

Effect of Mass Casualty Training Program on Prehospital Care Staff in Kuwait

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ABSTRACT

Background: An intensive training is required for prehospital staff, emergency medical technicians and paramedics to deal with major incidents. Despite the fact that Kuwait has experienced many major incidents and located into a politically conflict zone, there is no standardized preparedness training for prehospital care providers to disasters or major incidents. This study aimed to assess the effect of a training intervention in improving the knowledge and awareness of EMTs and paramedics in the Kuwait Emergency Medical Service (KEMS).

Methods: An interventional study was conducted in Kuwait Emergency Medical Services. Thirty-one participants from different ambulance districts were included in two educational interventions. Repeated measures analysis of variance (ANOVA), *t*-test, and one-way ANOVA test were used to analyze the data.

Results: The mean score was significantly higher immediately after first training program (18.2; standard error (SE):1.9) than before (12.4; SE: 2.8) ($P < 0.001$). The mean score three months later was significantly higher (19.8; SE: 0.5) immediately after the intervention program ($P < 0.001$).

Conclusion: The primary aim of improving preparedness among prehospital care providers was achieved through the training program. The tests results showed an improvement in score achieved by the participating prehospital care providers. This type of training courses would increase the competency and the confidence of prehospital care providers in providing emergency services.

Keywords: Training Program, Emergency, Mass Casualty, Prehospital, Kuwait.

INTRODUCTION

Emergency Medical Services (EMS) play a pivotal role in disaster planning, response and recovery. Prehospital care agencies take the primary responsibility in dealing with disasters and major incidents. Their role during disasters exceed that in normal every day single emergencies. They will be the first responders who deal with stressful and disturbance situations with maybe or without risky weather hazardous conditions⁽¹⁾. There is a consensus that prehospital providers should be trained to implement appropriate responses using a formal major incident management command system.

The evidence indicates that the health care sector needs to be involved in a periodic and systematic preparedness training to be able to reach required standards to enable them to have the competencies to swiftly and effectively manage any major incidents. This generally includes both didactic training and simulated disaster exercises, with the latter including extensive exercises or more economical table-top exercises⁽¹⁾. Addressing emergency medical readiness and developing a way to measure its level of preparedness is a fundamental step to enhance and strength emergency medical preparedness⁽²⁾. Indeed, EMS is the first line in any emergency management activities and an essential component of medical readiness and hence,

improving preparedness in EMS will support the national preparedness

efforts. This is despite the clear need for prehospital training in a high-risk setting⁽¹⁾.

Appropriate training will improve knowledge, skills, confidence and awareness and most importantly the adaptive and psychological preparedness capabilities to manage high magnitude events. Studies indicate that prehospital staff, Emergency Medical Technicians (EMTs) and paramedics, need appropriate training to deal with major incidents especially those that involve chemical and biological agents⁽³⁾. When quality training is provided preparedness and willingness to respond to MCIs is enhanced⁽⁴⁾. If the prehospital providers are not well trained they will be hesitant and unwilling to participate in such events⁽⁵⁾. This reluctance affects negatively on the overall health care system's ability to cope with the surge volume of these incidents⁽⁶⁾.

While the education and training for mass casualty events is growing in both entry-level and post-graduate education, there is no universal consensus on the validation of program content⁽⁷⁻⁹⁾. Additionally, there is no any consistency in the types of interventions used to improve response competency⁽¹⁰⁾. Although a variety of training courses are offered in different regions worldwide, the validity and effectiveness of this training is not satisfactorily measured⁽⁷⁾. This research

demonstrates that the training will have limited value unless it is consistent and standardized. One of the most common problems is that only small portion of prehospital providers have the opportunity to join mass casualty training exercises and therefore lose the opportunity to gain knowledge and expertise in this field^(8, 11-14). The primary focus of this study is the implementation of a training intervention to improve the knowledge and awareness of EMTs and paramedics in the Kuwait Emergency Medical Service (KEMS).

METHODS

This study is an implementation study that aimed to apply an educational intervention into routine training of practice of prehospital care providers. The study was conducted in Kuwait Emergency Medical Services (KEMS).

All participants undertaking an innovative major incident management course (the intervention) were paramedics employed by the Kuwait Emergency Medical Service (KEMS). Thirty-one participants from different ambulance districts were invited to the training at the Training Center of the KEMS Department. The same 31 participants exposed twice to training programs. In the first training program they attend the experimental one-day training course on the 27th of February 2017. After the reflection stage on the first training they had, they again attended the two days developed training program.

The second intervention was conducted on the 24-25th May 2017. A structured questionnaire was used that included six demographic questions and 20 multiple-choice knowledge questions adapted from different resources. Its purpose was to test basic knowledge of the Mass Casualty Incidents (MCI) plan and its associated procedures. All the questionnaires (pre-test, post-test) included the same questions with a different order each time. Additionally, in the post intervention questionnaire, participants were asked to describe the impact of the training on their personal disaster preparedness, the usefulness of the training and its content, and the quality of the instructor.

Data were analyzed using SPSS software edition 22 and included the performance of a dependent t-test to examine the knowledge scale mean difference between pre-/immediate post-tests, and delayed posttests scores. Means and standard deviations were used to describe participant responses to pre-training and post-training survey where p value of < 0.001 was considered significant. Repeated measures analysis of variance (ANOVA), t-test, and one-way ANOVA test were used to analyze the data.

Ethical approval was conducted from the La Trobe University Human Ethics Committee, Kuwait Emergency Medical Services (KEMS) and the Kuwait Ministry of Health. All participants were informed in both verbal and written form about purpose of the study. The confidentiality aspect in this research ensured that all the 31 participants' information was not reflected anywhere in their response and out interaction with them. The study protocols were approved by Kuwait Emergency Medical Service (KEMS) and the Kuwait Ministry of Health. In addition to the La Trobe University Human Ethics Committee has approved this study.

RESULTS

A total of 31 paramedics working in Kuwait Emergency Medical Services Department participated in this study. The demographic characteristics of the participants are shown in Table (1).

All of the participants were males. The participants were categorized into four age groups. Most of the participants (N=20; 64.52%) were young aged (25-34). The study showed that the majority of the participants (N = 25; 80.65 %) were non-Kuwaiti nationality. The highest participation rates were elicited from married paramedics who represented two third of the participants (N=21; 67.74%). The majority of the participants (N=19; 61.29) had more than five years work experience in ambulance services. Results showed that most of the participants graduated from paramedic school (N=19:51%) and (N=12) 38.71% were nurses who joined ambulance services after basic ambulance training.

Table (1): Demographic data of the participants (n = 31)

Characteristics	Frequency	Percent
Age groups		
Under 25	1	3.23%
26-34	20	64.52%
35-45	4	12.90%
46-55	6	19.35%
Nationality		
Kuwaiti	6	19.35%
Non-Kuwaiti	25	80.65%
Marital status		
Married	21	67.74%
Non-married	10	32.26%
Educational level		
Bachelor degree in paramedics	1	3.23 %
Diploma in EMS	13	41.94 %
Diploma + Advanced certificate	5	16.13 %
Bachelor in nursing +Basic EMS training	12	38.71 %
Years of experience		
1-3 years	5	16.13%
3-5 years	6	19.35%
More than 5 years	19	61.29%

Results of the 20 multiple-choice knowledge questions before and after the intervention showed that the minimum score was 6 in the pretest, after the first intervention (February 2017) the score was 14 and the maximum score was 18 after the second intervention, as shown in table (2). The result showed that changes in knowledge at the mean score was significantly higher immediately after the first intervention, $t(30) = -15.3$, $p < 0.01$. Of the 20 multi-choice questions the participants mean score was 12.35 in the pretest comparing to the mean score (18.19) in the posttest. While the lowest mark was 6 in the pre-intervention, it increased to be 14 in the posttest, and many scored 20 (100%) in the posttest, which indicate that the training was very

effective to improve participants knowledge about MCIs management, Table (2).

The second intervention was taken place three months later of the primary intervention during May 2017 The participants were given the test at the end of the training. The significant differences can be seen in the knowledge assessment scores of the three occasions (pre and posttest and 3 months post-intervention in Table (2). The mean score significantly elevated to 19.80 after the second training course. The results showed that there is a significant different in three tests attempts (p value < 0.01). Significant improvement in posttest 1 and posttest 2 scores, $t(30) = -5.1$, $p < 0.001$.

Table (2): Results before and after the first and the second interventions, (n = 31)

Results	Minimum	Maximum	Mean	SD
Pretest results	6	18	12.35	2.8
Results after the first training	14	20	18.19	1.9
Results after the second training	18	20	19.8	0.5

DISCUSSION

In the current study, interactive instructions and teaching methods used to engage the participant, besides using of both formative assessment and summative assessment to ensure that learning have taken place. The participants were able to answer the questions correctly and did improved significantly from the first intervention to the second. We found that participants who were taught the basics of MCI management through a short training course using lectures, tabletop, role play, and a drill without victims, made a significant improvement when comparing pretest scores with posttests scores. This indicates that short duration training of one or two days is sufficient for participants to understand the fundamentals of MCIs response competencies. This finding is consistent with a number of previous studies⁽¹⁵⁻¹⁸⁾.

In our study, the results showed that participants had relatively low pre-test scores. This is similar to other studies that found that the majority of participants demonstrated low baseline knowledge scores before training⁽¹⁸⁻²³⁾. There are some studies results where the participants scored high before the intervention^(20, 24). One of this studies used comparison of two teaching methodologies; computer based learning versus instructor based training to compare participants outcomes⁽²⁴⁾. However, this study did not clarify how much the previous knowledge and participants educational level have affected the results⁽²⁴⁾ reported in their study in the United States that the high score and preexisting knowledge may be not unexpected as that this agency is one of the largest and oldest departments of health in the United States and has experienced different types of public health emergencies.

The low score of the participants in the pretest confirmed the need to have this preparedness training, and acknowledged the inadequate prehospital care providers awareness about the KEMS national mass casualty management plan. Our study resembles other studies that improved prehospital care providers' limited knowledge using short time training courses from low score in the pre-intervention to high score in the after intervention^(15, 18, 24). It is noteworthy that our study, like previous studies have used non-randomized intervention trials and similarly followed a pre- and post-test design⁽¹⁸⁾.

In our study as many other studies showed that even with different participants demographic, educational and professional categories, significant improvement from pre- to

post-test results⁽²⁵⁾. Wherein this study the participants came from different professions as some nurses and others paramedics working in KEMS. There was no significant difference between the score of both groups as they all achieve well in the post-tests. One study examined 81 undergraduates' multidisciplinary students after both dedicated and simulated training to manage disaster, found that they score high after the intervention⁽²⁵⁾.

The participants received the training three months later which give power to this study as participants' information is still retained. The high score of posttests results scores of the immediate post intervention compared with the second post intervention suggested that the second training work as a reinforcement activity that help to improve and stabilize previously gained knowledge. The findings from this study suggested that MCIs preparedness training can significantly improve knowledge, skills and attitude of prehospital care providers. These results were consistent with other studies^(9, 20) who proved the importance of MCIs training for prehospital care providers.

CONCLUSION

Participants who had attended the training interventions have significantly better scores in all posttests. This statistically significant difference in pre-test comparing to posttests results revealed that such training was very effective in improving prehospital care providers' knowledge, skills, perceptions, and therefore their preparedness for handling disasters or MCI events. Further training programs to enhance the awareness and knowledge of the prehospital care providers' might be needed.

ACKNOWLEDGEMENT

The author wants to thank Professor, Peter O'Meara, and dr. Steve Begg, from Latrobe University, College of Sciences, Health and Engineering for their support and assistant in this project. Also, he wants to thank dr. Jamal Alharbi, and dr. Tareq Aljassar, from Ministry of Health in Kuwait for assistant and facilitations.

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