and depth of (OHS) training, particularly focusing on specific hazards associated with the workplace. Additionally, a follow-up protocol should be established for employees who report health issues. This protocol must include access to mental health professionals and occupational physicians, as well as comprehensive documentation of each case. Furthermore, the study strongly recommends conducting periodic assessments of workplace safety and environmental health at North Refineries Company, with the intention of extending these evaluations to other companies under the Ministry of Oil.

Conflict of interest

The author declares no conflict interest.

Ethical approval

Not applicable.

Data availability

The data will be available upon request.

Funding

Author contributions

Wesam Awad Hassn: formal analysis, validation, data duration, writing-original; Zeena N. Abdulrahman: research, administration, rewriting.

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