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How to advance legal education for future environmental health

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ABSTRACT. Legal education is a fundamental component of professional training in environmental health. As environmental health graduates are often responsible for disease prevention, as health experts, they need to receive the necessary training related to various work issues and possible aspects related to it during their student life. This study aimed to determine the effectiveness of the legal training program for environmental health students. This quasi-experimental study was conducted between 2020 and 2022 among 55 undergraduate students of environmental health at the Environmental Health Engineering Department of Gonabad University of Medical Sciences (EHEDGUMS). The sample was selected using the census method. The workshop addressed students' educational needs regarding legal training. The researcher-made questionnaire assessing knowledge and attitudes toward legal issues was completed before and one month after the training. Data were analyzed by SPSS software, version 22. The average legal knowledge scores before and after the intervention were 14.1 ± 2.7 and 21.19 ± 4.79, respectively. There was a significant difference between the knowledge scores before and after the educational intervention ($p < 0.05$). The mean attitude score toward legal issues increased from 95.6 ± 4.12 before the intervention to 104.5 ± 4.06 afterward, showing a significant improvement ($p < 0.05$). The legal training program has proven effective for environmental health students. It can improve various aspects of professional development, such as satisfaction, motivation, commitment, implementation, and barrier removal. Integrating "Legal Learnin" into the environmental health internship curriculum is recommended.

Keywords: Legal education; educational development; environmental health professionals.

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Introduction

All students, especially those at medical universities, must acquire essential knowledge and skills to perform better in their future professions (Gurpinar et al., 2005; Rahiminia et al., 2021). There is a need for continuous review, innovation, and the elimination of shortcomings in university curricula due to changes in societal expectations and needs. Accordingly, the Ministry of Health and Medical Education of Iran assigned universities the responsibility of revising the curricula. In this regard, the internship should be considered one of the practical aspects of education. For this purpose, it is possible to conduct a survey on the content and educational methods from various experts and thinkers, especially graduates who have worked in their field of study to make a relatively accurate estimate of educational needs and shortcomings. Although people may possess sufficient knowledge, there is often a significant gap between what they know and how they apply it. They may not have acquired the necessary skills to apply their learning accurately and promptly (Peirovi et al., 2021; Spoto et al., 2023). Given that units related to the students' internships are often offered in the final semesters, this situation provides a suitable context and opportunity for students to engage in real-world environments, allowing them to gain experience without the pressure of job responsibilities or consequences. Hence, it can be said that internships in the field of study play an important role in students' acquisition of professional competencies. Therefore, integrating legal learning into educational programs for students in this course can be beneficial for the development of their specialized skills (Meyer et al., 2017; Mills et al., 2017; Nouraey et al., 2020). Numerous studies (Ghani et al., 2021) have been conducted in this

field, suggesting that knowledge scores differ between traditional curricula and problem-based learning methods among medical students.

The findings of this study indicated that knowledge scores on public health concepts in the problem-based learning method were 4.5 points higher those of the other group (Schwendimann et al., 2019). Additionally, research has shown that strategically and systematically modifying the curriculum, when approached, enables the development of programs that prepare students for new professional roles within modern care models.

Several studies have examined the quality of internships from the perspective of students across various disciplines. These studies have highlighted issues such as deficiencies in the educational program, the effectiveness of educators, the adequacy of facilities, the roles of other members of the healthcare team, and the overall efficiency of the course. Additionally, concerns have been raised regarding skill acquisition and educators' performance. To address these shortcomings, it is essential that not only professors and field professionals but also students themselves actively participate in the critique and evaluation of the internship program (Hess & Collins, 2018).

Environmental health professionals are responsible for ensuring compliance with environmental regulations, managing pollution incidents, and addressing the legal aspects of health sciences, such as sanitation and disease control. These professionals must navigate complex legal frameworks to enforce regulations, mitigate health risks, and protect both the environment and public health. Their legal knowledge is essential for making informed decisions that align with legal standards and effectively address environmental health issues (Frumkin H, 2016).

Therefore, it is necessary for students to receive comprehensive training related to various professional issues and potential challenges in order to acquire the skills necessary to fulfill their roles as (Pakdaman et al., 2019) environmental health inspectors. In different countries, public places and food preparation and distribution centers are monitored by various organizations under different titles. In Iran, this responsibility lies with environmental health inspectors working in comprehensive health service centers, operating under the supervision of the Ministry of Health and Medical Education, in accordance with Article 13 of the Food, Beverage, Cosmetics, and Hygiene Law (Pakdaman et al., 2019; Peiravi et al., 2015).

Law enforcement by environmental health officers has always faced challenges and difficulties. Sometimes, even minor issues can lead to lawsuits due to the lack of knowledge and insufficient mastery of relevant laws and individual rights. In this context, a working group was formed, comprising professors from the Environmental Health Engineering Department of Gonabad University of Medical Sciences and several experienced environmental health inspectors. This group investigated the causes of legal complaints within the environmental health units of the university's community health centers. According to these findings and the results of the working group's review, the need to conduct the present study was confirmed. The objective of incorporating applied legal learning—specifically related to the activities of environmental health inspectors—into the internship curriculum of environmental health engineering was also validated. The method, including tool and content development as well as training implementation, is described in the following section.

Methods

This quasi-experimental study was conducted between 2020 and 2022 among 55 undergraduate environmental health students at the Environmental Health Engineering Department of Gonabad University of Medical Sciences. All participants had completed their specialized courses and had enrolled in the internship unit during the second semester of each academic years. The sample was selected using a census method and included all eligible students. The exclusion criteria were having more than one absence from the training sessions. The workshop was designed to address the educational need for legal training among students. A researcher-made questionnaire assessing knowledge and attitude toward legal issues was administered before the training and again one month after its completion. Data were analyzed by SPSS software, version 22.

Tool preparation

To design the initial questionnaire, a deductive approach was applied alongside a comprehensive review of relevant texts, articles, and previously developed questionnaires in the research domain. A summary of topics was compiled based on interviews with experts in environmental health engineering, as well as the review of related books, articles, existing guidelines, and checklists.

Due to the nature of the study, professionals were expected to spend at least one hour completing the initial 24-item questionnaire. Each item was rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating better status or performance of the respondent. An expert panel consisting of 10 specialists—environmental health engineering professionals (N = 7) and law specialists (N = 3)—was formed. The panel was asked to comment on individual items regarding accuracy, clarity, and style. All versions of the instruments and related documentation were considered, and attempted were made to ensure semantic, empirical, and conceptual equivalents of all items. The final questionnaire consisted of 20 items. The Content Validity Ratio (CVR) for each item was calculated using Lawshe's method (Spoto et al., 2023). According to the Lawshe table, with a 10-member expert panel, items with a CVR ⩾ 0.418 were considered necessary (Wilson et al., 2012). In this study, the total CVR for the scale was 0.81, indicating a satisfactory result. To further assess content validity, experts rated each item's relevance using a four-point rating scale: (i) not relevant, (ii) slightly relevant, (iii) relevant, and (iv) very relevant. The Content Validity Index (CVI) for each item was calculated as the proportion of experts rating the item as 3 or 4. Based on Lawshe's recommendation (Spoto et al., 2023), a CVI ⩾ 0.79 was considered acceptable. The CVI scores for the knowledge and attitude sections were 0.83 and 0.78, respectively. To establish face validity, the revised questionnaire was evaluated by 30 undergraduate students of environmental health engineering. Internal consistency of the instrument was assessed using Cronbach’s Alpha. The alpha values were 0.79 for the knowledge section and 0.76 for the attitude section, both indicating satisfactory reliability (Whitehead et al., 2008; Wilson et al., 2012).

Preparation of content

The training program was developed based on recommendations from environmental health and legal experts. In this phase, the instructional design was carried out in consultation with medical education specialists. Furthermore, a group discussion session was held among subject matter experts to gather their suggestions, such as using the web-based training method and creating a realistic learning environment. Based on these inputs and using reliable and credible sources, a training video was produced. Following consulting with the internship supervisor and the relevant instructor, the program was structured into four sessions, each lasting two hours.

Implementation of education

First, after explaining the educational goals and the importance of the subject, the questionnaire of demographic characteristics and knowledge and attitude questionnaires about legal issues were completed by the participants. Educational topics were presented in (Table 1).

Table 1. Educational heading titles.

Row	Educational topics
1	Introduction
2	Definition of terms
3	The reason for the increase of complaints against employees
4	Crimes against the soul
5	Innocence or satisfaction
6	Applied legal materials and documents in the field of environmental health
7	Law Amending Article (13) the Law on Food, Beverage, Cosmetics and Hygiene
8	Implementing Regulations of the Law Amending Article (13) the Law on Food, Beverage, Cosmetics, and Hygiene
9	Sample opinions and complaints related to the legal materials mentioned

The educational sessions were designed based on the target audience's characteristics, in consultation with the internship supervisor and relevant instructor. The training was delivered in four one-hour online sessions. During these sessions, the educational goals and the importance of the topic were first explained, followed by the completion of knowledge and attitude questionnaires by participants via the internet. The training content focused on legal issues, especially practical regulations relevant to the Environmental Health Inspectors, recent amendments to the laws, and related provisions. The sessions included lectures, questions and answers, and a slide presentation. In a training session, real legal cases involving environmental health

inspectors at Gonabad University of Medical Sciences were presented to the students through an online virtual training conducted by the university's legal advisor, who had represented the inspectors in these cases. The educational content was provided to the learners by downloading it in the NAVID system (the national LMS platform used by medical universities in Iran) to learn more deeply and as a reminder of the educational content produced in the form of a video. To evaluate the effect of the educational program, one month after the educational intervention. The research data were analyzed using the Statistical Package for Social Sciences (SPSS) software version 22 and descriptive statistics, paired t-test and independent t-test were analyzed at a significant level of 0.05.

Ethical consideration

All experimental protocols of this study were approved by the Ethics Committee of Gonabad University of Medical Sciences with the code IR.GMU.REC.1399.085. Written informed consent was obtained from all participants and/or their legal guardians in this study before the start of any experiments and/or data collection.

Results

The results of years are presented below. 49.09% (N = 27) of the subjects were male, 50.91% were female (N = 28), and the mean age of students was 22 ± 1.4 years. Initially, the normality of variables of knowledge and attitude were evaluated using the Kolmogorov-Smirnov test. According to this test, both variables were normal. Therefore, parametric tests were used to compare and analyze the data.

The results of the paired t-test showed a significant difference in the knowledge scores before and one month after the educational intervention ($t = 3.25$, $P < 0.05$). Also, there was a significant difference in the attitude scores before and one month after the educational intervention ($t = -11.42$ and $P < 0.05$) (Table 2).

Table 2. Comparison of the mean scores of students' knowledge and attitude before and one month after the educational intervention(Paired t-test).

Variable	Before intervention Mean ± SD	One month after intervention Mean ± SD	t-value	p- value
Knowledge	14.1 ± 2.7	21.19 ± 4.79	t = 3.25	P < 0.05
Attitude	95.6 ± 4.12	104.5 ± 4.06	t = -11.42	P < 0.05

Note: A paired t-test was conducted to compare the mean scores of students' knowledge and attitude before and one month after the educational intervention. Statistically significant improvements were observed in both domains ($p < 0.05$).

The independent t-test showed no significant difference in the mean knowledge scores between male and female students before the training ($p > 0.05$). However, after intervention, a significant difference was observed ($P = 0.004$), with female students scoring significantly higher than their male counterparts. Furthermore, there was no statistically significant difference in attitude scores was found between male and female students either before or after the educational intervention (Table 3).

Table 3. Comparison of students' mean knowledge and attitude scores before and one month after the intervention by gender.

Variable	Time Point	Male (Mean ± SD)	Female (Mean ± SD)	t -value	p - value
Knowledge	Before	13.5 ± 1.3	14.5 ± 1.35	-1.37	0.19
	After	20 ± 1.9	22.5 ± 1.26	-3.34	0.004
Attitude	Before	95.4 ± 4.46	95.4 ± 7.5	0.009	0.90
	After	103.43 ± 2.43	104.5 ± 4.1	-0.52	0.60

Note: Data are presented as Mean ± Standard Deviation (SD). Independent t-test was used to compare mean scores between male and female students. $p < 0.05$ was considered statistically significant.

Discussion

Educational and training systems should be tailored to the specific needs of individuals in their future careers. A review of relevant documents, legal cases, and interviews with environmental health experts working in comprehensive health service centers reveals a significant educational gap in legal education. Environmental health students face severe challenges due to limited understanding, insufficient knowledge, and lack of mastery and knowledge of labor laws and their rights, which may affect their future careers.

Weir et al., (2019) studied teaching and learning strategies among undergraduate biology students and suggested that using worksheets as tools for active, group-based learning for activities in the classroom can

be useful. This approach not only strengthens students' problem-solving skills but also offers educators valuable insights into the difficulties learners may face. Considering that the present study aimed to change the internship training program in accordance with future job needs, the legal cases involved by environmental health inspectors, similar to a worksheet, assisted the research team and instructor in identifying training needs and necessary adjustments.

The results of the present study are consistent with the findings of Burkholder et al., (2017), who investigated the effects of the curriculum titled "Climate Change on Undergraduate Students' Learning". Their study reported significant improvements in students' knowledge and understanding of climate change following the educational intervention.

Busch-Vishniac and Jarosz (2004) explored strategies aimed to increase diversity among undergraduate students through curriculum changes. Their study identified several key characteristics of an effective curriculum: emphasizing technical content, connecting foundational principles to real-world applications, minimizing lengthy prerequisite sequences, and incorporating team-based learning experiences.

In the present study, students were taught practical topics related to the duties of environmental health inspectors, grounded in real-world experiences, to better prepare them for potential challenges in their future careers.

The study by Eskandari et al., (2018) indicates that educational interventions are one of the most effective means of promoting knowledge and attitude. The findings of this study also demonstrated that teaching legal issues positively influences students' knowledge and attitudes. In addition, the results of the present study, which show an increase in attitude scores after educational intervention, supported the notion that increasing knowledge can also change attitudes (Seid & Hussen, 2018). This study was conducted virtually the COVID-19 pandemic (Delshad et al., 2022; Gholian-Aval et al., 2024; Pourhaji et al., 2022), and a significant difference was observed between knowledge and attitude scores before and after educational intervention.

In Najafi et al., (2019), conducted using virtual social networks for emergency nurses, a significant difference was observed between the trained and control groups.

One of the limitations of this study was that it coincided with the COVID-19 pandemic, which limited both access to and direct contact with participants. Consequently, observing the actual behavior of internship students during the inspection proved to be impossible.

Considering that the manner of interacting with operators during the inspection of public places and preparation and distribution of food is very important, and such interactions are influenced by knowledge and experience, it is recommended that future studies examine the extent of behavior change following training.

Conclusion

The legal training program has proven effective for environmental health students. It can improve various aspects of professional development, such as satisfaction, motivation, commitment, implementation, and barrier removal. Integrating "Legal Learning" into the environmental health internship curriculum is recommended, and considering the course of change and transformation in the educational system and new programs for new-emerging fields, a fundamental revision of approved educational programs is required to achieve responsive education.

Graduates should not only update their professional knowledge but also develop essential skills such as critical thinking, effective communication, moral sense, social responsibility, learning, and continuing education.

The legal training program is effective for environmental health students. This program can improve various aspects of satisfaction, motivation, commitment, implementation, and barrier removal.

Abbreviation list

Environmental Health Engineering Department of Gonabad University of Medical Sciences (EHEDGUMS).
Content Validity Ratio (CVR)
Content Validity Index (CVI)
Statistical Package for Social Sciences (SPSS)

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Data availability

All datasets generated or analyzed during this study are available from the corresponding author upon reasonable request.

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