

Effectiveness of an Educational Program on Ambulance Caregivers' Knowledge and Practices Concerning Adult Pre-hospital Trauma Care at Ambulance Department in Baghdad City

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Abstract

Objective: To evaluate effectiveness of an educational program on ambulance caregivers' knowledge and Practice Concerning Adult pre-hospital trauma care at ambulance department in Baghdad City

Methodology: A Quasi-experimental design is carried out to evaluate the effectiveness of an educational program on ambulance caregivers' knowledge and practice concerning adult pre-hospital trauma care at the ambulance. The study was initiated 3rd October 2016 through 20th April 2017. A purposive "Nonprobability" sample of (100) ambulance caregivers was selected from the ambulance department in Baghdad city, and divided into (50) ambulance caregivers for the study, which were exposed to the education program about adult pre-hospital trauma care, and (50) ambulance caregivers have been assigned to the control group who share the same criteria of selection for the study group and are not exposed to the educational program. To evaluate the effectiveness of an education program, the instruments have been constructed. The questionnaire is composed of three parts First part, the demographic data, the second part Knowledge test: it is composed of (50) multiple choice questions which covered relevant points from the major content area of the pre-hospital trauma care. The third part: Observational checklist. It is composed of (97) items and sub item which covered five domains of practices concerning adult pre-hospital trauma care. And presented adult pre-hospital trauma care, according to priority, Airway and Breathing care, Cardiovascular system care, Disability and Exposure. The validity of the questionnaire, observational checklist, and educational program were being identified by a panel of 10 experts; the study Reliability of instrument was determined through pilot study was carried out on 3ed to 24 January 2017. the reliability has been identified by adopting a pilot study. Data were analyzed through the application of descriptive statistics analysis and the inferential data

Results: The study findings indicated that all ambulance care givers who work ambulance department are male only. And the data show that there were highly significant differences between the study and the control group, post-educational program in overall main domains related to knowledge and practice concerning adult pre-hospital trauma care

Conclusion: There is significant effectiveness of an educational program on ambulance caregivers' knowledge and practice concerning adult pre-hospital trauma care at the ambulance department in Baghdad City.

Recommendation: promote to advance training about pre-hospital Trauma, care

Keywords: Ambulance Caregivers, Trauma Care

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I. Introduction

Pre-hospital care is the quick or immediate health care given to an injury who may have sudden trauma or illness. It is concerned not only with physical trauma or illness, but also preserve life, alleviate suffering, prevent further illness or trauma^(1,2). Pre-hospital care training prepares bystander to react and provide immediately and competency ambulance care for a wide variety of incidents including alerting the emergency medical system (EMS), maintaining the airway/C spinal control, Breathing/ventilation Circulation /hemorrhage control, Disability and Exposure control. The responses period in emergency situations is critical, but the Pre-hospital care provided should be performed properly in order to prevent further difficulties issues and potentially save lives⁽³⁾. Ambulance services providers should be able to evaluate, examine, determine the situation quickly and calmly, through dealing with life threatening conditions, in the meantime. On the other hand they protect

Safety of Team, Scene, and casualty (TSC), from the risk threat hazard, obtain medical aid through call the number of ambulance (122 in Iraq), in the case of serious trauma or illness ⁽⁴⁾. Pre-hospital care covers a wide range from minor illness and trauma to life threatening emergencies and also range from simple ambulance to advanced emergency care. Care providers may be first-aid responders, ambulance professionals, nurses or physicians of varying backgrounds ^(5,6). The highly percent of trauma deaths occurs in the pre-hospital setting of the traumatic incident. Mortality and Morbidity can be reduced by effective identification, field triage, the intervention of ambulance caregivers to give pre-hospital trauma care and transport of severely trauma casualty to hospital ⁽⁷⁾. Pre-hospital trauma triage are standards critical for guaranteeing that casualty with extreme trauma according to application of revised trauma score are transferred to hospital within appropriate time frames. The 'golden hour' is associated with the trauma, as the ideal time period for pre-hospital care and conveyance of definitive treatment ⁽⁸⁾.

II. Methodology

A quasi-experimental design is carried out to evaluate the effectiveness of an educational program on ambulance caregivers' knowledge and practice concerning adult pre-hospital trauma care at the ambulance. The study has been conducted in Emergency Medicine, Department of Baghdad City, it is the only center in Iraq to provide specialized training related emergency care to doctors, nurses working in emergency care and non-workers in the field of health. The center established by the European Union and in collaboration with the World Health Organization. It has been provided by simulation models for training scientific and theoretical training rooms, and has various administrative rooms and a theater. A non-probability (purposive) sample of (100) ambulance caregivers was (paramedics) selected from the ambulance department in Baghdad city, they were called to the regional center by sending official letters, through a schedule in the continuous education of paramedics for the training. The study sample divided in (50) ambulance caregivers for the study, were exposed to the education program about adult pre-hospital trauma care, and (50) ambulance caregivers have been assigned to the control group who share the same criteria of selection for the study group and are not exposed to the educational program.

To evaluate the effects of an educational program, the instruments have been constructed and it is composed of three parts:

Part I: The demographic data: which included the Ambulance Caregivers characteristic, such as gender, age, level of education, years of experience, and training courses included (duration, title and location of the training courses).

Part II Knowledge test

The knowledge test was composed of (50) multiple choice questions which covered relevant points from the major content area of the pre-hospital trauma care. and includes, trauma care, according to priority (10) questions, airway and breathing care (10) questions, Circulation and hemorrhage care (10) questions, disability (musculoskeletal and nerves system care (10) questions and exposure (environmental control) care (10) questions. The questions were scored as correct question (1) points and the incorrect question (0) point. For the purpose of this study, the number of correct responses on the knowledge test questionnaire was used as the measure of the level of ambulance caregiver's knowledge. The total scores of the test were 50 points. The cut of point was (0.5)

The Ambulance Caregivers in the study group are presented with a knowledge test prior to the implementation of the education program and retested after completion of the educational program. The ambulance caregivers in the control group are tested at the same time as the study group. Content of questionnaire remains the same for all tests.

III part: Observational checklist

The observational checklist was composed of (97) items and sub items, covered five domains of practices concerning adult pre-hospital trauma care. They are presented as follows

1. Adult pre-hospital trauma care, according to priority: consist of (9) items and sub items
2. Airway and Breathing care: consist of (13) items and sub items
3. Cardiovascular system care: consist of (42) items and sub items

4. Disability (musculoskeletal and nerves system care: consist of (20) items and sub items
5. Exposure (environmental control) care: consist of (13) items and sub items

The researcher observed and checked for correct or incorrect performance and then the practices as mean (3) or (2) corrects episodes were rated as always, (one) correct practice was rated as sometime and non-correct practice rated as never.

These items were rated according to the Likert scale {always (3), sometime (2), never (1)}. The levels of scale which were scored as total of three episodes of events were observed of each respondent. The cut of point was (2) and the limit for acceptance nursing practices was (2.1-3),

Observational checklist practices were observed ambulance caregivers prior to performing on a mannequin and simulation scenarios during Implementation of an educational program on ambulance caregivers. The educational program consisted of fifth sessions and was carried over a three-months period in the Emergency Medicine Department.

Content validity for the early developed instrument is determined through the experts' panel to investigate clarity, relevancy, and adequacy of the questionnaire to measure the concept of interest

The educational program consisted of fifth sessions and was carried over a three-months period in the Emergency Medicine Department. The researcher observed and checked correct or incorrect performance. A practice checklist for Ambulance Caregivers was given to them prior to performing a manikin and simulation scenarios during either the morning or the afternoon times. The plan of the education program was discussed; the implementation of the program was introduced to the study group and has included the following:

1. Demographic data are filled by each Ambulance Caregivers in study and control groups at the Ambulance Department in Baghdad City
2. Ambulance Caregivers Knowledge test (Questionnaire)
3. Ambulance Caregivers practice by observational (check list)
4. Implementation of an educational program is designed and presented in fifth sessions. Every session takes approximately three hours from (9-12) a.m. (Per day), and 5 days per week for two weeks (including pre-test and post-test both Knowledge and practice (study group).

The data were analyzed through the use of statistical procedures and using the SPSS (Statistical Process for Social Sciences) version 20 application Statistical analysis system.

III. The results

Table 1. Distribution of the Sample According to the Demographic Characteristics

List	Characteristics		Study group n =50		Control group n =50		P-value
			Frequency	Percent	Frequency	Percent	
1	Gender	Male	50	100	50	100	a
2	Age group	20-29 year	1	2.0	1	2.0	$\chi^2 =.56$
		30-39 year	32	64.0	33	66.0	
		40-49 year	10	20.0	11	22.0	
		50 ≤ year	7	14.0	5	10.0	
		Mean ± SD	39.08±8.50		39.56±8.66		
3	Educational level	Nursing Course	4	8.0	4	8.0	.875 (NS)
		School	0	0	1	2.0	
		secondary	28	56.0	21	42.0	
		Institute	15	30.0	24	48.0	
		college	3	6.0	0	0	
4	Years working in the immediate ambulance	1-5	1	2.0	0	0	.540 (NS)
		6-10	23	46.0	30	60.0	
		11-15	4	8.0	1	2.0	
		16-20	8	16.0	7	14.0	
		21-mor	14	28.0	12	24.0	
		Mean ± SD	15.08±9.63		12.82± 8.354		
5	Participation in	Yes	50	100.0	50	100.0	a

	training course	No	0	0	0	0	
6	Number of Training course	1-3	17	34.0	27	54.0	.643 (NS)
		4-6	26	52.0	16	32.0	
		7-11	5	10.0	3	6.0	
		10-12	2	4.0	4	8.0	
7	Course title	basic	3	6.0	0	0	a
		advance	47	94.0	50	100.0	
8	Duration of sessions	7days	1	2.0	0	0	a
		More than 7day	49	98.0	50	100.0	

C.S.: Comparison Significant, P= probability, N.S.= Not Significant, a= no statistical are computed because both group are constant

The descriptive analysis of the sample in the table (1) for both groups shows that all ambulance caregiver are males, higher proportion within the age group (30-39). The high percentage of the ambulance caregiver their educational level is a secondary school (56%) in the study group and (42%) in the control group. Concerning years of years of working in the immediate ambulance the table revealed that a high percentage of the study and the control groups (46%) and (66%) respectively are within (10-11). All the ambulance caregivers in both group are participating in a training course. Related course title majority (94%) of the study group and (100%) of the control group have had advanced courses in first aid and the duration of the sessions was more than 7 days in Iraq

Table 2. Distribution of educational Program on ambulance caregiver knowledge concerning Adult Pre-Hospital Trauma Care

Knowledge test domains	Knowledge test time	Study Group (N=50)					Control Group (N=50)				
		(Mean ± S.D)	t	df	p-value	Si g.	(Mean ± S.D)	t	df	p-value	Si g.
Care according to the priority of care	Pre-test	4.54±1.9	14.12	49	.000	HS	4.92±1.8	.531	49	.598	NS
	Post-test	8.64±.89	2				4.96±1.8				
Airway and Breathing care	Pre-test	3.96±1.7	15.64	49	.000	HS	4.54±1.6	.172	49	.864	NS
	Post-test	8.48±1.3	6				4.52±1.5				
Circulation and hemorrhage Care	Pre-test	4.12±1.7	12.74	49	.000	HS	4.56±1.7	.330	49	.743	NS
	Post-test	8.36±1.3	6				4.54±1.6				
Disability care	Pre-test	3.08±1.8	16.16	49	.000	HS	3.48±1.6	3.07	49	.003	HS
	Post-test	7.96±1.5	5				3.70±1.6				
Exposure care	Pre-test	3.24±2.0	15.86	49	.000	HS	4.38±2.0	1.40	49	.168	NS
	Post-test	8.64±1.1	1				4.58±1.64				

$\bar{x} \mp S.D$ = Arithmetic Mean and Standard Deviation, t = Paired Samples Correlations, d.f = Degree of freedom, C.S. = Comparison Significant, P = probability, N.S. = Not Significant, S: significant at P < 0.05, H.S. = high significant at P < 0.01.

Table (2) reveals that the knowledge test domains of pre-hospital trauma care pretest vs posttest. A highly statistically significant difference is observed between study and control group in practice post education program for ambulance care giver (p≤0.001).

Table 3. Distribution of educational Program on ambulance caregiver practice (pre and post) concerning Adult pre- hospital Trauma Care (the study and the control group)

$\bar{x} \pm S.D$ = Arithmetic Mean and Standard Deviation, t = Paired Samples Correlations, d.f = Degree of freedom,

Practice domains		Study Group (N=50)					Control Group (N=50)				
		(Mean ± S.D)	t	d f	P-value	Sig.	(Mean ± S.D)	t	dF	p-value	Sig.
Care according to the priority of care	Pre	10.00±0.00	49.390	49	.000	HS	11.16±1.3	.609	49	.545	NS
	Post	28.52±2.6					11.46±3.0				
Airway and Breathing care	Pre	24.70±1.4	42.630	49	.000	HS	25.16±1.4	.270	49	.987	NS
	Post	42.56±2.4					25.12±1.7				
Circulation and hemorrhage Care	Pre	88.18±2.4	-124.510	49	.000	HS	88.18±2.4	.954	49	.345	NS
	Post	149.6±2.9					88.42±2.6				
Disability care	Pre	33.00±0.00	1059.343	49	.000	HS	33.36±.8	1.949	49	.057	NS
	Post	69.00±0.00					33.10±.6				
Exposure care	Pre-	22.1±.76	-210.954-	49	.000	HS	22.36±.87	.330	49	.743	NS

C.S. = Comparison Significant, P = probability, N.S. = Not Significant at P > 0.05, S: significant at P < 0.05, H.S. = high significant at P < 0.01.

Table (3) reveals that the all practice domains of pre-hospital trauma care pretest vs posttest. A highly statistically significant difference is observed between study and control group in practice post education program for ambulance care giver (p<0.001)

Table 4. Distribution of Effectiveness of the Educational Program on the knowledge and practice Concerning Adult Pre-Hospital Trauma Care of ambulance caregiver Pre & Post-Test for Study and Control Groups

		Study Group (N=50)					Control Group (N=50)				
		MS± S.D	t	df	P-value	Sig.	MS± S.D	t	d f	p-value	Sig.
Knowledge	Pre-test	18.94±6.2	21.83	49	.000	HS	21.88±5.11	1.946-	49	.057	NS
	Post-test	42.08±4.0					22.30±4.7				
Practice	Pre-test	178.0±2.9	193.018	49	.000	HS	180.2±4.0	0.475-	49	.637	NS
	Post-test	334.6±5.0					180.5±4.69				

M: Mean, SD: Standard deviation, t: t-test, df: Degree of freedom, Sig: Significance, p: Probability value, N.S: Not significant. HS=high significant

Table (4) indicated Ambulance Caregivers' Knowledge and Practice concerning adult pre-hospital trauma care pretest vs post, highly statistically significant differences were found between pretest and posttest.

Table 5. Association of practice score with Socio- Demographic Characteristic Post education for study group

Variables		Knowledge Score of the study group post education (n = 50)	
		Mean± SD	df, test, P ≤ 0.05
Age group (Year)	20 – 29	334.00±0	46, f= .185 P= .906
	30 – 39	334.81±5.337	
	40 – 49	335.20±3.994	
	≥ 50	333.43±5.682	
Level of education	Nursing Course	334.50 ±7.937	46, f=2.867 P= .047
	secondary	335.46±3.636	
	Institute	334.80±3.028	
	college	327.00±13.528	

years of working in the immediate ambulance	1-5	341.00±0	49, f= 1.258, P= .299
	6-10	334.57±5.558	
	11-15	337.50±2.380	
	16-20	333.75±2.375	
	21-mor	334.77±5.357	
Number of Training course	1-3	334.00±5.575	49, f= .554 P= .684
	4-6	335.81±4.622	
	7-11	333.33±3.055	
	10-12	335.75±3.862	

Table (5) showed no statistical significant differences have been found between ambulance caregiver practice and their age, years of working in the immediate ambulance, and number of training courses for the study group post education, while statistically significant differences have just been found between the ambulance caregiver practice and level of education post education for study group.

IV. Discussion of the Results

Part I: Discussion of the demographic characteristics of the Ambulance caregivers (table 1):

The results revealed that the study and the control group were comparable or no statistics are computed because both groups are constant with regard to various sociodemographic characteristics. It has been found that the all ambulance caregivers for both study and control were (100%) male. Aasa et al,⁽⁹⁾ mentioned that the proportion of women and the male ambulance personnel sample was decided according to the proportion of population 20% female and 80% male. Regarding age, a high percentage (64%) of the study group and (66%) of the control group at (30–39) year age group. About the level of education of the ambulance caregiver, a high percentage (56%) of the study and (42%) of the control, were secondary nursing. The results, in the present study, indicate that most of the ambulance caregivers (46%) of the study group and (60%) of the control, the duration of years working in the immediate ambulance of Ambulance caregivers was (6-10) years. And all ambulance caregiver participant in a training course. Fifty two percent of the study group the number of training courses were (4-6) times and (54%) of the control group were (1-3) times and (94%) of the study group and (100%) of the control group they enrolled in advance course related to in first aid for more than seven days.

Although the ambulance caregivers enrolled and participant in many training courses, we observed low and very low ambulance caregivers in measuring knowledge through knowledge test and the practice through the checklist in pre-education program for both the study and the control group. This result may not use a mannequin, simulation scenarios and other real materials and equipment. Another factor may be the fact that all ambulance caregivers involved in previous courses are not given enough chance to practice and applications learned Häske and other⁽¹⁰⁾ they stated that the effect of a standardized course concept in pre-hospital trauma care leads to improved quality of the documentation of actual field operations and better and safer application of the principles.

Part II: Distribution of Effect of educational Program on ambulance caregiver knowledge concerning Adult Pre-Hospital Trauma Care between the study and the control group) Table (2)

Data analysis has revealed that the implementation of the educational program has a positive effect on ambulance caregiver knowledge concerning adult pre-hospital trauma Care, where results showed that the knowledge of the study group in post education in all knowledge domains (Care according to the priority of care, airway and breathing care, circulation and hemorrhage care, disability care and exposure care) of pre-hospital trauma care is better as compared with the control group; This trend is quite clear in the post test. Ambulance caregiver who participated educational program demonstrated a highly statistically significant difference in their knowledge when the pretest, and the post-test scores were compared between the study and the control group ($p \leq 0.001$).

These results are consistent with the Video-recorded case studies⁽¹⁰⁾ that evaluate the planning, culmination and the nature of documentation in the real field of the paramedics to their pre-healing facility care of trauma patients. The consequences of the impact of preparing on paramedics' influence on the patients and prehospital measures.

A phenomenographic study conducted at Sewed,⁽¹¹⁾ indicated that the specialist ambulance nurse perceptions of assessing patients exposed to severe trauma were divided into: To be prepared for emergency situations, Confidence in one's own leadership and developing professional. The ambulance caregiver, who participated in an educational program, demonstrated a significant increase in their knowledge when the pretest knowledge and the post-test knowledge scores were compared. By comparing the knowledge test score of the study group, the data showed a highly significant difference ($p < 0.01$) from pre-to posttest for all domains, for the study groups while the data showed no statistical significant difference from pre-to post test for all domains except the disability domain show highly significant difference from pre-to posttest knowledge.

Part III: Effect of Educational Program on Ambulance Caregiver Practice Concerning Adult Pre-Hospital Trauma Care Between the Study and The Control Group

Observational checklist practices were observed ambulance caregivers when performing the practice on a mannequin and simulation scenarios, pre-and post-implemented an education program

Data analysis had revealed that the implementation of the educational program had a positive effect on ambulance caregiver practice through measurement of practice concerning adult pre-hospital trauma care areas defined by Care according to the priority of care, Circulation and hemorrhage care, airway and breathing care, exposure care and disability care). The effects of these domains were clearly observed through the data analysis. A highly statistically significant difference is observed between study and control group in practice post education program for the ambulance care giver ($p \leq 0.001$)

In a comparison between Ambulance Caregiver practice (Pre-Post) education, the grand means of score of educational program for ambulance caregiver related the practice. The data shows that the domains in the study group was higher in post practice test, as comprising with pre-educational knowledge. While the control group shows no improvement in grand means of score in all items related to the care according to practice test Domains, some ambulance caregiver showed their grand mean of score less than low from pre to post-practice test.

In a study⁽¹²⁾ that examine PHTLS Provider courses in Germany and to proof the assumption that formation of physicians and paramedics in prehospital trauma care can be optimized Physicians noted significant ($p < 0.001$) more deficits in their professional training than paramedics. 80% of the paramedics affirmed to have had adequate training with respect to prehospital trauma care, and stated after the course confidence increased remarkably and reached higher rates than before the course ($p < 0.001$ After PHTLS both groups showed similar ratings concerning the course concept indicating that PHTLS could equalize some training deficits and help to gain confidence and assurance in prehospital trauma situations.

A qualitative study in the north of Sweden⁽¹³⁾ Experiences of nursing patients suffering from trauma—preparing for the unexpected: with a high-tech intensive care unit and the finding revealed that the Preparing for the unexpected with four subthemes: Feeling competent, but sometimes inadequate; Feeling unsatisfied with the care environment; Feeling satisfied with well-functioning communication; and Feeling a need to reflect when affected. Nursing trauma patients require critical care nurses to be prepared for the unexpected. Two aspects of trauma care must be improved in order to fully address the challenges it poses: formal preparation and adequate resources must be invested to ensure delivery of quality trauma care.

Initial training tracheal intubation skill requires the insertion of tracheal tubes, and further ongoing training is attained through clinical practice and manikin-based⁽¹⁴⁾

Distribution of Effectiveness of the Educational Program on the knowledge and practice Concerning Adult Pre-Hospital Trauma Care of ambulance caregiver Pre-and Post-Test for Study and Control Groups

The results reflected the improvement from pre- to post education for the study in knowledge and practice. As observed, there were high statistical significant differences between pre-and post-education for the study ($p < 0.05$). While no significant differences from pre-to post were observed for the control group.

Association of practice score with Sociodemographic Characteristic Post education program for study and control group

The data of post education program showed no statistical significant differences have been found between ambulance caregiver practice and their age, years of working in the immediate ambulance, and number of training courses for the study group and the control group post education. While statistically significant differences have just been found between the ambulance caregiver practice and level of education post education for study group and no statistical significant differences have been found in the control group.

These findings consistent with the Benha University Hospital study ⁽¹⁵⁾ showed that cardiac nurse's knowledge of cardio pulmonary resuscitation is above average (10.56/14). There was no statistically significant difference in mean knowledge score and age, years of ICU experience and ACLS Training program attendance. And Conclude that the cardiac nurses have average knowledge about cardio pulmonary resuscitation guidelines.

V. Conclusions

- 1- Ambulance caregivers in the study group demonstrated significant changes in their knowledge scores when the pre-and the post knowledge score were compared and when that is a highly significant association between the study and the control group in post knowledge test. The total grade level of all domains (trauma care according to priority, airway and breathing care, circulation and hemorrhage care, disability (musculoskeletal and nerves system care) and exposure (environmental control) care was changed from lower and less than lower grade level in pre-test to high grade level in post-test.
- 2- Improvement in the practice of ambulance caregivers was clearly observed in the study group through comparing pre and post education program, a highly significant association between the study and the control group in the post observational checklist all domains (trauma care according to priority, airway and breathing care, circulation and hemorrhage care, disability (musculoskeletal and nerves system care and exposure care) was changed from not apply practice perfectly in pre-education to applying practice perfectly in post education program.
- 3- There was no significant association between the variables such as age, gender, education level, Years' experience in the immediate ambulance, training course, and number of training courses with the knowledge and practice post education for the study groups.

VI. Recommendations

Based on the conclusions, the study can recommend that:

1. Providing a guide ambulance kit prepared by the researcher to the ambulance caregivers that include information and practice regarding pre- hospital trauma care and adopting the program as a training bag in the ambulance and emergency
2. Continue to train and engage ambulance caregivers in courses, seminars and conferences inside and outside the country so as to increase the skills and scientific information they have.
3. -Periodic performance evaluation of paramedics' acceptability to identify the shortage that influence in providing pre-hospital and emergency care
4. Employment of college or institution graduate nurses in ambulance department (as paramedics) should be planned by the ministry of health to providing the ambulance with new staff
5. Establishment a new department in the institutes, studying emergency and dealing with pre-hospital cases

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