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Evaluation of the Impact of Webinar Training in Comparison to Conventional Training on COVID-19 Risk Perception in Emergency Medical Technicians

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Abstract

Background: The COVID-19 pandemic has affected in countless ways conventional teaching methods and led to a sudden shift in teaching methods toward distance teaching.
Objectives: Hence, this study aimed to evaluate the impact of webinar training compared to conventional training on the risk perception of COVID-19 in emergency medical technicians (EMTs).
Methods: This quasi-experimental study selected 70 EMTs employed at the emergency medical services (EMS) affiliated to the Birjand University of Medical Sciences via convenience sampling. The participants were randomly designed into a webinar training group (n = 35) and a conventional training group (n = 35). The risk perception of COVID-19 was evaluated using a researcher-made questionnaire (40 questions) at baseline and immediately after teaching. The study data were analyzed using SPSS V.26, descriptive (frequency, mean, and standard deviation), and inferential statistics (*t*-test, ANOVA, and chi-square test).
Results: All the 70 participants completed the questionnaire. The mean score of COVID-19 risk perception in both groups improved following teaching ($P < 0.001$). However, there was no statistically significant difference between the groups immediately after training ($P = 0.76$). Also, independent *t*-test and one-way ANOVA showed that the mean score of COVID-19 risk perception had no significant difference with the participants' demographic data in the two groups ($P > 0.05$).
Conclusions: The webinar in the form of distance teaching can be as effective as conventional teaching in improving COVID-19 risk perception. Therefore, a webinar format can be used during pandemics of infectious diseases when conventional training is impossible.

Keywords: COVID-19, Emergency Medical Technicians, Risk Perception, Conventional Training, Preventive Measures

1. Background

The COVID-19 outbreak was detected in Wuhan, China, in December 2019, which rapidly led to a worldwide pandemic (1-3). In Iran, the COVID-19 outbreak was officially announced on February 18, 2020 (4). So far (April 21, 2021), the COVID-19 pandemic has infected near 2,286,927 people across Iran, of whom over 67,525 people have lost their lives.

According to the nature of their work, healthcare workers are always at risk of infectious diseases (5). In a study, the rate of disease transmission to healthcare workers was reported as 29% (6). In Iran, more than 6,000 healthcare workers have been infected by COVID-19, and more than 150 of them have died (7).

Healthcare workers, especially emergency medical technicians (EMTs), who are the mainstay of healthcare in prehospital services, have always been at risk of infectious diseases. The spread of the new virus has multiplied the risk. On the other hand, given the large number of EMTs infected with COVID-19, there is a gap between their knowledge and performance. In this regard, Brotons et al. (8) reported a lack of disease risk perception as one of the possible causes of the gap between knowledge and performance of healthcare workers in preventing diseases and promoting their health.

Training preventive measures in prehospital services on COVID-19 risk perception could improve protective behaviors in EMTs. On the other hand, many countries have applied social distancing measures to reduce the spread of COVID-19, which has also restrained conventional teaching (9). Nowadays, to overcome this problem, regarding

recent advances in network technology, methods for the simultaneous delivery of distance education, such as webinars, are rising. Of course, distance education has been in place for some time (10-12). Since distance education gives more flexibility to students, many have considered it the preferred mode of teaching in the future. A study on surgical skills training indicated that web-based distance learning was a feasible alternative to face-to-face surgical skills teaching (9). Due to certain advantages of distance education, this type of teaching has become necessary during the COVID-19 pandemic when social contact is minimal. A webinar, supported by synchronous platforms, such as Adobe Acrobat Connect, is a real-time online interaction between an instructor and a variety of geographically segregated learners (13). Hence, it is worthwhile to evaluate this type of training method.

2. Objectives

Since evidence to evaluate the potential of webinar education is limited to few studies, this study aimed to evaluate the impact of webinar training compared to conventional training on COVID-19 risk perception in EMTs using preventive measures training in prehospital services as an educational intervention.

3. Methods

3.1. Study Design

This quasi-experimental study was conducted in 2021. The research population consisted of all EMTs employed at the emergency medical services (EMS) affiliated to the Birjand University of Medical Sciences, Southern Khorasan Province, Iran. Since no similar study was found in this regard, considering a confidence level of 95%, a power of 80%, and an effect size of 0.7, the sample size in each group was estimated to be 32. To avoid the effects of potential dropouts and increase the accuracy of the measurement, we selected 35 participants for each group.

3.2. Participants

Seventy EMTs with no COVID-19 symptoms were selected through convenience sampling based on predetermined inclusion criteria. The inclusion criteria were EMTs with at least one year of experience in EMS and willingness to participate in the study. EMTs who incompletely filled out their questionnaires were excluded. The participants were randomly allocated into one of the two groups of conventional training (n = 35) and webinar training (n = 35) using a random-numbers table.

3.3. Intervention

The conventional training group received a live PowerPoint presentation of preventive measures in prehospital services on COVID-19 risk perception during 6 hours in a regular classroom with the implementation of health protocols. Also, the webinar group received the same training simultaneously via an individual computer or mobile device hosted on the Adobe Acrobat Connect conferencing platform. Preventive measures included teaching hand hygiene, donning and doffing of personal protective equipment (8), cardiopulmonary resuscitation, and Do's and Don'ts in the COVID-19 pandemic.

3.4. Data Collection

An online survey was used to collect data to prevent the spread of COVID-19. A researcher-made questionnaire was designed on Google Form, and a link was sent to the participants on WhatsApp groups. The questionnaire consists of questions related to demographics data and COVID-19 risk perception. The data in the demographic questionnaire consisted of gender, age category, marital status, educational status, work experience, and workplace. Questions related to risk perception consisted of 40 items in eight main dimensions, namely background knowledge of COVID-19 (eight items), perception of the seriousness of COVID-19 (three items), perception of susceptibility to COVID-19 (three items), perceived efficacy of preventive measures (five items), EMS factors (six items), family environment factors (five items), social factors (five items) and motivating/hindering factors (five items). The items of the dimensions were scored on a 5-point Likert-type scale (1) completely disagree; 2, disagree; 3, undecided; 4, agree; and 5, completely agree). The questionnaire was prepared based on the available articles (4, 14-17).

The mean score of COVID-19 risk perception was calculated by summing the scores of the questions and dividing them by the number of participants. Thus, the mean score of COVID-19 risk perception would be 40 to 200. At two time points, the data were collected. The first point of data collection was baseline (the day before teaching), and the next point of time was immediately after the intervention.

By content validity index (CVI) calculation, the content validity of the questionnaire was assessed. Hence, seven experts were requested to comment on the relevance of each item of the questionnaire on a 4-point Likert-type scale as follows: (1) Irrelevant; (2) somehow relevant; (3) relevant; and (4) completely relevant. Accordingly, the CVI of each item was calculated by dividing the number of experts rating that item as 3 or 4 by the total number of experts (n = 7). Finally, CVI values in this study were obtained from 0.87 to 1, with the total CVI value being 0.94.

The reliability assessment of the questionnaire was performed using a pilot study with 30 EMTs who were not included in the present study. The Cronbach's alpha of the questionnaire and its dimensions were 0.87 and 0.71 to 0.92, respectively.

3.5. Ethics Considerations

The Ethics and Research Committee of the Birjand University of Medical Sciences approved the study protocol (approval code: IR.BUMS.REC.1400.014). Firstly, the objectives and procedures of the study were explained to the participants. Then, they were informed that they would be free to withdraw from the study at any time.

3.6. Statistical Analysis

The Shapiro-Wilk test was performed to ensure the normal distribution of the data. A value of $P > 0.05$ confirmed that the data were normally distributed. Therefore, parametric statistics were used. The paired *t*-test was applied to compare the mean scores of risk perception before and immediately after teaching within each group, and an independent *t*-test was used to compare the groups. Also, one-way ANOVA was used for data analysis, and the chi-square test was used to compare the demographic data between the groups. For all the tests, the level of significance was set at $P < 0.05$. Analysis of the study data was performed using SPSS software, version 26.

4. Results

All the 35 EMTs from the conventional training group attended classroom-based teaching. Of them, 20 held an associate's degree, and 15 held a bachelor's degree. Also, of the EMTs, 33 were male, and two were female. All the 35 EMTs from the distance training group watched and listened to the lecture simultaneously using the webinar. They comprised 17 EMTs with an associate's degree and 18 EMTs with a bachelor's degree. There were 33 males and two females in this group. In terms of the participants' demographic data, there was no statistically significant difference between the study groups ($P > 0.05$; Table 1).

The independent *t*-test revealed that the mean score of COVID-19 risk perception was not significantly different between the two groups before the intervention ($P = 0.79$; Table 2). However, the paired sample *t*-test demonstrated that the mean score of COVID-19 risk perception was significantly improved immediately after training across the two groups ($P < 0.001$). There was also no statistically significant difference between the groups immediately after training ($P = 0.76$; Table 2). The independent *t*-test also indicated no significant difference between the groups based on the mean score of COVID-19 risk perception domains evaluated immediately after teaching ($P > 0.05$; Table 3). Moreover, the mean score of COVID-19 risk perception immediately after teaching had no significant difference with the participants' demographic data in the two study groups ($P > 0.05$; Table 4).

Table 1. Comparison of Demographic Data Between Groups

Demographic Data	Group		P-Value[a]
	Conventional Training, No. (%)	Webinar Training, No. (%)	
Gender			1.00
Male	33 (94.3)	33 (94.3)	
Female	2 (5.7)	2 (5.7)	
Age, y			0.462
20 - 29	17 (48.6)	13 (37.1)	
30 - 39	16 (45.7)	21 (60)	
40 - 49	2 (5.7)	1 (2.9)	
Marital status			0.339
Single	19 (54.3)	15 (42.9)	
Married	16 (45.7)	20 (57.1)	
Educational status			0.473
Associate	20 (57.1)	17 (46.8)	
Bachelor's	15 (42.9)	18 (51.4)	
Workplace			0.339
Urban EMS	19 (54.3)	15 (42.9)	
Rural EMS	16 (45.7)	20 (57.1)	
Work experience, y			0.209
1 - 5	14 (40)	8 (22.9)	
6 - 10	10 (28.6)	11 (31.4)	
11 - 15	8 (22.9)	13 (37.1)	
> 16	3 (8.6)	3 (8.6)	

[a] Chi-square test results.

5. Discussion

This study aimed to evaluate the impact of webinar training compared to conventional training on COVID-19 risk perception in EMTs using preventive measures training in prehospital services as an educational intervention. The findings showed that both groups significantly improved their COVID-19 risk perception immediately after preventive measures teaching. This finding is consistent with the findings of Alnabelsi et al. (18), who investigated traditional teaching compared to synchronous e-learning

Table 2. Comparison of Mean Scores of COVID-19 Risk Perception Pre- and Post-Educational Intervention Within and Between Groups

Group	Baseline	Immediately after teaching	P-Value[a]
Conventional training group	149.28 ± 28.81	174.60 ± 20.03	< 0.001
Webinar training group	151.31 ± 33.33	173.28 ± 15.52	< 0.001
P-value[b]	0.79	0.76	

[a] P-value was calculated by paired *t*-test for within-group comparison.
[b] P-value was calculated by independent *t*-test for between-group comparison.

Table 3. Comparison of Mean Scores of COVID-19 Risk Perception Domains Evaluated After Teaching Between Groups

Domains of COVID-19 risk perception	Conventional Training, Mean ±SD	Webinar Training, Mean ±SD	P-Value[a]
knowledge of COVID-19	29.14 ± 3.78	28.88 ± 4.86	0.80
perception of the seriousness of COVID-19	12.71 ± 2.45	11.57 ± 3.10	0.09
perception of susceptibility to COVID-19	11.74 ± 2.94	11.51 ± 3.33	0.76
perceived efficacy of preventive measures	22.20 ± 3.26	21.31 ± 4.34	0.33
EMS factors	26.28 ± 5.19	25.94 ± 4.47	0.77
family environment factors	18.94 ± 3.67	18.25 ± 4.07	0.46
social factors	19.85 ± 3.58	19.25 ± 4.21	0.54
motivating/hindering factors	19.31 ± 3.78	18.65 ± 5.04	0.54

[a] P-value was calculated by independent *t*-test for between-group comparison.

using otolaryngological emergencies teaching as an educational intervention. In his study, a statistically significant difference was found between the two groups regarding test scores before and after the intervention. Besides, to support this finding, the results of several studies on the use of e-learning compared to traditional training were acquired, indicating no overall difference in these modes of teaching delivery in terms of knowledge (19-22).

The study by Bernard et al. revealed that classroom instruction had a significant difference in overall achievement outcomes compared to e-learning, which is inconsistent with our results (23). This difference may be attributed to the different methods used. In their meta-analysis study, most previous studies compared asynchronous e-learning to classroom instruction. In contrast, in our study, two teaching methods synchronously presented by an instructor were compared.

The disruption of conventional medical education across the world in the COVID-19 pandemic has led to the use of webinars to maintain teaching and learning. In a study, the use of webinars in 2020 compared to the same period in 2019 was reported to increase by more than 300% (24).

A webinar is a form of communication that connects learners and tutors using the Internet simultaneously (25). With a webinar, a presenter can share a presentation with their audience without physically being available. It is an effective way because interaction can be compelling during a webinar. Intelligent tools are necessary to direct that interaction, especially when there are many participants (26). Therefore, a webinar offers different interactive opportunities including asking questions, chatting, surveying, and administering tests. In the teaching and educational viewpoint, webinars are engaging because of the very high degree of interaction that helps participants learn and understand more quickly.

Formerly, other studies assessed the evidence regarding the benefits of webinar teaching as an educational intervention for health professionals. Edward Christopher Yo et al. (27) mentioned that the use of webinars for health professionals training in Indonesia was well-received amidst the outbreak pandemic. Also, Bhattarai et al. (28) reported that teaching through a webinar was an invaluable instrument for medical education, particularly during the need of social distancing. The findings of the mentioned studies are in line with those of the present study.

Synchronous online teaching has a unique advantage similar to conventional training in terms of the ability to provide immediate feedback and educational support (29). Moreover, it provides logistical, instructional, and financial advantages over conventional teaching (30). The ability of EMTs to participate in the learning process from any geographical location is the logistical advantage of the webinar format. While it provides interaction between EMTs and instructors in real-time, it eliminates travel costs

Table 4. Comparison of Mean Scores of COVID-19 Risk Perception After Teaching Based on Demographic Data

Demographic Data	Conventional Training, Mean ±SD	Webinar Training, Mean ±SD
Gender		
Male	174.41 ± 20.30	172.66 ± 15.60
Female	181.30 ± 17.32	183.50 ± 13.43
P-value[a]	0.75	0.34
Age, y		
20 - 29	178.50 ± 28.99	177.00 ± 14.13
30 - 39	177.08 ± 17.89	171.28 ± 16.57
40 - 49	172.80 ± 21.35	170.60 ± 10.16
P value[b]	0.54	0.81
Marital status		
Single	173.31 ± 19.79	178.40 ± 14.72
Married	175.68 ± 20.72	169.45 ± 15.34
P-value[a]	0.73	0.09
Educational status		
Associate	176.00 ± 22.70	176.35 ± 14.52
Bachelor's	173.78 ± 16.48	170.38 ± 16.28
P-value[a]	0.65	0.21
Workplace		
Urban EMS	171.82 ± 17.66	173.26 ± 13.64
Rural EMS	177.22 ± 22.23	173.30 ± 17.15
P-value[a]	0.43	0.99
Work experience, y		
1 - 5	173.25 ± 24.08	182.00 ± 12.89
6 - 10	183.92 ± 16.62	174.09 ± 15.97
11 - 15	163.50 ± 14.86	170.69 ± 15.45
> 16	166.50 ± 12.02	158.33 ± 10.96
P-value[b]	0.12	0.13

[a] P-value was calculated by independent *t*-test for between-group comparison.
[b] P-value was calculated by ANOVA for between-group comparison.

that is the financial benefit of the webinar format. Also, the opportunity for EMTs to utilize rich multimedia resources is the instructional advantage of this format.

One limitation of the study was that it was a self-reported survey, leading to a significant bias. Another limitation was the small number of the participants, which, overall, limits the generalizability of our results. Therefore, these limitations should be considered in future studies, and further studies are needed before a definitive conclusion can be drawn. In addition, further research is also necessary to assess the sustainability of webinar learning as an online educational intervention for learners.

5.1. Conclusions

In general, the present study results showed that webinar training was as practical as conventional training in terms of education. Thus, providing relevant training through webinars may fill the gap created by the suspension of conventional training, especially during the COVID-19 outbreak that restrictions are applied. Although the present study's findings cannot be generalized to other curricula or educational settings, it seems that at least the webinar teaching format is indicated to be an acceptable alternative to conventional teaching. Further studies are needed to support this conclusion. Hence, health policy-makers should consider the possibility of expanding webinar training to improve staff performance, particularly during the country's lockdown for infectious diseases prevention.

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Footnotes

Authors' Contribution: Seyyed Mohammad Reza Hosseini determined the study design. Mohammad Azim Mahmodi and Amir Mirhaghi collected, analyzed, and interpreted the data.

Conflict of Interests: The authors declare that they have no conflicts of interest.

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