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# Occupational Health and Safety Education among Health Students: A Situation Analysis

## Sağlık Öğrencileri Arasında İş Sağlığı ve Güvenliği Eğitimi: Bir Durum Analizi

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**ABSTRACT**

This study aims to compare the occupational health and safety (OHS) knowledge levels of senior medical and dental students at Ankara Yildirim Beyazit University, Türkiye, and to evaluate the effectiveness of a standardized theoretical training. A quasi-experimental pre-test/post-test design was employed, involving 318 students (255 from the Faculty of Medicine and 63 from the Faculty of Dentistry). Prior to training, medical students had a higher mean score (M = 33.60) than dental students (M = 29.81), with a large effect size (Cohen's d = 0.82). Post-training scores increased significantly in both groups ($p < 0.001$); however, the knowledge gap persisted, with medical students again outperforming dental students (M = 37.51 vs. M = 32.84; Cohen's d = 0.93). These findings highlight the need for stronger and more consistent integration of OHS topics into health education curricula, particularly in programs where clinical exposure to such content may be limited.

**Keywords:** Occupational health and safety, Pre-test post-test design, Knowledge levels, Cohen's d.

**ÖZET**

Bu çalışma, Ankara Yıldırım Beyazıt Üniversitesi'nde öğrenim gören son sınıf tıp ve diş hekimliği fakültesi öğrencilerinin iş sağlığı ve güvenliği (İSG) bilgi düzeylerini karşılaştırmayı ve standartlaştırılmış teorik eğitimin etkinliğini değerlendirmeyi amaçlamaktadır. Yarı deneysel bir ön test/son test tasarımı kullanılmış olup, çalışmaya 255'i Tıp Fakültesi'nden ve 63'ü Diş Hekimliği Fakültesi'nden olmak üzere toplam 318 öğrenci katılmıştır. Eğitim öncesinde, tıp fakültesi öğrencilerinin ortalama puanı (Ort = 33,60), diş hekimliği öğrencilerine göre (Ort = 29,81) daha yüksekti ve bu fark büyük bir etki büyüklüğü ile belirlenmiştir (Cohen's d = 0,82). Eğitim sonrasında her iki grubun puanları anlamlı şekilde artmış olsa da ($p < 0,001$), bilgi düzeyi farkı devam etmiş; tıp öğrencileri, diş hekimliği öğrencilerinden yine daha yüksek puan almıştır (Ort = 37,51 vs. Ort = 32,84; Cohen's d = 0,93). Bu bulgular, özellikle klinik deneyimin sınırlı olduğu programlarda, İSG konularının sağlık eğitimi müfredatına daha güçlü ve sistematik biçimde entegre edilmesi gerekliliğini ortaya koymaktadır.

**Anahtar Kelimeler:** İş sağlığı ve güvenliği, Ön-test son-test deseni, Bilgi seviyesi, Cohen's d.

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## I. INTRODUCTION

Occupational health and safety (OHS) is a systematic discipline based on scientific principles, aiming to prevent health risks that may arise during work processes and to improve existing health and safety conditions in the workplace [1]. Individuals working in the healthcare sector are exposed to numerous occupational risks, such as infectious agents, sharp-edged tool injuries, chemical exposure, radiation and ergonomic challenges [2]. These risks may increase workplace accidents, reduce efficiency, and compromise safety for both healthcare workers and the individuals they serve [3].

One of the most fundamental and effective strategies in occupational health and safety is the systematic provision of safety training. International organizations, such as the World Health Organization (WHO), emphasize that structured safety education is essential for preventing occupational hazards across all sectors [10]. These training programs not only promote safe behavior but also play a vital role in reducing workplace accidents and preventing unsafe practices [4]. Universities and training institutions have a critical responsibility to ensure that future professionals are equipped with the knowledge and attitudes necessary to prioritize safety.

Therefore, students preparing for careers in healthcare sector should be introduced to OHS issues, learn to recognize risks, and acquire protective measures during their pre-professional education [5]. Senior students who actively participate in clinical practice may be directly exposed to occupational risks [6], highlighting the importance of addressing OHS early and systematically within healthcare education.

Studies indicate that health students demonstrate varying levels of OHS knowledge, often due to differences in curricula, duration of clinical exposure, and the extent to which OHS content is integrated into training programs. For example, while medical students are frequently exposed to biological hazards such as bloodborne pathogens, dental students often encounter procedural risks, including aerosol-generating procedures and ergonomic challenges [11]. Despite these differences, comparative studies examining OHS knowledge among undergraduate health students in Turkey remain limited. In particular, there is a notable gap in research evaluating differences within the same institutional context—such as between faculties of medicine and dentistry—where organizational structure is shared but educational emphasis may differ. Filling this gap could inform targeted curricular improvements in OHS education.

This study aims to comparatively assess the OHS knowledge of senior medical and dental students at Ankara Yildirim Beyazit University and to evaluate the impact of theoretical training on their knowledge levels. By highlighting variations across programs within the same institutional framework, the research seeks to inform curriculum development and enhance educational practices related to OHS in health professions education.

## II. METHODS

Ethical approval for this study was granted by the Ankara City Hospital No. 2 Clinical Research Ethics Committee (Decision No: E2-22-2884, dated 23.12.2022).

Demographic information such as age, gender, marital status, or ethnicity was not collected from participants. Participation was anonymous through coded identifiers, and no personal data was obtained during the research process.

This study was designed as a quasi-experimental study

to assess the OHS knowledge levels of senior students at the Faculties of Medicine and Dentistry of Ankara Yildirim Beyazit University and to evaluate the effect of provided training. Pre-test/post-test uncontrolled group design methodology followed in the research. A total of 318 volunteer students participated in the study, including 255 medical students and 63 dental students. While the small sample size of dentistry students limited the scope of data in this group, data were collected from all available participants. This sample imbalance between groups may limit statistical power in some analyses; can impact the interpretation of results, particularly in tests requiring homogeneity of variance. Additionally, the fact that the study was conducted at a single institution may restrict the generalizability of the findings to broader student populations. Therefore group size differences were taken into account in the analyses, and significance levels were carefully assessed.

During the data collection process, participants were administered a test consisting of 45 multiple-choice questions prepared by the researcher on OHS. Each item comprised five response options, with a single correct alternative; correct responses were scored as 1 point (incorrect responses as 0), yielding a dichotomous scoring scheme.

In the first stage, a pre-test was administered, followed by a 40-minute theoretical OHS training session delivered with identical content to both groups. After the training, the same test was administered as a post-test to evaluate changes in knowledge levels

Data were analyzed using IBM SPSS Statistics version 25.0. Descriptive statistics, including mean and standard deviation values, were calculated for the pre-test and post-test scores of both faculties. To assess differences in knowledge levels between the Faculty of Medicine and the Faculty of Dentistry, the Independent Samples t-test was employed, based on the assumption of independent groups. Within-group differences between pre-test and post-test scores were analyzed using the Paired Samples t-test, which is appropriate for related measurements. These parametric tests were selected due to their suitability for evaluating differences in means under the assumption of normal distribution. In addition, 95% confidence intervals were calculated to estimate the range within which the true mean differences are likely to lie, thereby enhancing the interpretability and precision of the findings. Cohen's d was also computed to quantify the effect size of the observed differences and to evaluate their practical significance. All statistical analyses were two-tailed, and p-values below 0.05 were considered statistically significant. According to Cohen's conventional thresholds, an effect size of 0.2 is considered small, 0.5 medium, and 0.8 or above large [12].

## III. RESULTS

The pre-test and post-test scores of the students participating in the study were analyzed separately according to the faculties in order to identify any statistically significant differences in OHS knowledge between the two groups.

As presented in Table 1, the pre-test mean score of the Faculty of Medicine students was 33.60 (SD = 4.605), while the Faculty of Dentistry students had a mean score of 29.81 (SD = 4.554). The Independent Samples t-test yielded a statistically significant result ($p < 0.001$; $p < 0.05$). The effect size calculated using Cohen's d was 0.82.

**Table 1:** Comparison of Pre-Test Means, Standard Devi-

| Faculty | N | Average | Std. Deviation | Cohen's d | P value (<) |
|---|---|---|---|---|---|
| Faculty of Medicine | 255 | 33.60 | 4.605 | 0.82 | 0.001 |
| Faculty of Dentistry | 63 | 29.81 | 4.554 | | |

To evaluate the effectiveness of the theoretical training, students' pre-test and post-test scores were compared across both the Faculty of Medicine and the Faculty of Dentistry. The analysis revealed statistically significant increases in post-test scores for both groups ($p < 0.001$), indicating that the training positively influenced knowledge acquisition. Specifically, the mean score for medical students increased from 33.60 (SD = 4.605) to 37.51 (SD = 4.514), and for dental students from 29.81 (SD = 4.554) to 32.84 (SD = 6.658). The effect size calculated using Cohen's d for the post-test comparison was 0.93, indicating a large effect size according to conventional thresholds (Table 2).

**Table 2:** Comparison of Post-Test Means, Standard Deviations, Cohen's d and p Values Between Faculties

| Faculty | N | Average | Std. Deviation | Cohen's d | P value (<) |
|---|---|---|---|---|---|
| Faculty of Medicine | 255 | 37.51 | 4.514 | | |
| Faculty of Dentistry | 63 | 32.84 | 6.658 | 0.93 | 0.001 |

## IV. DISCUSSION

This study aimed to compare OHS knowledge of senior students from the Faculties of Medicine and Dentistry at Ankara Yildirim Beyazit University and to assess the impact of the training provided. The findings indicated that, although both groups possessed baseline knowledge, medical students demonstrated significantly higher pre-training scores, possibly due to greater curricular integration of OHS content in medical education.

In the second phase of the study, both medical and dental students demonstrated notable improvements in their post-test scores following the theoretical training, underscoring the effectiveness of the educational intervention. Despite this overall improvement, the knowledge levels of medical students remained higher than those of dental students. This persistent difference suggests that short-term instructional efforts may be influenced by students' prior exposure to relevant content and their foundational understanding of OHS. It is likely that the medical curricula provide more frequent or in-depth engagement with such topics, which may enhance knowledge retention and application. Furthermore, differences in clinical practice intensity, duration of fieldwork, and the nature of occupational risk exposure may also influence learning outcomes. These findings highlight the need for discipline-specific adjustments in educational content to ensure more equitable learning gains across student populations.

Evidence from similar studies in the literature support the observation that OHS knowledge among health students varies significantly depending on the academic program and the extent of clinical exposure. Programs with more intensive practical components, such as medicine and nursing, tend to foster greater awareness of occupational risks, likely due to increased contact with real-world healthcare environments where such risks are more visible and immediate.

The present study aligns with this pattern, as medical students demonstrated significantly higher OHS knowledge than dental students, both before and after the training. This disparity may stem not only from curricular differences but also from the nature and frequency of clinical exposure. Medical curricula often integrate OHS topics into broader patient safety and public health training, whereas dental programs may address these issues more narrowly or intermittently [13].

A recent study conducted with 425 university students similarly reported low overall awareness of OHS within higher education institutions. These findings suggest that

existing OHS training may be insufficient to develop adequate knowledge and preparedness. Therefore, the implementation of proactive educational strategies, the expansion of practical training opportunities, and the reinforcement of OHS awareness are recommended to enhance student competence in this critical area [14].

For example, a study assesing dental students' knowledge of biomedical waste management identified widespread deficiencies, reflecting limited routine exposure to structured OHS protocols during training [7]. Similarly, research on needlestick injury awareness among nursing and dental students reported insufficient knowledge levels [2], emphasizing that exposure to practical risk does not necessarily result in adequate preparation unless supported by targeted instruction. Another study identified gaps in radiation protection practices among dental students and recomended educational interventions [8], a conclusion that is consistent with the improvements observed in post-training scores in the present study.

Furthermore, a comparative study on Hepatitis B awareness found that medical students were better informed than dental students [9], reinforcing the view that repeated clinical engagement and systemic curriculum integration enhance knowledge acquisition in areas related to occupational safety. Taken together, these findings suggest that clinical learning environments designed with a strong emphasis on safety play a critical role in developing students' OHS competence, and that educational interventions should be tailored to the specific needs and exposure profiles of different healthcare disciplines.

Building on this perspective, medical curricula generally integrate OHS topics within broader patient safety frameworks, whereas dental programs may address these topics more narrowly or sporadically, as demonstrated in a recent evaluation of dental students' limited baseline knowledge and the effectiveness of targeted training interventions [11].

The findings of this study highlight the need not only to standardize but also to strengthen OHS education within undergraduate health curricula. Variations in knowledge levels across faculties suggest that factors such as limited instructional time, insufficient practical components, and the lack of experiential learning strategies may contribute to these disparities. To address these issues, it is recommended that OHS content be integrated into competency-based curricula and supported through simulation-based training modules and case-based instruction. Establishing a national framework with minimum instructional hours dedicated to OHS may further promote consistency and ensure baseline competency among all health students.

## V. CONCLUSIONS

The This study reveals that senior medical students demonstrated significantly higher levels of OHS knowledge than dental students, both before and after a standardized theoretical training. Although the training resulted in statistically significant improvements in both groups, the initial knowledge gap persisted, suggesting that short-term interventions alone may be insufficient to address disparities rooted in curricular structure and clinical exposure. Effect size analysis supported this finding by indicating a substantial difference in pre-training knowledge, which became even more pronounced post-training—highlighting a stronger impact of the intervention on one group over the other.

The findings underscore the necessity of integrating OHS education more comprehensively into undergraduate health curricula. OHS training should be standardized and made compulsory across all health-related faculties, with

structured content covering fundamental principles, occupational hazards, and preventive strategies. To move beyond passive learning, educational programs should incorporate interactive, experience-based methods—such as case -based learning, simulations, and workshops—that have been shown to enhance knowledge retention and real-world application.

Given the relatively limited OHS content in certain programs, such as dentistry, increased instructional time and curriculum depth should be prioritized. Moreover, short-term evaluation tools, including pre-tests and post-tests and structured feedback mechanisms, can help monitor immediate learning gains. To ensure long-term impact, follow-up assessments should be employed to measure knowledge retention and application in clinical practice. At the institutional level, sustainability can be supported through ongoing faculty development and periodic in-service training. Collectively, these strategies aim to foster a culture of safety and prepare health professionals to engage in safe, informed clinical practice.

While the findings offer meaningful insights, they should be interpreted with caution due to certain limitations—namely, the unequal sample sizes between faculties and the absence of long-term follow-up to assess knowledge retention. These factors may affect the generalizability of the results. Even so, the study contributes valuable evidence to the discourse on OHS education and lays a foundation for curriculum improvements in undergraduate health programs.

Consent: Informed consent was obtained from all individual participants included in the study.

**Author Contrubutions:** Author contributions are of equal importance.

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## KAYNAKÇA

[1] Erdoğan, E., & Genç, KG (2023). Fundamental problems of occupational health and safety professionals. *Journal of Information Social Sciences*,25 (1), 57-93. https://doi.org/10.54838/bilgisosyal.1289671

[2] Elfarra, NE, et al. (2024). Knowledge and attitude of students regarding needle stick injuries: A cross-sectional study. *International Journal of Nursing Research* , 6(2), 8–14. https://doi.org/10.33545/26649187.2024.v6.i2a.69

[3] Solmaz, M., & Solmaz, T. (2017). Occupational Health and Safety in Hospitals. *Gümüşhane University Journal of Health Sciences*, 6(3), 147-156.

[4] Topgül, S., Alan, Ç. (2017). Evaluation of students' perception of job security and job security training. *Süleyman Demirel University Journal of Faculty of Economics and Administrative Sciences*, 22 (2), 587-598.

[5] Camur, D., Yıldız, AN, & Bilir, N. (2012). Evaluation of occupational health teaching sessions for final year medical students. *Safety and Health at Work*, 3(2), 117–121. https://doi.org/10.5491/SHAW.2012.3.2.123

[6] Moodley, R., Naidoo, S., & Van Wyk, J. (2018). Applying the perceptions of graduates on their dental training to inform dental curricula from the

perspective of occupational health. *South African Dental Journal*, 73(5), 273–276. http://dx.doi.org/10.17159/2519-0105/2018/v73no5a3

[7] Mahajan, A., Pawar, M., Patil, A. N., & Behera, S. (2024). Biomedical waste management: A study on the awareness and practice among dental healthcare workers in India. Journal of International Clinical Dental Research Organization, 16, 120-125. DOI: 10.4103/jicdro.jicdro_49_24

[8] Elmorabit, N., Azougagh, M., & Marrakchi, A. (2025). Radiation protection in dentistry: A systematic review of knowledge, attitudes, and practices. *Egyptian Journal of Radiology and Nuclear Medicine*. 56:28. https://doi.org/10.1186/s43055-025-01436-x

[9] S. H. Amiri, S. M. Danish, S. J. Asghari, and M. Q. Q. Adel, "Knowledge and awareness regarding hepatitis B among medical students in Kabul, Afghanistan: Cross-sectional study," *Afghan. J. Infect. Dis.*, vol. 3, no. 1, pp. 83–90, 2025. [Online]. Available: https://doi.org/10.60141/ajid.81

[10] World Health Organization, *WHO guidelines on hand hygiene in health care: First global patient safety challenge – Clean care is safer care*, Geneva: WHO Press, 2009. [Online]. Available: https://apps.who.int/iris/handle/10665/44102

[11] A. F. Alshammari, A. A. Madfa, and Y. E. Alenezi, "The potential benefit of an educational intervention on needle stick injury prevention among dental students at the University of Ha'il, Saudi Arabia: A prospective study," BMC Med. Educ., 2025. [Online]. Available: https://link.springer.com/article/10.1186/s12909-025-07581-1

[12] J. Cohen, Statistical Power Analysis for the Behavioral Sciences, 2nd ed. Hillsdale, NJ: Lawrence Erlbaum Associates, 1988.

[13] M. Saygun, "Sağlık Çalışanlarında İş Sağlığı ve Güvenliği Sorunları," *TAF Preventive Medicine Bulletin*, vol. 11, no. 4, pp. 373–382, 2012.

[14] A. F. Alshammari, A. A. Madfa, and Y. E. Alenezi, "The potential benefit of an educational intervention on needle stick injury prevention among dental students at the University of Ha'il, Saudi Arabia: A prospective study," BMC Med. Educ., 2025. [Online]. Available: https://link.springer.com/article/10.1186/s12909-025-07581-1