



Evaluation of Paramedics' Knowledge about Fracture for Road Traffic Accidents

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Abstract

Background:

Road traffic accidents are a significant area of research due to being a primary source of injuries and fatalities worldwide.

Objectives:

To assess Paramedics' Knowledge about Fracture for Road Traffic Accidents and Determine the effectiveness of an educational program on Paramedic`s knowledge about fracture for road traffic accidents.

Subjects and Methods:

A quantitative approach using the per-experimental design was carried out in medical operations department\ Immediate Ambulance Division in Al-Diwaniyah city, Iraq. A nonprobability, purposive sample of (50) paramedics who work at the medical operations department\ Immediate Ambulance Division in Al-Diwaniyah city, Iraq. Data were collected by using a self-administered questionnaire. Study instruments consist of two parts. **First part:** the demographic sheet included sociodemographic information about the paramedics and included (6 items). The **second part:** includes paramedics` knowledge toward the Fracture for Road Traffic Accidents According Australian version protocol and included (12 items). Descriptive and inferential data analysis approached were used to analyze the study data.

Results:

Paramedics' Knowledge about fracture for Road Traffic Accidents is fair in pre-assessment and good in post-assessment

Conclusions:

The paramedics` knowledge show fair level about fracture in pre assessment and improved after apply the educational program. And need to use the educational program as a guide for paramedics in performing their work as it follows (protocols Australian version protocol) classified by the World Health Organization.

Keywords: Paramedics' Knowledge, Fracture, Road Traffic Accide

Introduction

Road traffic accidents are a significant area of research due to being a primary source of injuries and fatalities worldwide. Research focuses on analyzing and predicting traffic accidents, as well as identifying key elements contributing to them⁽¹⁾. The significant number of injuries and fatalities resulting from road traffic accidents highlights the worldwide road safety problem. Vehicle crashes are the second most common cause of mortality for individuals aged 5 to 29 and the third most common cause for those aged 30 to 44⁽²⁾. Prehospital care (PHC) that is administered promptly is critical for enhancing the prognosis of victims involved in motor vehicle accidents⁽³⁾.

Around 178 million new fractures occurred worldwide in 2019 (a 33.4% increase from 1990), with an increase in patients linked to an aging population, a modern lifestyle, and chronic illnesses⁽⁴⁾.

Fracture is a condition that occurs due to a break, split, or crack in the skeleton of any bone, impacting the skeletal system⁽⁵⁾. are more prevalent in adults due to high-energy trauma. Fractures can occur in spiral, transverse, oblique, segmental, or comminuted forms based on the mechanism of injury⁽⁶⁾.

Major trauma and traffic accident-related limb injuries are a major health problem in developed nations, requiring lengthy medical interventions with significant socioeconomic consequences. However, less developed nations are also being negatively impacted by these accidents, as substantial disability are often caused by secondary consequences⁽⁷⁾.

Long bone fractures can take months to fully fuse together since they mend slowly and with difficulty. Prolonged medical interventions not only result in a substantial reduction of working days, which affects the patient and society economically, but they also increase the chance of nonunion and long-term disability from malunion, joint stiffness, muscle atrophy, or reflex sympathetic dystrophy⁽⁸⁾. Global and local programs focused on raising public awareness, early detection of individuals with a higher risk of

fractures, and implementing preventative or therapeutic measures could help reduce the growing occurrence of osteoporotic fractures⁽⁹⁾. For an open fracture, it is crucial to quickly apply a sterile bandage to reduce additional contamination of the wound. Initiate intravenous antibiotic therapy promptly⁽¹⁰⁾. Enhanced knowledge about prehospital emergency treatment may improve ambulance services and lower patient infection rates. Elderly nurses with advanced education and professional titles should enhance their accident knowledge training to maintain the overall accident knowledge level of the nursing team⁽¹¹⁻¹²⁾.

first aid must be administered to the injured person in order to minimize symptoms and prevent a progression of severity, which can be dangerous if not addressed promptly⁽¹³⁾. Traditional association of paramedics in the United Kingdom (UK) pertains to their role in delivering emergency care as part of an emergency medical service (EMS).

The role of paramedics has recently undergone a transformation. Moreover, additionally to supplying extensive essential assistance, modern Paramedics must exhibit the capacity to manage a wide range of acute medical situations. acute manifestations of mental illness, and social-care examinations⁽¹⁴⁾. To assess Paramedics' Knowledge about Fracture for Road Traffic Accidents and Determine the effectiveness of an educational program on Paramedic's knowledge about fracture for road traffic accidents.

Methods:

Study Design and duration:

A quantitative approach using per experimental design was conducted. The study has started from from November 2023 to February 2024

Prior to collection of the data, formal administrative approval was obtained to conduct the study from the ministry of planning / central organization of statistics for the acceptance of the questionnaire. An official request was submitted from the university of Baghdad / college of nursing to the ministry of health / Al-Diwaniyah health directorate / department of planning and resources development / center of staff training and development/ medical operations department

Immediate Ambulance Division in Al-Diwaniyah city, Iraq, to take approval for data collection.

Ethical considerations

The researcher acquired consent from all participants and prevented from collecting their personal information. Furthermore, the instrument to be used in the study has been approved by the University of Baghdad's College of Nursing's Research Ethics Committee with an ethical approval number 22/11/2023-16105. The researcher discusses the research and its objectives to all participants. Thus, a comprehensive understanding of their mission was acquired. The researcher informed all participants that the outcomes of the questionnaire would be only employed for research objectives. Subsequently, it was also communicated that all participants are autonomous individuals who have the ability to refuse participation.

Setting and Study Participant:

A non-probability, purposive sample

Of (50) paramedics who work in the medical operations department's Immediate Ambulance Division in Al-Diwaniyah city, Iraq,

Inclusion and exclusion criteria:

All paramedics from the medical operations department who accepted to participate in the study work both morning and evening shifts. Paramedics who refused to participate in the trial.

Sampling and sample size:

Non-probability purposive sampling was used to include 50 paramedics from all Ambulance Divisions and departments in Al-Diwaniyah Governorate. The sample size was determined by using a single population formula and considering the following assumption: = total population (paramedics) = 50, 95% confidence, 5% error $5/100=0.05$, if $N=50$, n = sample size E = error $n=N/(1+(N)(E)^2)$ ⁽¹⁵⁾.

Study instruments and data collection:

Information was gathered by a self-administered questionnaire. The study instruments consist of two sections. **First part:** demographic data gathered from paramedics consist from 6 items (age, sex, level of education, Years of service in profession,

Years of experience as paramedic, and Participation in training courses). **The second part** of the questionnaire consists from knowledge of paramedics about fracture for road traffic accident According Australian version protocol and included (12 items) as multiple-choice questions. The number of accurate responses was used to evaluate the understanding level of each issue. A paramedic is utilizing a binary rating system where (1) indicates a correct response and (0) indicates an incorrect response. The knowledge test lasted approximately 15 to 20 minutes.

Evaluation of paramedics' knowledge according to the sum of scores

- 0 – 0.33= poor knowledge.
- 0.34– 0.66= Fair knowledge.
- 0.67 – 1= Good knowledge

Data analysis:

The content validity was limited by assessment of the multiple-choice questions and educational program through a panel of (9) experts, which had 5 more than 10 years from professional experience in their fields, for examining the content of the questions of multiple choice and educational program concerning first aid for road traffic accident. The experts were (7) from faculty members of the Nursing College/University of Baghdad and (2) expert from Al-Diwaniyah Health Department, one from Al-Diwaniyah Teaching Hospital, one from Afak General Hospital. and (1) The expert from Al-Muthanna Health Department, Al-hussein Teaching Hospital.

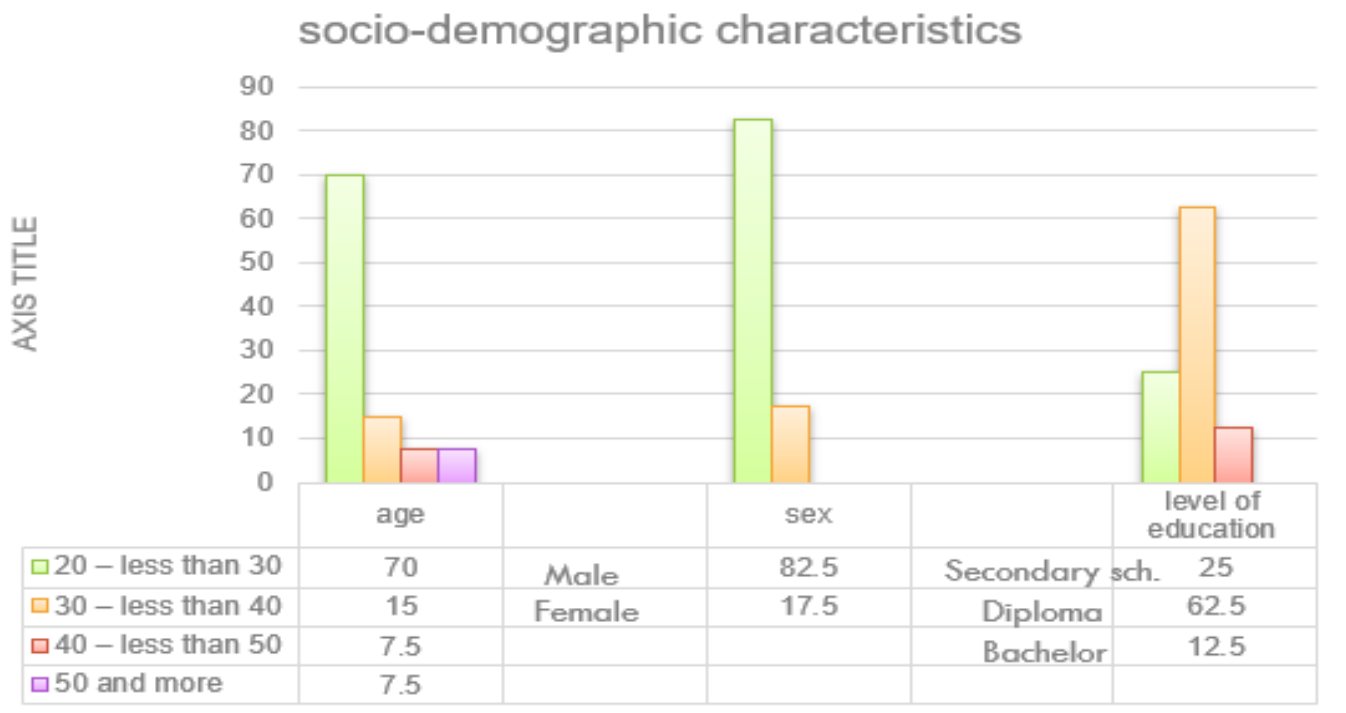
Statistical procedures including description and inference were conducted ⁽¹⁶⁾. The descriptive analysis included frequency, percentage, mean, and standard deviation. A chi-square test was conducted to examine the association between paramedic's knowledge of fracture and other demographic factors. A result is considered statistically significant when the p-value is less than 0.05. The data were analyzed using SPSS Statistics version 26. The reliability of the study instrument was evaluated using the Cronbach's alpha method in SPSS version 26.0. An assessment was carried out on five paramedics in the medical

operations section of the Immediate Ambulance Division in Al-Diwaniyah city, Iraq, using a test-and-retest method. The reliability analysis showed that Cronbach's Alpha ⁽¹⁷⁾ was $r = 0.754$ for

Knowledge, indicating a statistically reasonable match constrained by the reliability factor

Result:

Figure (1) Distribution of Participants according to their Socio-demographic Characteristics



The analysis in figure (1) shows that the average age for paramedics is 30±10 years, in which they are seen with age group of 20-less than 30 year among 70% of them.

The sex of paramedics refers that 82.5% of them are males and 17.5% of them are females.

Regarding level of education, 62.5% of paramedics are graduated with diploma degree and only 12.5% of them have bachelor degree.

Table (1): Distribution of Participants according to their Professional Characteristics

List	Characteristics	f	%
1	1 – less than 6	28	70
	6 – less than 11	5	12.5
	11 – less than 16	3	7.5
	16 and more	4	10
	<i>Total</i>	<i>40</i>	<i>100</i>
2	1 – less than 6	33	82.8
	6 – less than 11	4	10
	11 – less than 16	1	2.2
	16 and more	2	5
	<i>Total</i>	<i>40</i>	<i>100</i>

3	Participation in training courses	No	20	50
		Yes	20	50
		<i>Total</i>	40	100
4	Number of courses	Not participated	20	50
		One	14	35
		Two or more	6	15
		<i>Total</i>	40	100
5	Duration of course	Not participated	20	50
		Week	18	45
		More than week	2	5
		<i>Total</i>	40	100
6	Course place	Not participated	20	50
		Inside Iraq	20	50
		Outside Iraq	0	0
		<i>Total</i>	40	100

f: frequency %: percentage

The data in table 1 shows that paramedics with less than 6 years of experience make up 82.8% as paramedics and paramedics with less than 6 years of service in profession make up 70% of the

profession. Half of the paramedics in the study participated in a single training course lasting one week within Iraq.

Table (2): Assessment of Paramedics' Knowledge about "Fracture" for Traffic Accident for Pre-test and Post-test.

List	fracture	Scale	Pre-test			Post-test		
			f (%)	M	Ass.	f (%)	M	Ass.
1	Among the benefits of stabilizing fractures are Reducing bleeding and pain/reducing soft tissue injury	Incorrect	23(57.5)	.43	Fair	9(22.5)	.78	Good
		Correct	17(42.5)			31(77.5)		
2	To treat the lower jaw, you should Support it using a triangular band that is wrapped and placed under the jaw and then tied to the top of the head	Incorrect	11(27.5)	.73	Good	11(27.5)	.73	Good
		Correct	29(72.5)			29(72.5)		
3	To treat neck fractures, you must shape neck stabilizer by c- collar	Incorrect	19(47.5)	.53	Fair	6(15)	.85	Good
		Correct	21(52.5)			34(85)		
4	The most important step in treating back and spine fractures is Stabilize the spine well and use a triangle bandage around the body from top to bottom	Incorrect	15(37.5)	.63	Fair	8(20)	.80	Good
		Correct	25(62.5)			32(80)		

5	To treat fractures of the ribs and sternum, it is necessary Fixation with a triangle tie	Incorrect	23(57.5)	.43	Fair	8(20)	.80	Good
		Correct	17(42.5)			32(80)		
6	The first step in treating fractures of the ulna and radius, Place a figure 8 bandage around the broken limb	Incorrect	20(50)	.50	Fair	8(20)	.80	Good
		Correct	20(50)			32(80)		
7	To stabilize pelvic fractures, it must be used8 strap and use of anti-shock pneumatic clothing	Incorrect	20(50)	.50	Fair	8(20)	.80	Good
		Correct	20(50)			32(80)		
8	The reasons for using a traction splint are Fixation of femur fractures	Incorrect	28(70)	.30	Poor	10(25)	.75	Good
		Correct	12(30)			30(75)		
9	The reasons for using the splint are: There are fractures in one of the limbs	Incorrect	31(77.5)	.23	Poor	10(25)	.75	Good
		Correct	9(22.5)			30(75)		
10	To evaluate fractures before splinting them, we use Rule of thirds	Incorrect	27(67.5)	.33	Poor	9(22.5)	.78	Good
		Correct	13(32.5)			31(77.5)		
11	The site for assessing pulse movement, and sensation at the time of fracture is Above the fracture area before the splint	Incorrect	30(75)	.25	Poor	11(27.5)	.73	Good
		Correct	10(25)			29(72.5)		
12	What is meant by breaking a green branch an incomplete fracture in which the outer membrane of the broken bone (external periosteum) remains intact	Incorrect	25(62.5)	.38	Fair	9(22.5)	.78	Good
		Correct	15(37.5)			31(77.5)		

Ass: Assessment, M: Mean

The table 2 presents the paramedics’ knowledge about fracture during first aid; the mean scores indicates that during pretest they have poor level of knowledge in items 8, 9, 10, and 11; fair level of

knowledge in items 1, 3, 4, 5, 6, 7, and 12; and show good level in item 2 only. During the posttest, their level of knowledge is increased to good level among all items

Table (3): Assessment of Paramedics’ Knowledge about “fracture” through First Aids for Traffic Accident during Pretest and Posttest

Levels of knowledge	Pretest					Posttest				
	f	%	M	S. D	Assessment	f	%	M	S. D	Assessment
Poor	15	37.5	5.20	1.652	Fair	0	0	9.32	2.093	Good
Fair	25	62.5				13	32.5			
Good	0	0				27	67.5			
Total	40	100				40	100			

f: Frequency, %: Percentage, M: Mean of total score, SD Standard deviation of total score

This table shows that paramedics' knowledge about fracture during first aids; they show fair level of knowledge during the pretest (62.5%) while they show good level of knowledge during the posttest (67.5%).

Discussion:

Figure (1) shows that the average age for paramedics is 30 ± 10 years, in which they are seen with age group of 20-less than 30 year among 70% of them.

These results supported by study report the nurses' age was 25.1 and the standard deviation was 6.77 with a range of 20 to 39 years old ⁽¹⁸⁾.

The sex of paramedics refers that 82.5% of them are males and 17.5% of them are females.

These results supported by study report the paramedic's male (29%) more than female (1%) ⁽¹⁹⁾.

Regarding level of education, 62.5% of paramedics are graduated with diploma degree and only 12.5% of them have bachelor degree

This result agrees with result report the nurses' education, more than two-third of them are graduated from nursing institute, 23 (76.7 %). and have diploma in nursing ⁽⁴⁾.

table 1 shows that paramedics with less than 6 years of experience make up 82.8% as paramedics and paramedics with less than 6 years of service in profession make up 70% of the profession. Half of the paramedics in the study participated in a single training course lasting one week within Iraq.

Al-Fayyadh et al, indicated that there is no significant relationship between nurses' years of experience and their levels of knowledge ⁽²⁰⁾.

These results confirmed Iraq study who found years of experience in nursing, (38.2%) of nursing staff have (6-10) years in nursing field ⁽²¹⁾.and study published on paramedics who worked at army aviation bases in Iraq found that there were no statistically significant differences between the knowledge and the number of years of experience in first aid or aeromedical evacuation. The p-value was 0.81⁽²²⁾. Another study confirmed these findings, showing that the highest percentage

(90%) of participants attended advanced first aid training sessions conducted only in Iraq. The study concluded that there was no significant correlation between attending these training sessions and participants' knowledge, as indicated by a p-value of .75 ⁽¹⁹⁾.and the result supported by study report the participation rate in training courses is (yes, 82.5%), the number of training courses is (2), and the training course location is inside Iraq (93.93%) ⁽²³⁾.

A study conducted in southwest Missouri revealed that the majority of nurses (47.5%) had less than 5 years of experience in the nursing sector ⁽²⁴⁾.

This **table 2,3** that paramedics' knowledge about fracture during first aids; they show fair level of knowledge during the pretest (62.5%) while they show good level of knowledge during the posttest (67.5%).

The study agrees with this result reported the management of TDI by paramedics in Germany is poor, with about two-thirds having no or insufficient knowledge and another two thirds having no or insufficient skills ⁽²⁵⁾.

A study in Nigeria reported that only 3% of police officers had poor knowledge of FA for PHC of road traffic accident victims (3). These results confirmed Iraq study who found nurses' knowledge were (low), and after Implementation the educational program, the nurses' knowledge was improving to (good) about risk factors for bleeding ⁽²⁶⁾. Hammod and Mohammed supported this finding ⁽²⁷⁾. The outcomes of the paramedic's implementation of TCCC standards in various key areas were insufficient ⁽²⁸⁻²⁹⁾.

Conclusions: the paramedics show fair level of knowledge about fracture in pre assessment and improved after applying the educational program.

Recommendations: Use the educational program as a guide for paramedics in performing their work as it follows protocols classified by the World Health Organization

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Conflicts of interest:

There are no conflicts of interest.

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Reference:

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