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The Effect of Education on Knowledge of Pre-hospital Emergency Personnel about Attaching Cervical Collar in Patients with Head and Neck Trauma

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Abstract

Objective: One of the major injuries in trauma is cervical damage. Although using cervical collar is the standard method for emergency trauma patients, it is not usually properly placed. This study aimed at investigating the effect of education on knowledge of pre-hospital emergency staff regarding the use of cervical collar in patients with head and neck injuries.

Methods: In this semi-experimental study, all of the personnel in pre-hospital emergency departments of Rasht were included with census method. First, the knowledge of their staff about utilizing cervical collar was studied using a questionnaire. Then, those with a low/intermediate knowledge were trained by the emergency medicine resident. Instructional CDs including materials on using the cervical collar were distributed. After two weeks, their knowledge was measured by written and practical tests. By comparing the scores before and after the education, the intervention's effectiveness was monitored.

Results: All samples were male. The mean and standard deviation of their age and work experience were 38.8 ± 7.5 and 12.6 ± 6.5 years, respectively. The results of pre-education knowledge survey showed that the majority of subjects ($n=71$, 69.6%) had a moderate knowledge and 27 individuals (26.47%) had poor knowledge, and only 4 individuals (3.9%) had sufficient knowledge about using the cervical collar. Knowledge survey assessment after education in poor and moderate groups ($n=98$, 96.1%) showed that 73 subjects (74.5%) had good knowledge and 25 subjects (25.5%) had moderate knowledge. No sample had weak knowledge.

Conclusion: The pre-hospital emergency personnel knowledge on using cervical collar increased after holding an educational course.

Keywords: Education, Pre-hospital Emergency, Trauma

Introduction

Trauma accounts for 10% of the world's deaths [1]. Reports indicate that 2-4% of trauma patients have from cervical spinal injury (CSIs), of which 20% suffer from traumatic cervical spinal cord injuries (SCI), 10% show injury at multiple levels, and 10% have only ligament injury [2,3]. The cervical trauma is caused by injury due to vehicle collision, falling from height, violence, quarrel,

and sports injuries, that can lead to death by airway obstruction and asphyxia [4]. One of the most effective tools for reducing injuries in cervical trauma is collars. The main purpose of using them in trauma is to immobilize the neck. Depending on the collar type, the degree of the immobilization is variable [5,6]. The cervical collars are among the important tools for pre-hospital care in patients with trauma. In fact, using the collar is so important that its application is clearly emphasized in the criteria of the ABC in major trauma, along with maintaining the airway as the first step. The cervical collar plays a role in immobilizing the potential unstable spinal cord in order to prevent secondary damage. Millions of trauma patients undergo cervical immobilization by collar every year [4]. It is estimated that 3-25% of spinal cord injuries are secondary [7], which can occur due to inappropriate management during pre-hospital care or at the beginning of hospital admission [8]. There is a possibility of cervical injury in all patients with driving accident-induced injuries. Therefore, preventing damage to this area through adequate protection of the neck when transporting patients to the hospital is so vital [9,10]. One of the most common injuries in driving accidents is blunt neck trauma, in which the head first moves backward and then moves forward suddenly (whiplash injury). This type of cervical damage is not detected in X-ray imaging in 50% of cases, while a spiral CT scan is so conducive to diagnosis [10,11]. Diagnosing spinal injuries in patients with trauma during the initial examination is challenging, because patients often have low levels of consciousness due to multiple injuries, or may be affected by sedative drugs or pain-killer medications. Therefore, early diagnosis of spinal injuries in the emergency departments is very important in determining diagnostic tests and timely treatment and preventing spinal cord injury [12]. Using appropriate type of collar and correct way of attachment based on the scientific indications to prevent further neuromuscular damage are of high importance in patients with head and neck lesions. In most parts of the world, pre-hospital personnel are the first staff to face traumatic patients, and responsible for maintaining the stability and immobilization of the neck before transporting patients to healthcare centers [6,13,14]. Therefore, this study was designed and conducted to assess the knowledge of pre-hospital emergency personnel about using the cervical collar in patients with trauma.

Materials and Methods

In this semi-experimental and analytical study, all of the personnel employed in the pre-hospital emergency departments in Rasht were included in the study by census method. The study was designed in two phases.

In the first phase, the knowledge of the emergency department staff and primary care about using cervical collar were studied.

The instrument for measuring knowledge was a two-part questionnaire. The first part included demographic characteristics of age, work experience, and education. The second part included 15 knowledge survey questions about the conditions for attaching the cervical collar. For each correct answer, a score of one was considered, and an incorrect answer did not receive any score. Finally, the score of each person was calculated from the sum of the obtained scores (minimum=0 and maximum=15). Those who scored less than 66% of the total score entered the second phase of the study, and the rest were excluded from the education and study cycle.

In the second phase of the study, those with a low and intermediate level of knowledge after completing the first phase test were directly trained by the emergency medicine resident at their own base in an hourly educational session. Also, instructional CDs including materials on familiarity with the methods and how to use the cervical collar were distributed to them. After two weeks, the knowledge was measured by a written test. By comparing the scores before and after the education, the effectiveness of the intervention was monitored.

A tool for measuring the knowledge and ability of EMS unit personnel was composed of a two-part questionnaire in which demographic characteristics as part one included age, work experience and education. Part two included 19 questions on measurement of knowledge about the conditions of using cervical collar. Score one was assigned to having knowledge about a question, and score zero to not having knowledge. The total score of 19 questions was obtained. Then, people whose score was less than 66% of the total score were put into the present educational plan.

For reviewing validity of this tool, a panel including 10 people consisting of 7 emergency specialists, 2 neurosurgeon, and 1 anesthetist was used. The content validity ratio (CVR) was examined for necessity of the content validity index (CVI) and clarity of the questions.

CVR more than 62% was obtained for each of 19 items of the questionnaire. Therefore, it had high and relevant validity according to the Lawshe table. The CVI in most questions was for more than 90%. Some questions' CVI was between 80% and 90%, which were reviewed partially. The questions with the CVI between 70% and 80% were reviewed significantly. Therefore, the validity of the tool with 19 items were confirmed after the changes.

Richardson coefficient 20 was used in order to determine the internal consistency of the questions for measuring the level of knowledge of EMS unit on the use of collar in cervical spine stability. The Richardson coefficient 20 was obtained 0.72. Therefore, the above questions had an appropriate convergence for measuring the knowledge of the personnel. The equivalent forms were used to assess questionnaire's reliability. In this method, the sequence of questions in the equivalent form 2 was different from that in the equivalent form 1. The test retest reliability coefficient was 0.91, which indicated the repeatability of the tool.

Results

In the current study, the knowledge of 102 EMS staff Rasht regarding attachment of cervical collar in patients with trauma was studied. All samples were male. The mean and standard deviation of their age and work experience were 38.8 ± 7.5 and 12.6 ± 6.5 years, respectively. 40.2% (n=41) had diplomas, 17.6% (n=18) had associate degree, and 42.2% (n=43) had bachelor degree and higher.

Reviewing knowledge survey questionnaires showed that the highest score before the education belonged to the questions of 15 (93.1%), 14 (85.3%), and 8 (72.5%), and the lowest score belonged to the questions of 10 (9.8%), 6 (9.8%), and 12 (14.7%).

After education, most questions had been answered correctly with a high percentage; however, the level of knowledge on the questions of 6,12,5,13, and 3 was 78.6%, 61.2%, 55.1%, 49%, and 46.9%, respectively, that were at the low level (Table 1).

Table 1: Pre-hospital Emergency Department Staff Knowledge on Using Cervical Collar in Traumatic Patients before and after Education

N	Question	Before Education						After Education					
		Incorrect		Correct		Total		Incorrect		Correct		Total	
		n	%	n	%	n	%	n	%	n	%	n	%
1	The most common cause of cervical injury	65	63.7	37	36.3	102	100	26	26.5	72	73.5	98	100
2	The best tool used along with the collar for cervical spine immobilization	48	47.1	54	52.9	102	100	0	0.0	98	100.0	98	100
3	The most common type of cervical spine injury mechanism	80	78.4	22	21.6	102	100	46	46.9	52	53.1	98	100
4	Conditions requiring collar attachment	58	56.9	44	43.1	102	100	1	1.0	97	99.0	98	100
5	The highest prevalence of cervical injuries in the vertebrae	76	74.5	26	25.5	102	100	54	55.1	44	44.9	98	100
6	The predictors of severity of cervical and spinal cord injury	92	90.2	10	9.8	102	100	77	78.6	21	21.4	98	100
7	Way of attaching collar	37	36.3	65	63.7	102	100	2	2.0	96	98.0	98	100
8	Dealing with an injured patient meeting cervical collar attachment criteria	28	27.5	74	72.5	102	100	2	2.0	96	98.0	98	100
9	The best type of collar in traumatic cervical injury	62	60.8	40	39.2	102	100	5	5.1	93	94.9	98	100

10	The most important way to reduce cervical injuries	92	90.2	10	9.8	102	100	10	10.2	88	89.8	98	100
11	Stage of using the cervical collar in the traumatic patient	68	66.7	34	33.3	102	100	9	9.2	89	90.8	98	100
12	Maximum permitted use time for cervical collar in patients with trauma	87	85.3	15	14.7	102	100	60	61.2	38	38.8	98	100
13	Person examining cervical injuries in patient with trauma	63	61.8	39	38.2	102	100	48	49.0	50	51.0	98	100
14	Lack of meeting criteria for cervical injuries	15	14.7	87	85.3	102	100	5	5.1	93	94.9	98	100
15	Patient's condition to attach collar	7	6.9	95	93.1	102	100	2	2.0	96	98.0	98	100

The results of pre-education knowledge survey showed that the majority of the study participants, 71 individuals (69.6%) had moderate knowledge (score between 33.3% and 66.6%), 27 (26.47%) had low knowledge (score less than 33.3%), and only four people (3.9%) had sufficient knowledge (score more than 66.6%) regarding the use of cervical collar. Pearson's correlation coefficient showed that no statistically significant relationship between the level of knowledge of personnel with their age, work experience, and education ($p>0.05$).

After education, knowledge survey on two weak and moderate group ($n=98$, 96.1%) showed that 73 individuals (74.5%) had a good level of knowledge and 25 individuals (25.5%) had a moderate level. None of the samples were weak (Table 2).

Table 2: Pre-hospital Emergency Personnel Knowledge Status before and after Education on Using the Cervical Collar in Patients with Trauma

			Emergency Personnel Knowledge Status on Using Cervical Collar after Education		Total	P
			Moderate (33.3-66.3%)	Good (Higher than 66.6%)		
Emergency Personnel Knowledge Status on Using Cervical Collar before Education	Poor (Score lower than 33.3%)	Number	15	12	27	.0001
		Percent	55.6%	44.4%	100	
	Moderate (33.3-66.6%)	Number	10	61	71	
		Percent	14.1%	85.9%	100%	
Total		Number	25	73	98	
		Percent	25.5%	74.5%	100%	

Comparison of the scores before and after the education showed that the mean scores of knowledge after education improved (7.67 ± 2.1 vs 14.52 ± 1.68). Changes in the score (6.85 ± 1.97) were statistically significant based on pair t-test (Table 3).

Table 3: Comparison of Knowledge Score before and after Pre-hospital Emergency Personnel Education on Using Cervical Collar in Patients with Trauma

	Number	Mean	Standard Deviation	Median	95.0% Lower CL for Mean	95.0% Upper CL for Mean
Emergency Personnel Knowledge Score on Using Cervical Collar before Education	98	7.67	2.12	8.00	7.25	8.10
Emergency Personnel Knowledge Score on Using Cervical Collar after Education	98	14.52	1.68	15.00	14.18	14.86
Emergency Personnel Knowledge Changes on Using Cervical Collar before and after Education	98	6.85	1.97	7.00	6.45	7.24
Emergency Personnel	98	104.60	62.64	86.61	92.04	117.16

Knowledge Changes Percentage on Using Cervical Collar before and after Education						
P	0.0001					

Discussion

Most pre-hospital emergency systems around the world use cervical collars typically for patients with significant injuries [15]. In order to prevent secondary damages, spinal immobilization has been supported by the cervical collars as the main care in trauma patients in the past few decades [16]. Since very little evidence for the assessment of the knowledge in emergency medical personnel in Guilan was found, this study aimed to determine the knowledge level of medical emergency personnel in Rasht regarding using the cervical collar for traumatic patients.

In our study, all participants were male with a mean age of 38.8 ± 7.5 years. Most of whom had bachelor degree with work experience of 12.6 ± 6.5 years. Primary results before education showed that only 3.9% of the subjects had a good knowledge level, and most of them had moderate to weak knowledge in all age groups, occupations with different experiences.

Ziabari et al. studied on knowledge and practice of staff about cervical collar in traumatic patients that was consistent with our study. They studied 80 staff with a mean age of 25.93 ± 1.02 years, of which 72.2% were women. Mean score of knowledge and practice of participants was 11.5 ± 2.7 and 16.5 ± 2.3 , respectively. The highest rate of lack of knowledge was about predictor factors of the spinal cord and cervical injuries (98.8%), the importance of injury (95%), the maximum permitted length of use of cervical collar (91.3%), and inappropriate measures (91.3%). Also, the highest level of functional impairment was related to level external auditory meatus with shoulder after attaching the cervical collar in children (98.8%), the placing a protective pad behind the chest after attaching the collar in children (95%), and employing at least three individuals when attaching collar, and spinal column immobilization before collar attaching (65%). The findings of the study indicated that the level of knowledge and practice

about using cervical collar were intermediate to poor in more than 70% and 60%, respectively [14].

In the study of Kreinest et al., The mean age of participants was 34.5 ± 10.3 years. The majority of the personnel were rescue workers (80.8%) and emergency medicine doctors (12.5%). The mean working experience was 11.1 ± 8.9 years. 11% of them attached the cervical collar correctly on a medical moulage. The most common mistake (66%) was related to the incorrect adjustment of the cervical collar size [6].

The low level of knowledge can have serious complications for the patient's life, since about 3-25% of the cases of spinal cord injuries are secondary and happens due to inappropriate management, such as the lack of immobilization in the spinal cord during pre-hospital or hospital care. Spinal cord injury leading to the permanent damage in the cervical area is a potential threat to the traumatic patient's life. It is also one of the cases where a negligence on the part of the emergency staff and the occurrence of a complication has a legal burden. Using collar in the pre-hospital phase reflects the high quality of care for patients with trauma. Using the cervical collar is recommended in many guidelines such as Advanced Trauma Life Support (ATLS) and Pre-Hospital Trauma Life Support (PHTLS). In many protocols, pre-hospital emergency staff cannot deliver trauma patients without attaching the cervical collar to the hospital emergency unit [4]. Therefore, given to the low level of personnel knowledge and the importance of using a collar, the need for education intervention in this study is justified.

Statistical analyses of the present study showed that no statistically significant relationship between the level of knowledge of personnel with their work experience and their education, which is consistent with the results of the study by Kreinest et al. [6].

Analysis of post-education data indicated that the education had a positive impact on improving the level of knowledge about how to use the cervical collar so that most people had good knowledge. Therefore, the presence of emergency personnel, especially the pre-hospital emergency staff, is essential in continuing education programs regarding the use of the cervical collar. It is also necessary to include continuing education credits on spinal immobilization in current curricula [13].

In many other studies, the impact of the education and subsequent enhancement of individuals' knowledge have been proven [17,18].

This study has some limitations. Firstly, little demographic factors were studied. We avoided extending the questionnaire due to lack of time for pre-hospital emergency personnel to fill in the questionnaire and having a high percentage of respondents.

Secondly, most of our study's participants had a bachelor degree and higher, but the individuals with a diploma degree also had a high frequency. Given that these do not have a proper scientific and academic understanding of cervical and spinal cord injuries and the need to use a cervical collar, health policy makers need to hire trained and specialized staff, especially in the pre-hospital care setting, and improve primary care quantitatively and qualitatively.

Strengths of our study as follows: firstly, this research was conducted on the knowledge of personnel regarding the cervical collar for the first time. The method of attaching the cervical collar and its practical use were mainly focused in the reports and other similar studies on the use of cervical collar in triage patients, while level of knowledge of personnel about using cervical collar, as well as showing the importance and impact of education on the level of knowledge of personnel in the present study.

Secondly, the education was provided by an emergency medicine resident lecturing at each base along with giving the educational aid (CD). Using the multimedia educational package can have a more lasting impact compared to lectures [19,20].

Currently, some documentation shows the developing contradictory use of the cervical collar. It has been proved that the disadvantages in using collar are more than its benefits, so we can simply stop using it. Complications such as a significant increase in intracranial pressure and cerebral edema development [10,11], reduced ability to open the patient's mouth, which in turn could endanger airway management, as well as the deterioration of the neurological symptoms of patients with chest trauma, which have been used the cervical collar, have been observed [5,21,22).

Therefore, pre-hospital emergency staff should be able to identify and manage the protocol properly for using the cervical collar for patients with trauma. These patients should not be fixed with a single cervical collar but should be immobilized on the spinal board with blocks and belts [4].

Since the impact of education is significant, it is suggested that pre-hospital emergency staff be provided with continuing education courses for the training of various emergency

procedures. It is also recommended that a larger sample size is used to evaluate the performance of emergency staff in order to care for patients with trauma in future studies.

Our study showed that after holding educational courses for pre-hospital emergency personnel, their knowledge on using cervical collar increased and it had a positive effect clearly, and 74.5% of the personnel were in a good level at the knowledge. Therefore, the results showed that education on using cervical collar is so vital.

Our study showed that pre-hospital emergency staff's knowledge on the use of cervical collar increased after holding training courses for them, and it was good in 74.5% of the staff with a positive effect clearly. Therefore, the education on using cervical collar is vital, and the increase in knowledge on using the collar and similar training play a significant role in improving the performance of EMS personnel in the measures before transporting injured patients to the hospitals.

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Conflict of interest

None declared.

References

1. Hasler RM, Exadaktylos AK, Bouamra O, Benneker LM, Clancy M, Sieber R, et al. Epidemiology and predictors of cervical spine injury in adult major trauma patients: a multicenter cohort study. *J of trauma and acute care surgery*. 2012;72(4):975-81.
2. Chiu WC, Haan JM, Cushing BM, Kramer ME, Scalea TM. Ligamentous injuries of the cervical spine in unreliable blunt trauma patients: incidence, evaluation, and outcome. *J of Trauma and Acute Care Surgery*. 2001;50(3):457-64.
3. Demetriades D, Charalambides K, Chahwan S, Hanpeter D, Alo K, Velmahos G, et al. Nonskeletal cervical spine injuries: epidemiology and diagnostic pitfalls. *J of Trauma and Acute Care Surgery*. 2000;48(4):724-7.

4. Sundstrøm T, Asbjørnsen H, Habiba S, Sunde GA, Wester K .Prehospital use of cervical collars in trauma patients: a critical review. *J of neurotrauma*. 2014;31(6):531-40.
5. Goutcher C, Lochhead V. Reduction in mouth opening with semi-rigid cervical collars. *Br j of anaesthesia*. 2005;95(3):344-8.
6. Kreinest M, Goller S, Rauch G, Frank C, Gliwitzky B, Wöfl CG, et al. Application of cervical collars—an analysis of practical skills of professional emergency medical care providers. *PloS one*. 2015;10(11):e0143409.
7. Theodore N, Hadley MN, Aarabi B ,Dhall SS, Gelb DE, Hurlbert RJ, et al. Prehospital cervical spinal immobilization after trauma. *Neurosurgery*. 2013;72(suppl_3):22-34.
8. Marshall LF, Knowlton S, Garfin SR, Klauber MR, Eisenberg HM, Kopaniky D, et al. Deterioration following spinal cord injury: a multicenter study. *J of neurosurg*. 1987;66(3):400-4.
9. Ben-Galim P, Dreiangel N, Mattox KL, Reitman CA, Kalantar SB, Hipp JA. Extrication collars can result in abnormal separation between vertebrae in the presence of a dissociative injury. *J of Trauma and Acute Care Surgery*. 2010;69(2):447-50.
10. Mobbs RJ, Stoodley MA, Fuller J. Effect of cervical hard collar on intracranial pressure after head injury. *ANZ J of surgery*. 2002;72(6):389-91.
11. Lemyze M, Palud A, Favory R ,Mathieu D. Unintentional strangulation by a cervical collar after attempted suicide by hanging. 2010:emj. 2010.106625.
12. Hasler RM, Exadaktylos AK, Bouamra O, Benneker LM, Clancy M, Sieber R, et al. Epidemiology and predictors of spinal injury in adult major trauma patients: European cohort study. *Eur Spine J*. 2011;20(12):2174-80.
13. Bouland AJ, Jenkins JL, Levy MJ. Assessing attitudes toward spinal immobilization. *J. Emerg. Med*. 2013;45(4):e11-ve25.
14. Ziabari SMZ, Kasmaei VM, Pourshafiei SH, Saadatmand S. Knowledge and Practice of medical Interns Regarding Use of Neck Collar in Trauma Patients; a Cross-Sectional Study. *Iran J of Emerg Med*. 2018;5:11.
15. Deasy C, Cameron P .Routine application of cervical collars—What is the evidence? *Injury*. 2011;42(9):841-2.

16. Stanton D, Hardcastle T, Muhlbauer D, van Zyl D. Cervical collars and immobilisation: A South African best practice recommendation. *Afr J Emerg Med.* 2017;7(1):4-8.
17. Haghdoost Z, Safari M, Yahyavi H. Effect of Triage Education on knowledge, attitude and practice of nurses in Poursina Educational and Therapeutic Emergency center in Rasht. *J Holist Nurs Midwifery.* 2010; 20 (2) :14-21
18. Ebrahimi S, Ghofranipour F, Tavousi M. The Effect of Educational Intervention on Promoting Healthy Eating Behaviors among Primary School Students in Kermanshah City, Iran. *JECH.* 2016; 3 (3) :17-23.
19. Sadat L, Foruzesh R, Mahmoodi Z, Tahamtani T, Beirami A, Farmani P. Comparison of the effect of two teaching methods on nurses' awareness of occupational hazards and safety measures: Lectures versus Educational Packages. *JAMED.* 2015;1(1):1-9.
20. Hugenholtz NI, De Croon EM, Smits PB, Van Dijk FJ, Nieuwenhuijsen K. Effectiveness of e-learning in continuing medical education for occupational physicians. *Occupational Medicine.* 2008;58(5):370-2.
21. Clarke A, James S, Ahuja S. Ankylosing spondylitis: Inadvertent application of a rigid collar after cervical fracture, leading to neurological complications and death. *Acta Orthopaedica Belgica.* 2010;76(3):413.
22. Papadopoulos MC, Chakraborty A, Waldron G, Bell BA. Lesson of the week: exacerbating cervical spine injury by applying a hard collar. *BMJ: British Medical Journal.* 1999;319(7203):171.