Vol. 5 No. 1 (2026)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

Assessment of Knowledge and Practices Regarding Hemorrhage Control Techniques Suturing and Pressure Bandaging Among Emergency Health Care Personnel in Emergency Departments: A Cross-Sectional Study in Kohat

1.Muhammad Usman
Department of Emergency Care Technology, Kohat University of science and technology.
muhammadusmanafridi946@gmail.com
2.Ahmad Ali Shah
Department of Emergency Care Technology, Gomal University Dera Ismail Khan.
mrahmd8872@gamil.com
3.Malaika Khattak
Department of Emergency Care Technology, Kohat University of science and technology.
malaikakhattak36@gmail.com
4.Muhammad Tyyab Akram
Lecturer Operation Theater Technology / Surgical Technology at University Ibadat International University Islamabad.
tayyab.akram@dhpt.iiui.edu.pk
5. Amna Rauf
Lecturer of Emergency Care Technology at Kohat University of science and technology.
amnarauf@kust.edu.pk
6. Tehmina Tariq
Superior university Lahore
tehminatariq@superior.edu.pk
7. Naveed Ullah Khan*
Lecturer of Emergency Care Technology at Kohat University of science and technology.
naveedullah@kust.edu.pk

Author Details

Keywords: Hemorrhage control, suturing, pressure bandaging, emergency health care personnel, trauma care, Kohat.

Received on 25 Feb 2026
Accepted on 09 March 2026
Published on 28 March 2026

Corresponding E-mails & Authors*:
Naveed Ullah Khan*
naveedullah@kust.edu.pk

Abstract

Background: Traumatic bleeding is a significant trauma-related cause of death that can be prevented, especially if the bleeding is not identified and controlled early. The emergency department (ED) staff needs to be knowledgeable and have practical experience in assembling and using pressure bandages,

suturing, cleaning wounds, preventing infection and other basic skills for controlling hemorrhage.

Objective: This study aimed to estimate knowledge and self-reported practices of health care providers in emergency department in Kohat regarding hemorrhage control techniques especially suturing and pressure bandaging.

Design: Descriptive Cross sectional study was conducted in Emergency health care personnel of Government Hospital Kohat and Rescue 1122 Kohat of 80 participants. Information was gathered using a structured self-administered questionnaire comprising of demographic, knowledge, practice-related and perceived effectiveness questions. The responses were analyzed by using SPSS version 29. Frequency, percentage, mean and standard deviation were calculated and some associations were explored using appropriate statistical methods.

Results: The mean age of the participants was 32.36 ± 6.88 years. They were predominantly male (76% to be exact), had a higher education level (diploma or above) and had over six years of experience in emergency work. The mean knowledge score was 6.69 ± 0.63 out of 7 and 93.8% of the respondents had a good knowledge. The mean score for practice was 34.61 ± 5.10 out of 40, with 81.2% being classified as good practice. The effectiveness of the learning process was also good, with an average score of 27.22 ± 2.74 out of 30. The greater the experience, workplace, knowledge level or practice level, the better the hemorrhage-control performance and perceptions.

Conclusions: Overall, there was good knowledge among the emergency health care personnel in Kohat and positive self-reported practices related to hemorrhage control. The results, however, also showed there were identified deficits regarding awareness of emergency priorities and in practice. For hemorrhage-control care, regular refresher sessions, simulation-

based exercises, competency checks and supervision at the workplace are recommended to reinforce hemorrhage-control care and improve trauma outcomes.

INTRODUCTION

Hemorrhage is a serious clinical problem often seen after traumatic injury, and is defined as the bleeding of damaged blood vessels. Depending on the type and degree of wound or injury bleeding can be visible or concealed. Without rapid control, blood loss can lead to shock, organ failure and death. One of the immediate needs in emergency care is to control bleeding, hence rapid bleeding control is one of the most important concerns (1).

Hemorrhage in clinical terms is a sudden loss of blood as a result of an injury or disturbance of the blood vessel. This can be a minor wound or serious bleeding, internal or external, as a result of trauma, fractures or penetrating injuries. It involves capillary, venous or arterial bleeding, and all bleeding, however minor it may appear, should not be ignored, as it may get worse if left untreated (2).

Blood volume is important for circulation, oxygen delivery to vital organs and tissues, and for the removal of metabolic wastes from the vital organs and tissues. Hemorrhage disturbs this by letting blood out of the circulation. If the blood loss is enough to cause a decrease in tissue oxygenation, hemorrhagic shock can occur (3).

Trauma is known to be a significant contributor to morbidity and mortality in the younger and adult ages and bleeding is one of the most common modifiable causes of trauma related death, after central nervous system injury (3).

Many injury patients are transported to the ED from the pre-hospital environment or from paramedic call. This is especially crucial in places that have long travel times or lack emergency

supplies. Under these conditions, the knowledge and skill of the emergency personnel in the ability to control bleeding can have a significant impact on patient survival (4).

Trauma-related uncontrolled bleeding continues to be a top preventable cause of death, according to Jones et al. Both blunt and penetrating trauma were found to be associated with severe hemorrhage, with the most frequent sites of bleeding being in the chest and abdominal cavity, their findings showed. Transport time was reported as about 57 minutes and only about 1/3 of participants received any pre-hospital care, including the use of a tourniquet, before arriving at the hospital (5).

There are a number of techniques to help control bleeding, some of which are particularly relevant in emergency care, such as pressure bandaging and suturing. Pressure bandages control visible external bleeding by applying continuous pressure over the wound and suturing is used to close appropriate wounds and enhance hemostasis and healing. Both methods need training, sound judgment and safe clinical practice as the improper usage may result in complications or poor bleeding control (6).

Charlton et al., (2018) conducted a randomized crossover trial looking at various hemorrhage control techniques. From their findings, they found that the pressure generated is higher when they applied focused pressure through thinner layers of gauze as compared to thicker layers of gauze. They also concluded two hand pressure is better than one hand pressure, elastic and self-adhesive bandages have lower pressure than hand pressure (7).

Background of the Study

Hemorrhage is bleeding from the blood vessels due to a trauma, surgery or disease. It can rapidly progress to hemorrhagic shock and multi-organ dysfunction and result in death. Control of bleeding is a key component of the emergency care process, as many trauma deaths can be averted by controlling bleeding early on (3).

Trauma is a significant public health problem and causes over 5,000,000 deaths every year. The majority of these deaths in low and middle income countries occur because of the lack of timely

emergency and trauma care. Uncontrolled bleeding is a significant cause of trauma mortality, and is responsible for a significant proportion of deaths in patients with injuries, many of which occur within the first few hours of an injury before definitive surgery can be performed (3, 9).

This makes the early recognition and prompt control of hemorrhage a crucial part of the trauma management. International guidelines stress the prompt recognition of life-threatening bleeding and prompt response to it using direct pressure, pressure bandaging, packing of the wound, when appropriate, tourniquet and prompt referral for definitive care. The morbidity and mortality rate of trauma patients increases as the time of delayed intervention (3, 10).

Another important skill acquired in the ED is suturing. Superficial lacerations can be treated with wound closure to stop bleeding, decrease infection risk, aid in tissue repair, enhance cosmetic outcome, and minimize recovery time. Theoretical knowledge combined with clinical skills is needed for proper wound assessment, using aseptic, selecting sutures and suturing techniques. The suturing may be inadequate, which can be a factor in wound dehiscence, infection, delayed healing, and patient dissatisfaction (3). Kohat, Khyber Pakhtunkhwa, has a trauma facility that is able to treat people from both remote and city areas. Injuries frequently need urgent bleeding control and wound management, and are treated in district's Emergency Departments. However, little, if any, local information exists to determine if emergency health care workers possess the knowledge and skills necessary to pressure bandage, suture and control hemorrhage in general. If not, administrators and policy makers may find it difficult to determine training requirements and enhance the quality of trauma care (13).

Problem Statement

One of the greatest single preventable causes of death, in particular the early stages after injury, where prompt bleeding control will avert death (3, 9). Emergency health care workers will be familiar with and able to perform the following essential techniques for the control of bleeding, to provide timely and appropriate assistance to bleeding patients: pressure bandaging, suturing, direct pressure, wound packing and the use of tourniquets (3, 10).

International guidelines and evidence-based training programmed exist, but research has indicated gaps in emergency care providers' knowledge and competence in providing practical care. These deficiencies can contribute to the delay in hemorrhage control, complications and poor outcomes for the patient (11, 14).

Rationale of the Study

The purpose of this study was to investigate the rationalization of services.

Hemorrhage can be an important preventable cause of death in trauma victims, and the pressure bandaging and suturing techniques are important emergency skills for minimizing blood loss and ultimately enhancing survival. Emergency departments at Kohat are used to treat many trauma cases but the knowledge and practices of emergency health care personnel regarding hemorrhage control has not been thoroughly evaluated. This study offers some initial data that could inform training, enhance emergency care, save lives and bolster local emergency services.

Good hemorrhage control increases survival through minimizing blood loss, avoidance of shock and rapid stabilization. But the techniques available are not sufficient; emergency workers need to be skillful in applying them properly. Results of past studies indicate that lack of training, insufficient practice, and inconsistent procedures can result in poor hemorrhage-

control performance. In Emergency Departments like Kohat a frequent check of the competence of the staff is critical, since these departments might be overloaded and have limited resources.

This study is significant for the following reasons:

It pinpoints gaps in knowledge and skills of emergency health care workers. It offers local evidence from Kohat, for training and policy planning.

It helps the hospital leaders and the emergency services to develop specific practical training. It could also help to enhance trauma care by boosting hemorrhage-control skills.

This research, which evaluated both knowledge and practice, correlated theory with actual emergency performance and provided proof of the need to enhance the skills of health care personnel in hemorrhage management.

Objective

General Objective

To evaluate the knowledge and practice of emergency health care personnel in Kohat about hemorrhage control techniques especially pressure bandaging and suturing, and to see their preparedness to use these techniques in emergency department.

Specific Objectives

- To determine the knowledge of emergency health care workers about hemorrhage control.
- To discuss the need and application of pressure bandage in emergency situations.
- To evaluate the knowledge and reported use of suturing among the emergency health care workers.

- To assess if being trained in hemorrhage control is correlated with clinical practice.

Research Gap

While hemorrhage control is acknowledged as a key emergency care skill, there is little local information regarding the knowledge and practice of pressure bandaging, suturing and associated skills by emergency department staff in Kohat. Previous research has identified the critical role of

bleeding control and injury-related deaths and the critical role of health care workers, but has not thoroughly captured the preparedness in this local context. If it is not possible to find such information, the training needs and practice weaknesses may not be recognized. In this study, the aim is to check knowledge and practices of emergency health care staff in Kohat and evidence which would help in the training and improvement of services.

MATERIALS AND METHODS:

Research Design

In this study, descriptive cross sectional research design was used. This design was well suited as it allowed the researchers to describe the knowledge and practices of a specific population at one time and look at correlations between demographic or professional variables and the principal outcomes without any follow-up longitudinal data. The descriptive approach gave a clear picture of the current knowledge and practice and the cross sectional structure assisted in the statistical comparison of selected variables.

The design was chosen due to its ability to align with the research goals, the data collected being in a questionnaire format and of limited time and resources for a BS-level research project. It also offers a feasible method that is widely used in other similar studies in resource-limited contexts.

Study Area

The study was conducted in Kohat district of KP Khyber Pakhtunkhwa Pakistan. Kohat is situated in the southern part of the province about 130 km from Peshawar and 250 km from Islamabad. The district has its connection with other districts via Indus Highway and with surrounding urban and rural communities as well.

The following two places were included: Emergency Department, Government Hospital Kohat (called District Headquarters Hospital Kohat) and Rescue 1122 Kohat Station. These sites were chosen as they have a high proportion of emergency and trauma patients attending and as they house many Emergency Care Technologists in the public emergency-care system. The Government Hospital Kohat is handling secondary level emergency services while Rescue 1122 is handling pre-hospital emergency services for trauma, medical and obstetric emergencies.

Study Population

The target population was qualified emergency health care workers working in PSEDs of Kohat district. The accessible population comprised the staff working at the two selected sites - Government hospital Kohat and Rescue 1122 Kohat. Each individual emergency health care personnel, who fulfilled the inclusion criteria, was treated as a study unit.

Sampling Technique

An approach of non-probability convenience sampling was used in the recruitment of participants. This approach was chosen due to the small number of accessible populations, their identification and readiness to be studied in the selected study areas. Due to the size and the constraints of a BS research project, it was not possible to use probability sampling.

In order to avoid selection bias, the researchers tried to contact the staff performing the various shifts (morning, evening, night) and the various days of the week working in the emergency health care setting. The sample was comprised of all eligible staff available during

the data collection period to obtain a sample of the required size. Refusals were not replaced to ensure that they remained voluntary.

Sample Size

The intended number of participants was 100 but operational constraints such as staff leave, duty schedules, staff turnover etc. during the four-month data-collection period resulted in 80 participants being recruited. The numbers obtained from the final sample was less than desired but adequate for the descriptive and analytical purposes of the study.

Inclusion Criteria

The following inclusion criteria were used for selecting the eligible participants:

1. An Emergency Care Technologist who has completed Diploma or Bachelor of Science degree in Emergency Care Technology or any other recognised Paramedic qualification in Pakistan.
2. Government hospital Kohat staff working in the emergency departments and Rescue 1122 Kohat staff, actively working in duty.
3. Staff members with a minimum of 6 months of uninterrupted working in the ED at the time of data collection with a sufficient number of procedures studied.
4. Staff who offered to take part and signed written informed consent prior to enrolment.

Exclusion Criteria

The following criteria for exclusion were used:

Students or interns who have finished clinical rotations in the ED, regardless of having a relevant previous qualification.

2. All administrative (non-clinical) staff members in the ED not directly involved in patient care.

3. Emergency Care Technologists or other staff who did not have more than 6 months experience in the emergency department at the time the data was collected.

5. Personnel who refused to participate and/or who failed to give informed consent.

Data Collection Tools

Structured self-administered questionnaires were completed using relevant literature and questionnaires from past studies that also assessed the knowledge and practice on hemorrhage control. The questionnaire was developed in English language which is the medium of instruction for a Diploma and BS ECT program at KUST and allied institutions in Pakistan. Content validity of the tool was checked by the supervisors prior to its use in the field. There were four sections to the questionnaire (see Table 3.1). Demographic and Professional Characteristics were recorded in Section A. Section B consisted of SBA multiple-choice questions to assess knowledge of hemorrhage-control principles, indications, materials and infection-control measures. The items of self-reported practice were assessed on a 5-point Likert scale ranging from Always to Never (Section C). The perceived effectiveness of the pressure bandaging and suturing was evaluated on a five point agreement scale, ranging from Strongly Disagree to Strongly Agree, in Section D. An entire copy of the questionnaire is included in Appendix A.

Section	Variable Type	Item (n)	Response scale	Variable Role
A — Demographics	Demographic / Professional	7	Categorical	Independent
B — Knowledge	Knowledge	7	Multiple choice	Dependent

C — Practice	Practice	8	5-point Likert	Dependent
D — Perceived Effectiveness	Perception	6	5-point Likert	Dependent

Interpretation: Table 3.1 shows the format of the data collection instrument. This piece of software consisted of 28 items in four sections. Demographic and professional variables were considered to be independent variables and knowledge, practice and perception items were dependent variables. The responses were quantified for descriptive (multiple-choice) and inferential (Likert-scale) analysis.

Data Collection Procedure

The data was collected for four months (January 2026 – April 2026). Prior to the data collection, the Ethical Review Board of Kohat University of Science & Technology approved the study, and the permission was obtained from the Medical Superintendent of Government Hospital Kohat and District Emergency Officer of Rescue 1122 Kohat.

Ethical Considerations

The study was in accordance with the principles of the Declaration of Helsinki as well as the research ethics guidelines provided by Kohat University of Science & Technology. The KUST ethical review board gave ethical approval and written administrative approval from both study sites prior to data collection. Participation was voluntary. No emergency health care workers were coerced, pressured or induced to engage in participation. Before signing the consent form, each participant was informed of the purpose of the study, the procedures to be followed in the study, the potential risks and benefits involved in the study. It was also explained to participants that they have the right to withdraw from the program at any time without impact to their job or job standing.

Statistical Analysis

The data collected were processed, cleaned and analyzed on the Statistical Package for the Social Sciences (SPSS) version 27. All questionnaires were given a study ID. Careful checking of data entry was done and inconsistencies were identified and corrected from the reference to the original questionnaire.

Descriptive statistics were used to summarize the demographics and professional characteristics, and knowledge, practice, and perceived-effectiveness scores of the participants. Frequencies and percentages were used to report the categorical variables (gender, qualification, multiple choice response). The age and total scores were reported as mean and standard deviation (SD) for continuous variables.

Chi square test was used to test the association between categorical variables. Fisher's exact test was used for expected cell counts that were less than five. A P value < 0.05 was deemed as statistically significant.

The data are presented in Chapter 4 in tables and figures and interpreted. Where graphs and charts would assist in explaining the results these were used.

RESULTS

Introduction

In this chapter, the results of the 80 emergency health care workers of government hospital Kohat and rescue 1122 Kohat have been presented. The analysis was done using the methodology outlined in Chapter 3. Information about the demographic and professional characteristics, hemorrhage-control knowledge, self-reported practices, and perceived effectiveness were summarized and presented in descriptive statistics. Fisher's exact test was used to test association between selected categorical variables with expected cell counts of less than five.

The factors studied were age, gender, qualification, emergency experience, workplace, whether or not they had undergone formal hemorrhage-control training, whether or not they had attended a trauma workshop, knowledge score, practice score, and perceived-effectiveness score. The knowledge score was 7 points, the practice score was 40 points and the perceived effectiveness score was 30 points. There was one invalid response in the perceived-effectiveness section that was considered to be missing and the score was adjusted using the valid responses of the participant.

Demographic and Professional Characteristics of Participants

ılts of the survey items about the participants' demographic and professional characteristics (n = 80)

Variable	Category	Frequency / Percentage
Age (years)	Mean ± SD	32.36 ± 6.88
Age range	Minimum - maximum	24 - 55
Gender	Male	76 (95.0%)
Gender	Female	4 (5.0%)
Qualification	Diploma	68 (85.0%)
Qualification	BS	12 (15.0%)

Variable	Category	Frequency / Percentage
Years of experience	Less Than 1 Year	3 (3.8%)
Years of experience	1 To 3 Years	10 (12.5%)
Years of experience	4 To 6 Years	13 (16.2%)
Years of experience	More Than 6 Years	54 (67.5%)
Current workplace	Govt Hospital	49 (61.3%)
Current workplace	Rescue 1122	31 (38.8%)
emorrhage-control training	Yes	71 (88.8%)
emorrhage-control training	No	9 (11.2%)
/emergency workshop in last 2 years	Yes	32 (40.0%)
/emergency workshop in last 2 years	No	48 (60.0%)

The mean age of the participants was 32.36 ± 6.88 years, and ranged from 24 to 55 years. The majority of respondents were male, diploma qualified and with over 6 years experience of working in the ED. The majority were formally trained to perform hemorrhage control, but less than half were previously at a trauma or emergency workshop in the previous two years. The sample was thus largely comprised of experienced emergency workers, with recent refresher exposure not being widespread.

Figure 4.1: Professional profile of the respondents

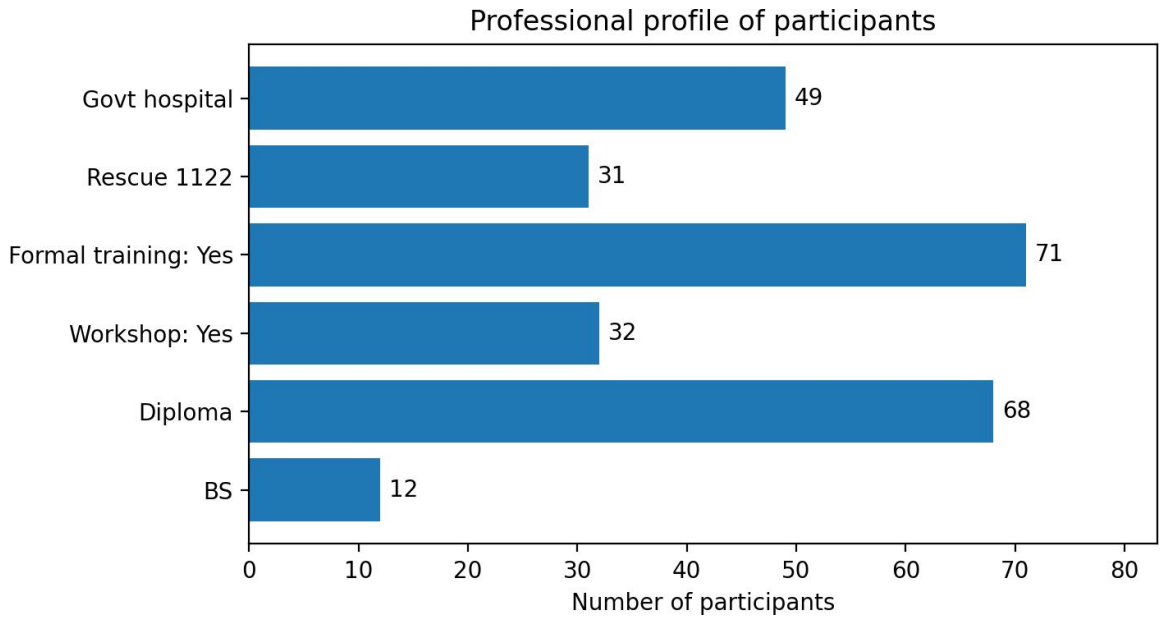


Table 4.1 is a summary of the professional profile of the respondents. The ratio of people coming from Government Hospital Kohat was higher than that from Rescue 1122 and diploma qualification was more than BS qualification. The figure also reveals high exposure to formal training and relatively low level of participation in workshops in the recent period.

Knowledge Regarding Hemorrhage Control Techniques

Table 4.2 shows that the correct responses to questions about hemorrhage control are correct.

Knowledge item	Correct answer	Correct (n)	Correct (%)

First priority in external bleeding management	Bleeding control	68	85.0%
essure bandaging is most effective for	Minor to moderate external bleeding	77	96.2%
ring is mainly used for	Closing wound	80	100.0%
Knowledge item	Correct answer	Correct (n)	Correct (%)
Continuous severe bleeding may lead to	Shock	77	96.2%
Material commonly used for pressure bandaging	Sterile gauze	80	100.0%
Before suturing, wound should be	Cleaned properly	80	100.0%
Infection control during hemorrhage management	Wearing gloves	73	91.2%

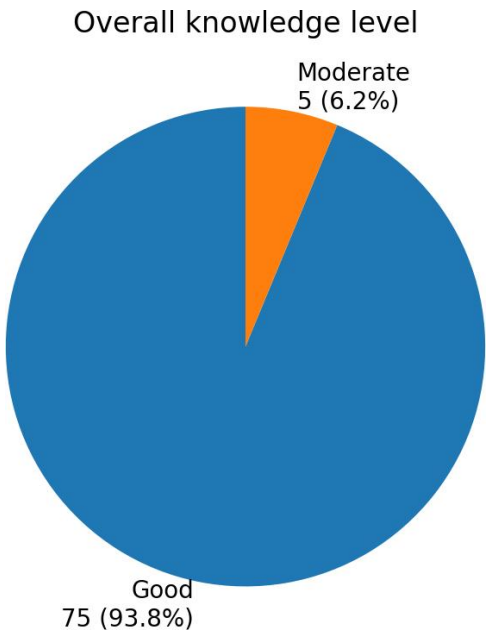
Overall, there is a high level of knowledge, as illustrated in Table 4.2. 100% of the respondents correctly answered all three questions related to wound closure, sterile gauze and wound cleaning prior to suturing. The smallest number of correct responses was for the first priority in external bleeding management with 68 respondents choosing bleeding control with others

choosing IV cannulation or pain management. But also that there is a need to refresh a small number of participants on emergency priorities.

Table 4.3: Overall knowledge level of participants

Knowledge level	Frequency	Percentage / Score
Good	75	93.8%
Moderate	5	6.2%
Poor	0	0.0%
Mean knowledge score		6.69 ± 0.63 out of 7

Figure 4.2: Overall knowledge level of participants



The mean knowledge score was 6.69 ± 0.63 out of 7. The majority were considered to have good knowledge, a minority moderate knowledge and no one poor knowledge.

Practices Regarding Hemorrhage Control Techniques

Table 4.4: Distribution of practice responses for hemorrhage control techniques

actice item	Always	Often	Sometimes	Rarely	Never

ce item 1	54	14	11	0	1
ce item 2	54	17	5	4	0
ce item 3	42	26	9	2	1

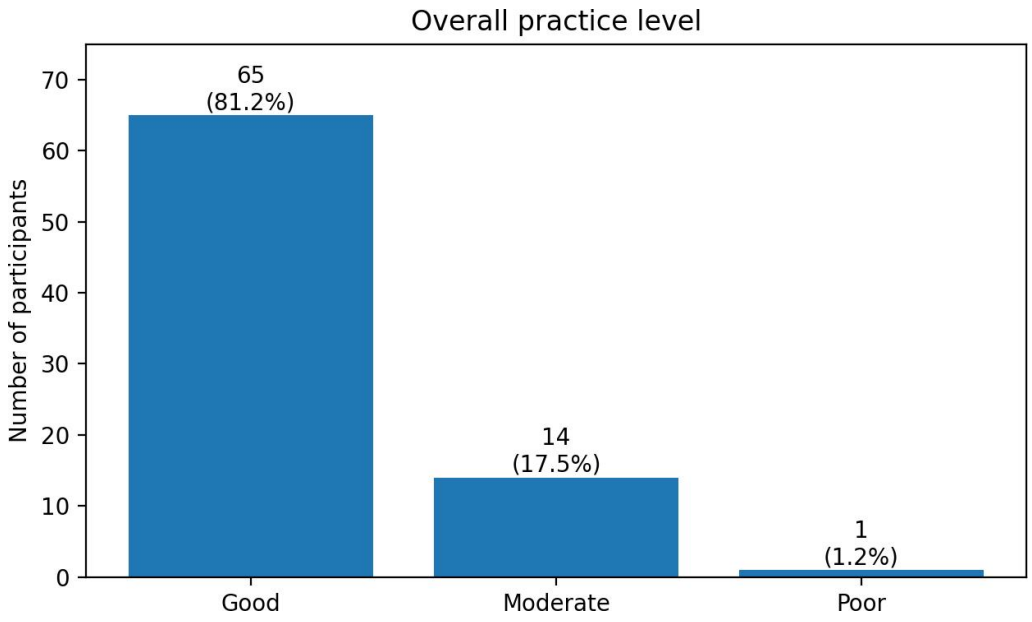
actice item	Always	Often	Sometimes	Rarely	Never
ce item 4	32	33	7	5	3
ce item 5	42	23	8	3	4
ce item 6	46	20	7	7	0
ce item 7	35	29	11	3	2
ce item 8	57	12	8	3	0

Table 4.4 shows the answers to eight practice items of hemorrhage-control techniques. The majority chose Always or Often for key practices, suggesting that they practice the correct bleeding-control measures often in clinical situations. But occasional responses (Sometimes, Rarely and Never) were also given, indicating that practice was not consistent across all respondents. This is significant as the treatment of hemorrhage needs timely and constant treatment in emergencies.

Table 4.5: Overall practice level of participants

Practice level	Frequency	Percentage / Score
Good	65	81.2%
Moderate	14	17.5%
Poor	1	1.2%
Mean practice score		34.61 ± 5.10 out of 40

Figure 4.3: Overall practice level of participants



The mean practice score was 34.61 ± 5.10 out of 40. The majority of the participants were in the good practice category with fewer in moderate practice and one in poor practice. Overall,

the practice reported was good, but the results also highlight the necessity of regular skill checks and refresher training to minimize inconsistencies.

Perceived Effectiveness of Hemorrhage Control Techniques

Table 4.6: Perceived effectiveness responses

Item	trongly agree	Agree	Neutral	Disagree	Strongly disagree	nvalid / missing
Perceived-effectiveness item 1	44	33	3	0	0	0

Item	trongly agree	Agree	Neutral	Disagree	Strongly disagree	nvalid / missing
Perceived-effectiveness item 2	38	36	5	1	0	0
Perceived-effectiveness item 3	49	25	4	1	0	1
Perceived-effectiveness item 4	64	12	3	1	0	0
Perceived-effectiveness item 5	56	18	3	3	0	0
Perceived-effectiveness item 6	52	17	7	3	1	0

Table 4.7: Overall perceived effectiveness level

Perceived effectiveness level	Frequency	Percentage / Score
High	71	88.8%
Moderate	8	10.0%

Low	1	1.2%
ɛived effectiveness score		27.22 ± 2.74 out of 30

As per the data of tables 4.6 and 4.7, the majority of the participants believed that hemorrhage-control techniques are effective. Most of the perception items received a positive response with the Strongly Agree and Agree categories being the highest. The mean perceived-effectiveness score was 27.22 ± 2.74/30, and most of the respondents were in the high perceived-effectiveness category. This demonstrates that these techniques were not only known and used by the participants, but that they also believed that they were useful to the patient.

Association Between Selected Variables

Table 4.8: Association between selected variables and study outcomes

Association tested	ıigh outcome count	p-value	Interpretation
Qualification and good knowledge	BS: 11/12; DIPLOMA: 64/68	0.566	Not significant
ɒrmal training and good knowledge	YES: 67/71; NO: 8/9	0.458	Not significant
Workshop attendance and good knowledge	30/32; NO: 45/48	1.000	Not significant
ence and good practice	4 years or more: 58/67; Less than 4 years: 7/13	0.013	Significant

place and good practice	GOVT HOSPITAL: 34/49; RESCUE 1122: 31/31	<0.001	Significant
rmal training and good practice	YES: 59/71; NO: 6/9	0.358	Not significant
Vorkshop attendance and good practice	28/32; NO: 37/48	0.381	Not significant
Association tested	high outcome count	p-value	Interpretation
od knowledge and good practice	od: 64/75; Not good: 1/5	0.004	Significant
Good practice and high perceived effectiveness	od: 64/65; Not good: 7/15	<0.001	Significant

A total of four or more years' experience was significantly linked to good practice (Table 4.8). There was also a significant association between workplace and good practice; the number of participants in the Rescue 1122 group was all classified as good practice whereas fewer participants were classified as good practice in the Government Hospital group. Good knowledge was significantly related to good practice and good practice was significantly related to high perceived effectiveness. Good knowledge or good practice did not show any significant association in this dataset with qualification, formal training or attendance at recent workshop.

Summary of Findings

In general, the knowledge scores of the emergency health care personnel from Kohat were high and their self-reported knowledge of hemorrhage control practices were generally good, especially in the areas of pressure bandaging and suturing. The most successful areas of knowledge were: how to clean the wounds before suturing, how to use sterile gauze and why suturing is used. The primary knowledge gap was the importance of bleeding control as the primary goal of the management of external bleeding. Findings from the practice exercise were positive but there was some variation. There was a relationship between experience, workplace and knowledge/practice level and the better hemorrhage-control performance and perceptions.

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

Introduction

This chapter explains the key findings in the light of the objectives of the study, methodology used and the literature reviewed in Chapter 2. The study examined the level of knowledge and the practices related to hemorrhage control in general and pressure bandaging and suturing in particular with emergency health care workers in Kohat. Topics discussed are knowledge, practice, perceived effectiveness, relationships between variables, implications, limitations, recommendations and conclusion.

Discussion of Demographic Findings

The study was conducted on 80 people including emergency health care workers of Government Hospital Kohat and Rescue 1122 Kohat. The average age of the people when they participated was

32.36 years, which represent the active working age group of most respondents. The majority of them were male and the majority were diploma qualified with fewer possessing BS level

qualifications. A high percentage had a greater than six years' experience in the emergency department. This profile is applicable because hemorrhage control is a practical skill that can benefit most from repeated exposure, supervision and hands-on clinical practice.

The majority of respondents reported having received formal hemorrhage-control training, while fewer had received training at a trauma or emergency workshop, in the last two years. This distinction is important since training is useful as a foundation, but training in what to do for pressure bandaging or suturing, for example, should be done at regular intervals. As outlined in Chapter 2, ongoing training, simulation, and assessment of competence can be important to enhance hemorrhage-control skills and to prevent trauma deaths.

Discussion of Knowledge Findings

The mean knowledge score was high and majority of the respondents were fairly classified as good knowledge. This indicates that the basic principles of hemorrhage control were understood by the emergency health care workers studied in the selected settings. The items in the suture, use of sterile gauze, cleaning the wound prior to suturing and recognizing that shock can occur as a result

of severe bleeding were the items on which the respondents performed very well. The topics are related directly to everyday tasks of trauma care.

The item "first priority in external bleeding management" had lesser correct responses as compared to other knowledge items. Bleeding control was not chosen by some of the participants. In terms of trauma care, these options are still relevant, but the outcome suggests that a reminder is needed to ensure that the priority of the Emergency is recognized. Life-threatening bleeding should be controlled immediately as it can result in hemorrhagic shock and death in trauma management if not(3, 10).

The overall level of knowledge is good and is encouraging as knowledge is the basis for safe practice. Wound management and indications, materials, and infection control principles are all better known to personnel who understand them, which increases their odds of executing hemorrhage-control techniques properly. This is substantiated by the high correlation found between good knowledge and good practice in this study.

Discussion of Practice Findings

The practice score was also high with majority of the participants in good practice category. This suggests that the respondents often engaged in the proper use of hemorrhage control measures. Responses that are very positive (Always or Often) indicate the pressure bandaging of wounds, infection prevention, wound care, and suturing activities are likely to be performed in the emergency settings selected.

However, practice was not completely consistent. Some of the respondents marked Sometimes, Rarely or Never on some of the practice items. This needs to be addressed as time is a critical issue in hemorrhage control, and any gaps, even in practice, can impact outcomes should an emergency occur. With the

literature that was reviewed in Chapter 2, it is evident that improper application of pressure, wound closure, infection control and delayed bleeding control will decrease the effectiveness and increase the complications(19, 23, 24).

There was a significant relationship between experience and good practice. It is easy to see that there is a correlation between number of years experienced and practice level as participants with 4 or more years experienced reported higher levels of practice which is understandable given that one's years in clinical practice will contribute to the level of confidence and skills acquired in the

procedure. Workplace was also a significant factor with good levels of practice with Rescue 1122 participants in particular. This could be a result of the field based Rescue 1122 operations, when staff often perform trauma care, and are required to take steps to control bleeding before hospital transfer.

Discussion of Perceived Effectiveness

Most participants thought hemorrhage-control methods were helpful in emergencies and the perceived effectiveness was high. There was general agreement on all perception items suggesting that the respondents appreciated aspects of pressure bandaging, suturing and bleeding control within trauma management highly. The importance of positive perception is that the technique will be performed more regularly when the personnel believes that it will help care for patients better.

High perceived effectiveness was highly correlated with good practice. This implies that workers who employ hemorrhage control procedures more often are more inclined to value the procedures. Familiarity and/or experience with the techniques can increase confidence and the perceived value of the techniques, and not enough practice can decrease confidence and perceived value.

Limitations of the Study

There were a number of limitations to this study. First, the results would only apply to two settings in Kohat, thus may not be representative for all emergency departments in Khyber Pakhtunkhwa or Pakistan. Second, the results of the study might have been affected by selection bias because of convenience sampling. Thirdly, practice was assessed via self-reported responses to questionnaires and these responses could be influenced by the social desirability bias. Evidence based on direct observation or simulation might be stronger indicators of actual clinical performance. Fourthly, due to operational constraints, 80 participants were sampled. Lastly, one incorrect answer in the perceived-effectiveness section was dealt with during data cleaning.

Conclusion

The study found that the overall knowledge of the EHCP in Government Hospital Kohat and Rescue 1122 Kohat of the techniques used to control bleeding (pressure bandaging and suturing) was good and their practice was also good. Mean knowledge, practice and perceived-effectiveness scores were good but there were still some areas needing improvement, namely emergency priority recognition and consistency of practice. Better outcomes were related to experience, workplace, knowledge level and practice level. The results justify frequent re-training, simulation training, competency assessment and supervision in the workplace to promote the development of hemorrhage control services in Kohat.

References

1. Latif RK, Clifford SP, Baker JA, Lenhardt R, Haq MZ, Huang J, et al. Traumatic hemorrhage and chain of survival. 2023;31(1):25.

2. [Internet]. S. Hemorrhage Control. Eric R. Donley; Sunil Munakomi; Joshua W. Loyd.; Last Update: August 13, 2023.

. p. S57.

3. Donley ER, Munakomi S, Loyd JWJS. Hemorrhage control. 2023.

4. Surgeons ACo. Advanced trauma life support (ATLS) student manual: American College of Surgeons; 2004.

5. Jones AR, Miller J, Brown MJP, medicine d. Epidemiology of trauma-related hemorrhage and time to definitive care across North America: making the case for bleeding control education. 2023;38(6):780.

6. Mitchnik IY, Regev S, Rivkind AI, Fogel IJI. Disparities in trauma care education: An observational study of the ATLS course within a national trauma system. 2023;54(9):110860.

7. Charlton NP, Solberg R, Rizer J, Singletary E, Woods WJC. Pressure Methods for Primary Hemorrhage Control. 2018;138(Suppl_2):A192-A.

8. Elfar A, Mohamed AAO, Mahdi A, Mohammed MAA, Shaikh AM, Alkhazendar JH, et al. Suture Techniques for Traumatic Wound Closure in the Emergency Department: A Systematic Review of Cosmetic, Functional, and Infection-Related Outcomes. 2025;17(7).

9. Spiegel S, Baker AMJS. EMS junctional hemorrhage control. 2023.

10. Trentzsch H, Goossen K, Prediger B, Schweigkofler U, Hilbert-Carius P, Hanken H, et al. Stop the bleed "–Prehospital bleeding control in patients with multiple and/or severe injuries–A systematic review and clinical practice guideline–A systematic review and clinical practice guideline. 2025;51(1):92.

11. Sharifi Y, Mofard MN, Jamsahar M, Nasiri M, Safari MJAoaem. Knowledge, attitude, and practice of emergency medical services staff in bleeding control of trauma patients; a cross sectional study. 2020;8(1):e11.

12. Goralnick E, Ezeibe C, Chaudhary MA, McCarty J, Herrera-Escobar JP, Andriotti T, et al. Defining a research agenda for layperson prehospital hemorrhage control: a consensus statement. 2020;3(7):e209393.

13. Organization WH. Injuries and violence: the facts 2014: World Health Organization; 2014.

14. Tran A, Dodd J, Dawson EG, Campion EM, Browder TD, Rochwerg B, et al. An American College of Surgeons Committee on Trauma Stop the Bleed guideline on the use of improvised tourniquets for trauma patients with life-threatening extremity hemorrhage 2025. 2023:10.1097.

15. Organization WH. Minimizing morbidity and mortality due to trauma in humanitarian settings. 2023.

16. American College of Surgeons Committee on Trauma %J American College of Surgeons

C. ATLS student course manual. 2008.

17. Newgard CD, Fischer PE, Gestring M, Michaels HN, Jurkovich GJ, Lerner EB, et al. National guideline for the field triage of injured patients: recommendations of the National Expert Panel on Field Triage, 2021. 2022;93(2):e49-e60.

18. Hall JE, Hall ME. Guyton and Hall textbook of medical physiology e-book: Guyton and Hall textbook of medical physiology e-book: Elsevier Health Sciences; 2020.

19. Charlton NP, Solberg R, Rizer J, Singletary E, Woods WAJIJoFAE. Pressure methods for primary hemorrhage control: a randomized crossover trial. 2019;2(1).

20. Bouri N, Ravi SJJm, uHealth. Going mobile: how mobile personal health records can improve health care during emergencies. 2014;2(1):e8.