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Evaluation of Occupational Safety Culture and Awareness Among Vocational and Technical High School Students

Mesleki ve Teknik Anadolu Lisesi Öğrencilerinde İş Güvenliği Kültürü ve Farkındalığının Değerlendirilmesi

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ABSTRACT

The aim of this study is to evaluate the occupational safety culture and awareness of students enrolled in the 2022-2023 academic year at 44 Vocational and Technical High Schools (VTHS) in Samsun province. The research method is descriptive and cross-sectional, as it analyzes the data of variables collected from a group of people at a specific point in time. The study population consists of students attending VTHS in Samsun province. A simple random sampling method was used to survey 9,517 students in grades 9-12 across 44 VTHS in Samsun. Descriptive statistical methods (mean, standard deviation, frequency, etc.) and tests that allow comparisons between independent variables (T-test, ANOVA test, etc.) were used to evaluate the data. The analysis revealed that approximately 60% of the students scored 50 or below on the test measuring their occupational safety knowledge level. When examining the average responses of students to statements regarding occupational safety culture by school, statistically significant differences were found between the schools. Evaluating by grade level, it was found that 12th-grade students had higher averages compared to other grades. In terms of gender, it was determined that female students had higher average responses to occupational safety culture statements compared to male students. Occupational Health and Safety (OHS) is a critical area of social policy that directly impacts public health. It is essential for students to develop an OHS culture before entering the workforce. In this context, it is recommended that OHS training be made mandatory in vocational education institutions.

Keywords: Occupational Health and Safety Culture, Occupational Safety Awareness, Social Policy, Vocational and Technical High Schools, Field Research

ÖZ

Bu çalışmanın amacı, Samsun ilinde bulunan 44 adet Mesleki ve Teknik Anadolu Lisesinde 2022-2023 eğitim-öğretim döneminde kayıtlı öğrencilerin iş güvenliği kültürü ve bilincini değerlendirmektir. Araştırmanın yöntemi, belirli bir zamanda belirli bir noktada toplanan değişkenlerin verilerini bir grup insan üzerinde analiz eden bir gözlemsel araştırma olduğu için betimleyici ve kesitsel bir araştırmadır. Çalışmanın evrenini Samsun ilindeki Mesleki ve Teknik Anadolu Liselerine (MTAL) devam eden öğrenciler oluşturmaktadır. Samsun ilindeki 44 MTAL'de 9-10-11-12. sınıflarda öğrenim gören 9.517 öğrenciye basit tesadüfi örneklem yöntemi ile anket uygulanmıştır. Verileri değerlendirilirken bağımsız değişkenler arasında karşılaştırmaya olanak tanıyacak testler (T-testi, ANOVA testi vb.) ile tanımlayıcı istatistiksel metotlar (ortalama, standart sapma, frekans vb.) kullanılmıştır. Yapılan analizler sonucunda, öğrencilerin yaklaşık %60'ının iş güvenliği bilgi düzeylerini ölçen testten 50 veya daha düşük puan aldığı belirlenmiştir. Öğrencilerin iş güvenliği kültürü ifadelerine verdikleri yanıtların ortalamaları okullara göre incelendiğinde, okulların yanıt ortalamalarında istatistiksel olarak anlamlı farklılıklar bulunmuştur. Sınıflara göre değerlendirildiğinde, 12. sınıf öğrencilerinin diğer sınıflara kıyasla daha yüksek ortalamalara sahip olduğu tespit edilmiştir. Cinsiyet açısından karşılaştırıldığında ise özellikle kız öğrencilerin erkek öğrencilere kıyasla iş güvenliği kültürü ifadelerine verdikleri yanıt ortalamalarının daha yüksek olduğu belirlenmiştir. İş Sağlığı ve Güveliği (İSG) toplumsal sağlığı doğrudan etkileyen önemli bir sosyal politika alanıdır. Öğrencilerin çalışma hayatına başlamadan önce İSG kültürünü kazanmaları önemlidir. Bu kapsamda İSG eğitimlerin mesleki eğitim veren okullarda zorunlu hale getirilmesi önerilmektedir.

Anahtar Kelimeler: İş Sağlığı ve Güvenliği Kültürü, İş Güvenliği Bilinci, Sosyal Poitika, Mesleki ve Teknik Anadolu Liseleri, Alan Araştırması

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INTRODUCTION

According to the data from the International Labour Organization (ILO) in 2023, there are approximately 3 million fatal occupational accidents each year worldwide, resulting in about 8,000 deaths daily.[1] These accidents create significant social and economic problems both for workers and the society.[2] Occupational accidents are a major issue in nearly every sector, affecting the entire community both materially and morally.[3] According to the ILO, the cost of occupational accidents and diseases to national economies varies between 1.8% and 6% of GDP, with an average annual cost of 4%.[4] Morally, they inflict irreversible damage on the affected workers, their families, and the large community.[5]

In the industrial and manufacturing sectors, the variety and complexity of encountered risks make Occupational Health and Safety (OHS) measures more prominent compared to the service sector.

A significant portion of workers in the industrial and manufacturing sectors are graduates of vocational high schools. Vocational high schools train intermediate personnel who are positioned between top-level management and skilled labor in their professional lives, equipped with both theoretical knowledge and practical skills.

These schools, serving as educational institutions to train workers, continue their educational activities using a curriculum that includes both theoretical and practical components. The competencies taught encompass three areas: attitudes, knowledge, and skills. Attitudes related to practical learning are about the appropriate behaviours students exhibit while performing hands-on activities in laboratories or workshops. Occupational safety is an aspect of the attitude developed through learning in workshops. Knowledge is designed as a theoretical foundation for acquiring practical skills in workshops. Skills involve the correct application of theoretically learned information.[6] Students trained in technical fields need more than just theoretical knowledge and lecture notes; they must develop psychomotor and cognitive skills that enable them to safely operate machinery.[7]

OHS training is an integral part of vocational education and aims to foster safety habits and health awareness, and cultivate a culture of safety.[8] OHS training is crucial for reducing occupational diseases and workplace accidents, enhancing workers' self-help capabilities, and protecting workers' health and safety.[9]

The quality of OHS training received by students throughout their educational lives significantly impacts their personal safety awareness and the safety culture of the organizations they will join in the future.[10] OHS courses are crucial in creating awareness of OHS among students. This awareness, fostered through education, helps students develop a culture of prevention in their working lives.[11]

In the literature, various studies have been conducted to determine the level of OHS awareness among students at different educational levels. Izegbu et al. conducted a survey with 300 participants in two medical school laboratories in Nigeria to measure their awareness and consciousness of OHS. Their analysis revealed that 45.6% of participants ate in the laboratory, 47% used lab cabinets for storing food and cooling water, 12.6% smoked inside, and 82% did not wear masks while working in the laboratory. These results indicated that the employees' knowledge, attitudes, and perceptions regarding OHS were poor.[12]

Sarıkaya et al. (2010) conducted a survey with 240 students at Kırıkkale Vocational School using a 15-question questionnaire to explore the importance of Occupational Safety and Health in Vocational Schools. The results emphasized the importance of OHS and the necessity of offering it as a course in vocational schools before students start their professional careers.[13]

Topgül and Alan (2017) conducted a study at Tokat Gaziosmanpaşa University to measure the perception of education on OHS. They surveyed a total of 65 students, both those who had taken and those who had not taken an OHS course, using a 13-question questionnaire. The study explored the differences in knowledge and educational perception between the students who had taken the course and those who had not. The results revealed that the OHS perceptions of the students who took the course did not change, and the small sample size was cited as a reason for the inconclusive results.[14]

In another study, Özgüler and Koca (2013) assessed the knowledge levels of technician candidates regarding OHS at İnönü University Vocational School. They administered a 20-question survey to a total of 1,000 students across various programs. The findings indicated that the students lacked adequate knowledge about OHS.[15]

Bayguş (2019) investigated the knowledge levels of OHS and the frequency of accidents among 12th-grade students at a Vocational and Technical High School. The study aimed to assess their knowledge of OHS and the frequency of occupational accidents both in school and at work. The analysis found that 41.9% of the students who received OHS training had a good level of knowledge about OHS. However, 27.3% of those who had received OHS training had experienced a work-related accident. It was determined that the OHS training received by the students was insufficient on its own to prevent workplace accidents.[16]

Tong et al. (2009), in their study aimed at measuring university students' perception levels regarding OHS, concluded that students with backgrounds in natural sciences or engineering showed greater interest in OHS-related topics.[17] Similarly, Tappura et al. (2022) conducted a survey with employees from companies operating in the construction and chemical industries to investigate the relationship between safety culture and employee satisfaction. The study found that overall satisfaction with safety culture also influences employee engagement.[18]

Unlike other studies in the literature, this study was conducted across 44 Vocational and Technical High Schools located throughout Samsun province. These schools provide vocational education in various sectors, such as industry, healthcare, tourism, and others. Surveys were administered to students from a total of 37 different departments in these schools. The study is distinct from others in terms of the sample size collected and the diversity of departments included. This highlights the significance of the study in understanding the effectiveness of OHS education in Vocational High Schools. Additionally, the responses related to OHS culture were analyzed based on the demographic characteristics of the students.

MATERIAL AND METHOD

Purpose and Significance of the Research

The purpose of this study is to determine the performance and levels of OHS culture among students in vocational high schools and to identify how these factors vary according to different variables.

In Turkey, a leading cause of workplace accidents is the lack of education.[19] Many workers enter the job market straight from school without any training in occupational safety, thereby facing safety issues due to inexperience. The insufficient responsibility taken by workplaces leads to young workers facing occupational accidents and diseases. According to the occupational accident statistics published by the Social Security Institution (SSI), 12% of the accidents that occurred in 2023 involved workers aged 20 and under. Given the high rate of accidents among young workers, the importance of OHS training for high school students becomes evident. OHS training provided in vocational and technical education institutions, which graduate nearly 500,000 students annually, will play a crucial role in

fostering a safety culture in Turkey. Educating individuals on protecting, improving, and enhancing their health, and enabling them to take responsibility will positively contribute to the welfare and development of our society in the future.

In this study, we investigate the occupational safety awareness and culture among students at Vocational High Schools, which are a crucial component of our country's development.

Type of Research

This study is a descriptive and cross-sectional research conducted to assess the occupational safety culture and awareness among students registered during the 2022-2023 academic year at 44 Vocational and Technical High Schools in Samsun province. The survey model used in this research is an approach aimed at describing a current or past condition as it exists. The subject matter of the research, whether an event, individual, or object, was described in its own conditions without any intervention.

Research Population and Sample

The population of this study comprises students from Vocational and Technical High Schools (VTHS) in Samsun province. There are 19,244 students across grades 9 to 12 in 44 VTHS located in 16 districts within Samsun province.[20] A sample calculation method was utilized to select a representative sample from this population. Considering the population size, the sample size required to maintain a 99% confidence interval (α= 0.01) needs to be at least 8,925. The calculated sample size was distributed based on the student counts across these schools, and a total of 9,517 students were surveyed in this study.

Data Collection Tool

In this study, the data collection tool utilized consisted of questions developed by Alkan (2017) that have undergone reliability analyses.[21] Accordingly, the survey included 9 questions measuring students' demographic information, 10 multiple-choice questions assessing their level of OHS awareness, and 15 multiple-choice questions related to OHS culture. The survey was distributed on a voluntary basis, and the students answered the questions according to their own perceptions.

For the OHS culture-related statements, items 1, 2, 3, 4, 5, 6, 12, 13, 14, and 15 were negatively phrased, therefore, reverse coding was performed in the statistical software package. The reliability of the 15-statement scale measuring OHS culture was tested, resulting in a Cronbach's Alpha value of 0.739. A Cronbach's Alpha value above 0.60 indicates that the scale is quite reliable.[22] Based on the analysis conducted, it can be stated that the scale used to assess the students' OHS culture is highly reliable and usable.

Data Analysis

The data obtained in the study were analysed using SPSS to verify one of the prerequisites for using parametric tests, which is the assumption of normal distribution of data, skewness and kurtosis values were examined by calculating the means for each variable related to the questions. According to Tabachnick and Fidell (2013), data are considered normally distributed if skewness and kurtosis values are between -1.5 and +1.5. Accordingly, skewness and kurtosis values were analyzed for the questions related to OHS culture, and parametric tests were used in this study since all data were between -1.5 and +1.5.[23]

Descriptive statistics were used to determine the demographic characteristics of the participants and their levels of agreement with statements related to OHS culture. Parametric tests, such as the T-test and ANOVA, along with descriptive statistical methods (Count, Percent, Frequency), were utilized to determine if there were any variations in the opinions of the students based on their demographic characteristics.

Research Variables and Hypotheses

The dependent variable in this study is the students' OHS culture, measured using a scale consisting of 15 statements.

In the study, nine different independent variables were used. These variables are: Performance Level, School, Department, Grade, Gender, Previous Occupational Accidents, Previous Near Misses, Mother's Education Level, and Father's Education Level.

Nine different hypotheses were formulated based on the dependent and independent variables used in the study.

H_1: There is a significant difference in OHS culture based on students' performance levels.

H_2: There is a significant difference in OHS culture among students based on the school they attend.

H_3: There is a significant difference in OHS culture among students based on their department of study.

H_4: There is a significant difference in OHS culture among students based on their class level.

H_5: There is a significant difference in OHS culture between male and female students.

H_6: There is a significant difference in OHS culture between students who have and have not been exposed to a work accident before.

H_7: There is a significant difference in OHS culture between students who have and have not experienced a near-miss incident.

H_8: There is a significant difference in OHS culture based on the education level of students' mothers.

H_9: There is a significant difference in OHS culture based on the education level of students' fathers.

These hypotheses will guide the statistical analysis, helping to understand the factors that influence the awareness and cultural approach to occupational safety and health among vocational and technical high school students. Testing these hypotheses will provide insights into targeted areas for improving safety education and training initiatives.

Ethical Considerations

Before the study commenced, permission was secured from the Samsun Provincial Directorate of National Education. Following this, the activities during the survey application were reviewed by the Social and Human Sciences Ethics Committee at Ondokuz Mayıs University on December 30, 2022, and were unanimously approved with the decision number 2022-1094.

Additionally, research permission was obtained from the Samsun Provincial Directorate of National Education with the reference number E-27485554-606.01-46489316 on 25.03.2022.

RESULTS AND DISCUSSION

Descriptive Statistical Findings

The survey was conducted among students of 44 Vocational and Technical High Schools in Samsun province as part of the research. In the research, the minimum number of surveys to be conducted at each school was determined based on the number of students at each institution. Accordingly, the highest proportion of surveys was conducted at Atakum Vocational and Technical High School, representing 6.7% of the total with 633 surveys. This was followed by Çarşamba Vocational and Technical High School, with 602 surveys, accounting for 6.3% of the total. On the other hand, the schools with the fewest surveys conducted, based on student numbers, were Bafra Dedeli Vocational and Technical High School with only 22 surveys (0.2%) and Yıldıray Çınar Vocational and Technical High School with 0.5% of the surveys.

The surveys were evaluated by department, with the highest number of surveys conducted in the Information Technologies department, totaling 1,199 surveys (12.6% of the total surveys).

Following this, the Health Services (n=1,005), Child Development and Education (n=851), Electrical and Electronics Technology (n=818), and Accounting and Finance departments (n=729) were surveyed. Departments such as Medical Device Production (n=9), Printing Technology (n=10), Clothing Production Technology (n=14), and Ship Management and Captaincy (n=17) had the fewest surveys due to their lower prevalence in schools.

This data helps to understand the distribution and representation of survey responses across different vocational programs, highlighting areas where data may be more or less extensive. Such detailed information is crucial for interpreting the study results accurately and understanding where more focus may be needed in future research or educational improvements.

The demographic characteristics of the students who participated in the survey are summarized in Table 1. This table provides an overview of the participants' demographic information, such as gender, grade level, work accident exposure, and possibly other relevant factors.

Among the students participating in the study, 60% (n=5670) were male and 40% (n=3847)were female. An analysis of gender distribution across various departments in Vocational and Technical High Schools revealed distinct preferences:

Female students predominantly chose departments such as Child Development and Education (n=728), Health Services (n=708), Food and Beverage Services (n=439), Public Relations and Organization Services (n=215), Beauty and Hair Care Services (n=211), Fashion Design Technology (n=198), Justice (n=118), and Handicrafts and Technology (n=90).

Male students were more inclined towards departments like Information Technologies (n=962), Electrical and Electronic Technology (n=780), Accounting and Finance (n=521), Machine Technology (n=432), Motor Vehicles Technology (n=383), Construction Technology (n=306), Furniture and Interior Design (n=278), and Metal Technology (n=243).

Table 1. Number of Questionnaires by Demographic Variables

Gender	**N**	**%**	**Mother's Education**	**N**	**%**
Female	3847	40	Primary education	6740	71
Male	5670	60	High School	2218	23
Total	9517	100	Associate degree	192	2
Grade Level	**N**	**%**	License	171	2
Grade 9	2489	26	Postgraduate	196	2
Grade 10	2530	27	Total	9517	100
Grade 11	2469	26	**Father's Education**	**N**	**%**
Grade 12	2029	21	Primary education	5837	61
Total	9517	100	High School	2914	31
Work Accident Exposure	**N**	**%**	Associate Degree	224	2
Yes	1655	17	License	310	3
No.	7862	83	Postgraduate	232	2
Total	9517	100	Total	9517	100
Near Incident Exposure	**N**	**%**			
Yes	2165	23			
No.	7352	77			
Total	9517	100			

N: Number of surveys; %: Percentage

The survey showed a relatively balanced distribution across different grade levels. However, 10th grade students constituted the largest group surveyed (27%), while 12th grade students, likely due to their internships, were the least surveyed group (21%).

Regarding safety incidents, 83% of students reported they had never been involved in a work accident, while 17% had experienced such incidents. When asked about near-miss incidents, 77% of students reported they had never experienced a close call, whereas 23% indicated they had.

The educational background of students' parents was predominantly elementary school, with 71% of mothers and 61% of fathers having completed this level of education. These findings provide valuable insights into the demographic characteristics of students and their experiences with safety at work, highlighting the need for targeted occupational safety and health education that considers the specific vulnerabilities of different student groups. The significant percentage of students reporting accidents or near misses underscores the importance of enhancing safety training and awareness programs within vocational and technical schools.

Students' awareness of OHS issues was evaluated using a multiple-choice questionnaire consisting of 10 questions. In the evaluation of the questions, 10 points were awarded for each correct answer, while 0 points were given for incorrect answers. As a result of the survey, 118 students could not answer any question correctly, while 140 students answered all questions correctly. Overall, around 60% of the students got 5 or fewer correct answers, indicating that the majority of respondents have a medium to low level of OHS awareness. These results suggest significant variability in the level of OHS knowledge among students, highlighting areas where educational efforts could be intensified to improve safety awareness and practices. The data demonstrates a critical need for enhanced OHS training in vocational and technical schools, especially considering the risks associated with the technical and industrial work environments these students are preparing to enter. Table 2 shows the distribution of the answers given by the students participating in the study to the questions aimed at measuring the level of occupational safety awareness.

The question where students showed the most difficulty was related to collective protection measures in workplace safety. Specifically, the question 2 "Which of the following is not a method of collective protection to ensure the health and safety of workers?" was answered incorrectly by 75% of the students. This indicates a significant gap in understanding more complex safety measures that are crucial for protecting groups of workers.

Table 2. Distribution of Responses to OHS Awareness Questions

Score	Number of students	Percentage (%)
0	118	1,2
10	348	3,7
20	666	7,0
30	989	10,4
40	1763	18,5
50	1651	17,3
60	1236	13,0
70	1163	12,2
80	965	10,1
90	478	5,0
100	140	1,5
Total	**9517**	**100**

On a more positive note, students performed better on questions regarding personal protective equipment and safety symbols. For example: Question 3: "*Which of the following is the most important Personal Protective Equipment you should use when cleaning in a dusty working environment?*" saw a correct response rate of 65%, suggesting a good understanding of PPE usage in specific conditions. Question 5:*"Related to recognizing safety symbols, specifically asking " Which of the following definitions does the pictogram on the left represent?"* also received a correct response rate of 65%. This indicates that students are relatively better at identifying visual safety cues, which are vital for quick decision-making in hazardous situations. These results suggest significant variability in the level of OHS knowledge among students, highlighting areas where educational efforts could be intensified to improve safety awareness and practices. The data demonstrates a critical need for enhanced OHS training in vocational and technical schools, especially considering the risks associated with the technical and industrial work environments these students are preparing to enter. Table 3 shows the percentage (%) distribution of students who gave correct and incorrect answers to the safety performance level questions.

Table 3. Percentage (%) Distribution of OHS Awareness Questions

OHS Awareness Questions	Wrong Answer (%)	Correct Answer (%)
1. Which of the following is considered as a priority when planning measures against a potential hazard?	54	46
2. Which of the following is not a collective protection method to ensure the health and safety of workers?	75	25
3. Which of the following is the most important Personal Protective Equipment you should use when cleaning in a dusty working environment?	35	65
4. Which of the following is the most important Personal Protective Equipment you should use when working in noisy environments at work?	36	64
5. Which of the following definitions does the pictogram on the left represent?	35	65
6. What does the red colour sign mean to you?	58	42
7. Which is not necessary for a fire to occur?	37	63
8. Which of the following is incorrect according to the general safety precautions to be taken in machines and benches?	48	52
9. Which type of accident is more likely to occur in the absence of order?	46	54
10. Which of the following should be disinfected to ensure occupational hygiene in workplaces?	50	50

Table 4. Distribution of OHS Culture Statements

OHS Culture Statements	Strongly Disagree (%)	Disagree (%)	Undecided (%)	Agree (%)	Strongly Agree (%)	Avg.	sd.
1*. Some of the safety rules are not necessary to work safely.	6,6	6,9	17,2	24,5	44,8	3,94	1,219
2*. I think that the problems about OHS are not my problem, but the problem of the managers.	5,8	7,6	27,7	26,3	32,6	3,72	1,163
3*. I think in some cases it is necessary to take risks to get the job done.	11,4	16	25,4	21,3	25,9	3,34	1,322
4*. I think production is more important than job security.	10,5	10,6	17,2	21,2	40,5	3,71	1,365
5*. I think that what makes occupational safety practice important and widespread is the pressure to comply with the rules.	9	10,9	28,8	23,9	27,3	3,5	1,247
6*. I think that the trainings I received on OHS will not be useful in my working life.	12,9	10,8	17,6	23	35,8	3,58	1,396
7. I know how to intervene correctly and quickly in emergencies such as fire, electrical accidents, natural disasters.	8,5	15,1	26,6	25,4	24,4	3,42	1,242
8. I understand the safety rules related to my work.	5,3	12,4	18,3	28,5	35,5	3,76	1,207
9. I am able to deal with security issues in the area where I work.	8,8	13,4	26,2	27,8	23,7	3,44	1,233
10. I always follow safety rules.	5,7	13,1	25,4	24,3	31,4	3,63	1,21
11. OHS should be at every stage of life, not only in the working environment.	3,1	13	18,5	20,1	45,2	3,91	1,197
12*. Safety rules can sometimes be ignored.	10,5	11	20,8	21,6	36	3,61	1,345
13*. If no one has ever had an accident, there is no harm in working outside the rules, and it won't happen to me.	9,7	8,7	16,2	20,1	45,2	3,83	1,343
14*. I sometimes disobey OHS rules because "my friends make fun of me".	8,5	9,8	18	23,8	39,8	3,77	1,296
15*. Small jokes during work will not hurt.	9,7	9,7	17,2	21,5	41,9	3,76	1,34
Average	8,4	11,27	21,41	23,55	35,33	3,66	1,28

Avg.: Average; sd.: Standard Deviation; %: Percentage

The percentage (%) distributions of students' responses to statements related to OHS culture are given in Table 4.

According to Table 4, the overall average scores for the statements related to OHS culture are generally above the midpoint, with an average of 3.66. This indicates a moderately positive attitude toward safety among students, though this average also suggests opportunity for improvement in certain areas. Statement 3: " *I think in some cases it is necessary to take risks to get the job done.*" This statement received the lowest average response, highlighting a concerning perception among students. Approximately 52.8% of students expressed agreement or neutrality (undecided, agree, strongly agree)

with this statement. This acceptance of risk-taking as a necessity in work processes is problematic as it can lead to increased accidents and unsafe work practices. Statement 7: *"I know how to intervene correctly and quickly in emergencies such as fire, electrical accidents, natural disasters."* This statement also has one of the lowest averages, indicating significant gaps in knowledge. About 50% of students admitted they do not know how to handle emergency situations effectively.

Analysis of Variations in OHS Culture Based on Independent Variables

In the study, students were asked 9 different questions as part of the demographic data collection. The responses provided by the students regarding the demographic data and their OHS awareness were tested to determine if there was a significant relationship with their OHS culture. Within the scope of the analyses, an independent samples t-test was used to test the differences between the means of two independent groups, and a one-way ANOVA test was used to test for differences among more than two groups.

Based on these responses, students were grouped into 11 different categories ranging from 0 to 100 points. The differences between students' OHS awareness and their OHS culture were analysed using a One-Way ANOVA test. According to the analysis results, it was found that there were statistically significant differences between students' OHS awareness and the average responses to statements measuring their OHS culture (Sig < 0.05). Based on these statistical results, the H_1 hypothesis was accepted.

When testing the homogeneity of the distribution among the OHS awareness groups, it was found that the groups were not homogeneously distributed (Sig. 0.000). Therefore, to determine the multiple correlations among the groups, the "Games Howell" test, which is applied to non-homogeneously distributed groups, was used under the "Post Hoc" tab in the One-Way ANOVA analysis. According to the analysis results, it was determined that students who scored 70, 80, 90, and 100 had significantly higher levels of OHS culture compared to others.

The differences in OHS culture among students based on the schools they attended were analysed using the One-Way ANOVA test. Upon examining the analysis results, it was found that the average responses to the statements measuring students' OHS culture significantly differed statistically according to the school (Sig < 0.05). Based on the statistical results, the H_2 hypothesis was accepted.

The differences in the number of surveys among the groups compared could lead to misinterpretation of the results. Therefore, the schools were divided into six different groups based on their departments: Group 1: Schools predominantly with departments like Metal, Machinery, Construction, Electrical Electronics, etc., called “Industrial Vocational High School”, Group 2: Schools with a combination of social, technical, and health departments called “Mixed High School”, Group 3: Schools predominantly with departments like Child Development and Education, Handicrafts, Apparel Production Technology, and Beauty and Hair Care Services called “Girls’ Vocational High School”, Group 4: Schools predominantly with departments related to health services called “Health Vocational High School”, Group 5: Schools predominantly with departments like Hospitality and Travel Services, and Food and Beverage Services called “Tourism Vocational High School”, Group 6: Schools predominantly with departments like Journalism, Agriculture, Animal Husbandry, and Health called “Specialized Vocational High School”. By categorizing the schools into these groups, the analysis aims to account for the disparities and ensure more accurate interpretation of the results.

When the homogeneity test of the distribution among school groups was conducted, it was determined that the groups were homogeneously distributed (Sig. 0.069). Therefore, to determine the multiple correlations among the groups, the "Tukey"

test, which is applied for homogeneously distributed groups, was performed in the "Post Hoc" section of the One-Way ANOVA analysis. According to the results of the Tukey test, there are statistically significant differences in the mean responses of students in the industrial vocational high school group to statements measuring OHS culture compared to other school groups (Sig. = 0.000). When examining the mean response scores among school groups, it was found that the industrial vocational high school group (mean 3.45) had lower mean response scores compared to other school groups. Similarly, when examining the mixed school group (mean 3.56), it was found that there was no statistically significant difference in mean response scores compared to the specialized vocational high school group (mean 3.51) (Sig. = 0.735). However, there were statistically significant differences in mean response scores compared to all other school groups. When examining the mean response scores of school groups, it can be observed that while the mean response scores of students in the mixed school group to statements measuring OHS culture were higher than those of the specialized vocational high school group, they were lower than those of the vocational high school for girls (mean 3.76), health vocational high school (mean 3.81), and tourism vocational high school (mean 3.85) groups. It was determined that the school group with the highest average response score was the tourism vocational high school group.

The study included students from 37 different departments across 44 Vocational and Technical High Schools in Samsun. The significant variation in the number of surveys conducted across departments affects the statistical significance of the results. Therefore, departments with 100 or fewer surveys were combined and labelled as "Other Departments". In this context, the differences in occupational safety culture according to the department of study were analysed using a One Way ANOVA test. The analysis showed that there are statistically significant differences in the average responses to statements measuring students' occupational safety culture based on the department they study (Sig < 0.05). According to these statistical results, Hypothesis 3 (H_3) has been accepted. Before determining the specific differences between departments, a homogeneity test was conducted to assess the distribution of groups. The results indicated that the groups were homogeneously distributed (Sig. 0.055). Following this, a Tukey post hoc test was performed to identify which departments significantly differed from others in terms of their OHS culture. According to the results of the Tukey test, certain departments distinguished themselves positively from the others, particularly: Food and Beverage Services, Fashion Design Technology, Graphic and Photography, Handicrafts and Technology. These departments showed more positive responses in OHS culture compared to others, suggesting that students in these fields may have a better understanding or adherence to safety standards and practices.

The differences in OHS culture among students based on their grade level were analysed using a One Way ANOVA test. Upon examining the results, it has been determined that there are statistically significant differences in the average responses to statements measuring OHS culture among students in different grades (Sig < 0.05). Based on these statistical results, Hypothesis 4 (H_4) has been accepted. When the homogeneity test for the distribution among groups was conducted, it was determined that the groups were not homogeneously distributed (Sig. 0.000). Therefore, to determine the multiple correlations among groups, the "Games-Howell" test, which is applied to non-homogeneously distributed groups, was conducted in the "Post Hoc" section of the One Way ANOVA analysis. According to the Games-Howell test results, it has been specifically determined that 12th-grade students are statistically significantly different from all other grades. When examining the average responses to statements measuring the levels of OHS

culture based on the grade level they are in, the highest average was found to be 3.79 among 12th-grade students.

The difference in OHS culture between male and female students was analysed using an independent samples t-test. According to the analysis results, statistically significant differences were found in the mean responses to statements measuring OHS culture between male and female students (Sig. (2-tailed) < 0.05). Based on these statistical results, Hypothesis 5 (H_5) was accepted. According to the comparison results conducted to determine the difference between groups, the mean scores of female students (mean 3.74) were found to be higher than those of male students (mean 3.61).

The differences between students' experiences of previous occupational accidents and near-miss incidents and their OHS culture were analysed using the independent samples t-test. According to the variance test conducted, it was determined that the variances of the groups were equally distributed (occupational accidents: Sig.= 0.425; near-miss: Sig.= 0.931). According to the results of the independent samples t-test, it was determined that there were statistically significant differences in the mean responses to statements measuring OHS culture between students who had experienced occupational accidents and those who had not (Sig. = 0.036). However, no statistically significant differences were found in the mean responses to statements measuring OHS culture between students who had experienced near-miss incidents and those who had not (Sig. = 0.300). According to the statistical results, Hypothesis 6 (H_6) was accepted, while Hypothesis 7 (H_7) was rejected.

The education levels of the students' parents were categorized into five different levels: primary education, high school, associate degree, bachelor's degree, and postgraduate degree. In the collected data, the frequencies for associate degree, bachelor's degree, and postgraduate education levels were very low compared to the other two groups, so they were combined into a single group named "associate degree and above" for analysis. First, homogeneity among the groups was tested. The homogeneity test results indicated that the groups were homogeneously distributed (Sig. = 0.294). When examining the results of the One-Way ANOVA analysis, it was found that the average responses of students to the statements measuring their OHS culture significantly differed according to their mothers' and fathers' education levels (Sig < 0.05). Based on the statistical results, Hypotheses 8 (H_8) and 9 (H_9) were accepted.

These findings underscore the importance of considering demographic factors in the implementation and enhancement of occupational safety education programs within Vocational and Technical High Schools. Tailoring safety education initiatives to address the specific needs and backgrounds of different student groups can enhance their effectiveness and ensure a broader and more profound impact on students' safety awareness and practices.

In the literature, studies typically analyse OHS awareness among students in only one Vocational and Technical High School or within a single department of a high school. For instance, Asan and Yıldız (2022) assessed 9th and 12th-grade students at Şehit Emin Güner Vocational and Technical High School,[24] while Alkan (2017) analysed students at İzmit Vocational and Technical High School.[21] Moreover, Küçükoğlu (2018) focused on departments of furniture and interior design,[25] Dündar (2022) on the chemistry department,[26] and Akay (2022) on students in the machine field.[27] Our study distinguishes itself in the literature by being conducted across 44 different Vocational and Technical High Schools in Samsun, encompassing 37 distinct departments.

In a study conducted by Alkan (2017) at İzmit Vocational and Technical High School, students were asked 10 multiple-choice questions to measure their awareness of OHS. Approximately 90% of the students scored 70 points or above, indicating a high level of knowledge concerning occupational safety.[21] This outcome contrasts with our

study results. In our study, same multiple-choice questions were used to measure the OHS awareness of students. However, only about 6% of the students scored 90 points or above, suggesting that the level of knowledge on occupational safety is low. Similar to our study, Andersson et al. (2014) found in their research that students receiving vocational education demonstrated insufficient knowledge regarding risks associated with their educational fields, as well as the relevant laws and regulations.[28] Moreover, consistent with our findings, studies in the literature have also emphasized the importance of occupational safety training in schools and highlighted the necessity of linking such training to professional life [29,30]

Akay (2022) conducted a study to determine the level of awareness and application of OHS Law No. 6331 among students in the machine department of a vocational and technical school, as well as to assess whether an OHS culture had been established. Unlike our study, Akay found no statistically significant differences in the average responses to the survey based on the students' gender and the grade they were in. Similarly to our findings, Akay also determined that there was no statistically significant difference between students' experiences of near-miss incidents *(ramak kala)* and their responses to the survey, indicating a lack of significant impact from such incidents on their safety awareness. Similarly, in line with our study, Akay stated in his research that the number of female students in Vocational and Technical High Schools is lower than that of male students and that female students tend to prefer fields such as commerce, healthcare, and tourism, which require less physical strength.[27]

In contrast to our study, Saraç (2016) found in his research that females' perception of safety culture is lower compared to males.[31]

In their study, Demir and Ulutaşdemir (2023) found that, similar to our study, the average scores on the occupational safety scale were higher for students who had not experienced work accidents compared to those who had.[32]

CONCLUSION AND RECOMMENDATIONS

In Turkey, students attending Vocational and Technical High Schools are entering the workforce both domestically and internationally. Some of these students continue their education in higher education institutions to become engineers or technicians. Regardless of their roles, these students are predominantly positioned in jobs where they are more likely to encounter workplace accidents. Therefore, it is crucial to determine the levels of occupational safety performance and culture among students of Vocational and Technical High Schools. Having high safety performance and occupational safety culture levels can significantly contribute to reducing workplace accidents.

This study aimed to explore how the OHS performance and culture levels of vocational high school students vary according to the independent variables used in the research. The study achieved the targeted number of survey responses, highlighting the differences in OHS culture and awareness among vocational high school students based on various independent variables.

To establish and develop OHS culture among students, who are the future workforce and managers, it is recommended that they receive training at regular intervals from experts and institutions specialized in areas where teachers may not have full expertise, such as practical applications and updates in regulations. It is advised that students receive education not only from those with theoretical knowledge but also from those with field experience. Training from experienced professionals will make learning more engaging, enjoyable, satisfying, and enduring, ensuring that knowledge is not only absorbed but retained and applied effectively in their future workplaces.

Ensuring that all departments and workshops have complete and accurate OHS warning signs and indicators is believed to enhance students' awareness. Incorporating OHS courses into the vocational high school curriculum is also expected to contribute significantly to developing a robust OHS culture among students. To increase the effectiveness of these courses, it is advisable to engage external professionals such as Safety Officers, Occupational Physicians, and authorized Joint Health and Safety Units from the local area.

Additionally, the development and implementation of an OHS curriculum could be further enhanced through a collaborative project between the Ministry of Labor and Social Security and the Ministry of National Education. This joint effort would ensure that the courses are not only comprehensive but also aligned with the latest safety standards and legal requirements, providing students with a thorough and practical understanding of occupational safety and health issues.

Students should participate in both general informational trainings and sector-specific OHS trainings related to their departments. By ensuring students receive comprehensive OHS education tailored to their specific fields of study, it is anticipated that there will be an overall increase in the level of OHS culture within society. This approach is expected to make learning not only easier but also more profound, as students will be better equipped with the knowledge and skills necessary to manage safety effectively in their future professional environments.

In future studies, structural equation models (SEM) could be developed to investigate the relationships between OHS culture and variables such as “Psychological Factors in the Workplace,” “Workplace Safety Culture,” “Management Support for OHS,” “Employee Satisfaction,” “Employee Engagement,” and “Productivity,” both as independent and mediating factors. This model would provide valuable insights into the factors influencing OHS culture and help evaluate their impact on various outcome variables more comprehensively.

Limitations of the Research

The primary limitation of the current study is that the application was conducted solely with students from Vocational and Technical Anatolian High Schools. In future studies, researchers could expand the scope by conducting surveys in different types of high schools to identify potential differences in OHS culture among students based on school types. Another limitation of this study is that the sample was drawn exclusively from Vocational and Technical Anatolian High Schools located in Samsun. Future research could include samples from Vocational and Technical Anatolian High Schools in other cities within the Black Sea region to allow for inter-city comparisons. Similarly, by collecting samples from across the Black Sea region and other regions in Turkey, researchers could not only assess the OHS culture levels of students in Vocational and Technical Anatolian High Schools within the Black Sea region but also conduct regional comparisons.

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Conflict of Interest

The authors declare that there are no conflicts of interest.

Researchers’ Contribution Rate

M.A.Z.; contributed to the "Literature Review", "Method", "Data Collection", "Data Analysis", "Results", and "Conclusion and Recommendations" sections of the manuscript. **M.S.;** contributed to the "Literature Review", "Data Collection", "Results", and "Conclusion and Recommendations" sections of the manuscript. **M.T.;** contributed to the

"Literature Review", "Data Collection", and "Conclusion and Recommendations" sections of the manuscript. All authors have read and approved the published version of the manuscript.

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