



St. Paul's Hospital Department of Emergency and Critical Care Medicine Millennium Medical College

Knowledge, attitude and practices of cervical spine immobilization among health care workers in trauma centers of Addis Ababa, Ethiopia

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A RESEARCH THESIS PAPER SUBMITTED TO SPHMMC, DEPARTMENT OF EMERGENCY AND CRITICAL CARE MEDICINE FOR PARTIAL FULFILLMENT OF THE REQUIREMENT FOR RESIDENCY PROGRAM

December, 2023

Addis Ababa, ETHIOPIA

St. Paul's Hospital Millennium Medical College

Department of Emergency and Critical Care Medicine

RESEARCH THESIS SUBMISSION FORM

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Full title of the research project	Knowledge, attitude and practices of cervical collar and immobilization in Addis Ababa, Ethiopia
Duration of the project	One year
Study Area	Addis Ababa (multicenter)
Total Cost of the project	25,000ETB
Source(s) of Funding	SPHMMC

Assurance of Principal Investigator

I the undersigned agree to accept all responsibilities for the scientific and ethical conduct of the research project. I will provide timely progress report to my advisor and seek the necessary advice and approval from my primary advisors in the course of the research. I will communicate timely to my advisors all stakeholders involved in the study including any source of funding for this research.

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Date: _____

Acknowledgements

I would like to thank the department of emergency and critical care medicine for giving this golden opportunity to conduct this interesting research project.

Moreover, I would like to express my deepest and special gratitude to my advisors Dr. BIRUKTAWIT ZEMEDA as well as the people who were constantly giving me their assistance, encouragement with constructive professional comments during the development of this research paper, thank you once again.

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Acronyms and abbreviations

AA –Addis Ababa

ECCM-Emergency & Critical care medicine

ED- emergency department

ETB-Ethiopian birr

HCP-health care professionals

HCW- health care workers

HDP-hospital disaster preparedness

IRB- institutional review board

MD- Medical doctor

SPHMMC- St. Paul's hospital millennium medical college

SPSS -Statistical Package for Social science

Aabet –Addis Ababa Burn Emergency and Trauma center

BLH- Black Lion Hospital

Abstract

Introduction:

Objectives: To assess the knowledge, attitudes and practices of health care on cervical spine immobilization among hospitals, Addis Ababa, Ethiopia, 2023.

Methods: The study design was multicenter cross sectional survey by using structured close ended sheet paper questions which was spread to HCW fulfilling the inclusion criteria working in Aabet hospital , BLH and Alert Hospital Addis Ababa.. The sample size for the study was 250 which included all HCW fulfilling the inclusion criteria in the three hospitals that were studied. Data entering, coding and clearing was performed using SPSS version 25. Frequency and cross tabulation then binary logistic regression and multivariant regression preformed to check for missed values , variables , identify clinically pertinent categorical variables associated with the dependent variable ,for association and for descriptive analyses of the data to be reported and presented as figures and tables.

Result

A total of 250 completed questionnaires were collected, captured, and analyzed. All questionnaires collected were complete, and none excluded from analysis about from 110 Aabet hospital, 83 were from Black Lion Hospital and 57 were from Alert hospital. And male were 166 whereas female were 84. Among the participants 113 (45.2%) were nurses, 83 (33.2%) were residents, 36 (14.4%) were interns and 18 (7.2%) were general practitioners. 135 (54.4%) of the respondents had training on cervical collar before but around 114 (45.6%) had no training. knowledge was poor among 54.0% of the respondents and was good among 46%. The attitude of the respondents was negative among 143 (57.2%) and positive among 107 (42.8%). The participant's level of practice was poor among 157 (62.8%) and good among 93 (37.2%). Knowledge level of respondents had statically significant positive association with the work place of respondent with p-value of < 0.05 (i.e. 0.0000) ($B=1.1$ and $AOR=4.6$) predicting that working in Aabet had a 4.6x increment in knowledge score of respondents. Attitude of respondents had statically significant positive association with p value - < 0.05 (i.e. 0.0000) ($B=4.86$ & AOR =ranges from 32.5-129.8) year of experience of respondents. The level of knowledge had statically significant association p-value < 0.05 (i.e. 0.006) ($B=0.739$ & $AOR=2.093$) signifying that good practice had 2.1x incremental influence on the knowledge of participants. The level of attitude had statically significant association p-value < 0.05 (0.03) ($B=0.812$ & $AOR=2.252$) with the practice of respondents reflecting good practice had 2.3x incremental influence on the attitude of the respondents.

Conclusion

Knowledge among respondents at different levels of education regarding collar application is poor across the board signifying the poor

attention given to this subject in different courses .This study also shows the clear positive impact of practice on knowledge and practice on attitude and vice versa.

Keyword: knowledge, practice , attitude ,Addis Ababa

1. Introduction

1.1. Background

Trauma accounts for 10% of the world's deaths. Reports indicate that 2% to 4% of trauma patients have cervical spinal injuries, and 20% of them suffer from traumatic cervical spinal cord injuries, 10% show at multiple level injuries, and 10% have only ligament injury. The cervical trauma is caused by car accident, falling, violence, quarrel, and sports injuries that can lead to death by airway obstruction and asphyxia. Head-injured patients sustaining MVA-related trauma and those with an initial GCS score less than or equal to 8 are at highest risk for concomitant cervical spine injury. A disproportionate number of these patients sustain high cervical injuries, the majority of which are mechanically unstable and involve an SCI. The development of safer and more rapid means of determining cervical spine integrity should remain a high priority in the care of head-injured patients.(1)

US estimates of spine injuries range from 30 to 50 survivors per 1 million population, or about 10,000 annually. Most victims are male and sustain injury between the ages of 10 and 30 years. Costs of long-term rehabilitation and medical treatments are estimated at US\$2 billion annually.(2) spinal immobilization of all trauma patients with a cervical spine or spinal cord injury or with a mechanism of injury having the potential to cause cervical spinal injury is recommended. A combination of a rigid cervical collar and supportive blocks on a backboard with straps is effective in limiting motion of the cervical spine and is recommended. The longstanding practice of attempted

spinal immobilization with sandbags and tape is insufficient and is not recommended. Spinal immobilization in patients with penetrating trauma is not recommended because of increased mortality from delayed resuscitation.(3)

It is estimated that 3% to 25% of spinal cord injuries occur after the initial traumatic insult, either during transit or early in the course of management. Multiple cases of poor outcome from mishandling of cervical spinal injuries have been reported. As many as 20% of spinal column injuries involve multiple non-continuous vertebral levels; therefore, the entire spinal column is potentially at risk. Consequently, complete spinal immobilization has been used in prehospital spinal care to limit motion until injury has been ruled out.(4)

Cervical immobilization is a standard procedure in trauma patients in emergency medicine is intended to protect against compression of the spinal cord by bony structures of the injured cervical spine, immobilization of the cervical spine is a common prehospital and emergency department maneuver. Although spine fractures represent only a minority in all trauma patients, their influence on the patients' social and financial environment is more significant than other injuries(5) Case reports demonstrating improved neurologic function after application of cervical traction indicate that proper positioning of the spinal cord relative to the spinal canal is critical in trauma patients (6, 7)

It is often observed that cervical collars are applied incorrectly; resulting in reduced immobilization of the cervical spine cervical collar is one of the most effective appliances to reduce injuries in cervical

trauma. The main purpose of using a cervical collar is to immobilize the neck. Depending on the cervical collar type, the degree of the immobilization is variable cervical collars are among the important tools for pre-hospital care in patients with trauma. In fact, using the cervical collar is so important that its application is explicitly emphasized in the criteria of the ABC in major trauma, along with maintaining the airway as the first step. The cervical collar plays a major role in immobilizing the potential unstable spinal cord and preventing secondary damage. Millions of trauma patients undergo cervical immobilization by wearing a collar with the appropriate type and its correct application based on the scientific indications to prevent further neuromuscular damage are of high importance in patients with head and neck lesions(8)

1.2. Statement of the problem

Over the last 30 years, there has been a dramatic improvement in the neurologic status of spinal cord–injured patients arriving in emergency departments. During the 1970s, the majority (55%) of patients referred to regional spinal cord injury centers arrived with complete neurological lesions. In the 1980s, however, the majority (61%) of spinal cord-injured patients arrived with incomplete lesions. This improvement in the neurologic status of patients has been attributed to the development of emergency medical services and spinal immobilization rendered by hospitals. Spinal immobilization is now an integral part of prehospital management and is advocated for all patients with potential spinal injury after trauma by EMS programs nationwide and by the American College of Surgeons.(8)

Spinal immobilization can reduce untoward movement of the cervical spine and can reduce the likelihood of neurological deterioration in patients with unstable cervical spinal injuries after trauma. Immobilization of the entire spinal column is necessary in these patients until a spinal cord injury (or multiple injuries) has been excluded or until appropriate treatment has been initiated.(9) The minimum number of indiscriminately immobilized patients needed to prevent one secondary injury is thus likely between 625 and 3333 trauma patients. Non-immobilized patients are significant by the binomial exact test with 25% and more of spinal-cord-injured patients deteriorating. Secondary deterioration is real, and immobilization is the best intervention reported to date.(10)

For the past decades, immobilization of the spine has been a cornerstone in spinal injury management and trauma patients ([1](#)). The rationale underlying such an approach is that spinal injuries are not uncommon in the trauma setting, and thus immobilization of the spinal column will prevent or minimize further pathological damage to the spinal cord by vertebrae ([2](#)). Traumatic spinal column injuries generally occur over multiple vertebral levels. Prior to ruling out injury, to minimize further risk of damage, complete spinal immobilization has been recommended.

However, despite the common dogma and recommendations of spinal immobilization in the trauma setting, there are still setups in which there is a lack of knowledge, practice or attitude towards cervical collar and immobilization.

1.3. Significance of the study

The application of cervical collar for the immobilization of the cervical vertebra helps in reducing secondary injury to the spinal cord. The usual victims are young productive adults who are predominately in the age group of 20-40 who will require prolonged rehabilitation, socioeconomic support, high dependency on family, society and the country in whole thereby requiring limited resources and most of them usually end up with low functional status and high mortality. With this study we aim to identify necessary requirements which enable to reduce in secondary spinal cord injury through cervical immobilization thereby alleviating the socioeconomic burdens faced by the country, dependency burden on the family and promoting healthy productive lives to young adults so as to fulfill their livelihood dreams.

This study will identify the knowledge, attitude and practice of health professionals on cervical collar and immobilization and the associated factors which hinder the acquirement of knowledge, which hinder the attitude towards applying the knowledge and factors which hinder the practice despite having motivated health care workers with good scientific background.

Additionally, the findings in this study will be insightful to the ministry of health , hospital society ,health care providers and other stakeholders by providing momentous input in the overall gap related to the application of cervical immobilization and consequent secondary spinal cord injury ,thereby, initiating these parties in refocusing their policies and strategies at increasing the knowledge , attitude and practice of cervical collar and immobilization through better

educational trainings , through motivating health care professionals by providing necessary materials for cervical immobilization.

Furthermore, reviewed literatures in Ethiopia didn't show any study on the assessment of knowledge, practice and attitude of healthcare workers on cervical collar and immobilization so this research will help in becoming scientific evidence baseline for future studies conducted in our country and beyond.

2. Literatures review

Spinal cord injury (SCI) is always a medical emergency as it could lead to chronic painful conditions, permanent paralysis or even death. Spinal injury is a lethal clinical condition that can occur frequently among adults. The treatment is often difficult and resulted in high incidence of disabilities and death around the world. Also, cervical spinal cord injury is a severe problem that alters the neurological function resulting in compromising the cardiovascular and respiratory systems especially during the 3-8 hours. It must be managed properly within the accurate time otherwise; these conditions could result in death. The patient must be stable to avoid further damage thus the secure mobilization is an indispensable must for definitive treatment and recovery The proper knowledge, positive attitude and practice skills towards cervical immobilization can make a significant difference.(11)

2.1. Knowledge regarding cervical immobilization among the study participants

Study done in Iran showed improvement after the educational training of the participants. The knowledge of 102 EMS staff of Rasht City, regarding the use of cervical collar in patients with trauma was studied. The results of pre-education knowledge survey showed that the majority of the study participants, i.e. 71 (69.6%) individuals had moderate knowledge (score between 33.3% and 66.6%), 27 (26.47%) had low knowledge (score less than 33.3%), and only 4 (3.9%) had sufficient knowledge (score more than 66.6%) regarding the use of cervical collar.

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

A study done in 2018 in Iran on the knowledge and practice of medical staff about cervical collar in traumatic patients. They studied 80 medical staff with a Mean $\pm$ SD age of 25.93 $\pm$ 1.02 years, of which 72.2% were women. Mean $\pm$ SD score of knowledge and practice of the participants was 11.5 $\pm$ 2.7 and 16.5 $\pm$ 2.3 years, respectively.

The worst lack of theoretical knowledge comprised predictor factors of the spinal cord and cervical injuries (98.8%), the importance of injury (95%), the maximum permitted the length of use of cervical collar (91.3%), and inappropriate measures (91.3%). Also, the worst lack of practical knowledge was related to leveling external auditory meatus with shoulder after attaching the cervical collar in children (98.8%), placing a protective pad behind the chest after attaching the cervical collar in children (95%), and employing at least three individuals when attaching cervical collar, and spinal column immobilization before attaching cervical collar (65%). The findings of the study indicated that the level of knowledge and practice about using cervical collar were intermediate to poor in more than 70% and 60% of paramedics, respectively(13)

In the study done in Germany, the Mean $\pm$ SD age of the participants was 34.5 $\pm$ 10.3 years. The majority of the personnel were rescue workers (80.8%) and emergency medicine doctors (12.5%). Their Mean $\pm$ SD working experience was 11.1 $\pm$ 8.9 years. About 11% of them attached the cervical collar correctly on a medical moulage. The most common mistake (66%) was related to the incorrect adjustment of the cervical collar size (14)

2.2. Attitude regarding cervical immobilization among the study participants

In a study done in Maryland a total of 172 surveys were returned by 64 BLS prehospital providers (10% of those contacted), 84 ALS prehospital providers (46% of those contacted), and 22 hospital-based providers (16% of those contacted, including 2 technicians, 10 registered nurses, 4 physicians, and 6 midlevel providers).

Those providers practicing the longest indicated the great comfort using the KED ($r [163] = 0.239, p = 0.001$). There was widespread agreement across provider types with regard to comfort using a cervical collar (84% of respondents indicated they “Agree” or “Agree Strongly”), which increased with frequency of practice ($r[163] = 0.165, p = 0.035$) and number of spinal immobilization encounters ($r[163] = 0.156, p = 0.046$), as well as comfort using the KED ($r[163] = 0.432, p < 0.001$). BLS Prehospital ($n = 59$) ALS Prehospital ($n = 80$) Hospital-Based ($n = 21$) I feel comfortable using the Kendrick Extrication Device (KED). (15, 16)

Provider Practices Forty-six percent of BLS prehospital providers ($n = 27$), 55% of ALS prehospital providers ($n = 44$), and 50% of hospital-based providers ($n = 11$) indicated that they “Agree” or “Agree Strongly” that spinal immobilization is appropriate in the management of penetrating trauma to the chest and abdomen. Only 17% of respondents indicated that they “Agree” or “Agree Strongly” to

regularly observing or using padding on backboards. Agreement regarding observation or use of padding was negatively correlated with spinal immobilization encounter frequency ($r[163] = 0.219, p = 0.005$) and frequency of practice ($r[163] = 0.235, p = 0.003$).

Agreement regarding practice or observation of spinal immobilization after treatment or transport has begun (i.e., “secondary immobilization”) was positively correlated with how frequently respondents encountered immobilized patients ($r[163] = 0.186, p = 0.017$). Attitudes toward Spinal Immobilization There was widespread agreement across provider types to performing spinal immobilization due solely to mechanism of injury (95% of BLS prehospital providers, 89% of ALS prehospital providers, and 64% of hospital-based providers indicated they “Agree” or “Agree Strongly”).

Spinal immobilization is often performed unnecessarily by EMS providers” varied greatly by provider type, with ALS prehospital providers indicating the most agreement (54% indicating they “Agree” or “Agree Strongly”). Spinal Immobilization Attitudes and practices (15% indicated they “Disagree” or “Disagree Strongly”) and clinical judgment is appropriately utilized to initiate spinal immobilization (13% indicated they “Disagree” or “Disagree Strongly”).

More experienced providers were more likely to agree that they immobilize solely due to mechanism of injury ($r[163] = 0.239, p = 0.002$). Respondents agreeing that the spinal immobilization is often performed unnecessarily were more likely to agree that spinal immobilization causes an unnecessary delay in patient care ($r[163] = 0.613, p < 0.001$) and were less likely to agree that clinical decision rules ($r[163] = 0.154, p = 0.050$) or clinical judgment ($r[163] = 0.182, p =$

0.020) are utilized appropriately. Respondents indicating greater agreement that overuse of spinal immobilization results in an unnecessary delay in patient care were more likely to use observation or secondary immobilization ($r[163] = 0.267, p = 0.001$).

Those respondents agreeing that spinal immobilization is appropriate in the management of penetrating trauma to the chest and abdomen were more likely to agree that patients are immobilized using appropriate practices ($r[163] = 0.203, p = 0.009$) and all patients who meet criteria are immobilized ($r[163] = 0.199, p = 0.011$). Respondents indicating familiarity with clinical decision rules were more likely to agree that those decision rules are utilized appropriately ($r[163] = 0.316, p < 0.001$), and those indicating that patients are immobilized using appropriate practices were more likely to agree that they regularly use or observe padding ($r[163] = 0.306, p < 0.001$)(17, 18)

2.3. Practices regarding cervical immobilization among the study participants

In a study done in Virginia a total of 63,981 encounters were analyzed. At baseline, 16.7% of patients underwent full immobilization. The pre-protocol slope was slightly positive (0.2% per month; 95% confidence interval, 0.1–0.2%). Slope and level changes after protocol implementation did not differ from those observed for intravenous access (–0.4% vs. –0.4% per month [$p = 0.4917$] and –1.6% vs. –1.1%

[$p = 0.1202$], respectively). Cervical spinal immobilization became more common over the post implementation period (0.1% per month; 95% confidence interval, 0.1–0.1%)(19, 20)

3. Objectives

3.1. General objective

To assess the knowledge, attitudes and practices of cervical spine immobilization among HCW in trauma centers of Addis Ababa Ethiopia

3.2. Specific objectives

- ✓ To determine the knowledge of cervical spine immobilization among HCW in trauma centers of Addis Ababa.
- ✓ To describe attitudes towards cervical spine immobilization among HCW in trauma centers of Addis Ababa.
- ✓ To identify practices of cervical spine immobilization among HCW in trauma centers of Addis Ababa.
- ✓ To determine factors that influences cervical immobilization among HCW in trauma centers of Addis Ababa.
- ✓ To describe association among knowledge , attitude and practice

4. Materials and Methods

4.1. Study area and study period

The study will be conducted at hospitals in Addis Ababa, which is a capital city of Ethiopia & seating for the African Union (AU). It covers an area of 530 square kilometers and has a population size of 3, 048, 63 of whom 1,595,968 were females and the rest 1,452,663 were males. The city has an altitude ranging from 2,100 meters at Akaki in the south to 3,000 meters at Entoto Hill in the North. Astronomically, Addis Ababa is located at 090 02' N Latitude and 38044' E Longitude. The city is divided into 11 sub-cities and has 49 hospitals. Thirteen are public hospitals. Thirty-six of the city's hospitals are private, from which twenty two hospitals are served as general hospitals. Furthermore, the city has 51 health centers and 700 different level private clinics (21-23).

The study will be conducted from April 01-June 30, 2023 with the prepared questionnaires.

4.2. Study design

Our study design was multicenter cross sectional survey by using structured close ended questions.

4.3. Population

4.3.1. Source population

All HCW in Addis Ababa trauma hospitals during the study period will be considered as the source population.

4.3.2. Study population

Health care workers who fulfilled the inclusion criteria from the randomly selected trauma centers in Addis Ababa city will be the study population.

Inclusion criteria

HCW working in

- ✓ Emergency

Exclusion criteria

- ✓ Consultants
- ✓ Practicing students who came from other institutions

4.5. Sample size

The sample size for the study we took were all available HCW at the emergency during the study period from October 2023- December 2023 which were in total 250 participants obeying the inclusion criteria.

4.6. Sampling Procedures

The study was conducted at all three trauma centers in Addis Ababa which includes Addis Ababa Burn Emergency and Trauma hospital (Aabet), Black Lion hospital and Alert hospital.

4.7. Measurement

4.7.1. Study variables

Independent variables

- ✓ Age
- ✓ Sex
- ✓ Educational level
- ✓ Profession
- ✓ Experience
- ✓ Working hospital
- ✓ Previous Training

Dependent variables

- ✓ Knowledge
- ✓ Attitude
- ✓ Practice

4.8. Data Collection

The study was based on a questionnaire sheet that was designed after conducting a systemic search on all online medical search engines then was tested in a 5% pilot study to be tested, modified and validated. The questionnaires was close ended on sheet papers and were distributed to the study participants and those who were on sick leave, maternal leave and pay leave were contacted to fill the questioner.

4.9. Operational definitions

HCW- health care workers who are actively involved in patient care in Emergency these would include residents, general practitioners, interns and nurses who work in trauma center.

Respondent's knowledge about cervical spine immobilization was assessed using a twelve-item questioner developed. The knowledge scores were calculated assigning one point to each correct question the aggregate score was calculated (range 0-12) then percentage score of 60% and above were used to categorize as Good knowledge.

To measure attitude related to cervical spine immobilization, we examined using nine-item questioner developed. The attitude score were calculated assigning one point to each correct question the

aggregate score was calculated (range 0-9) then percentage score of 50% and above were used to categorize as Positive Attitude .

Practice was measured using twelve-item questioner developed. The practice score were calculated assigning one point to each correct question the aggregate score was calculated (range 0-12) then percentage score of 60% and above were used to categorize as Good Practice.

Sociodemographic factor included age, gender, work place, profession, level of education, work experience

4.10. a. Data Collection Tools and Procedures

Data were collected from respondents themselves by distributing manually prepared questioners using papers, and then the data was entered in to the spss version 25.

An English version and a pretested checklist were used to collect data. Brief training for the data collectors about the process of data collection was given before the process of data collection.

Close supervision was maintained during data collection and filled checklists were double-checked daily for consistency and completeness by data collectors and the principal investigator before analysis.

4.10. b. Data Quality Control and Management

All data were checked for clarity, completeness and correct recording of all the necessary information. The quality of data were further ascertained during data entry and cleaning process. Finally data was digitalized for further processing.

4.11. Data Analysis and procedures

Data entering, coding and analysis were performed using SPSS (Statistical Package for Social science) version 25. Descriptive statics were run to produce and present the profiles response to questions on knowledge, attitude and practice. These were presented in the form of frequencies and percentage, for categorical variables, and in mean scores with standard deviation for numerical variables. The Pearson Chi-square test was used to examine differences in knowledge, attitude and practice according to the different respondent's profiles as well as institution. This was done for categorical variables, and in cases where the variables involved exceeded two categories, pairwise comparison were used and the Bonferroni correction used to adjust the p-value so as to lower making type-1 errors. Multivariate logistic regression was used to determine associations between independent and dependent variables. Those variables with a p-value of ≤ 0.2 in binary logistic regression were taken to multiple logistic regressions. Finally, the study findings were presented using diagrams, tables, and figures. Statistical significance testing was set at the 95% confidence level and therefore a p-value of $< 0.05\%$ indicated statistical significance.

4.12. Ethical Consideration

Ethical clearance and approval was obtained from the Ethical and Research Committee of SPHMMC. Official letters was obtained from the department of Emergency and critical care medicine. The hospital administrations were informed about the purpose of the study, anticipated benefits, selection criteria, and data collection procedures and a written legal ethical clearance regarding the study was obtained from St. Paul's Hospital Millennium Medical College. Confidentiality of participants was kept during the study and during dissemination of the result.

4.13. Dissemination of Results

The result will be submitted to the Department of Emergency and Critical Care Medicine and presented partial fulfillment of the residency program. The manuscript will also be sent to journals for possible publication and presentations (conferences, workshops).

5. Results

5.1 Sociodemographic profile of study participants

A total of 250 completed questionnaires were collected, captured, and analyzed. All questionnaires collected were complete, and none excluded from analysis. As shown on the tables and charts below, 110 were from Aabet hospital, 83 were from Black Lion Hospital and 57 were from Alert hospital. And male were 166 whereas female were 84. The respondent's median age was 28 with minimum being 23 and maximum 44 with age groups 20-30 accounting for 75.6%. Among the participants 113 (45.2%) were nurses with 84(33.6%) of them holding bachelor degrees, 21(8.4%) of the nurses had masters while 10(4%) of the nurses had diplomas. 83(33.2%) were residents, 36(14.4%) were interns and 18(7.2%) were general practitioners. Participants had been at their current hospital with 45(18%) of them for less than 1 year, 29(11.6%) for 1–2 years, 47(18.8) for 2-3years, 79(31.6%) for 3-5years, 37(14.8) for 5-10 years and 13(5.2%) for 10 years. 135 (54.4) of the respondents had training on cervical collar but around 114(45.6%) had no training.



Figure 1. Work place distribution of respondents who participated in filling the questionnaires to assess the knowledge, attitude and practice of cervical collar and immobilization.

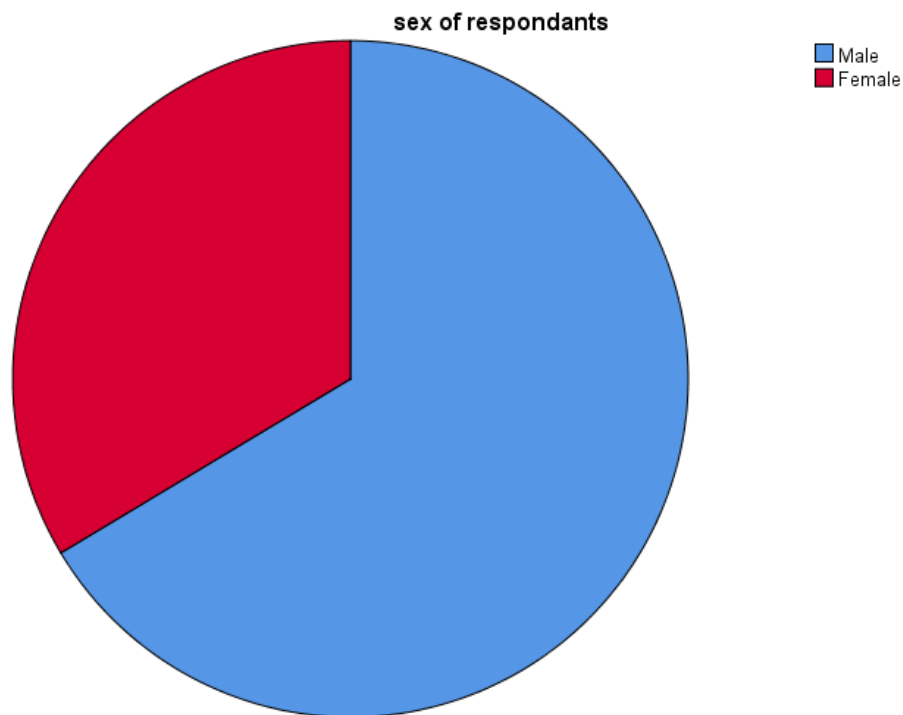


Figure 2. Gender distribution of respondents who participated in filling the questionnaires to assess the knowledge, attitude and practice of cervical collar and immobilization.

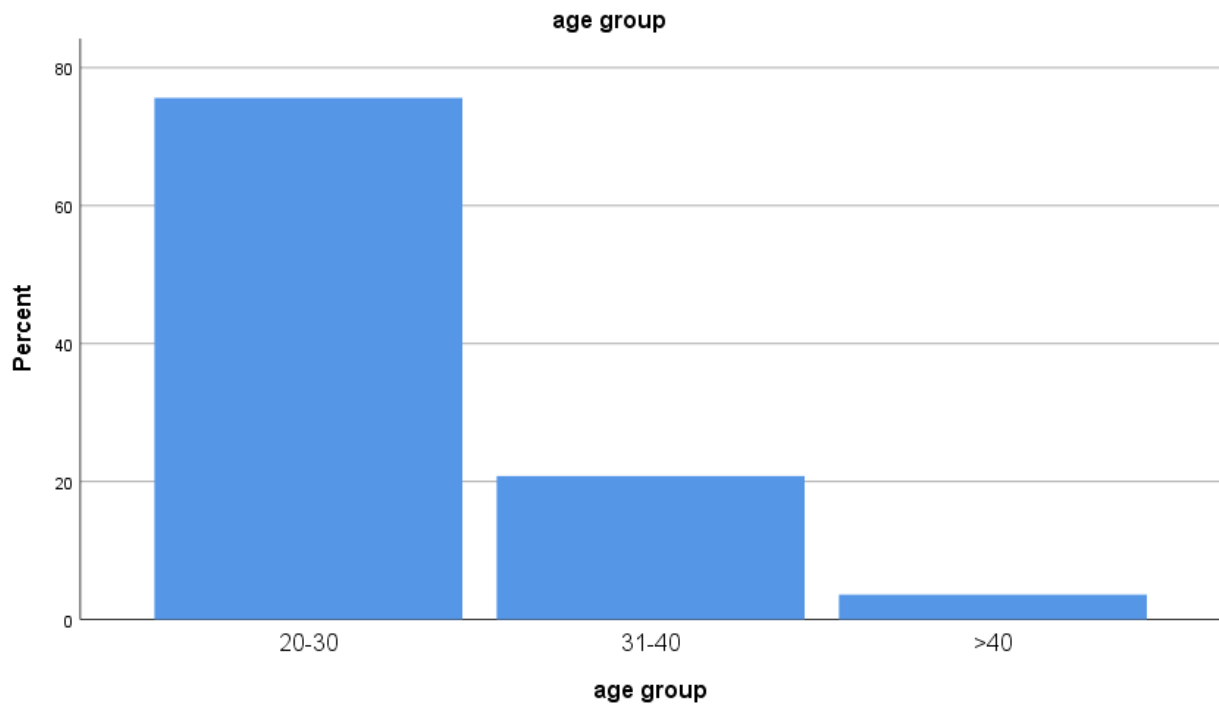


Figure 3. Age group distribution of respondents who participated in filling the questionnaires to assess the knowledge, attitude and practice of cervical collar and immobilization.

Distribution among respondents	Frequency	Percent	Valid Percent	Cumulative Percent
Profession	Nurse	113	45.2	45.2
	General practitioner	18	7.2	7.2
	Resident	83	33.2	33.2
	Intern	36	14.4	14.4
	Total	250	100.0	100.0
Level of education	Residency	83	33.2	33.2
	General Medical degree	18	7.2	7.2
	Masters	21	8.4	8.4
	Degree	84	33.6	33.6
	Diploma	10	4.0	4.0
	Student	34	13.6	13.6
	Total	250	100.0	100.0

Table1. The profession and level of education distribution of respondents who participated in filling the questionnaires to assess the knowledge, attitude and practice of cervical collar and immobilization.



Figure 4. Age group distribution of respondents who participated in filling the questionnaires to assess the knowledge, attitude and practice of cervical collar and immobilization.

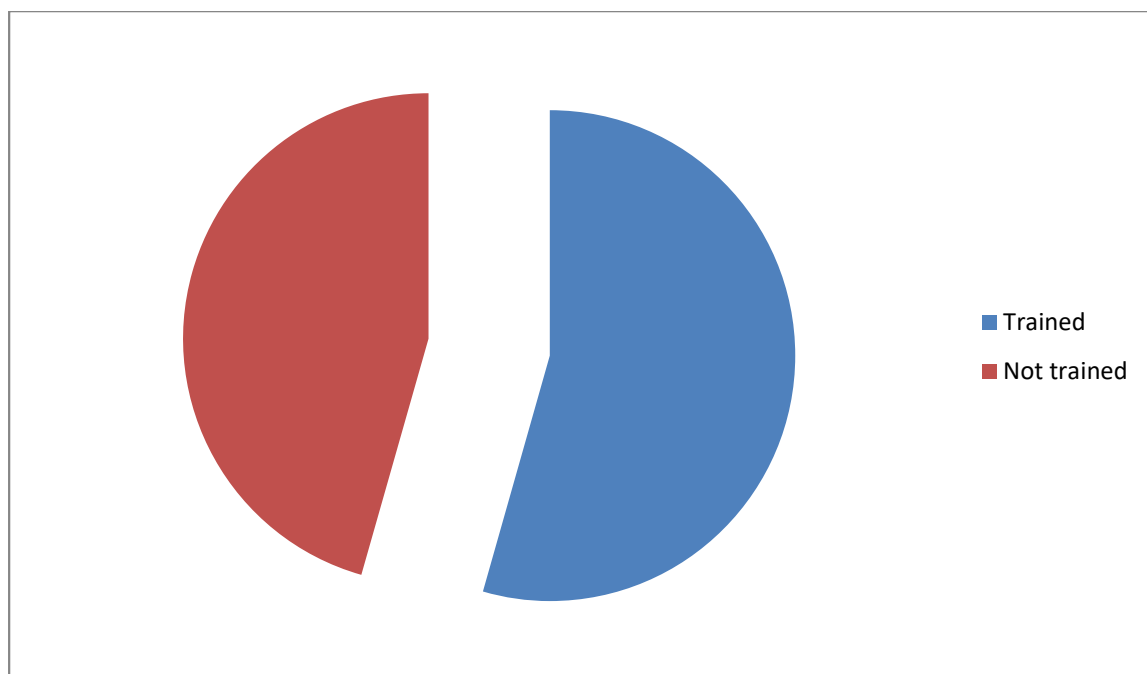


Figure5. Age group distribution of respondents who participated in filling the questionnaires to assess the knowledge, attitude and practice of cervical collar and immobilization.

5.2 knowledge, attitude and practice concerning cervical collar application and immobilization

Most respondents 51(20%) answered about five out of twelve knowledge items correctly ($M=4.00$, $SD = 1.7$). The level of knowledge was poor among 54.0% of the respondents and was good among 46%.

		Frequency	Percent	Cumulative Percent
knowledge	poor	135	54.0	54.0
	good	115	46.0	100.0
	Total	250	100.0	

Table2. Level of knowledge of respondents who participated in filling the questionnaires to assess the knowledge, attitude and practice of cervical collar and immobilization.

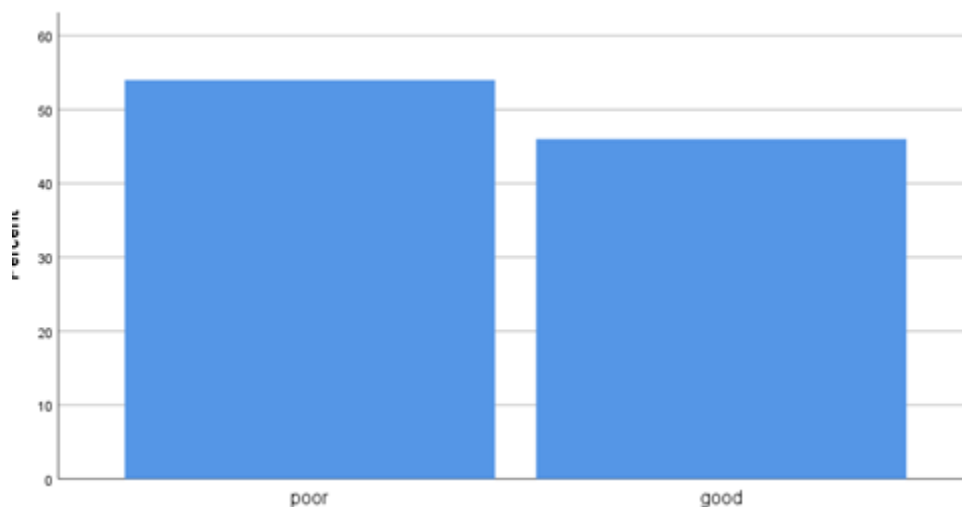


Figure 6. Level of knowledge of respondents who participated in filling the questionnaires to assess the knowledge, attitude and practice of cervical collar and immobilization.

As portrayed on the image below the attitude of the respondents was negative among 143(57.2%) and positive among 107(42.8%). Specifically, on question item number four and ten which specified there agreement towards the immobilization causing unnecessary

delay in patients care was 127(50.8%) and they also reflected preforming spinal immobilization was unnecessary at emergency was 136 (54.4%) respectfully .

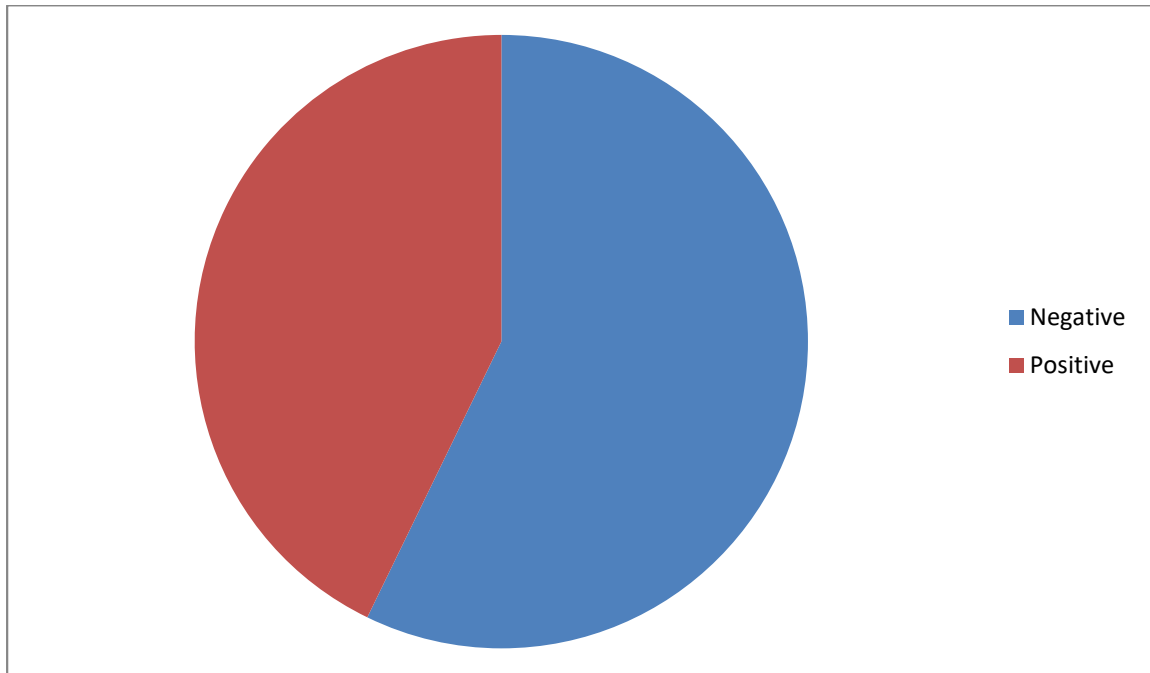


Figure 7. Level of Attitude of respondents who participated in filling the questionnaires to assess the knowledge, attitude and practice of cervical collar and immobilization.

Questions	Values	Frequency	Percent
Attitude item 4	Negative	128	51.2%
	Positive	122	48.8%
Attitude item 10	Negative	136	54.4%
	Positive	114	45.6%

Table3. Level of attitude of respondents on question item four and ten who participated in filling the questionnaires to assess the knowledge, attitude and practice of cervical collar and immobilization.

The participant's level of practice was poor among 157(62.8%) and good among 93(37.2%).

Value	Frequency	Percent
Poor	157	62.8%
Good	93	37.2%

Table4. Level of practice of respondents on question item four and ten who participated in filling the questionnaires to assess the knowledge, attitude and practice of cervical collar and immobilization.

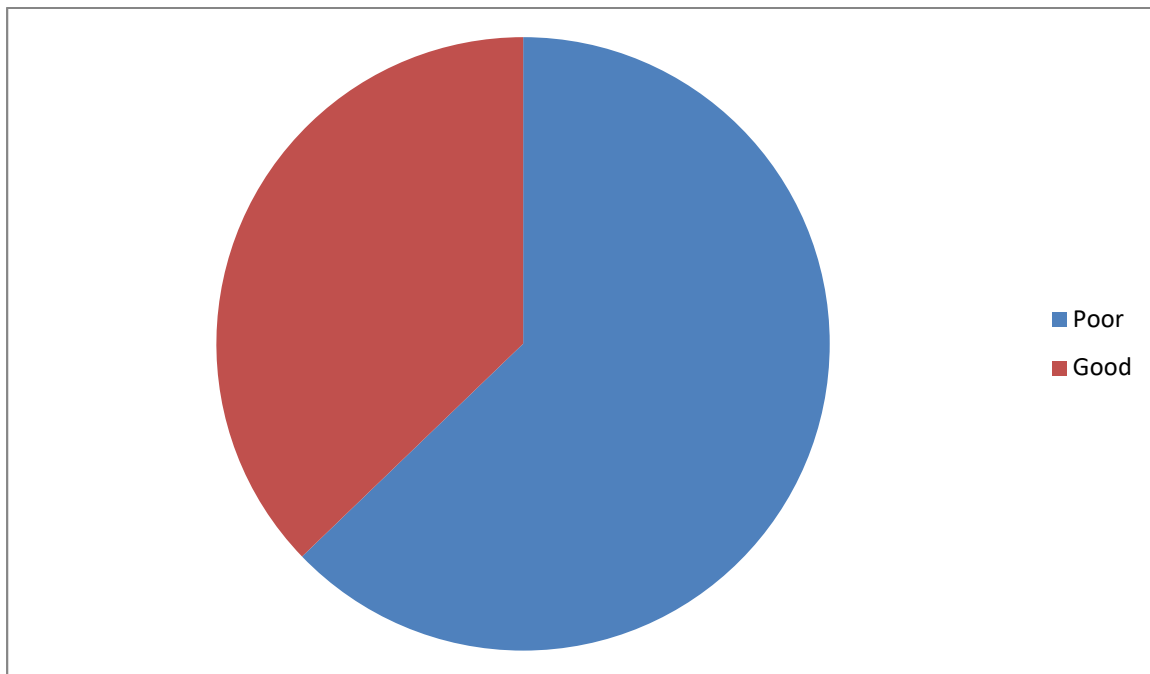


Figure 8. Level of practice of respondents who participated in filling the questionnaires to assess the knowledge, attitude and practice of cervical collar and immobilization.

5.3 .Association of knowledge, attitude and practice with independent variables

Knowledge level of respondents had statically significant positive association with the work place of respondent with p-value of < 0.05 (i.e. 0.0000) ($B=1.1$ and $AOR=4.6$) predicting that working in Aabet had a 4.6x increment in knowledge score of respondents. Whereas knowledge level of respondents had statically significant negative association with the gender of the respondent with p-value < 0.05 (i.e. 0.26) ($B=-.85$ and $AOR=0.43$) which showed that being male had 0.43x decrement in knowledge scores of respondents keeping in mind that there were more number of male respondents . On the contrary the age, profession, level of education, years of experience, having training had no association with the level of knowledge of respondents.

Attitude of respondents had statically significant positive association with p value < 0.05 (i.e. 0.0000)($B=4.86$ & $AOR=$ ranges from 32.5-129.8) with years of experience of respondents predicting that those with < 1 year experience would have 129.8x incremental effect in the attitude ,those with < 3 years would affect the attitude of respondents by 32.56x as well > 10 years of experience had again 63.3x incremental effect but the year between 5 years- 10 year of experience had no statically significant association. The work place of respondents had negative statically significant p-value < 0.05 (i.e. 0.005 and 0.000) ($B=-1.1$ & $AOR=0.32$ and $B=-2.523$ & $AOR=0.08$)association with working at Aabet hospital and BLH having 0.32x increment and 0.08x increment in the negative attitude of respondents respectfully. Attitude of respondents hand no statically significant association with age, gender, profession, level of neither education nor training.

The level of practice of respondents were statically significantly affected with $p\text{-value} < 0.05$ (i.e. 0.012) ($B=0.952$ & $AOR=2.59$) showing that working in Aabet Hospital has 2.6x incremental influence on the practice of respondents. Also respondents in the age group of 30-40 years had statically significant association with $p\text{-value} < 0.05$ (i.e. 0.016) ($B=2.234$ & $AOR=11.4$) being in this age group *predicts 11.4x incremental practice of respondents*. Level of practice of respondents had no association with gender, profession, level of education, years of experience and training.

5.3 .Association of knowledge, attitude and practice with independent variables

Knowledge level of respondents had statically significant positive association with the work place of respondent with $p\text{-value}$ of < 0.05 (i.e. 0.0000) ($B=1.1$ and $AOR=4.6$) predicting that working in Aabet had a 4.6x increment in knowledge score of respondents. Whereas knowledge level of respondents had statically significant negative association with the gender of the respondent with $p\text{-value} < 0.05$ (i.e. 0.26) ($B=-.85$ and $AOR=0.43$) which showed that being male had 0.43x decrement in knowledge scores of respondents. On the contrary the age, profession, level of education, years of experience, having training had no association with the level of knowledge of respondents.

Attitude of respondents had statically significant positive association with $p\text{ value } < 0.05$ (i.e. 0.0000) ($B=4.86$ & $AOR=\text{ranges from } 32.5\text{-}129.8$) with year of experience of respondents predicting that those with < 1 year experience would have 129.8x incremental effect in the attitude of

respondents, having < 3 years of experience affects the attitude of respondents by 32.56x as well > 10 years of experience had 63.3x incremental effect but the year between 5 years- 10 year experience had no statically significant association. The work place of respondents had negative statically significant p-value, 0.05 (i.e. 0.005 and 0.000) ($B = -1.1$ & $AOR = 0.32$ and $B = -2.523$ & $AOR = 0.08$) association with working at Aabet hospital and BLH having 0.32x increment and 0.08x increment in the negative attitude of respondents respectfully. Attitude of respondents had no statically significant association with age, gender, profession, level of neither education nor training.

The level of practice of respondents was statically significantly affected with p-value < 0.05 (i.e. 0.012) ($B = 0.952$ & $AOR = 2.59$) showing that working in Aabet Hospital has 2.6x incremental influence on the practice of respondents. Also respondents in the age groups 30-40 years had statically significant association with p-value < 0.05 (i.e. 0.016) ($B = 2.234$ & $AOR = 11.4$) being in this age group predicts 11.4x incremental practice of respondents. Level of practice of respondents had no association with gender, profession, level of education, years of experience and training.

Table 5.Association of knowledge with its independent variables

		B	S.E.	Wald	df	Sig.	Exp(B)
	sex of respondents(1)	-.848	.380	4.982	1	.026	.428
	work place of respondents			19.313	2	.000	
	work place of respondents (1)	1.530	.367	17.385	1	.000	4.617
	work place of respondents (2)	.095	.471	.040	1	.841	1.099
	Profession			1.103	3	.776	
	profession (1)	-22.372	28421.618	.000	1	.999	.000
	profession (2)	-21.461	28421.618	.000	1	.999	.000
	profession (3)	-21.871	28421.618	.000	1	.999	.000
	level of education			10.046	3	.018	
	level of education(2)	-20.149	28421.618	.000	1	.999	.000
	level of education(3)	-22.083	28421.618	.000	1	.999	.000
	level of education(4)	-20.908	28421.618	.000	1	.999	.000
	years of work experience			1.235	5	.941	
	years of work experience(1)	-.453	.708	.410	1	.522	.636
	years of work experience(2)	-.084	.660	.016	1	.898	.919
	years of work experience(3)	.057	.612	.009	1	.925	1.059
	years of work experience(4)	.316	.773	.167	1	.683	1.371
	years of work experience(5)	.180	1.062	.029	1	.865	1.198

did the respondents have cervical collar and immobilization training before			1.181	3	.757	
did the respondents have cervical collar and immobilization training before (1)	.394	.363	1.181	1	.277	1.483
did the respondents have cervical collar and immobilization training before (2)	-20.068	28420.722	.000	1	.999	.000
did the respondents have cervical collar and immobilization training before (3)	-21.432	40192.970	.000	1	1.000	.000
age group			1.398	2	.497	
age group(1)	.614	.523	1.380	1	.240	1.848
age group(2)	.350	.979	.128	1	.721	1.419
Constant	20.962	28421.618	.000	1	.999	1269337677.329

Table 6.Association of Attitude with its independent variables

	B	S.E.	Wald	df	Sig.	Exp(B)
sex of respondents(1)	.604	.417	2.092	1	.148	1.829
work place of respondents			17.973	2	.000	
work place of respondents (1)	-1.111	.400	7.712	1	.005	.329

work place of respondents (2)	-2.523	.632	15.920	1	.000	.080
Profession			9.453	3	.024	
profession (1)	22.982	28419.836	.000	1	.999	9569500116.020
profession (2)	22.626	28419.836	.000	1	.999	6703231411.166
profession (3)	25.349	28419.836	.000	1	.999	102108670872.562
level of education			8.305	3	.040	
level of education(2)	22.664	28419.836	.000	1	.999	6961643807.012
level of education(3)	20.716	28419.836	.000	1	.999	992581554.183
level of education(4)	21.373	28419.836	.000	1	.999	1915035131.954
years of work experience			30.019	5	.000	
years of work experience(1)	4.866	.985	24.422	1	.000	129.794
years of work experience(2)	4.117	.929	19.627	1	.000	61.372
years of work experience(3)	3.484	.853	16.664	1	.000	32.577
years of work experience(4)	1.730	.995	3.022	1	.082	5.642
years of work experience(5)	4.149	1.375	9.110	1	.003	63.365
did the respondents have cervical collar and immobilization training before			.509	3	.917	
did the respondents have cervical collar and immobilization training before (1)	-.278	.390	.509	1	.476	.757

did the respondents have cervical collar and immobilization training before (2)	20.988	28420.722	.000	1	.999	.000
did the respondents have cervical collar and immobilization training before (3)	-16.868	40192.970	.000	1	1.000	.000
age group			2.365	2	.306	
age group(1)	-.697	.538	1.679	1	.195	.498
age group(2)	.403	1.181	.116	1	.733	1.496
Constant	-24.823	28419.836	.000	1	.999	.000

Table 7.Association of Practice with its independent variables

		B	S.E.	Wald	df	Sig.	Exp(B)
	sex of respondents(1)	.040	.369	.012	1	.913	1.041
	work place of respondents			13.190	2	.001	
	work place of respondents (1)	.952	.377	6.372	1	.012	2.591
	work place of respondents (2)	-.787	.501	2.469	1	.116	.455
	Profession			9.032	3	.029	
	profession (1)	-1.237	32189.019	.000	1	1.000	.290
	profession (2)	-3.324	32189.019	.000	1	1.000	.036

profession (3)	-1.581	32189.019	.000	1	1.000	.206
level of education			7.709	3	.052	
level of education(2)	-.991	32189.019	.000	1	1.000	.371
level of education(3)	-2.761	32189.019	.000	1	1.000	.063
level of education(4)	-22.156	28421.836	.000	1	.999	.000
years of work experience			9.953	5	.077	
years of work experience(1)	.343	.694	.244	1	.621	1.409
years of work experience(2)	.219	.647	.115	1	.735	1.245
years of work experience(3)	-.782	.624	1.570	1	.210	.457
years of work experience(4)	-1.408	.858	2.694	1	.101	.245
years of work experience(5)	-1.960	1.186	2.732	1	.098	.141
did the respondent have cervical collar and immobilization training before			.841	3	.840	
did the respondent have cervical collar and immobilization training before (1)	-.350	.381	.841	1	.359	.705
did the respondent have cervical collar and immobilization training before (2)	-19.457	28420.722	.000	1	.999	.000
did the respondent have cervical collar and immobilization training before (3)	42.980	42939.166	.000	1	.999	4632354383140 373500.000
age group			6.196	2	.045	
age group(1)	.295	.529	.311	1	.577	1.344

	age group(2)	2.434	1.010	5.805	1	.016	11.407
	Constant	2.238	32189.019	.000	1	1.000	9.378

5.4. Association of knowledge, attitude and practice with one another

The level of knowledge had statically significant association p-value<0.05(i.e.0.006) (B=0.739 & AOR=2.093) with practice signifying that good practice had 2.1x incremental influence on the knowledge of participants. Knowledge had no statically significant association with attitude.

Table8. The association of attitude and practice on knowledge

	B	S.E	Wald	Df	p-value	AOR	95%C.I	
							lower	Upper
Practice	.739	.271	7.413	1	.006	2.093	1.230	3.562
Attitude	-.153	.266	.333	1	.564	.858	.509	1.445
Constant	-.373	.188	3.932	1	.047	.689		

The level of practice of respondents had statically significant association with p-value<0.05 (0.003&0.006) (B=0.812&AOR=2.252; B=0.739&AOR=2.093) with both good attitude having 2.3x and good knowledge having 2.1x incremental influence on the respondents having good practice.

Table 9.The association of attitude and knowledge on practice

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Attitude	.812	.272	8.930	1	.003	2.252	1.322	3.836
Knowledge	.739	.271	7.413	1	.006	2.093	1.230	3.562
Constant	-1.246	.236	27.788	1	.000	.288		

The level of attitude had statically significant association p-value<0.05(0.03)(B=0.812&AOR=2.252) with the practice of respondents reflecting good practice had 2.3x incremental influence on the attitude of the respondents. Knowledge had no association.

Table 10.The association of practice and knowledge on attitude

	B	S.E.	Wald	Df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Knowledge	-.153	.266	.333	1	.564	.858	.509	1.445
Practice	.812	.272	8.930	1	.003	2.252	1.322	3.836

6. Discussion

Restriction of movement of the injured spine is significantly vital and could be lifesaving. If it is ignored it could result in unstable damage to spinal cord, decline in respiratory and cardiac function. It is considered the first step of first aid to support the back and neck while managing the patient with trauma. The proper knowledge, positive attitude and good practice skills towards cervical collar immobilization can make a significant difference.(21) Thus, the aim of this study was to investigate the knowledge, attitudes, and practices (KAP) as well as determine their associated factors by analyzing response of participants. The study took place in three tertiary trauma hospitals in Addis Ababa, Ethiopia.

Comparing our study to a study done in the Middle East; the level of knowledge was sufficient among 84.9% of their medical students where as ours had majority with insufficient knowledge (54%) . They also showed positive attitude among most of the participants regarding calling help and starting CRP immediately, taking care while moving the patients by immobilizing the cervical spine and applying direct pressure on the side of bleeding unlike our respondents that considered the immobilization of cervical spine would just delay other managements and believed cervical immobilization as unnecessary hurdle in patient management .This clearly show the gap in attitude among our respondent be it either because of poor training , unfamiliarity with the

technique, and show their lack of anticipation for fatal complication secondary to cervical spine injury .This precisely reflects the level of exposure in undertaking cervical immobilization. The level of practice among most of medical students was good toward patients with spinal injury even conscious or not but ours showed poor practice (62.8%).
(21)

Our study demonstrated that respondents have insufficient knowledge, negative attitude and poor practice about cervical spine immobilization unlike other similar researches done in South African which was done on nurses that indicated generally they had good KAP scores: thus, 88.5% of the participants had good knowledge, 93.1% had positive attitudes and 81.9% good practices. However, only 23% of participants reported good management strategies as evidenced by low levels of training (41.1%), the availability of SOPs (35.6%) and lack of sufficient staff (48.4%)($p < 0.01$ and $p = 0.01$). Unlike their study, our study showed that the level of education and year of experience did not bring any difference while theirs showed that Registered nurses and those with more nursing experience were more likely to be knowledgeable. This signifies that the knowledge among our nurses , residents, general practitioner and interns was not statically significant to make a difference among each other which may be due to not giving the course the attention it requires or the lack of proper training across the different levels of trainings.

In their study, participants with positive attitudes were more likely be knowledgeable ($p < 0.01$) unlike our which showed no association among the two. There was no association between knowledge and practices

($p=0.21$) in south Africa's study but on ours those respondents with good practice showed ($p<0.006$) that they were more likely to be knowledgeable.

On their study, practice was only influenced by the attitude of respondent ($p<0.01$) and in ours good practice was more in those with both good knowledge ($p<0.05$) and positive attitude ($p<0.05$).

In agreement with their study, our study may reflect gaps in proper training of respondent according to the level of their education. (22)

Similar to our results, a study done in Iran showed the knowledge of 102 EMS staff of Rasht City, regarding the use of cervical collar in patients with trauma . A total of 41 (40.2%) had diplomas, 18 (17.6%) associate degree, and 43 (42.2%) bachelor's degree or higher. The results of pre-education knowledge survey showed that the majority of the study participants, i.e. 71 (69.6%) individuals had moderate knowledge (score between 33.3% and 66.6%), 27 (26.47%) had low knowledge (score less than 33.3%), and only 4 (3.9%) had sufficient knowledge (score more than 66.6%) regarding the use of cervical collar.

(12)

Just as our study had insufficient knowledge in 54% of respondents with no positive association to their level of education or years of experience. Their study also showed no statistically significant relationship between the level of knowledge of personnel with their age, work experience, and education ($P>0.05$). Then they implemented educational training on cervical immobilization as one of their objective was to identify any difference that would come with educating the participants. And then knowledge survey on the two weak and moderate groups ($n=98$, 96.1%) showed that 73 (74.5%) individuals had a good level of knowledge and 25 (25.5%) individuals had a moderate level. None of the samples had weak knowledge. Comparison of the scores before and after the education showed that the Mean $\pm$ SD scores of knowledge after education improved (7.67 ± 2.1 vs. 14.52 ± 1.68). Changes in the score (6.85 ± 1.97) were statistically significant based on the paired t-test. This shows us that lack of proper training specifically for each profession contributed for the insufficiency in knowledge. (12)

7. Limitations

We undertook a non-probability, convenience study that focused on the knowledge, attitude, and practices of HCW working three trauma center. The study has a small sample size and took place in institutions

that may have similar practice patterns. Further research will be required to determine whether these findings are consistent with other provinces and other practice environments. It was better if the level of practice was assessed through observation. There could be social-desirability bias on the attitude item questions

8. Conclusion

Knowledge among respondents at different levels of education regarding collar application is poor across the board signifying the poor attention given to this subject in different courses .This study also shows the clear positive impact of practice on knowledge and practice on attitude and vice versa.

9. Recommendation

We recommend proper training or mentorship programs to be planned and provided to address gaps in knowledge, practice and to overcome negative attitude. Since good practice has been shown to positively influence both knowledge and attitude; institutions should incorporating more practical teaching tools in their training modules in accordance with current scientific knowledge and updated recommendations. We recommend striving to create excellence in practice which will intern greatly influence both acquiring knowledge and positive attitude.

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8. Annex

Questionnaires for disaster risk management study

Part 1: Socio-Demographics Information

1. Age (years)

2. Sex:

1) Male____

2) Female____

3. Working place (name):

a. Abet hospital

b. Black lion hospital

c. Alert hospital

d. Zewditu hospital

4. Profession category:

- 1) Nurse
- 2) General practitioner
- 3) resident
- 4) intern

5. Level of education:

- | | |
|-------------------------|------------|
| 1) resident | 4) Degree |
| 2) general practitioner | 5) Diploma |
| 3) Master | 6) Student |

6. Work experience (in year)

- | | |
|------------------|-------------------|
| 1) <1 year____ | 5) 5-10 years____ |
| 2) 1-2 years____ | 6) >10years_ |
| 3) 2-3 years____ | 7) No experience |
| 4) 3-5 years____ | |

7. Did you have cervical collar and immobilization training before?

A. Yes

B. No

**Part 2. Knowledge, attitude and practices of HCW about cervical collar and
Immobilization**

2.1 Knowledge regarding cervical collar and immobilization

1. How do you rate your current knowledge and skill in cervical collar and immobilization

A. Excellent

B. Very good

C. Good

D. Neutral

E. Poor

2. What are the clinical decision rules that help determine which patients require evaluation for cervical spine injury

B. CAFIS

C. NEXUS

D. All

E. A& C

3. What are the causes of spinal trauma?

A. Fall down

B. Assault

C. Diving

D. None

E. All

4. What are the contraindications to use Canadian c-spine injury tool

A. GCS <15

B. Distracting injury

C. Intoxication

D. None

E. All

5. What are the indications for requesting CT-SCAN

A. Elderly patient

B. GCS < 13

D. Patient with degenerative disease

E. None

F. All

6. What method of protecting cervical collar do you know

A. MILS

B. Blocks

C. Collar

D. None

E. All

7. What airway maneuver is appropriate for suspected spinal trauma?

A. Chin lift only

B. Jaw thrust only

C. Head tilt only

D. All

E. None

8. A patient comes to you after sustain RTA and he has weakness on all 4 extremity

1) Send for imaging

2) Clear the c-spine

4) Unsure

5) Other action(s)

9.. a patient comes to you with bruising to his arms after a fall ,the patient is intoxicated

1) Send for imaging

2) Clear the c-spine

3) Need more information

4) Unsure

5) Other action(s)

10. The distance between these lines should be used for cervical collar sizing when measuring a patient for fitting of a cervical collar

A. An imaginary line should be drawn across the shoulders and another drawn from the level of the lower lip

B. An imaginary line should be drawn across the top of the shoulders and another across the bottom of the chin.

C. An imaginary line should be drawn across the top of the lip and another across the bottom of the chin.

D. All

E. None

11. If the height and tightness are correct to say appropriate application

A. The chin retracts to the chin piece

C. Head will be 20 degrees

D. None

E. All

12. after application of the cervical collar

A. The patient shouldn't be able to open their mouth.

B. The neck is completely immobilized

C. The neck is able to move 25-30 % of flexion and extension

D. The neck is able to move 80% of other mov't other than flexion and extension

E. All

2.2 Attitude regarding cervical collar and immobilization among the study participants

1. The emergency department should be adequately prepared to manage for any possible cervical spine injury in emergency in which there is a sudden arrival of patients

1) Very much agree

2) Agree

3) Neutral

4) Disagree

department

- 1) Very much agree
- 2) Agree
- 3) Neutral
- 4) Disagree

3. Emergency department health professionals need training and education on cervical collar and immobilization

- 1) Very much agree
- 2) Agree
- 3) Neutral
- 4) Disagree

4. Overuse of spinal immobilization results in an unnecessary delay in patient care

- 1) Very much agree
- 2) Agree
- 3) Neutral
- 4) Disagree

spinal immobilization when an injury is suspected.

- 1) Very much agree
- 2) Agree
- 3) Neutral
- 4) Disagree

6. Clinical judgment (consisting of experience, expertise, and factual knowledge) is appropriately utilized to initiate spinal immobilization.

- 1) Very much agree
- 2) Agree
- 3) Neutral
- 4) Disagree

7. All patients who are immobilized are done so using appropriate practices

- 1) Very much agree
- 2) Agree
- 3) Neutral
- 4) Disagree

8. I sometimes initiate spinal immobilization due solely to mechanism of injury

- 1) Very much agree
- 2) Agree
- 3) Neutral
- 4) Disagree

9. Spinal immobilization is often performed unnecessarily by EMS providers

- 1) Very much agree
- 2) Agree
- 3) Neutral
- 4) Disagree

2.3 Practice regarding cervical collar and immobilization among the study participants

- 1) Send for imaging
- 2) Clear the c-spine
- 3) Need more information
- 4) Unsure
- 5) Other action(s)

2. patient with penetrating trauma to the chest but is otherwise alert and appears well

- 1) Send for imaging
- 2) Clear the c-spine
- 3) Need more information
- 4) Unsure
- 5) Other action(s)

3. Patient with a fall down accident from 7meter height

- 1) Send for imaging
- 2) Clear the c-spine
- 3) Need more information
- 4) Unsure

4. what barriers do you believe exists that make managing patients with potential cervical spine injuries difficult

- A. Materials are not available
- B. I don't see the point of applying collar
- C. It will do more harm than benefit
- D. Not confident enough to apply
- E. I don't know the indications

5. What factors do you believe would improve your management of this subset of patients in the future?

- A. Training
- B. Equipment availability
- C. Bedside simulations
- D. All
- E. Not important

- A. The distance between the sizing post and the lower edge of the rigid plastic should
- B. The distance between the black fastener and the lower edge of the rigid plastic
- C. The distance between the head and the lower edge of the rigid plastic
- D. All
- E. None

7. Some patients will not fit into a cervical collar what will you do

- A. Saline bags with tape
- B. Towels
- C. Blankets roll
- D. None
- E. All

8. The function of a cervical collar is

- A. To rigidly maintain a minimum distance between the neck and torso to eliminate intermittent compression of the cervical spine
- B. To rigidly maintain a minimum distance between the head and neck to eliminate intermittent compression of the cervical spine
- C. To rigidly maintain a minimum distance between the shoulder and neck to eliminate intermittent compression of the cervical spine
- D. None
- E. All

9. Loose cervical collars may result in which complications

- A. Can cover the anterior chin, mouth, and nose resulting in airway obstruction.
- B. Compress the carotid arteries and neck veins.
- C. Allows for significant flexion.
- D. Hyperextension of the head.
- E. None

10. If the cervical collar is too short it will what would you expect

- A. Can cover the anterior chin, mouth, and nose resulting in airway obstruction.
- B. Compress the carotid arteries and neck veins.
- C. Allows for significant flexion.
- D. Hyperextension of the head.
- E. None

11. If the cervical collar is too tall it will cause overextension of the carotid arteries and can lead to tears.

- A. Can cover the anterior chin, mouth, and nose resulting in airway obstruction.
- B. Compress the carotid arteries and neck veins.
- C. Allows for significant flexion.

E. None

12. If the cervical collar is too tight it can compress the carotid arteries and neck veins.

A. Can cover the anterior chin, mouth, and nose resulting in airway obstruction.

B. Compress the carotid arteries and neck veins.

C. Allows for significant flexion.

D. Hyperextension of the head.

E. None