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Knowledge, Attitude, and Practice of Students from Kurdistan University of Medical Sciences regarding Fire Safety in 2023: A Cross-Sectional Study

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ABSTRACT

Background: Fire is a significant disaster that poses a threat to people's lives, properties, and overall well-being. The level of awareness within a community plays a crucial role in effective handling of fire incidents. This research aims to assess knowledge, attitude, and practice of students at Kurdistan University of Medical Sciences concerning fire safety.

Methods: This was a cross-sectional descriptive study conducted in 2023 among the students studying medical sciences in Kurdistan. The sample size consisted of 250 participants, and data were collected using a researcher-made questionnaire consisting of four parts: demographic information, knowledge, attitude, and practice. Data analysis was performed using SPSS24, employing descriptive statistics, independent t-tests, and ANOVA.

Results: The mean and standard deviation of knowledge, attitude, and performance scores were 23.28 ± 4.31, 21.53 ± 8.36, and 23.04 ± 4.94, respectively, and the average scores of knowledge, attitude, and performance were reported in 24.56%, 32.59%, and 41.05% of the participants. The results indicated a statistically significant relationship between the average knowledge score and gender and educational level ($p < 0.05$). The primary sourceof information about fire for students was the Internet, followed by professors and academic units' views.

Conclusion: The findings of this study reveal an average level of knowledge, attitude, and performance among students regarding fire safety, and the obtained scores are considered inadequate for educated and young individuals in the country. It is recommended to develop suitable educational programs that encompass both theoretical knowledge and practical exercises (maneuvers) to enhance awareness, foster the right attitude, and improve practice. These educational programs should be conducted regularly to minimize forgetfulness in this context.

Keywords: Knowledge, Attitude, Practice, Student, Fire safety

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Introduction

Fire is a destructive and significant factor that can cause extensive damage to peoples' lives and property if proper safety measures are not followed. It is one of the oldest disasters that can rapidly endanger people's well-being and belongings. Therefore, raising awareness among individuals in society is crucial when dealing with such incidents (1). Analyzing statistics and the causes of fires in various industrialized countries has revealed that 75-80% of the fires can be prevented, resulting in a significant reduction of 3.4% in annual fire losses. Workplace fires account for one-third of all the fire incidents, leading to irreparable losses (2). The primary causes of fatalities in fire-related incidents are smoke inhalation, toxic gases, and high temperatures. In many cases, victims do not exhibit signs of direct contact with flames or extreme heat. The risks associated with smoke and toxic gases are manifested in different ways (3). Fire is an incident that can occur unexpectedly at any time and in any location. However, it's important to remember that most accidents are preventable. Many house fires, particularly in urban areas, are caused by carelessness or structural deterioration, both of which can be mitigated with foresight and investment. Every fire requires three elements to ignite: oxygen, heat, and combustible materials. By eliminating any of these components, the likelihood of a fire occurring can be greatly reduced. All the fire prevention and suppression methods are based on this fundamental principle (4). Student dormitories are susceptible to the damage caused by unforeseen events, especially fires, due to the constant occupancy, high population density, furniture arrangement, and the presence of refrigeration and heating equipment. The lack of a crisis management plan and insufficient knowledge among students and staff on handling emergency situations and ensuring safety can result in irreversible losses and damages (5).

Students' lack of awareness regarding appropriate responses in the event of an accident, coupled with blocked emergency exit routes, expose students to various risks. Despite the round-the-clock usage of dormitories and the possibility of unexpected incidents, inadequate attention has been given to crisis management and non-structural measures in such facilities. Proper prevention and preparedness achieved through providing students with sufficient practical knowledge can yield favorable outcomes (6). Educational spaces, particularly universities, face significant risks and potential harm due to the large number of users and the presence of important documents and research materials. Disorganized structure and insufficient awareness of professors and university staff regarding critical conditions and proper crisis response also emphasize the importance of addressing this issue (7). In the study by Amasi et al., it was stated that public education about fire prevention is very important and should be included in the school curriculum to reduce fire hazards (8).

Furthermore, considering their future careers and active roles in society's health and treatment, medical students should acquire a high level of knowledge regarding fire prevention, control, and management. No article was found in domestic or foreign scientific databases regarding the level of knowledge, attitude, and performance of medical students in Kurdistan region. Therefore, this study aims to explore the knowledge, attitude, and practice of students at Kurdistan University of Medical Sciences respecting fire safety.

Methods

This study employed a descriptive-cross-sectional research method. The statistical population comprised all the students in Kurdistan University of Medical Sciences. A sample size of 250 individuals was selected using a statistical formula. Kurdistan University of Medical Sciences encompasses five faculties: health, nursing-midwifery, medicine, dentistry, and paramedicine. The sample size of 250 was determined based on a previous study (9) and was calculated using the formula, with a confidence level of 95% and Z = 1.96

$$n = \frac{z^2 p(1-p)}{d^2}$$

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These 250 individuals were chosen through a lottery system based on the number of students within each faculty. Once informed consent was obtained from the students, necessary explanations were provided, and the confidentiality was insured, questionnaires were distributed to the participants.

Please pharaphrise this

Participants in the study had to be students at Kurdistan University of Medical Sciences and stay involved in the program until it finished. Individuals who refused to collaborate or failed to fill out the survey were not included in the research. The requirements were explained to potential participants prior to the start of the research, and only those who showed interest and agreed were included in the study.

Research tool

This research utilized a researcher-made questionnaire as the data collection tool. The questionnaire was developed through an extensive review of texts, articles, and expert opinions in the field. The value of (Content Validity Index) CVI for each item was reported to be higher than 0.79, and the reliability of the questionnaire was confirmed by Cronbach's alpha. Using a pilot study, 30 questionnaires were completed by the target group (students) and Cronbach's alpha of 0.83, 0.85, and 0.92 was obtained regarding knowledge, attitude and practice sections respectively.

The questionnaire consists of four parts: demographic information, awareness, attitude, and performance. The demographic section included items related to gender, age, faculty, income, educational level, and marital status. The awareness section comprised 20 questions with three choices (correct, incorrect, and "I don't know"), and the assigned scores of 2, 0, and 1, respectively.

For knowledge assessment, students' scores were categorized into three groups: good knowledge (26-40), medium knowledge (13-26), and poor knowledge (0-13). The attitude section consisted of ten questions measured on a five-point Likert scale (ranging from strongly agree to strongly disagree), with scores ranging from zero to four. Students' scores were then classified into three groups: good attitude (26-40), average attitude (13-26), and poor attitude (0-13).

The practice section also included ten questions evaluated on a five-point Likert scale (ranging from always to never). Scores were assigned from zero to four, and students' practice levels were categorized as good (26-40), average (13-26), and poor (0-13). The study focused on working students enrolled in Kurdistan University of Medical Sciences as the target population**.**

Statistical analysis of data

The collected data was entered into SPSS 24 software for statistical analysis. Descriptive statistics, such as means, standard deviations, frequencies, and percentages, were used to summarize and describe data. Inferential statistical tests, specifically independent t-tests and analysis of variance (ANOVA), were conducted to examine any significant differences or relationships between the variables. A significance level of 0.05 (or a 5% significance level) was chosen, indicating that the results with a P-value of less than 0.05 were considered statistically significant.

Results

The average age of the students in the study was 22.17 ± 4.07. Detailed demographic characteristics of the participants can be found in Table 1.

The results of the study also revealed a statistically significant relationship between the average knowledge score and gender and educational level ($P < 0.05$).

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Table 1. Average and standard deviation of knowledge, attitude, and practice of students based on demographic characteristics

Demographic		Frequency		Awareness score		Attitude score		Practice score	
		Number	Percentage	M	SD	M	SD	M	SD
Gender	Man	195	78	23.28	2.25	21.25	3.39	23.87	5.51
	Woman	55	22	15.61	2.11	21.04	3.25	23.01	5.88
P				0.04		0.22		0.27	
Age (year)	< 21	89	35.6	23.28	2.95	21.65	3.11	23.34	5.09
	21-24	120	48	23.29	2.34	21.95	4.05	23.69	5.03
	> 24	41	16.4	22.24	2.09	21.44	2.91	23.50	5.33
P				0.24		0.61		0.23	
Faculty	Medicine	80	32	23.06	2.64	21.35	2.87	23.74	5.62
	Paramedical	57	22.8	23.31	2.02	21.12	2.65	23.04	5.94
	Dentistry	50	20	23.64	2.67	21.05	2.24	23.57	5.08
	Health	39	15.6	22.66	2.39	20.56	2.33	23.19	5.65
	Nursing and midwifery	24	9.6	22.33	2.28	21.07	2.69	23.34	5.16
P				0.62		0.15		0.22	
Grade	Bachelor's degree	115	46	17.08	2.28	21.69	2.74	23.32	5.35
	Master's degree	79	31.6	20.55	2.38	21.03	2.88	22.99	5.15
	PhD	56	22.4	26.39	2.96	21.11	2.20	23.96	5.44
P									
Income	High	55	22	23.36	2.49	21.02	2.12	23.57	5.68
	Middle	167	66.8	23.33	2.33	21.44	2.04	23.93	5.05
	Low	28	11.2	23.07	2.69	21.74	2.36	23.56	5.14
P				0.25		0.24		0.32	
Marital status	Bachelor's degree	178	71.2	23.64	2.04	21.91	2.77	23.55	5.59
	Married	72	28.8	23.98	2.11	21.08	2.86	23.05	5.55
P				0.19		0.21		0.21	

*Independent samples T-test
**ANOVA

The results indicated that the mean and standard deviation of knowledge, attitude, and practice scores were 23.28 ± 4.31, 21.53 ± 8.36, and 23.04 ± 4.94, respectively (Table 2).

Table 3 indicates that the primary sources of information for students regarding fire were the Internet.

Table 2. Average scores of knowledge, attitude, and practice of the students

Variable	Frequency (number)	Score range	M ± SD	Score status (percentage)		
				Good	Average	Poor
Knowledge	250	0-40	23.28 ± 4.31	16.63	56.24	27.13
Attitude	250	0-40	21.53 ± 8.36	21.20	59.32	19.48
Practice	250	0-40	23.04 ± 4.94	31.07	41.05	27.88

Table 3. Key sources of information on fire for students

Resources	Frequency	
	Number	Percentage
Internet	108	43.20
Professors and courses	61	24.40
Books and magazines	37	14.80
Friends and families	29	11.60
TV and radio	15	6
Total	250	100

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Discussion

Sufficient knowledge and awareness within the community are crucial in effective method of managingfire incidents. Most fires originate from small fires that can quickly escalate into uncontrollable blazes within a span of fewer than 5 minutes. Promoting the culture of safety among society members, particularly students and young individuals, can significantly reduce the number of accidents and the resulting damages. Therefore, this study was conducted to assess the level of knowledge, attitude, and practice of students at Kurdistan University of Medical Sciences regarding fire safety.

The findings revealed that the average knowledge score was 23.428 ± 31, with 56.24% of the participants falling within the average range. These results were consistent with the studies conducted by Delshad (7) and Jalali (10), but differed from those of Musigapong (11) and Yeturu (12). In another study by Dawoodian, it was found that 40.87% of the participants lacked knowledge about fire prevention, and 19.3% had limited knowledge of preventive methods. Furthermore, 73% were unaware of fire control methods (13). Similarly, a study conducted in Shiraz reported that 70% of the surveyed students lacked the necessary knowledge on fire prevention and extinguishing methods (2). Considering the sensitive and high-risk nature of medical professions, the level of awareness revealed by this study was not deemed sufficient. It is possible that the existing courses and topics related to fire safety in the curriculum of medical students lack practicality or require further emphasis. Hence, integrating comprehensive fire safety courses into the educational curriculum is necessary. Furthermore, the study found a statistically significant relationship between average knowledge scores and gender, which aligned with the findings by Morrongiello (14), Karemaker (15), and Rahim (16); however the results differed from the studies conducted by DeChamplain (17), Kim (18), and Baek (19). This gender disparity in knowledge may be attributed to differences in personality traits, physical capabilities, and practical experience in dealing with accidents and fires, which typically provided men with greater skills and knowledge in this area.

The study also identified a statistically significant relationship between average knowledge scores and educational level, which was consistent with Hong's research (20). Students at higher educational levels displayed greater knowledge, possibly due to their completion of related coursework and workshops on fire safety. Regarding attitudes, the mean attitude score was found to be 21.53 ± 8.36, with 59.32% falling within the average range. These results supported the findings of Mihanpour's study (9), suggesting that fostering a positive safety attitude among students directly contributes to enhancing safety levels and preventing fire incidents in various settings such as workplaces, universities, and dormitories. Encouraging students to engage in safe behaviors can effectively reduce accidents.

In terms of practice, the mean practice score was 23.04 ± 4.94, with 41.05% falling within the average range. These findings aligned with Mihanpour's study (9). The study emphasized the need for continuous theoretical and practical training for medical science students. Mere knowledge and awareness on fire-related topics may not be sufficient to encourage correct individual behaviors unless the individuals are supported by ongoing training sessions. In summary, this study shed light on the importance of enhancing knowledge, attitude, and practice related to fire safety among the students. The findings underscored the need for comprehensive education, practical training, and the development of a positive safety culture to mitigate the risks associated with fire incidents in various settings. The primary sources which provided students with information about fire were the Internet, followed by professors, and academic units. In a study conducted by Shirazeh Arghami (2) it was found that most individuals gained their knowledge about fire extinguishing methods through their education in school and university. The present study also had certain limitations. One limitation was the use of self-report questionnaires, which may not

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always yield accurate results. Since the study was descriptive in nature, the causal relationships were not established. Furthermore, the findings of the study could not be generalized to all the students across the country. Therefore, it was recommended to conduct further research to investigate the impact of education within this particular group.

Conclusion

Based on the findings of this study, which assessed the knowledge, attitude, and practice of students regarding fire safety at an average level, the scores obtained by the participants are not deemed satisfactory for educated and young individuals in the community. It is recommended to develop appropriate educational programs that encompass theoretical knowledge as well as practical training exercises (maneuvers). These programs can enhance students' awareness, foster the right attitude, and improve their performance. Regular and continuous implementation of these educational programs is essential to minimize the risk of forgetfulness in this domain.

Data availability statement

The original contributions presented in the study were included in the article/supplementary material, and further inquiries can be directed to the corresponding author.

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Ethical considerations

The students who took part in the study were instructed not to write their names on the questionnaires. They were assured that all the questionnaires would be collected in a single location for statistical analysis, and their confidentiality would be maintained. The research conducted followed all the principles outlined in the Declaration of Helsinki. This article was derived from a research project conducted at Kurdistan University of Medical Sciences, which adhered to an approved code of ethics set by the university's ethics committee.

Code of ethics

IR.MUK.REC.1401.406

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Conflict of interests

The authors declared no conflict of interests.

Author’s contributions

All the authors contributed to the initial writing and subsequent revisions of the article. They had collectively approved the final version of the manuscript and taken the responsibility for the accuracy and integrity of its content.

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