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Research Paper

Satisfaction Survey on Training in Response to Multiple Casualties for New Firefighters

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Abstract:
The purpose of this study was to develop a simulation-based training program for MCI (mass casualty incident) response for new firefighters from the viewpoint of patient classification accuracy, response attitude, teamwork, and program satisfaction, and to verify satisfaction according to job field. This study was aimed at preliminary firefighters who were scheduled to enter the K fire school new recruitment course in early October 2021. This program was conducted for one day from 09:00 to 17:50 on November 15, 2021. It was written as a total of 28 questions, including 7 questions for practice content, 7 questions for practice method, 7 questions for practice environment, and 7 questions for debriefing. SPSS 23.0 for Windows was utilized to analyze the data. Participants' general characteristics were described using frequencies and percentages. Satisfaction scores were calculated as mean and standard deviation. As a result of this study, satisfaction was found to be statistically significant in the number of trainees and practice time. The protocol should be improved in consideration of various demographic characteristics, quality and time of training. In addition, in order to improve satisfaction, various expert verification and evaluation of the training protocol should be accompanied.
Keywords*: Satisfaction, casualties, training, firefighters*

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I. INTRODUCTION

Fire officials are exposed to a variety of accidents and must participate in emergency situations such as fire suppression, explosions, and natural disasters [1]. Since various incidents and accidents experienced by firefighters are sudden and unpredictable, continuous emergency training is required. Firefighting plays a key role at disaster sites by protecting people's lives and minimizing damage through prompt dispatch and efficient on-site activities to various disaster sites [2]. In order to be hired as such firefighters, through the basic training course for a certain period of time at the fire school, they will acquire basic knowledge and disaster response capabilities necessary for field activities such as fire, rescue, and first aid.

In particular, field-oriented education should be conducted to bring about the effect of transfer of education to applied studies [3]. Recently, various joint disaster response drills are being conducted in Korea, centered on the police, firefighting, and military, but many problems have been pointed out in terms of the comprehensive and systematic education system [4]. The purpose of education and training is to improve individual job competency and organizational productivity. A systematic and standardized education is required for consistent and consistent on-site response. In particular, consistent team training can improve team efficiency and achieve efficient work performance in a complex and dynamic work environment [5]. It is not easy to standardize the curriculum due to various variables such as facilities, equipment, number of training personnel, training hours, and scenario types, etc. Many instructors may be required. In addition, the quality and effectiveness of education are inevitably different depending on the experience of the participating instructors and the competency of the trainees. This study provides a hypothetical scenario in which emergency response training for multiple casualties is organized sequentially from the first responders to transfers to medical institutions, and the roles and missions of each responder are assigned to each individual. The purpose of this study is to examine the satisfaction of the participants in the training in response to multiple casualties by job field. This is to increase the differentiation of education provision according to job field and provide efficient and consistent education in the case of training for multiple casualties in the future.

II. RESEARCH METHOD AND MATERIALS

Research design

The study utilized a one-group post-test design to verify the effects of the practical training in response to multiple casualties utilizing the satisfaction test.

Data collection and treatment

The number of subjects suitable for this study was determined by the Cohen [6] formula after considering the significance level (α=.05), power (1-β=.80), and effect size (F=.50) of the sample size for each group. The minimum number of samples was 17, and 21 were used in the study considering the dropout rate. This study was aimed at preliminary firefighters who were scheduled to enter the K fire school new recruitment course in early October 2021. In order to prevent the participation of research subjects based on their interests, an announcement was made for the recruitment of research subjects to participate voluntarily. This is because the co-researcher belongs to the institution where the experiment is conducted. This researcher used the bulletin board on the first floor of the dormitory where the subjects live and posted them from November 3 to November 10, 2021 (for one week). In addition, after receiving a report and permission through the chain of command of the affiliated institution in advance, the selected research subjects will proceed with the multi-casual accident response training, reveal the title, method, and responsibility of the research, distribute the pre-written explanations to the subjects, and conduct the research. Written consent and cooperation were obtained.

This program was conducted for one day from 09:00 to 17:50 on November 15, 2021. From first-come-first-serve activities to transfers to medical institutions, mobilization units were formed sequentially. Based on a hypothetical scenario, individual roles and tasks were assigned to each dispatcher, and a practice protocol was developed suitable for organizational, step-by-step, and repetitive training. This program promotes convenience and efficiency of the training process for instructors, and requires uniform behavior from trainees to recognize individual roles. Therefore, a standardized practice protocol was developed to understand the flow of field response (Table 1).

Research tool

As key factors in applying the protocol of this study, it was written as a total of 28 questions, including 7 questions for practice content, 7 questions for practice method, 7 questions for practice environment, and 7 questions for debriefing. Satisfaction with practice training in response to multiple casualties was analyzed using the likert scale of 1 point for 'not satisfied at all' and 5 points for 'very satisfied'.

Data analysis

SPSS 23.0 for Windows was utilized to analyze the data. Participants' general characteristics were described using frequencies and percentages. Satisfaction scores were calculated as mean and standard deviation.

Table 1. Contents of protocol

Session	Subjects	Activities
1	First-come	① First-come team leader: Select the location of the temporary medical center and assign tasks to the team members. - Inform the emergency situation and report the situation. - When the rescue team arrives, explain the situation to the rescue team leader. - The patient status is handed over to the on-site emergency medical center. ② Team member 1: Classify the severity using the Modified-MASS method. ③ Team member 2: Classify the severity of the rescued patient by the Modified-MASS method.
2	Rescue team	· Check site safety. · Take over the rescue situation from the first responder team leader. ① Rescue team leader: Perform the duties of the rescue team leader and grasp the life-saving situation. - Assign tasks to team members. - Rescue from emergency patients. - Control the "Non-Emergency Patient" area after mission completion. ② Team members 1 and 2: Perform lifesaving work. - Rescue from emergency patients. - After completing the mission, control the "Emergency Patient" and "Emergency Patient" area.
3	Paramedic activity	· Check on-site safety and confirm the location of the temporary medical center from the first-come team leader. ① Rescue team leader: Perform the duties of the temporary medical center team leader and "classification team". - Assign tasks to team members. - Establishment of temporary medical center and temporary mortuary - Class organization (classification group, treatment group, transfer group) - Reclassification of severity (START method) ② Team member 1: Perform the "treatment team" mission. ③ Team member 2: Perform the "transfer team" mission.
4	Transport group activity	· Check site safety. ① Transfer team leader: Perform the task of transferring ambulance team leader.

		- Assign tasks to team members. - MCSC activation - Transfer patients and hospitals are selected by the transfer leader. ② Team member 1: Perform first aid duties during transport. ③ Team member 2: Perform the ambulance driving mission.
5	119 Emergency Situation Management Center Activities	· Check site safety. ① 119 Emergency Situation Management Team Leader: Performs training dispatch and general task of situation management. ② Team member 1: Manage the multiple casualty management system. ③ Team member 2: Perform liaison duties at disaster sites and related organizations.

. RESULTS

Demographic characteristics

The demographic characteristics of the subjects of this study are as follows. In terms of gender, 'male' 90.5%, by age, '26-30 years old' 57.1%, marriage 'unmarried' 90.5%, religion 'other' 61.9%, educational background 'university graduate' 80.9%, employment classification 'competitive recruitment' was 71.4%, field training experience 'no' was high 52.4% (Table 2).

Table 2. The demographic characteristics of subjects

Variable	Category		
		n	%
Total		21	100.0
Gender	Male	19	90.5
	Female	2	9.5
Age	20-25	3	14.3
	26=30	12	57.1
	31-35	6	28.6
Marriage	Unmarried	19	90.5
	Married	2	9.5
Religion	Christian	3	14.3
	Catholic	4	19.0
	Buddhism	1	4.8
	Other	13	61.9
Educational background	High school graduate	3	14.3
	College graduate	1	4.8
	University graduate	17	80.9
Employment classification	Open	6	28.6
	Competitive	15	71.4
Field training experience	Yes	10	47.6
	No	11	52.4

Satisfaction on training in response to multiple casualties

In terms of satisfaction with practice education for multiple casualties, question 16, 'the number of trainees is adequate to achieve the practical effect,' was found to be statistically significant (F=3.893, p=.039). The general firefighting score was 3.00, rescue 4.50, and first aid 4.36. In addition, it was found to be statistically significant in item 17, 'The time required to master the practice is appropriate' (F=4.399, p=.028). General firefighting was 2.67 points, rescue 4.25 points, and first aid 3.73 points (Table 3).

Table 3. Satisfaction with training in response to multiple casualties

Satisfaction with training in response to multiple casualties							
NO	Categories	Item	GF M(SD)	Rescue M(SD)	First aid M(SD)	F	*p*
1	Practice contents	It is designed to achieve the learning goals.	4.17(0.76)	4.75(0.50)	4.27(0.65)	1.045	.372
2		It gives you a new experience and is interesting and beneficial.	4,67(0.52)	4.75(0.50)	4.46(0.52)	0.6221	.548
3		Understand the flow of response to multiple casualties.	4.33(1.21)	4.75(0.50)	4.55(0.52)	0.356	.705
4		It is appropriate to identify and respond to the on-site situation.	4.00(1.10)	4.50(0.58)	4.36(0.50)	0.698	.511
5		The ability to classify severity according to the patient's condition arises.	4.17(0.75)	4,50(0.58)	4.55(0.69)	0.612	.553
6		Clearly present individual and team tasks to be performed.	4.50(0.55)	4.75((0.50)	4.27(0.90)	0.613	.552
7		Problem-solving skills are developed through practical content.	4.33(0.82)	4.75(0.50)	4.36(0.67)	0.536	.594
8	Practice method	It was practiced sequentially according to the established protocol.	4.33(0.52)	4.50(0.58)	4.09(0.83)	0.552	.585
9		Emphasizes teamwork that collaborates through communication.	4.00(0.89)	4.50(0.58)	4.46(1.04)	0.538	.593
10		Individual and team roles are separated and easy to understand.	3.83(0.98)	4.75(0.50)	4.27(0.90)	1.337	288
11		Repeat learning by alternating roles for each individual and team.	3.00(1.41)	4.50(0.58)	3.64(1.21)	1.905	.178
12		Easy to prioritize with standardized patients.	3.33(1.21)	4.25(0.96)	4.18(0.75)	1.851	.186
13		There is a sense of presence in response to a multi-casual accident response situation.	4.17(0.75)	4.50(0.58)	4.64(0.50)	1.212	.321
14		The overall flow proceeds similarly to the actual situation.	4.33(0.82)	4.50(0.58)	4.64(0.67)	0.364	.700
15	practice environment	There is a sense of realism in the practice atmosphere.	4.83(0.41)	4.50(0.58)	4.46(0.69)	0.799	.465
16		The number of trainees is appropriate to achieve the practical effect.	3.00(1.26)	4.50(1.00)	4.36(0.92)	3.893	.039
17		The amount of time required to master the practice is adequate.	2.67(0.52)	4.25(0.96)	3.73(1.01)	4.399	.028
18		The number of instructors required for the practice is appropriate.	4.00(0.89)	4.75(0.50)	4.64(0.67)	1.881	.181
19		Materials (equipment) that can facilitate the practice are appropriate.	3.67(1.21)	3.75(0.96)	4.09(1.14)	0.320	.730
20		The practice location is suitable for realizing	4.00(0.89)	4.25(0.96)	4.36(0.81)	0.348	.711

		the field situation.					
21		The practice proceeded safely.	4.83(0.41)	4.25(0.96)	4.82(0.60)	1.329	.290
22	Debriefing	You can check mission performance errors and improve problems.	4.33(0.82)	4.50(0.58)	4.36(0.92)	0.051	.950
23		The debriefing reflects the level of the trainee and is specific.	4.00(0.00)	4.25(0.50)	4.46(0.52)	2.092	.152
24		Debriefing is done separately for each team and individual.	3.50(1.05)	4.50(0.58)	4.36(0.67)	2.873	.083
25		Summarize the key points and praise the good points.	4.33(0.52)	4.25(0.96)	4.64(0.50)	0.827	.453
26		Facilitate learning from hands-on experience.	4.33(0.52)	4.25(0.96)	4.46(0.52)	0.187	.831
27		Develop a variety of strategies for effective transfer.	3.83(1.33)	4.50(0.58)	4.46(0.69)	1.066	.365
28		Approach intuitive and practical knowledge.	4.00(0.89)	4.75(0.50)	4.55(0.69)	1.582	.233

GF=General firefighting

. DISCUSSION

The necessity of education for new firefighters in preparation for various disasters and accidents with multiple casualties is constantly being emphasized. The purpose of this study was to develop a simulation-based training program for MCI (mass casualty incident) response for new firefighters from the viewpoint of patient classification accuracy, response attitude, teamwork, and program satisfaction, and to verify satisfaction according to job field. In this study, it was found to be statistically significant in the case of 'the number of trainees is adequate to achieve the practical effect' in the practice environment. Satisfaction was found in the order of rescue, first aid, and general firefighting. As a result of this study, in Korea, with the improvement of medical guidance, it is continuously emerging as a legal requirement to board a three-person ambulance consisting of two or more first-class first responders capable of specialized first aid skills [7]. Training and guidance for 3-person team training are becoming accustomed. Therefore, it is considered that the personnel composition of the protocol provided in this study was properly recognized by trainees. In this study, it was found to be statistically significant in 'The time required to master the practice is appropriate'. Satisfaction was found in the order of rescue, first aid, and general firefighting. In this study, theoretical education, practical training, and video viewing of practice scenes were sufficiently conducted in one day. These results are consistent with previous studies [8], and it was found that the more training, the better the ability to prepare in advance and respond quickly in the field. Recently, in Korea, fire safety management targets are compulsory at least once a year, and a fire safety manager arbitrarily selects a time and place throughout the year [9]. However, the head of the fire station specified that fire drills and education should be conducted in excess of two times when fire prevention is necessary, but the specific details are determined at the discretion of the institution. Therefore, it is considered that the training time suggested in this study was appropriately presented according to the competency and level of trainees. The limitation of this study is that the number of newly appointed firefighters appointed to the fire school was limited, so more personnel could not be included in the training. In future studies, preparation for the number of samples should be considered.

. CONCLUSION

This study aims to improve the training protocol for multiple presidents in the future by providing training for multiple casualties to new hires at fire schools and verifying satisfaction by job field. As a result of this study, satisfaction was found to be statistically significant in the number of trainees and practice time. The results of this study showed significant results in two areas, but in future studies, the protocol should be improved in consideration of various demographic characteristics, quality and time of training. In addition, in order to improve satisfaction, various expert verification and evaluation of the training protocol should be accompanied.

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