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Perspectives And Approaches Among Paramedics In The Saudi Red Crescent Authority About Spine Trauma Management

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ABSTRACT

This study aimed to assess perspectives and approaches of paramedics in the Saudi Red Crescent Authority regarding spine trauma management. Given the high prevalence of spinal injuries in Saudi Arabia, particularly from traffic incidents. A descriptive, cross-sectional survey was conducted among 236 Saudi red crescent authority paramedics. A structured questionnaire measured participants' perspectives and approaches on spine trauma management. The findings indicated that paramedics demonstrated adequate foundational knowledge, particularly regarding the mechanisms of spinal injury and basic immobilization techniques, with an average knowledge score of 4.01 out of 5. However, gaps were observed in familiarity with advanced protocols, such as ATLS, where responses were neutral. Attitudes toward evidence-based guidelines were generally positive, with a mean attitude score of 3.57, though confidence in handling complex spine trauma cases was lower. Practice scores revealed consistent application of basic immobilization techniques, yet documentation and reassessment practices were less rigorously applied. The study highlights a solid knowledge base among Saudi Red Crescent Authority paramedics but identifies specific areas for improvement, particularly in advanced protocol training, practical skills reinforcement, and documentation practices. Targeted training programs, scenario-based simulations, and feedback mechanisms are recommended to enhance paramedics' confidence, skills, and consistency in managing spine trauma.

KEYWORDS: Paramedics, Spinal trauma management.

1. Introduction

Spinal trauma, which is characterized by injury to the vertebrae, the spinal cord or the nerves involved, is a major health issue and, if not controlled, may lead to permanent disability or death. According to a study, spinal cord injuries (SCI) occur

at 10–83 per million population worldwide, to demonstrate the effect of these injuries on the healthcare system(Vaillancourt et al., 2011). Appropriate spine trauma management by paramedics is critical, as they are usually the first responders who influence the outcome of such injuries through their initial care decisions.

The standard of care for treating possible spine injuries in the prehospital context has undergone significant alterations over the past 10 years, which have been characterized as a paradigm shift (Jones Rhodes et al., 2016). International jurisdictions have seen these developments, and new treatment options provide more flexibility than earlier recommendations (Connor et al., 2013; White et al., 2014). Prehospital treatment guidelines under the general category of spinal motion restriction still exhibit notable variations, despite the widespread endorsement of the overall premise of decreasing movement.

According to current international guidelines, emergency medical services should immobilize trauma patients who are at risk of spinal injury to lower the risk of neurological degeneration (Kreinest et al., 2016; Theodore et al., 2013). These immobilization measures are justified by the belief that unstable spinal injuries may worsen because of movement or manipulation, leading to additional spinal cord damage (Benger & Blackham, 2009; Crosby, 1992).

Many patients are immobilized needlessly because most blunt trauma patients do not have a spine fracture. Both the patient and the paramedic may experience difficulties because of spine immobilization: pressure sores, breathing difficulties, the need for aspiration following vomiting, increased intracranial pressure, and difficulties with airway management (Chan et al., 1994). Additionally, it takes a lot of time to implement (Morrissey, 2013).

However, as research shows, many paramedics subject to save people's lives have a rather limited understanding of how spinal injuries should be managed. For example, one revealed that less than 10% of paramedics possessed adequate knowledge about cervical collars in trauma patients (Asadi et al., 2018). That lack of knowledge takes the form of incorrect application of spinal motion restriction (SMR) methods which are important in minimizing additional harm during movement of the patient.

Attitudes toward spinal immobilization also vary among paramedics. Some published papers presented an increased level of doubt as to the necessity and efficiency of the laid down conventional SMR procedures (McDonald et al., 2022). These may be due to changing of boundaries that have challenged earlier approaches to spine trauma so that today there is confusion on the right approach in managing the condition. Why these attitudes exist must be known if education campaigns are going to be designed to correct misconceptions that exist with regards to COVID-19 and to reinforce behaviour changes necessary to adhere to recommended protocols.

The practice patterns among paramedics reveal a concerning trend where theoretical knowledge does not always translate into effective practice. For example, while many paramedics may understand the importance of immobilizing a patient with suspected spinal injury, their actual implementation of this knowledge can be inconsistent (Almarhoon et al., 2018). This discrepancy highlights the need for comprehensive training programs that not only educate but also provide practical

skills reinforcement.

Educational interventions have shown promise in enhancing paramedics' knowledge and confidence in managing spine trauma. A study indicated that after targeted training sessions, there was a significant improvement in paramedics' understanding and application of cervical collar usage (Asadi et al., 2018). Such findings underscore the necessity for ongoing education and refresher courses to keep emergency personnel updated on best practices in spinal injury management.

Furthermore, integrating feedback from paramedics into training programs can improve their engagement and receptiveness to new guidelines. Research suggests that when EMS personnel feel their experiences and observations are valued, they are more likely to adopt recommended practices (McDonald et al., 2022). This collaborative approach can foster a culture of continuous learning and adaptation within emergency medical services.

In addition to formal education, practical simulations and scenario-based training can enhance paramedic preparedness for real-life situations involving spine trauma. Engaging paramedics in hands-on training allows them to practice skills in a controlled environment, thereby increasing their confidence and competence when faced with actual emergencies.

As the paramedics are the first responders, their ability to make informed decisions quickly can significantly impact the trajectory of a patient's recovery. Therefore, ongoing research into KAP dynamics is necessary to inform policy changes and educational strategies within emergency medical services.

In Saudi Arabia spine trauma is common, with one of the highest rates of spinal cord injuries in the world, with 62 people injured per 1 million, and the injuries are mostly due to traffic accidents(Bakhsh et al., 2020). The quality of prehospital care for spine trauma patients can significantly impact their long-term outcomes. Understanding the knowledge, attitudes, and practices of paramedics in Saudi Arabia is essential for identifying gaps in their training and developing targeted interventions to improve their skills and patient care. This study will explore the current state of knowledge and practice among paramedics in the Saudi red crescent authority about spine trauma management, highlighting areas for improvement and future research directions.

Study problem

Spinal cord injuries (SCIs) can result in catastrophic consequences, with the potential for paralysis and loss of motor function below the injury site. The extent of the injury frequently corresponds with the severity of problems resulting from SCIs. Higher cervical level injuries can cause respiratory failure, whilst lower-level injuries can cause different levels of limb dysfunction. Because of the consequences of these injuries, paramedics must be properly educated to identify and treat any spinal injuries (Wang et al., 2021).

Neurogenic shock is a serious consequence of spine trauma that can happen after major cervical traumas. Bradycardia and hypotension brought on by a loss of

sympathetic tone are the hallmarks of this illness, which can make resuscitation more difficult. A multidisciplinary panel's consensus statement, which stresses rapid life support interventions for patients with traumatic spinal cord injury 1, highlights the importance of early detection and management of neurogenic shock in enhancing patient outcomes (Picetti et al., 2024).

Due to extended immobility, people with SCIs are susceptible to secondary problems like pressure ulcers, pneumonia, and urinary tract infections (UTIs) in addition to neurological issues. According to research, paramedics' typical immobilization techniques may make these dangers worse. Rigid spine boards, for example, may cause more pain and suffering, which could lead to further issues during travel. This emphasizes the necessity of a well-rounded strategy for immobilization that considers both the advantages and disadvantages (Vaillancourt et al., 2011).

Despite established protocols advocating for spinal immobilization in trauma cases, recent studies have raised questions about their efficacy. A systematic review found that many patients transported with suspected spinal injuries do not actually have significant fractures or instability. This over-reliance on immobilization can lead to unnecessary interventions that may increase patient discomfort without improving outcomes (Ahn et al., 2011).

The decision-making process regarding spinal immobilization often relies on paramedics' assessments of the mechanism of injury and clinical symptoms. However, studies show that paramedics frequently misjudge the risk of spinal fractures based solely on these factors. For example, a cohort study indicated that selective immobilization strategies could safely reduce unnecessary immobilization without compromising patient safety. This suggests a need for enhanced training focused on clinical evaluation skills among paramedics (Vaillancourt et al., 2011).

Moreover, prolonged immobilization can lead to adverse effects such as increased pain and psychological distress. A study demonstrated that patients who experienced discomfort during transport due to rigid immobilization devices were more likely to develop respiratory complications. This situation underscores the importance of continuous patient assessment and communication between paramedics and receiving facilities (Wang et al., 2021).

Research Questions

- What is the knowledge about spine trauma management among paramedics in the Saudi Red Crescent Authority?

- What is the attitude about spine trauma management among paramedics in the Saudi Red Crescent Authority?

- What is the practice about spine trauma management among paramedics in the Saudi Red Crescent Authority?

Research Objectives

- To identify the knowledge about spine trauma management among paramedics in the Saudi Red Crescent Authority.

- To identify the attitude about spine trauma management among paramedics in the Saudi Red Crescent Authority.

- To identify the practice about spine trauma management among paramedics in the Saudi Red Crescent Authority.

2. Literature review

A study McDonald et al. investigates the perceptions and practices of paramedics regarding spinal motion restriction (SMR) in prehospital settings. Conducted with 220 paramedics from a North American EMS agency, the survey revealed that many respondents perceived SMR as less important than in the past and reported treating fewer patients with potential spine injuries. Exploratory factor analysis identified two key constructs: "Judging Mechanisms of Injury" (MOI) and "Treatment Value," with advanced life support (ALS) paramedics showing greater skepticism towards SMR's effectiveness compared to basic life support (BLS) providers. The study highlighted a notable tension between adherence to protocols and the practical application of SMR, suggesting that EMS personnel utilize various strategies to optimize patient care while navigating these guidelines. Overall, the findings underscore the need for incorporating paramedic feedback into future revisions of spinal care protocols to enhance their relevance and efficacy in practice (McDonald et al., 2022).

A study by Thorvaldsen et al. investigates the adoption of a new evidence-based guideline for managing adult trauma patients with potential spinal injuries among emergency medical services (EMS) personnel in Norway. Conducted 18 months after the guideline's publication, an electronic survey garnered responses from 938 out of approximately 5,500 EMS personnel, revealing that over half were aware of the guideline, with 56% reporting its implementation in their services. Notably, the primary barrier to guideline execution was a lack of real-life trauma case exposure, while only 18% had completed the accompanying e-learning course. Despite the absence of formal national endorsement, the findings suggest a significant level of guideline integration into practice, indicating that guidelines developed from practitioners' perceived needs can facilitate implementation effectively. However, the e-learning component did not appear to significantly influence this process (Thorvaldsen et al., 2019).

A study by Bouland et al. investigates the attitudes, knowledge, and comfort levels of Emergency Medical Services (EMS) providers regarding spinal immobilization practices, particularly under a non-selective protocol. Conducted through an online survey of EMS and Emergency Department (ED) personnel in Howard County, Maryland, the research reveals significant disparities in comfort levels with spinal immobilization techniques. Notably, while 76% of prehospital providers reported comfort using the Kendrick Extrication Device (KED), most hospital-based providers expressed discomfort. The findings indicate that experienced providers tend to feel more comfortable with immobilization devices, yet many respondents believe that spinal immobilization is often unnecessary, particularly in cases of

penetrating trauma to the chest and abdomen. This study underscores the need for enhanced education and training on spinal immobilization protocols to align EMS practices with contemporary research findings, suggesting that complacency may exist among providers due to outdated practices (Bouland et al., 2013).

A study by Chang et al. aimed to investigate the beliefs of Emergency Medical Services (EMS) providers concerning spinal precautions during the transport of pediatric trauma patients. Conducted through a nationwide survey of certified EMS providers, the research garnered a response rate of 17%, with 5,400 participants. The findings revealed that while there was a consensus among providers (over 66% agreement) on the efficacy of rigid cervical collars (68%) and long backboards with soft conforming surfaces (79%) for maintaining spinal alignment, only 39% endorsed the use of rigid long backboards for pediatric patients. Notably, there was no consensus on specific precautions based on age or risk factors associated with cervical spine injuries. Factors influencing the belief in the effectiveness of these devices included provider experience and education level, suggesting a need for improved training and guidelines tailored to pediatric care in EMS settings. Overall, the study highlights significant variability in EMS providers' beliefs and underscores the necessity for developing specific pediatric spinal precaution protocols (Chang et al., 2017).

A study titled by Neil et al. investigates the actual and perceived knowledge of athletic trainers (ATs), paramedics, and emergency medical technicians (EMTs) regarding the management of spine-injured athletes. Conducted with 785 participants, the research revealed that overall performance on a knowledge assessment was poor, with an average score of only 5.5 out of 9, indicating a significant knowledge gap. Despite participants believing they were knowledgeable, there was a minimal difference between their preassessment perceived knowledge (5.0) and postassessment perceived knowledge (4.7), suggesting a lack of improvement post-evaluation. The findings underscore the urgent need for enhanced training and interprofessional education to address these deficiencies, particularly in life-preserving skills for managing spinal injuries, which can have serious implications for patient outcomes (Neil et al., 2018).

3. Methodology:

Given the nature of the current study topic (Perspectives and Approaches among paramedics in the Saudi red crescent authority about spine trauma management). To achieve the study objectives, the researcher used the descriptive method, which is: the type of research by which all members of the research community or a large sample of it are questioned; with the aim of describing the phenomenon being studied in terms of its nature and degree of existence. (Al-Assaf, 2016, p. 211).

Study Community:

The current study community consists of all Paramedics in the Saudi Red Crescent Authority.

Study Sample:

The origin of scientific research is to be conducted on all members of the research community; because this is more likely to confirm the results, but the researcher resorts to choosing a sample of them if this is not possible due to their large number, for example" (Al-Assaf, 2003, p. 96); therefore, the researcher chose a random sample, where the sample amounted to (236) Paramedics in the Saudi Red Crescent Authority.

Study Tool:

Based on the nature of the data and the methodology followed in the study, the researcher found that the most appropriate tool to achieve the objectives of this study is (the questionnaire). The study tool was built by referring to the literature and previous studies related to the subject of the study, Perspectives and Approaches among paramedics in the Saudi red crescent authority about spine trauma management. The researcher designed the initial questionnaire and distributed it to the study sample to find out the data that this tool seeks to collect. The validity and reliability procedures for this tool were verified. The following is a detailed explanation of how to prepare the tool and the procedures taken by the researcher to verify the validity and reliability of the tool.

Validation of questionnaire

The validity of the study tool means ensuring that it measures what it was prepared to measure. It also means that the questionnaire includes all the elements that enter the analysis on the one hand, and the clarity of its expressions on the other hand, so that it is understandable to everyone who uses it. The researcher verified the validity of the study tool through:

Honesty of arbitrators:

The face validity method was used, with the aim of ensuring the validity of the questionnaire and its suitability for research purposes, by presenting it to a group of academic and specialist arbitrators, and asking them to express an opinion regarding the extent of the validity and validity of each paragraph of the questionnaire and its suitability for measuring what it was designed to measure, and introducing Necessary amendments, whether by deletion, addition or reformulation. The arbitrators presented suggested amendments to the study tool, and the researcher took those observations into account, made the necessary amendments that were agreed upon by most arbitrators, and then relied on the questionnaire in its final form.

Internal consistency validity

Through internal consistency, we know the extent to which each paragraph of the questionnaire is consistent with the axis/dimension to which this paragraph belongs. To calculate the validity of the internal consistency of the study tool, the Pearson correlation coefficient was calculated (Pearson Correlation Coefficient), through which the correlation coefficients were calculated between the score of each item and the total score of the dimension (the average score of the items of the dimension) to which the item belongs. The following tables show the validity of the internal

consistency.

Table (1): internal consistency results

N = 236	Pearson Correlation Coefficient	Sig
knowledge about spine trauma management		
1- I am confident in my knowledge of the spinal anatomy and the potential mechanisms of spine trauma.	.802**	.000
2- I am familiar with common mechanisms of spine injuries, such as falls and motor vehicle accidents, and their implications for trauma management.	.563**	.000
3- I can accurately recognize symptoms of spine trauma, including loss of sensation, weakness, or paralysis in extremities.	.779**	.000
4- I am knowledgeable about the standard assessment protocols for suspected spine injuries in prehospital settings.	.774**	.000
5- I understand the recommended spinal immobilization techniques, including the use of spinal boards, cervical collars, and other supportive devices.	.870**	.000
6- I am aware of situations where spinal immobilization may not be appropriate, such as cases with obstructed airways or penetrating trauma.	.787**	.000
7- I am knowledgeable about steps to prevent secondary injuries, such as avoiding unnecessary movements during patient handling.	.716**	.000
8- I am familiar with Advanced Trauma Life Support (ATLS) or other international guidelines for the management of spine trauma.	.741**	.000
9- I keep myself updated on the latest practices and evidence-based protocols in spine trauma management through continuous education.	.785**	.000
attitude about spine trauma management		
1- I believe that following evidence-based guidelines in spine trauma management is essential for patient safety.	.633**	.000
2- I consider ongoing training and professional development necessary to maintain competency in spine trauma management.	.575**	.000
3- I feel comfortable prioritizing patient safety even if it means deviating from standard immobilization protocols.	.804**	.000
4- I am confident in my ability to manage patients with suspected spine trauma.	.827**	.000
5- I believe that immobilization protocols for spine trauma are necessary and should be consistently followed.	.827**	.000
6- I think that collaboration with other emergency team members is essential for effective spine trauma management.	.885**	.000
7- I am comfortable adopting new spine trauma management practices, even if they differ from traditional protocols.	.784**	.000
8- I believe feedback on my spine trauma management practices can help improve my skills and patient outcomes.	.833**	.000
practice about spine trauma management		
1- In cases of suspected spine trauma, I immobilize the spine using appropriate techniques and devices.	.852**	.000
2- I apply updated spine trauma management protocols and guidelines during prehospital care.	.894**	.000
3- I carefully monitor patients with spine trauma for potential secondary injuries during transportation.	.819**	.000
4- I perform periodic reassessment of the patient's condition and stability during transport to the hospital.	.872**	.000
5- I document all steps taken in managing spine trauma, including assessment findings, immobilization, and any deviations from standard protocol.	.728**	.000

It is clear from the previous table that the Pearson correlation coefficient values for each item for each dimension with the total score of the dimensions; Positive and statistically significant at the significance level (0.01), where the values of the correlation coefficients ranged from (0.563) as a minimum to (0.894) as a maximum.

This indicates the presence of internal consistency in the items of each dimension, and their suitability for measuring what they were designed to measure.

Reliability of the questionnaire

Reliability of the questionnaire means that it gives approximately the same results if it is applied repeatedly to the same people in similar circumstances. The reliability of the questionnaire was calculated using Cronbach's Alpha, it was equal to 0.918. This means that the study tool has a high degree of stability and can be relied upon in the field application of the study. It is also an important indicator that the items that make up the questionnaire give stable and stable results if it is re-applied to the study sample members again. Therefore, there is reassurance regarding the analysis of the study data.

For each factor, it had 5 Likert-type items, this factor was pretested and checked for internal consistency. Accordingly, all the items were found to qualify internal consistencies table 2 shows the values of Cronbach's Alpha coefficient (α) of each factor. Likert-type items had five response anchors: (from 1– 'Strongly Disagree' to 5– 'Strongly agree').

Table (2): Reliability of the questionnaire

Factors	Number of Items	Cronbach's Alpha
knowledge about spine trauma management	9	.904
attitude about spine trauma management	8	.905
practice about spine trauma management	5	.956
Total questionary	22	0.918

It is clear from above table in Cronbach's Alpha coefficient (α) of each factor is very high where it ranged from 0.904 to 0.956

Study implementation procedures:

The questionnaire was sent to Paramedics in the Saudi Red Crescent Authority, where the researcher converted the questionnaire to electronic in order to collect the largest possible amount of the study sample, where the researcher distributed the questionnaire and after examining it, the researcher obtained (236) questionnaires valid for statistical analysis, after which the data was entered and processed statistically by computer using the (SPSS) program, and then the researcher analyzed the data and extracted the results.

Statistical processing methods:

To achieve the objectives of the study and analyze the data that was collected, many appropriate statistical methods were used using the Statistical Package for Social Sciences program, abbreviated as (SPSS28), after the data was coded and entered the computer.

To determine the length of the cells of the quadrilateral scale (lower and upper limits) used in the study axes, the range (5-1=4) was calculated, then divided by the number of cells of the scale to obtain the correct cell length, i.e. (4/5= 0.80), after that this value was added to the lowest value in the scale (or the beginning of the scale, which is the correct one) to determine the upper limit of this cell, and thus the

length of the cells became as shown in the following: (1.00 - 1.80) Strongly disagree, (1.80 – 2.60) disagree, (2.60 - 3.40) neutral, (3.40- 4.20) agree, (4.20-5) Strongly agree.

4. Results

Table (3): Characteristics of the study participants

Characteristics	N = 236	Frequency	Percentage
educational degree	diploma	160	67.8
	Bachelor's	68	28.8
	Master/ PhD	8	3.4
Profession	Technician	172	72.9
	Specialist	60	25.4
	admenstrative	4	1.7
Seniority at work	Less than 3 years	4	1.7
	4 - 10	84	35.6
	11-15	76	32.2
	15+	72	30.5

The study studied 236 individuals, 67.8% had diploma degree, 28.8% had bachelor’s degree, and 3.4% had master/PhD degree. 72.9% were Technician, 25.4% were Specialist and 1.7% were admenstrative. 35.6% had 4-10 years’ work, 32.2% had 11-15 years’ work, 30.5% had more than 15 years’ work, and 1.7% had less than 3 years’ work (Table 3).

For factor 1: knowledge about spine trauma management, the researcher calculated the mean, standard deviation, relative weight, level of agreement, and ranking for each item. Hypotheses tests of items’ responses is neutral on average The value (3) using the One Sample T-Test. Table (4) shows the results.

Table (4): knowledge about spine trauma management

N = 236	Mean	Standard deviation	Relative weight	T-value	Sig	Agreement degree	Rank
1- I am confident in my knowledge of the spinal anatomy and the potential mechanisms of spine trauma.	4.41	0.91	88.14	23.85	.000	Strongly agree	3
2- I am familiar with common mechanisms of spine injuries, such as falls and motor vehicle accidents, and their implications for trauma management.	4.73	0.69	94.58	38.71	.000	Strongly agree	1
3- I can accurately recognize symptoms of spine trauma, including loss of sensation, weakness, or paralysis in extremities.	4.15	1.21	83.05	14.67	.000	agree	4
4- I am knowledgeable about the standard assessment protocols for suspected spine injuries in prehospital settings.	3.88	1.24	77.63	10.93	.000	agree	6
5- I understand the recommended spinal immobilization	4.08	1.24	81.69	13.42	.000	agree	5

techniques, including the use of spinal boards, cervical collars, and other supportive devices.							
6- I am aware of situations where spinal immobilization may not be appropriate, such as cases with obstructed airways or penetrating trauma.	3.64	1.33	72.88	7.45	.000	agree	7
7- I am knowledgeable about steps to prevent secondary injuries, such as avoiding unnecessary movements during patient handling.	4.42	1.08	88.47	20.27	.000	Strongly agree	2
8- I am familiar with Advanced Trauma Life Support (ATLS) or other international guidelines for the management of spine trauma.	3.14	1.46	62.71	1.43	.154	neutral	9
9- I keep myself updated on the latest practices and evidence-based protocols in spine trauma management through continuous education.	3.59	1.41	71.86	6.48	.000	agree	8
Mean of factor 1	4.01	0.90	80.11	17.17	.000	agree	

The average of the sample members' answers to the "knowledge about spine trauma management" dimension was (4.01 out of 5) with a relative weight of 80.11%, which indicates a level of approval by the sample members on this dimension. The highest item received the highest degree of approval from the sample members was: The paragraph that states, "I am familiar with common mechanisms of spine injuries, such as falls and motor vehicle accidents, and their implications for trauma management." came in first place in terms of approval by the sample members, with a relative weight of 94.58%.

While the item that received the lowest degree of support from the sample members was: The paragraph that states, "I am familiar with Advanced Trauma Life Support (ATLS) or other international guidelines for the management of spine trauma." ranked next to last in terms of approval by the sample members, with a relative weight of 62.71%.

For factor 2: attitude about spine trauma management, the researcher calculated the mean, standard deviation, relative weight, level of agreement, and ranking for each item. Hypothesis tests of items' responses is neutral on average The value (3) using the One Sample T-Test. Table (5) shows the results.

Table (5): attitude about spine trauma management

N = 236	Mean	Standard deviation	Relative weight	T-value	Sig	Agreement degree	Rank
1- I believe that following evidence-based guidelines in spine trauma management is essential for patient safety.	3.95	0.97	78.98	15.09	.000	agree	1
2- I consider ongoing training and professional development	3.93	1.03	78.64	13.97	.000	agree	2

necessary to maintain competency in spine trauma management.							
3- I feel comfortable prioritizing patient safety even if it means deviating from standard immobilization protocols.	3.93	1.03	78.64	13.97	.000	agree	3
4- I am confident in my ability to manage patients with suspected spine trauma.	2.76	1.26	55.25	-2.90	.004	neutral	8
5- I believe that immobilization protocols for spine trauma are necessary and should be consistently followed.	3.63	1.17	72.54	8.27	.000	agree	5
6- I think that collaboration with other emergency team members is essential for effective spine trauma management.	3.22	1.31	64.41	2.59	.010	neutral	7
7- I am comfortable adopting new spine trauma management practices, even if they differ from traditional protocols.	3.73	1.15	74.58	9.74	.000	agree	4
8- I believe feedback on my spine trauma management practices can help improve my skills and patient outcomes.	3.41	1.31	68.14	4.78	.000	agree	6
Mean of factor 2	3.57	0.90	71.40	9.77	.000	agree	

The average of the sample members' answers to the "attitude about spine trauma management "was (3.57out of 5) with a relative weight of 71.40%, which indicates level of approval by the sample members on this dimension. The highest item received the highest degree of approval from the sample members was the paragraph that states, "I believe that following evidence-based guidelines in spine trauma management is essential for patient safety." came in first place in terms of approval by the sample members, with a relative weight of 78.98%.

While the item that received the lowest degree of support from the sample members was the paragraph that states, "I am confident in my ability to manage patients with suspected spine trauma." ranked next to last in terms of approval by the sample members, with a relative weight of 55.25%.

For factor 3: practice about spine trauma management, the researcher calculated the mean, standard deviation, relative weight, level of agreement, and ranking for each item. Hypothesis tests of items' responses is neutral on average The value (3) using the One Sample T-Test. Table (6) shows the results.

Table (6): practice about spine trauma management

N = 236	Mean	Standard deviation	Relative weight	T-value	Sig	Agreement degree	Rank
1- Sometimes I feel like I treat some patients impersonally, as if they were objects.	2.68	1.49	53.56	-3.32	.001	neutral	4
2- I have become more hardened towards people since I started practicing this profession.	2.76	1.42	55.25	-2.57	.011	neutral	3
3- I am worried that this profession might make me emotionally hardened.	3.17	1.44	63.39	1.81	.072	neutral	2
4- Sometimes I don't care what	2.31	1.41	46.10	-7.58	.000	neutral	5

happens to some patients.							
5- I sometimes feel that patients blame me for their problems.	3.19	1.37	63.73	2.08	.038	neutral	1
Mean of factor 3	2.82	1.19	56.41	-2.32	.021	neutral	

The average of the sample members' answers to the "Depersonalization" was (2.82 out of 5) with a relative weight of 77.42%, which indicates neutral opinion by the sample members on this dimension. The highest item received the highest degree of approval from the sample members was the paragraph that states, "I sometimes feel that patients blame me for their problems." came in first place in terms of approval by the sample members, with a relative weight of 63.73%.

While the item that received the lowest degree of support from the sample members was the paragraph that states, "Sometimes I don't care what happens to some patients." in terms of approval by the sample members, with a relative weight 46.10%.

5. Discussion

Research conclusions drawn from this study suggest that paramedics practicing within the Saudi red crescent authority possessed adequate KAP regarding spine trauma management for patients that meet the eligibility criteria. The data offer a broad exposure of KAP strength and weakness as well as indicate targets for educational intervention and policy changes to improve prehospital patient outcomes of spine trauma.

It was found that paramedics possessed a good amount of basic knowledge about the causes of spinal injury and the first things that should be done. In particular, the respondents demonstrated good knowledge of the nature of injuries, including falls and motor vehicle accidents, and consequences for the treatment of trauma. These are important to know as in the prehospital environment the paramedic may need to quickly determine the presence of spine injuries without extensive diagnostic capabilities. However, a significant deficit of awareness of such sophisticated guidelines as ATLS was revealed, with most of the respondents expressing no opinion on the matter. The difference indicates that although paramedics have overall information, higher, uniform procedures need to be repeated to maintain accurate and proof-based treatment of spinal injuries.

The study also revealed that paramedics hold a positive attitude towards spine trauma protocols with high level of agreement regarding the necessity of following evidence base guidelines to protect patient's well-being. This attitude is in line with the general operation of the Saudi red crescent authority as an organization whose core business is to deliver quality emergency care. However, some respondents reported no preference towards their confidence in managing suspected spine trauma cases which may mean they are indecisive when confronted with complex or critical cases. Such uncertainty might originate from the inconsistency in training or experience of Saudi red crescent authority paramedics; therefore, there is a requirement for constant, hands-on, and scenario-based training to enhance the

confidence and efficiency of paramedics.

However, there is an inconsistency in the practical knowledge of spine trauma management among the practitioners. While 86% of the paramedics said that they often used immobilization and monitoring regimens, the study found that the participants had a neutral response to the use of periodic reassessment and documentation of spine trauma cases. These findings imply that although initial efforts are made to restrain and secure patients and ongoing assessment and documentation may be less stringently implemented, this could be because of a stressful setting, workload or logistical factors. Thorough documentation and reassessment are essential to spine trauma care because they provide continuity of care from the scene to definitive care facilities.

6. Conclusion

This study reveals that while Saudi red crescent authority paramedics demonstrate a foundational understanding and generally positive attitudes toward spine trauma management, areas for improvement remain, particularly in advanced knowledge, consistent documentation, and confidence in practical applications. Addressing these gaps through targeted training, policy revisions, and supportive measures could enhance the quality of prehospital care for spine trauma patients in Saudi Arabia, ultimately leading to better patient outcomes.

Study recommendation

- Offer targeted training on advanced guidelines, such as ATLS, to address knowledge gaps in spine trauma management.
- Conduct continuous education programs, emphasizing recent updates and hands-on skill reinforcement for spine trauma protocols.
- Integrate scenario-based simulations to improve paramedics' confidence and practical skills in handling spine trauma cases.
- Create guidelines that allow flexible immobilization based on individual patient conditions to minimize unnecessary complications.
- Implement a feedback system, where paramedics receive constructive performance reviews to support best practice adherence.
- Emphasize detailed documentation and regular patient reassessment during transport to ensure patient stability and care continuity.
- Provide mental health resources, including stress management and counseling, to address burnout and improve paramedic well-being.
- Encourage peer learning through case study discussions to enhance knowledge-sharing and teamwork.
- Conduct further research, using observational or simulation methods, to better understand how training translates into field practices and patient outcomes.

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