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THE IMPACT OF OCCUPATIONAL HEALTH AND SAFETY TRAINING ON STUDENTS' KNOWLEDGE LEVEL AND SAFETY CULTURE: A QUASI-EXPERIMENTAL STUDY

Elif Işik Demirarslan

Artvin Çoruh University, Artvin, Türkiye
Faculty of Health Sciences, Department of Occupational Health and Safety

Highlights

- Occupational health and safety (OHS) training significantly increased students' knowledge levels.
- Large effect size observed in pre–post knowledge comparison.
- Positive correlation found between OHS knowledge and safety culture.
- Safety culture perceptions differed by gender and academic discipline.
- Engineering students showed the highest safety culture scores.

Abstract

Background: This study investigates university students' occupational health and safety (OHS) knowledge levels and their perceptions of safety culture, with a particular emphasis on evaluating the effectiveness of structured OHS training. **Material and Methods:** The research was conducted with 1291 students at Artvin Çoruh University Artvin, Türkiye, using a quasi-experimental pre-test/post-test design. Data were analyzed through descriptive statistics, correlation analysis, independent samples Student's t-tests, and analysis of variance. **Results:** Students demonstrated high safety culture perceptions (mean ± standard deviation [M±SD] 4.38±0.67 on a 5-point Likert scale) but moderate OHS knowledge levels (M±SD 2.38±0.48 on a 3-point Likert scale). A positive and statistically significant correlation was found between OHS knowledge and safety culture ($r = 0.330$, $p < 0.01$). Following the training, knowledge scores increased significantly from pre-training (M±SD 24.15±5.06 pts) to post-training (M±SD 29.22±4.20 pts) with a large effect size (Cohen's $d = 1.07$, $p < 0.001$). Female students reported significantly higher safety culture perceptions than male students ($p < 0.001$). Engineering students achieved the highest safety culture scores, significantly surpassing several health-related programs ($p < 0.05$). **Conclusions:** Occupational health and safety training significantly enhances students' knowledge levels, demonstrating a strong intervention effect. Safety culture perceptions are positively associated with knowledge and vary according to gender and academic discipline. Med Pr Work Health Saf. 2026;77(3)

Key words: university students, occupational health, safety culture, occupational safety, occupational health and safety culture, occupational health and safety training

Corresponding author: Elif Işik Demirarslan, Artvin Çoruh University, Faculty of Health Sciences, Department of Occupational Health and Safety, No. 2 Livlevha St., Çayağzı Neighborhood, Merkez, Artvin 08000, Türkiye, e-mail: elif_syo@artvin.edu.tr
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INTRODUCTION

Occupational health and safety (OHS) is not merely a technical field focused on preventing occupational accidents and diseases; it is a multidimensional approach that influences employee well-being and the overall quality of life in society. Recognized as a fundamental component of organizational culture in developed countries, OHS in Turkey gained a systematic structure with the enactment of Law No. 6331 [1].

The law mandates that employers deliver occupational health and safety training to their employees, including apprentices, interns, and students. The scope and content of the training are governed by the Regulation on the Procedures and Principles of Occupational Health and Safety Training for Employees [2]. This regulation introduces individuals to the concept of OHS culture during their educational process, thereby laying the foundation for a future workplace safety culture.

The World Health Organization (WHO) and the International Labour Organization (ILO) recommend instilling OHS culture from an early age and integrating it into educational systems [3,4]. Occupational health and safety training at the university level not only imparts

knowledge but also fosters safety-oriented attitudes and behaviors. The inclusion of these courses, whether compulsory or optional, in Turkish universities and vocational schools promotes the spread of a more comprehensive safety culture across society.

Occupational health and safety culture encompasses the knowledge, attitudes, and behaviors that individuals acquire regarding healthy and safe living. This culture enables individuals to act consciously and responsibly toward risks in both their professional and daily lives. Cultivating this understanding during university education is crucial to influencing future safety-related behaviors.

According to Cooper [5], OHS culture is a system that arises from the interaction of psychological, behavioral, and situational factors that shape how people act regarding safety. The success of this system relies on each person's knowledge, which helps them identify risks, take steps to avoid them, and act safely.

Geller [6] emphasized that rules alone do not foster enduring safe behaviors; instead, individuals must actively participate in the process and perceive their value. As a result, OHS training should not only be about passing on information but also about helping people change their behavior.

Aydoğan [7] reported that OHS training provided to vocational school students enhanced their environmental health awareness and risk perception. Similarly, Demir and Yolcu [8] found that increased OHS knowledge among health sciences students led to a greater tendency toward safe behaviors, while Çil [9] demonstrated a significant improvement in OHS awareness among forestry faculty students following the training. These findings indicate that OHS training facilitates both cognitive and behavioral transformation [8,9].

Occupational health and safety training offered to university students transcends regulatory requirements; it is a strategic initiative aimed at improving individuals' risk awareness, safe practices, and professional consciousness. This training helps create a culture of personal safety by giving students both academic and practical knowledge. Occupational health and safety courses at universities are designed in compliance with legal regulations, and the training acquired within this framework may, at the employer's discretion, be recognized as equivalent to the mandatory basic training required prior to employment [2].

University-level OHS education enhances knowledge and promotes the development of a safety culture. Ahsan et al. [10] found that values, attitudes, and risk perception substantially influence safe behaviors in higher education students. This finding highlights the capacity of OHS education to drive cultural transformation beyond the mere dissemination of knowledge [10].

Implementing the Regulation on the Procedures and Principles of Occupational Health and Safety Training for Employees at the university level enhances technical knowledge and fosters safety-oriented attitudes and behaviors among students, thereby promoting a safety culture within educational institutions. Research demonstrates that OHS training improves students' knowledge and risk perception [7,8]; however, studies examining the impact of this knowledge on behavior and the development of a safety culture remain limited.

Safety culture is a broad concept that extends beyond cognitive comprehension, encompassing individuals' beliefs, attitudes, and behaviors. Research indicates that higher education students' perceptions of safety culture may be improved through training [10]; however, empirical evidence in this area remains limited. University-level studies primarily concentrate on knowledge acquisition, leaving a dearth of empirical research on safety culture. This study aims to contribute to the literature by examining the impact of OHS training on students' knowledge and their perceptions of safety culture.

MATERIAL AND METHODS

Research design and population

This study employed a one-group pre-test–post-test quasi-experimental design, which is a quantitative research method. The study population consisted of students enrolled in OHS courses provided by faculties, schools, and vocational institutions at Artvin Çoruh University (Türkiye) during the autumn, spring, or both semesters of the 2023–2024 academic year. The total number of students enrolled in these courses was 1408.

Sample

A total of 1408 students were enrolled in the course throughout the fall and spring semesters at the university. Surveys were administered to 1300 students who voluntarily agreed to participate in the study; however, the responses of 9 students were excluded due to incorrect marking on the forms. Consequently, the analyses were conducted on data collected from 1291 participants. Since the sample represents 92% of the population, the results are highly representative.

Instruments used for data collection

Personal information form

The personal information form was developed to determine participants' demographic characteristics. The form mainly covers questions regarding participants' age, gender, educational institution, department, year of study, and academic performance.

Total safety culture general safety survey (*Safety Culture Scale*)

To assess students' perceptions of safety culture, a 17-item safety culture questionnaire was employed. The questionnaire was based on an instrument previously used in a study conducted with students taking an OHS course [11]. The conceptual framework of safety culture in this study was informed by Geller's total safety culture approach, which emphasizes the interaction between individual attitudes, safe behaviors, and organizational environment [6]. Accordingly, the items were designed to capture students' general safety perceptions, attitudes toward safe behaviors, and safety awareness. All items were measured using a 5-point Likert scale ranging from 1 – "strongly disagree" to 5 – "strongly agree."

Occupational health and safety knowledge survey (*OHS Knowledge Scale*)

An 11-item OHS knowledge questionnaire was used to assess students' level of OHS knowledge. The questionnaire was prepared in line with the content and learning outcomes of the OHS course and was based on instruments previously used in studies conducted with student samples [11]. Rather than representing a standardized psychometric scale, the questionnaire was designed to evaluate students' basic knowledge of key OHS concepts. Responses were obtained using a 3-point Likert-type scale ranging from 1 – "disagree" to 3 – "agree." The total score ranged 11–33, with higher scores indicating a higher level of OHS knowledge.

Data collection procedure

Data were collected through face-to-face surveys administered at the beginning (pre-test) and at the end (post-test) of the courses during the fall and spring semesters. The same questionnaires were administered to all students, enabling a comparative evaluation of the impact of the training process on students' OHS knowledge levels and perceptions of safety culture.

Training content and standards

The content of the OHS course was developed in accordance with Law No. 6331 on OHS and the Regulation on the Procedures and Principles of Occupational Health and Safety Training for Employees [2]. This regulation emphasizes that training should not be limited to technical practices provided solely by employers; it should also include content aimed at instilling general health and safety awareness in prospective employees, such as students who have not yet entered the workforce. Topics covered in the training include labor legislation, occupational diseases and prevention methods, physical and chemical risk factors, emergency procedures, use of personal protective equipment, and safety culture [2].

While core topics remained consistent across departments, certain content was adapted to the specific needs of each academic program. This approach allowed for content variation at the departmental level while maintaining curricular consistency across the institution.

Data analysis

Statistical analyses were performed using IBM SPSS Statistics, v. 24 (IBM Corp., Armonk, NY, USA). The fact that these values fell within ±1 indicated that the dataset met the assumption of normality [12]. The internal consistency of the scales was assessed using Cronbach's α, yielding 0.893 for the *OHS Knowledge Scale* and 0.951 for the *Safety Culture Scale*, indicating high reliability [13].

To examine the relationships between variables, Pearson correlation analysis was performed. To determine the effect of training on OHS knowledge levels, an independent samples t-test was conducted. The effect size was calculated as Cohen's d = 1.07, which was interpreted as a significant effect [14].

The *Safety Culture Scale* was administered as a single measurement across the whole sample. To examine differences between groups, independent samples t-tests and one-way analysis of variance (ANOVA) were employed.

All analyses met the assumptions of parametric testing, and the results were statistically significant and methodologically robust. The analysis process enabled a comprehensive evaluation of students' knowledge levels and perceptions of safety culture, in relation to training, demographic characteristics, and differences across academic departments.

RESULTS

The results of the study are presented below. Table 1 presents the sample of the study, which consists of a total of 1291 students. An examination of the age distribution reveals that the majority of participants were

Table 1. Sociodemographic and educational characteristics of students enrolled in occupational health and safety courses at Artvin Çoruh University, 2023–2024 academic year,Türkiye

Variable	Participants (N =1291)	
	n	%
Sociodemographic		
age		
17–19 years	470	36.4
20–22 years	717	55.5
≥23 years	104	8.0
gender		
female	883	68.4
male	408	31.6
Educational		
academic year level		
first year student	815	63.1
second year student	471	36.5
third year student	4	0.3
fourth year student	1	0.1
faculty/vocational school		
Faculty of Health Sciences	61	4.7
Vocational School of Health Services	737	57.1
Artvin Vocational School	265	20.5
Borçka Vocational School	27	2.1
Faculty of Forestry	60	4.6
Faculty of Engineering	16	1.2
Yusufeli Vocational School	51	4.0
Şavşat Vocational School	31	2.4
Faculty of Tourism	43	3.3
department		
Computer Engineering	61	4.7
Physiotherapy	27	2.1
Occupational Therapy	108	8.4
Electrical and Electronics Engineering	41	3.2
Psychology	69	5.3
Elderly Care Services	135	10.5
Oral and Dental Health Services	45	3.5
Emergency and First Aid	43	3.3
Forest Engineering	27	2.1
Home Patient Care	61	4.7
Medical Documentation and Secretariat	74	5.7
Emergency and Disaster Management	40	3.1
Culinary Arts	8	0.6
Civil Defense	127	9.8
Medical Laboratory Techniques	85	6.6
Educational – cont.		
department – cont.		
Gastronomy	289	22.4
Automation Technology	61	4.7
Disabled Care and Rehabilitation	51	4.0
academic achievement		
very good	210	16.3
good	654	50.7
moderate	402	31.1
poor	25	1.9
occupational health and safety training status		
yes	556	43.1
no	735	56.9

in the 20–22 age group (N = 717, 55.5%), followed by those aged 17–19 years (N = 470, 36.4%). Participants aged ≥23 years constituted a smaller portion of the sample (N = 104, 8.0%).

The students were mostly female (N = 883, 68.4%), with fewer males (N = 408, 31.6%). Most participants were in their first year (N = 815, 63.1%) or second year (N = 471, 36.5%). Only a few were in their third (N = 4, 0.3%) or fourth year (N = 1, 0.1%).

When the distribution by faculty and vocational school is examined, more than half of the participants were from the Vocational School of Health Services (N = 737, 57.1%), followed by Artvin Vocational School (N = 265, 20.5%), the Faculty of Health Sciences (N = 61, 4.7%), the Faculty of Forestry (N = 60, 4.6%), and other faculties/vocational schools with lower representation.

The Department of Gastronomy recorded the largest share at 22.4% (N = 289). Elderly Care Services came in at 10.5% (N = 135). Civil Defense reached 9.8% (N = 127), a figure that sat just beneath it and carried a similar weight in the distribution. Occupational Therapy reached 8.4% (N = 108). Other departments from engineering, health sciences, and several service fields appeared in smaller proportions, drifting through the sample with lighter representation.

An examination of perceived academic achievement revealed that more than half of the participants rated their academic performance as "good" (N = 654, 50.7%). Additionally, 31.1% (N = 402) rated their achievement as "moderate," 16.3% (N = 210) as "very good," and only 1.9% (N = 25) as "poor."

Table 2. Descriptive statistics, reliability coefficients, and Pearson correlations between occupational health and safety (OHS) knowledge and safety culture among students enrolled in OHS courses at Artvin Çoruh University, 2023–2024 academic year, 1291 students, Türkiye

Variable	M	SD	Skewness	Kurtosis	Pearson's r correlation	
					1	2
1. OHS knowledge level	2.38	0.48	0.765	–0.896	0.893[a]	0.330*
2. Safety culture	4.38	0.67	0.698	–0.123		0.951[a]

[a] Cronbach's α coefficients.
* $p < 0.01$.

Table 3. Comparison of pre-training and post-training occupational health and safety (OHS) knowledge scores among students enrolled in OHS courses at Artvin Çoruh University, 2023–2024 academic year: independent samples t-test results and effect size, Türkiye

Variable	Participants (N = 1291) [n]	M	SD	t	df	p	Cohen's d
OHS knowledge							**1.07**
pre-training group	748	24.15	5.06				
post-training group	543	29.22	4.20	–19.07	1289	<0.001	

The pre-training group and the post-training group were treated as independent samples. Since the distributional characteristics were assumed to be normal, an independent samples t-test was conducted. The effect size was calculated using Cohen's d coefficient.
The bolded value is statistically significant.

Table 4. Comparison of safety culture scores according to binary categorical variables among students enrolled in occupational health and safety (OHS) courses at Artvin Çoruh University, 2023–2024 academic year: independent samples t-test results, Türkiye

Variable	Participants (N = 1291) [n]	M	SD	t	df	p
Gender						
female	883	4.43	0.60	4.57	1288	**0.000**
male	408	4.25	0.78			
Previous OHS training						
yes	556	4.42	0.65	1.88	1288	0.058
no	735	4.34	0.68			

Independent samples t-tests were conducted for variables with 2 categories.
The bolded result is statistically significant ($p < 0.05$).

Regarding the status of receiving OHS training, 56.9% of the participants (N = 735) reported that they had never received any prior OHS training, whereas 43.1% (N = 556) indicated that they had received such training at least once.

Descriptive statistics related to the variables used in the study indicate that students' mean OHS knowledge level was mean ± standard deviation (M±SD) 2.38±0.48 on a 3-point Likert scale, while their perception of safety culture was considerably higher, with a mean score of M±SD 4.38±0.67 on a 5-point Likert scale. Table 2 presents the descriptive statistics and correlation coefficients for the variables. A positive and statistically significant relationship was found between OHS knowledge level and safety culture ($r = 0.330$, $p < 0.01$).

As shown in Table 3, the mean OHS knowledge score of the pre-training group was 24.15 (SD = 5.06), while this value increased to 29.22 (SD = 4.20) in the post-training group. A comparison of the 2 independent groups revealed a clear and statistically significant difference, $t(1289) = –19.07$, $p < 0.001$. To assess the magnitude of this difference, Cohen's d was calculated as 1.07, indicating a strong effect according to Cohen's classification [13]. Based on Table 3, it can be concluded that students demonstrated a clear improvement in their knowledge following the OHS training.

Table 4 examines whether students' safety culture scores, measured on a 5-point Likert scale, differ significantly based on binary categorical variables. According to the independent-samples t-test by gender, fe-

Table 5. Analysis of variance (ANOVA) results for safety culture scores according to selected socio-demographic and educational characteristics among students enrolled in OHS courses at Artvin Çoruh University, 2023–2024 academic year (N = 1291), Türkiye

Variable	F	df	p	Post-hoc (Tukey HSD)
Age distribution	0.936	2	0.392	–
Year of study	0.608	2	0.610	–
Academic achievement	0.661	8	0.726	–
Department	2.746	16	0.001	Electrical and Electronic Engineering > Occupational Therapy 0.033 Electrical and Electronic Engineering > Oral and Dental Health Services 0.013 Electrical and Electronic Engineering > Emergency and First Aid 0.011
Faculty/Vocational school	0.661	8	0.726	–

F – F statistic, df – degrees of freedom, HSD – honestly significant difference.
One-way ANOVA was conducted for variables containing >2 categories. Tukey's HSD *post-hoc* comparisons were performed only for variables showing a statistically significant omnibus ANOVA result. No post-hoc analyses were conducted for non-significant ANOVA results.

male students had significantly higher safety culture scores (M±SD 4.438±0.601) than male students (M±SD 4.256±0.783), $t(1288) = -4.578$, $p < 0.001$.

In the analysis based on previous OHS training status, students who had received training scored higher (M±SD 4.420±0.651) than those who had not (M±SD 4.349±0.684); however, this difference was not statistically significant, $t(1286) = 1.885$, $p = 0.058$.

Table 5 shows that the average OHS knowledge score was 2.3893 on a 3-point Likert scale, whereas the average safety culture score was 4.380 on a 5-point Likert scale. For both measures, skewness and kurtosis remained within the range of –1–1, suggesting a normal distribution. Reliability analysis yielded Cronbach's α of 0.893 and 0.951, indicating good internal reliability. Moreover, a noticeable positive link emerged between OHS knowledge and safety culture ($r = 0.330$, $p < 0.01$).

DISCUSSION

This research examined the effects of OHS training on students' understanding of OHS and their attitudes toward workplace safety. The results indicate that while most participants expressed positive views regarding safety practices, their actual OHS knowledge levels were only average (Table 2). For the OHS knowledge measure, the skewness was 0.765 and kurtosis was –0.896; similarly, the safety culture scores yielded a skewness of 0.698 and kurtosis of –0.123. As all values fall within the ±1 range, both distributions can be considered approx. normal [12], indicating that the use of parametric methods is appropriate.

Although the increase in students' OHS knowledge after training is an expected finding, this result should not be interpreted as the sole contribution of the study. Previous studies have also emphasized the relationship between OHS education, students' knowledge levels, and safety culture [11,15,16]. However, the present study extends this evidence by evaluating face-to-face OHS training together with students' safety culture perceptions using both pre-test and post-test measurements. Therefore, the contribution of this study lies not only in demonstrating knowledge improvement, but also in examining whether OHS education is associated with changes in safety culture perceptions before students enter professional life.

The Cronbach's α showed strong internal consistency – 0.893 for the *OHS Knowledge Scale*, while the *Safety Culture Scale* reached 0.951. Since these figures go beyond the standard cutoff of 0.80, reliability appears solid [13]. This implies the tools used delivered stable results; their data can be considered dependable.

An examination of the correlation analysis revealed a positive and statistically significant relationship between OHS knowledge and safety culture ($r = 0.33$, $p < 0.01$). The moderate strength of this correlation indicates that students with higher levels of OHS knowledge tend to exhibit stronger perceptions of safety culture. This finding is consistent with prior research suggesting that safety culture is associated with knowledge, awareness, and behavioral tendencies [17,18].

The relatively high levels of perceived safety culture observed among students may be attributed to the internalization of safety norms at both organizational and societal levels. This implies that OHS awareness initiatives implemented within university settings may influence not only individual knowledge but also broader collective attitudes.

The present study demonstrates that OHS training has a highly significant impact on students' knowledge levels. The enormous effect size (Cohen's $d = 1.07$) suggests that the training contributed not only to short-term

recall but also to lasting cognitive learning. This indicates that, when implemented with appropriate methods and content, OHS training can substantially strengthen students' foundational knowledge in OHS.

Similarly, previous studies have shown that university-level OHS education significantly improves knowledge levels. In 1 study, a significant increase in students' knowledge was observed following completion of an OHS course, and this effect extended partially to safety awareness as well [11]. Likewise, a systematic review by Odu et al. [19] identified knowledge-based intervention programs as one of the most effective approaches for enhancing workplace safety culture. In another study, safety training provided in technical education institutions was found to significantly improve both instructors' knowledge and safety behaviors, with knowledge gains directly associated with increased safety awareness [20].

The findings of the present study are consistent with the existing literature and further support the conclusion that OHS training has a substantial impact – both statistically and practically – on improving knowledge and promoting safety-related competencies.

The substantial impact of the training indicates the material was organized to aid understanding, so learners could grasp knowledge while embedding it into a proper context – rather than just memorizing facts. Research shows safety training works best when learning is supported by activities that build routine actions [21]. Therefore, these findings indicate that OHS training at the university level serves not merely as a vehicle for information transfer but also as an effective tool for fostering lasting safety awareness and cultivating a culture of safety.

The findings of this study (Table 4) indicate that female students reported higher perceptions of safety culture compared to male students. This result aligns with existing literature suggesting that women tend to exhibit stronger risk perception and greater tendencies toward safe behavior. For instance, a study conducted by Gao et al. [22] found that female students demonstrated more positive safety beliefs and behaviors than their male counterparts. Similarly, in a study within the manufacturing sector, Zakaria et al. [23] reported that female workers showed greater adherence to safety protocols and higher levels of safety awareness.

This difference may be explained by the influence of gender roles on risk perception. Women are generally more inclined to avoid risk, make cautious decisions, and prioritize safety [24]. Therefore, the higher safety culture scores among female students may be associated with their greater tendency to internalize safe behavior norms.

Although the difference in safety culture scores by previous OHS training was not statistically significant, the direction of the mean scores suggests a positive trend, suggesting that training may have a favorable influence on safety culture. This finding is consistent with the systematic review conducted by Odu et al. [19], which emphasized that while safety training significantly improves knowledge levels, cultural and behavioral changes tend to emerge only through longer-term interventions. This suggests that although short-term training may enhance knowledge, developing a robust safety culture requires sustained, continuous educational processes.

Moreover, as shown in Table 5, students' safety culture scores did not differ significantly by age, year of study, academic achievement, or faculty. This result indicates that safety culture is more closely associated with educational and environmental factors than with individual or demographic variables. Similar findings have been reported in studies conducted in Türkiye, where variables such as age and gender were not found to be decisive in shaping safety culture; instead, differences were attributed to the educational process and safety awareness practices [15,25]. These findings highlight the importance of organizational awareness and educational policy over personal characteristics in the development of safety culture.

In contrast, a statistically significant difference was observed across academic departments. Students in the Department of Electrical and Electronics Engineering had significantly higher safety culture scores compared to those in Occupational Therapy, Oral and Dental Health, and Emergency and Disaster Management. This can be explained by the nature of technical and engineering disciplines, in which education is more directly integrated with risk management, safety procedures, and hands-on learning. Supporting this, a study conducted in Türkiye reported that students enrolled in technical programs had significantly higher levels of occupational safety awareness than students in social science programs, a difference attributed to curriculum structure and the emphasis on practical courses [16].

This finding is further supported by international literature. For instance, Makhtar et al. [20] found that technical teacher candidates' safety knowledge and behavior improved through direct experience in applied training. Similarly, Gao et al. [22] reported that engi-

neering students scored higher on safety culture than students in health and social sciences. These studies clearly demonstrate that disciplinary differences play a critical role in shaping safety culture. The safety culture literature also emphasizes that academic disciplines may differ in risk perception and safety-related behaviors. One study noted that core elements of safety culture – such as perception, values, and behavior patterns – vary across sectors, highlighting the need for discipline-specific safety education strategies [26]. In line with this, research by Neupane and Hamzeh [27] showed that safety culture levels across professional groups differ based on job characteristics, hazard levels, and the mode of information delivery.

The department-based differences identified in this study suggest that the field of study, curriculum content, and the extent of practical training significantly influence the development of safety culture. While safety tends to be an inherent component of education in technical disciplines, in social and health sciences, such awareness is often acquired through more indirect means.

Therefore, initiatives aimed at strengthening safety culture at universities should be planned not only at the course level but also at the departmental and faculty policy levels. Such a comprehensive approach can support students in internalizing safe behaviors during their professional development and contribute to the sustainable integration of institutional safety culture.

CONCLUSIONS

This study examined university students' levels of OHS knowledge and their perceptions of safety culture. Based on the findings, the following conclusions were drawn:

- students demonstrated a high level of safety culture perception, while their OHS knowledge was moderate;
- a positive and statistically significant relationship was identified between OHS knowledge and safety culture;
- OHS training significantly improved students' knowledge levels;
- a significant difference in safety culture scores was found by gender: female students had higher perceptions of safety culture than male students;
- significant differences were also observed across academic departments;
- no statistically significant differences were found in age, year of study, faculty, or perceived academic achievement.

In line with these findings, the following recommendations are proposed:

- OHS education should be made mandatory and practice-oriented across all departments. It is recommended that safety training be systematically integrated into the curricula of not only technical disciplines but also social sciences and health-related programs;
- training programs should be reinforced with practical components. Laboratory activities, simulations, and case-based learning methods may enhance the long-term retention of safety knowledge.

The findings indicate that face-to-face OHS training improved students' OHS knowledge levels. However, the significance of this study lies not only in confirming this expected educational outcome, but also in evaluating safety culture perceptions together with knowledge levels through a pre-test and post-test design. Therefore, OHS education should be considered not only as a means of transferring technical knowledge, but also as a process that may contribute to the development of safety awareness and safety culture among students before they enter professional life.

AI USE

Artificial intelligence was used solely to correct sentences and assist with the translation.

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REFERENCES

1. Republic of Türkiye Ministry of Labour and Social Security. Occupational Health and Safety Law No. 6331. Off Gaz Repub Türk. 2012 Jun 30;28339.
2. Republic of Türkiye Ministry of Labour and Social Security. Regulation on the procedures and principles of occupational health and safety training for employees. Off Gaz Repub Türk. 2013 May 15;28648.
3. International Labour Organization. Safety and health at work [Internet]. Geneva: ILO; 2023 [cited 2026 Feb 26]. Available from: https://www.ilo.org/global/topics/safety-and-health-at-work/lang–en/index.html.
4. World Health Organization. Occupational health: health workers [Internet]. Geneva: WHO; 2022 [cited 2026 Feb 26]. Available from: https://www.who.int/news-room/fact-sheets/detail/occupational-health–health-workers.

5. Cooper MD. Towards a model of safety culture. Saf Sci. 2000;36(2):111–36. https://doi.org/10.1016/S0925-7535(00)00035-7.
6. Geller ES. Ten principles for achieving a total safety culture. Prof Saf. 1994;39(9):18–24.
7. Aydoğan Z. Meslek yüksekokulu öğrencilerinin iş sağlığı ve güvenliği eğitimleri ve bu eğitimin çevre sağlığı farkındalığına etkisi. İstanbul Aydın Üniv Sos Bilim Derg. 2021;13(1):261–84. https://doi.org/10.17932/IAU.IAUD.2757.7252. Turkish.
8. Demir F, Yolcu S. Assessment of knowledge levels of nursing and midwifery students on occupational health and safety. J Health Nurs Manag. 2024;11(3):475–85. https://doi.org/10.54304/SHYD.2024.70707.
9. Çil M, Gedik T. Orman Fakültesi öğrencilerinin iş sağlığı ve güvenliği konusunda farkındalıklarının analizi (Düzce Üniversitesi). Artvin Çoruh Üniv Orman Fak Derg. 2024;25(2):178–83. https://doi.org/10.17474/artvinofd.1538192. Turkish.
10. Ahsan AHM, Hasan MK, Rumi MH, Ahmed T, Aunto TK. Students' safety culture at tertiary level academic institutes in Bangladesh: a cross-sectional study. Heliyon. 2024;10(22):e40155. https://doi.org/10.1016/j.heliyon.2024.e40155.
11. Olcay ZF, Temur S, Sakalli AE. A research on the knowledge level and safety culture of students taking occupational health and safety course. Cypriot J Educ Sci. 2021;16(1):187–200. https://doi.org/10.18844/cjes.v16i1.5519.
12. Tabachnick BG, Fidell LS. Using multivariate statistics. 7th ed. Boston: Pearson; 2019.
13. Cohen J. Statistical power analysis for the behavioral sciences. 2nd ed. Hillsdale (NJ): Lawrence Erlbaum Associates; 1988.
14. Nunnally JC, Bernstein IH. Psychometric theory. 3rd ed. New York: McGraw-Hill; 1994.
15. Güler M, Derin KH, Şahin L. İş sağlığı ve güvenliği kültürü eğitim ilişkisi. İş ve Hayat Derg. 2018;4(8):311–48. Turkish.
16. Topgül S, Alan Ç. Öğrencilerin iş güvenliği ve iş güvenliği eğitimi algısının değerlendirilmesi. Süleyman Demirel Üniv İktisadi ve İdari Bilimler Fak Derg. 2017;22(2):587–98. Turkish.
17. Clarke S. Safety leadership: a meta-analytic review of transformational and transactional leadership styles as antecedents of safety behaviours. J Occup Organ Psychol. 2013;86(1):22–49. https://doi.org/10.1111/j.2044-8325.2012.02064.x.
18. Fernández-Muñiz B, Montes-Peón JM, Vázquez-Ordás CJ. Safety culture: analysis of the causal relationships between its key dimensions. J Saf Res. 2007;36(6):627–41. https://doi.org/10.1016/j.jsr.2007.09.001.
19. Odu JO, Hamedon TR, Mahmud A, Baharudin MR. Systematic review of intervention programs to improve the level of knowledge, attitude, and practices towards work safety culture among office workers. Malays J Med Health Sci. 2023;19(1):263–71. https://doi.org/10.47836/mjmhs.19.1.34.
20. Makhtar N, Parasuraman B, Zakaria M, Ismail A, Satrya A. Determining factors on technical instructors' safety culture using structural analysis approach. J Kejuruteraan SI. 2019;2(1):35–43. https://doi.org/10.17576/jkukm-2019-si2(1)-05.
21. Kiyantaj R. Ramezani A, Amrolahi N. Knowledge management as a tool to enhance the safety culture in organizations. Iran Occup Health. 2019;16(5):1–13.
22. Gao S, Chang C, Ren F, Yu F. Safety culture measurement among Chinese undergraduates at a private university: development and validation. Front Public Health. 2022;10:825106. https://doi.org/10.3389/fpubh.2022.825106.
23. Zakaria J, Che Hassan CR, Hamid MD, Sukadarin EH, Razak Z. Safety culture level among workers in the selected manufacturing plant. IOP Conf Ser Mater Sci Eng. 2020;778(1):012153. https://doi.org/10.1088/1757-899X/778/1/012153.
24. Harahap AS, Cahaya YF. Literature review of factors affecting occupational safety culture. Dinasti Int J Manag Sci. 2025;6(4):1108–19. https://doi.org/10.38035/dijms.v6i4.4397.
25. Birdişli F. A research on security culture: Security perception of Kahramanmaraş Sütçü İmam university students. J Int Soc Res. 2016;9(43):641–55.
26. Erdoğan E, Genç KG. Güvenlik kültürü modellerinin karşilaştirilmasi Güvenlik kültürü modellerinin karşılaştırılması. In: Selek Öz, editor. Çalışma Ekonomisi ve Endüstri İlişkileri Seçme Yazılar. Sakarya: Değişim;2021. p. 147–83. Turkish.
27. Neupane P, Hamzeh F. Safety culture in construction industry of Nepal. In: Proceedings of the 31st Annual Conference of the International Group for Lean Construction (IGLC31); 2023 Jun 26–Jul 2; Lille, France. p. 365–376. https://doi.org/10.24928/2023/0114.

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