Original Article

Evaluation of Patient's Knowledge of Prevention and Treatment of Burn Injuries

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ABSTRACT

Background: Burn injuries are amongst the most devastating causes of trauma worldwide. Preventive measures can be of great value in decreasing burn incidents. Increasing the knowledge and education of patients is a crucial step in this process.

Methods: In this prospective cross-sectional study, we evaluated 82 patients with burn injuries who were divided into two groups randomly during the 2018 to 2019 at Shahid Motahari Hospital, Tehran, Iran. The first group received an e-Book, and the second group a paperback booklet to read before visiting their primary care. Besides, both groups received a questionnaire on their knowledge of burn injuries and prevention before and after the visit. The e-Book and paperback booklet included basic information about burn injuries and preventive measures. We compared the questionnaire results in both groups before and after reading the e-book and booklet using a paired t-test analysis.

Results: There was a significant improvement in self-reported knowledge of burn prevention ($P < 0.05$; CI: 95%). Subjects receiving the eBook performed significantly had better post-survey ($P < .01$, 95% CI), despite equivalent pre-survey scores compared to those receiving the booklet.

Conclusion: Increased use of interactive educational modalities, such as an e-book, can benefit patients with knowledge of their disease and improve the quality of care. These modalities may increase compliance with the physician's recommendations regarding their disease states and treatments.

KEYWORDS
Interactive e-book; Knowledge; Education; Burn Prevention

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INTRODUCTION

According to the WHO, burn injuries can cause an estimated 180,000 death annually, with a high tendency in low- and middle-income countries[1,2]. Besides, non-fatal burn injuries can lead to further complications; therefore, preventing these injuries can decrease the frequency of associated morbidities and moralities[3].
Burn injuries are preventable, and there are basic methods to prevent these injuries, such as education and safety measures in buildings, houses, and workplaces (i.e., installing smoke detectors, fire extinguishers, emergency exits, etc.)[4].

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Education is an essential part of prevention which has different aspects, from educating the general population on prevention and first aid for burn injuries to training healthcare system members for first aid and management of burn injuries[4,5]. This education should be an active process that necessitates continuous training and intermittent workshops.

Physicians and nurses are usually busy with the routine daily tasks of caring for and treating patients, which do not allow them to interact sufficiently with patients and spend enough time with them to provide enough information and education on different aspects of their disease[6]. Therefore, other methods and modalities should be utilized to assist in the educational pathway and compensate for the lack of communication between healthcare professionals and patients. One of these tools is electronic books (e-books) which can be given to patients at any time to provide more information about their disease (prevention, diagnosis, or treatment) and compensate for the knowledge gap[7]. We aimed to evaluate the basic knowledge of the patients on burn injuries, preventative measures, and basic first aid before and after presenting an e-book on burn injuries with the necessary information.

MATERIAL AND METHODS

We enrolled patients with first and second-degree burn injuries presenting to our clinic at Shahid Motahari Hospital (Tehran, Iran) from October 2018 to December 2019. Our team evaluated the burn injuries based on their extent, depth, and location. In addition, we recorded the demographic data on age and sex, cause of the burn, and total burn surface area (TBSA).

We randomly assigned patients into two groups; one group received the e-book, while the other received a booklet that served as the control. We surveyed all patients about their perception of burn injuries knowledge using a questionnaire consisting of six statements (Likert scale) and four basic knowledge questions (Multiple choice with only one correct answer). All patients (case and control) received the same questionnaire after visiting the physician to evaluate any changes in their knowledge. There were also four questions measuring patients' general perception of burn injuries.

Our team obtained informed consent from patients or their guardians before participating in the study. The Iran University of Medical Sciences IRB Committee approved this study. (Ethical code: IR.IUMS.SMD.REC.1399.041)

Statistical analysis

We used SPSS software version 18 (Chicago, IL, USA) to analyze the data, calculating the descriptive measures (e.g., mean, standard deviation, frequencies, and percentages). Results for quantitative variables are given as mean ± standard deviation, and parametric tests (Student's *t* and Chi-square tests) were used to identify statistical differences. A P-value < 0.05 was considered significant.

RESULTS

A total of 82 patients participated in this study, including 53 males (68%) and 51 (32%) females, with burn injuries were enrolled. The mean age of the patients was 36 years (range: 18–63 years), with the mean length of hospital stay of 17.16 days (range: 2–124 days).

Table 1 shows the demographics of the enrolled patients. Age average had no significant difference between the two groups (P=0.79). However, there was statistically significant differences between case and control groups regarding their educational level (P= 0.02) and professional experience years (P= 0.01), respectively.

Table 2 shows comparison of answering the questions pre- and post-visit with caregiver in case group. The results only shows statistically significant difference in one question (question 5 asking the knowledge of patients on first aid after burn injuries) before and after e-book and visiting caregiver.

Fig.1 depicts the mean pre and post scores difference in perception of knowledge and factual knowledge in both the control and experimental groups.

Gain in perceived and factual knowledge was higher in the experimental (case) group in comparison to the control group (P = 0.03). Experimental group used the interactive e-book and control group used a paperback booklet.

Fig. 2 indicates the average improvement to questions 1 through 5 by assessment of the perception of the knowledge. Also, it shows the overall correct percentage in the survey's assessment of the factual knowledge.

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Table 1: Demographics of subjects who participated in the study

Variable	Case*	Control**	*P*-value
Mean Age (yr)	36.95 ±11.56	37.63 ±11.49	0.79
Gender			
Male	27	26	
Female	14	15	
Educational Level			
Illiterate	3	1	**0.02**
Elementary	0	0	
Intermediate	0	0	
High School	15	13	
Diploma	17	21	
Associate	0	0	
Bachelors	5	5	
Masters	1	1	
Professional experience (years)			
< 5	14	7	**0.01**
≥5 & < 10	6	8	
≥ 10	5	6	

*Case group received the e-book

**Control group received paper booklet

Table 2: Comparison of survey questions pre- and post-visit with caregiver(s) using the independent samples test

Variable		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Question 1 cause of burn injuries	Equal variances assumed	4.214	.043	-.467	80	.642
	Equal variances not assumed			-.467	73.642	.642
Question 2 vulnerable individuals	Equal variances assumed	1.225	.272	-.765	80	.447
	Equal variances not assumed			-.765	78.429	.447
Question 3 preventative	Equal variances assumed	8.446	.005	-.882	80	.381
	Equal variances not assumed			-.882	73.033	.381
Question 4 degree of burn	Equal variances assumed	1.933	.168	-1.450	80	.151
	Equal variances not assumed			-1.450	77.058	.151
Question 5 First aid	Equal variances assumed	6.370	.014	-2.500	80	.014
	Equal variances not assumed			-2.500	72.265	.015
Question 6 age group affected	Equal variances assumed	1.814	.182	.686	80	.494
	Equal variances not assumed			.686	79.823	.494
Question 7 knowledge burn treatment	Equal variances assumed	3.995	.049	.545	80	.588
	Equal variances not assumed			.545	76.229	.588
Question 8 increased risk	Equal variances assumed	2.014	.160	.713	80	.478
	Equal variances not assumed			.713	79.634	.478
Question 9 first aid in burn	Equal variances assumed	2.793	.099	.899	80	.371
	Equal variances not assumed			.899	79.835	.371
Question 10 treatment of burn	Equal variances assumed	3.463	.066	.943	80	.349
	Equal variances not assumed			.943	79.448	.349

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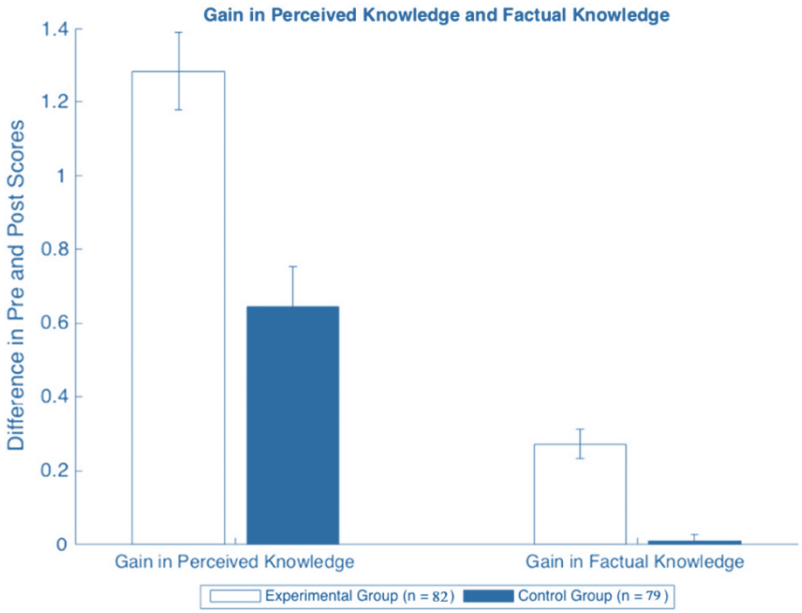

Figure 1: Mean pre and post scores difference in perception of knowledge and factual knowledge in the control group and experimental group

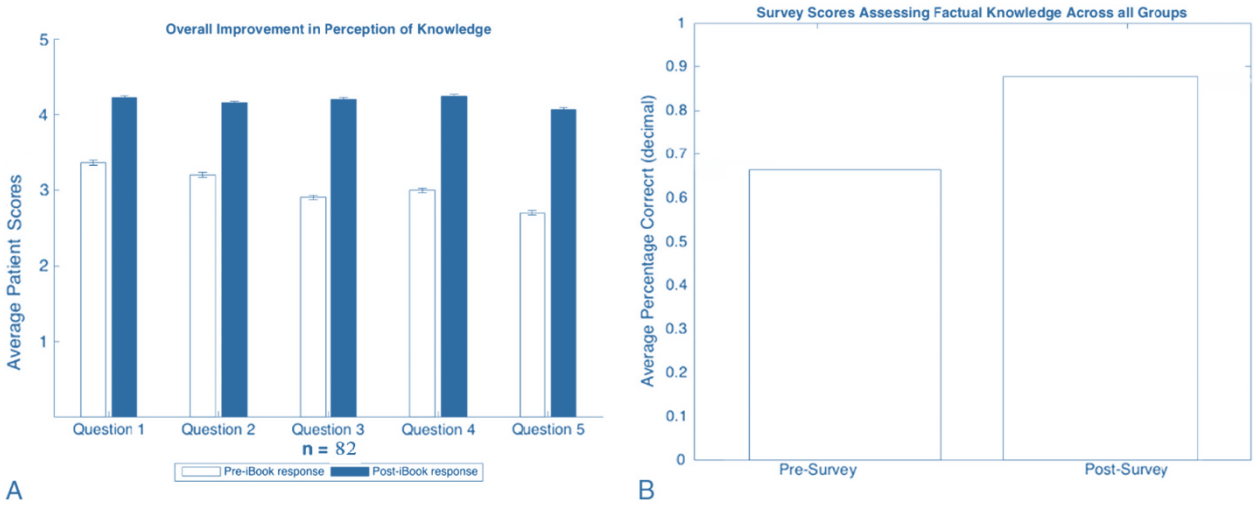

Figure 2: (A) Average improvement to questions 1 through 5 assessing the perception of knowledge. (B) Overall percent correct in the survey's assessing factual knowledge

DISCUSSION

Our study showed a significant improvement in self-reported knowledge of electrical injuries in all patients regardless of the type of intervention (e-book vs. pamphlet). However, the improvement was more prominent in patients receiving the e-book. In addition, the self-reported quality and satisfaction were higher in patients receiving e-books than in the group-receiving booklet. Our results are similar to previous studies indicating interactive electronic books to be more productive than other methods[8-14].

Patients with higher educational levels perceive care differently than patients with lower educational backgrounds[15-17]. These findings were evident in our patient population as well. Even though patients of all academic backgrounds experienced an improvement in the perception of knowledge, factual knowledge gained was not achieved equally. While those with graduate degrees had the most significant improvement in factual knowledge acquired, this

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cohort had the lowest pre-survey understanding of their disease before reading the eBook. This suggests that those with higher education may not have increased baseline knowledge of their disease. This has substantial implications for physicians who may incorrectly assume that patients with advanced degrees are more knowledgeable about their condition and thus require less explanation[18]. The effect of education on patient satisfaction working with e-books is also reflected in our data, which demonstrates statistically more robust performance on baseline survey scores and following educational intervention in patients receiving eBooks compared to those with lower levels of education.

Regarding patient satisfaction and reception to educational interventions and the digital enhancement of the clinical experience, our data suggest that eBook administration was preferred over text-based resources (i.e., pamphlet administration)[19,20]. eBook-based educational interventions helped optimize the clinical encounter by giving the clinician the discretionary time that would generally be devoted to explaining the patient's medical condition. This allowed the clinician to build on the knowledge gained from the educational intervention and provide focused and personalized information or conceptual clarification while minimizing the likelihood of patient misunderstanding and dissatisfaction [21]. Furthermore, patients reported an overall more significant increase in patient satisfaction following iBook administration that was not observed with pamphlet administration[18, 22, 23].

This study was limited because it only assessed short-term content retention since the pre- and post-surveys were administered during the same visit. Future studies should focus on assessing long-term recall. Furthermore, potential studies can evaluate the interactive mode of delivery to engage the reader in the eBook by comparing eBook supplementation to patients receiving a non-interactive educational resource, such as an informational pamphlet. The control group would be provided identical information using printed material, allowing us to make further inferences on how patients learn new information.

CONCLUSION

Using interactive educational interventions, patients of all educational backgrounds and burn pathologies demonstrated improved subjective understanding of conditions and treatment options. A simultaneous improvement in objective knowledge validated this. The implementation of eBooks to augment patient education should be investigated in other medical specialties and patient populations.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interests.

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