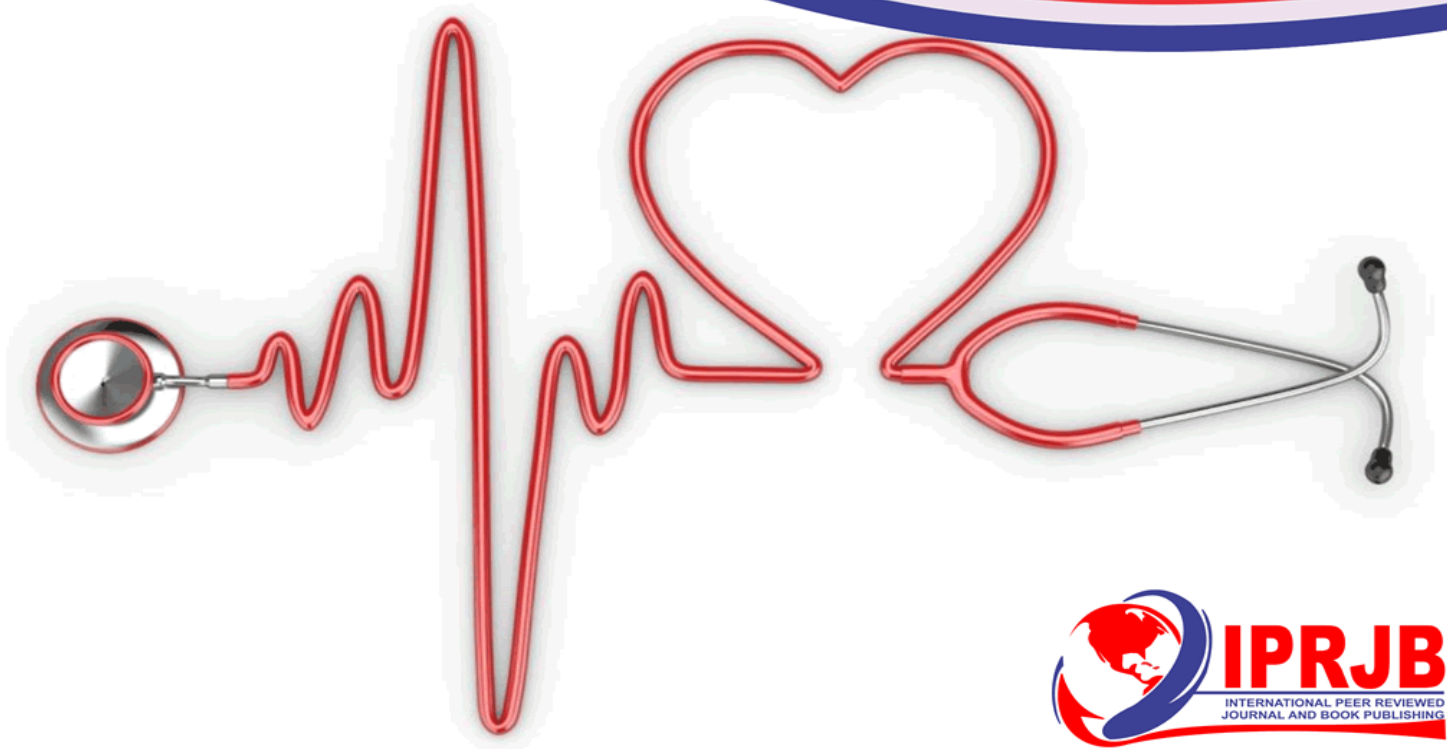


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**HEALTHCARE PROVIDERS' FACTORS INFLUENCING
TRAUMA CARE PREPAREDNESS IN ACCIDENT AND
EMERGENCY DEPARTMENT OF SELECTED HOSPITALS IN
KAKAMEGA COUNTY, KENYA**

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HEALTHCARE PROVIDERS' FACTORS INFLUENCING TRAUMA CARE PREPAREDNESS IN ACCIDENT AND EMERGENCY DEPARTMENT OF SELECTED HOSPITALS IN KAKAMEGA COUNTY, KENYA

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Abstract

Purpose: The main objective of the study was to determine health care provider factor influencing trauma care preparedness among health care providers working in accident and emergency department of the selected hospitals.

Materials and Methods: This was a cross-sectional Analytic study. Census sampling was used to select General Practitioner hospitals. Systematic sampling technique was used to choose study participants from 11 selected hospitals. The study participants were 183 health care providers (Doctors, Clinical Officers and Nurses) working in the selected hospitals' accident and emergency departments. Data was collected using structured questionnaires and observation checklists. Data was analyzed using statistical package for Social Science software version 22.0. Inferential statistics were used to test the strength of association.

Findings; Health care providers' factors that influenced trauma care preparedness were; specific training on trauma care ($p=0.002$), attending Continuing medical education ($p=0.0008$) and duration when last update was received ($p= 0.04$).

Unique contributions to Theory, Practice and Policy: Trauma related training, trauma related continuing medical education and duration when last trauma update was received influence trauma. Health care providers working in accident and emergency department should undergo trauma related training and get frequent updates on trauma care.

Keywords: *Emergency department, Health care Providers, Preparedness, Trauma care*

1.0 INTRODUCTION

Trauma is physical injury of sudden onset and severity to living tissue caused by an extrinsic agent and may result in wounds, broken bones or internal organ damage (Webster, 2018). It is a significant health problem worldwide. More than 9 people die every minute from trauma and 5.8 million people of all ages and economic groups die every year from accidental injuries (Holtz, 2016). It is the primary cause of disability and mortality in people aged 1 to 44 years (CDC, 2017). As a result of unsafe conditions, about 90% of the global burden of injury related mortality and disability is found in low and middle-income countries (Laytin, 2019). In United States, work loss costs of injuries and violence in 2013 was 671 billion dollars. Injuries account for 59% of all deaths among people aged 1-44 years. 2.5 million People are hospitalized while 26.9 million people are treated in emergency departments and released annually (CDC, 2017). In United Kingdom, trauma is a leading cause of death. More than 16000 deaths due to trauma occur in England and Wales annually. After 2005 terror attack, delivery of trauma care in United Kingdom changed rapidly (Moran, 2018).

Injury is a major problem facing developing countries. More than 90% of global mortality from trauma occur in low and middle-income countries. In sub Saharan Africa, trauma results from gender-based violence, conflicts, motor vehicle crashes, and political unrest among others. The burden of injuries is said to be decreasing in developed countries and increasing in sub- Saharan Africa (Blankson, 2019). In South Africa, a middle- income country, major causes of trauma include road traffic injuries and violence. In addition, trauma related death rate in South Africa is six times the worldwide rate (Zaidi, 2019). In Ghana, road traffic accidents are the main source of trauma. 25.5% of the road accidents involved motor cycles (Blankson ,2019). In Kenya, road traffic accidents are the leading cause injury (36%). Other causes include; post-election unrest. Falls and domestic violence (Gatheka,2018). In Kakamega, motor cycles are the common means of public transport and equally the traffic accidents (Khanbhai, 2012).

1.1 Problem Statement

Trauma is a neglected disease of the modern world and has received less attention compared to other diseases (Davis, 2017). Motor vehicle crashes are the leading cause of trauma globally. They cause more than one million deaths yearly and approximately 50 million significant injuries. Over 90% of these motor vehicle crashes occur in the developing world. Death resulting from trauma due to motor vehicle crashes was projected to upsurge by 80% in low and middle-income countries by 2020 (Balch, 2013). Kenyan residents have been victims of many injuries related to building collapses, fire outbreaks, terrorism and post-election unrest (Huhu, 2016). Currently it is estimated that 3,000 Kenyans lose their lives as a result of road traffic accidents yearly (Mock, 2019). Injury accounts for more than 85% of patients treated in level 3 and 4 hospitals (Hadley, 2016). Subsequently, Counties suffer disproportionately from this burden and urgently need trauma care preparation. Motorcycle transport (boda boda) is commonly used in Kakamega County. This mode of transport results to many road accidents leaving many injured or dead (Luchidio, 2013). Many trauma victims are taken to health facilities by bystanders, who have not been trained on resuscitation and transportation of trauma patients. In addition, the receiving hospital is not always informed earlier about the trauma patients being taken to the hospital. (Hadley, 2015). Deficiencies in resources and organization

result to increased burden of disability, morbidity and mortality. Patient's chances of survival are increased if they receive care within the shortest time after severe injury (Mock,2019). In 2013, health services Management in Kenya was devolved from the National government to the County government (Tsofa, 2017). As a result, those health facilities that were initially equipped to handle Trauma cases in the Country were geographically located in different Counties resulting in disparities in trauma care preparedness. The study findings formed a baseline upon which health care providers' improvement on trauma care preparedness in Kakamega county shall be measured and informed stakeholders on areas of improvement.

1.2 Specific objective

To examine healthcare providers' factors influencing trauma care preparedness in accident and emergency department in Kakamega County.

1.3 Research Question

What are the healthcare providers' factors influencing trauma care preparedness in hospitals at Kakamega County?

2.0 LITERATURE REVIEW

Health care providers' factors that influence Trauma care preparedness

Health care providers require knowledge and skills for trauma care. WHO recommends that health care providers in accident and emergency department should have knowledge and skills in the following areas; assessment of airway for patency, manual maneuvers including chin lift, jaw thrust and recovery position to help open the airway. They require training on wearing protective gears, sharps and biological waste disposal. Knowledge and skills on post-exposure prophylaxis for HIV are vital too. According to the study carried out in India, it was found that all personnel there were trained on universal safety precautions (Uthkarsh, 2016). Trauma related training is a necessity. In Pakistan, these courses are crucial in capacity building for Doctors and Nurses. They help them provide quality trauma care (Goraya, 2018). The following courses are vital - Advanced Trauma Life Support (ATLS). It is the widely utilized continuing education in trauma care worldwide. The course lasts 2-3 days and covers the breath of trauma care. Advanced cardiac life support (ACLS), a 2 days course to equip health care providers with advanced skills to give emergency treatment life-threatening medical emergencies, for instance cardiac arrest. Advanced Trauma Care (ATC) is a 3 days course which aims at equipping health care providers with skills that maximize management in the golden hour hence good outcome of those affected. Basic life support (BLS), a 1day course designed to equip health care providers with skills to save life. Pediatric Advanced Life Support (PALS) is a 3 days' course that equips health care providers with skills to efficiently manage critically ill children (Muindi, 2018). Continuing Professional Development (CPD) enhances the quality of services delivered to trauma patients. Furthermore, it includes organized activities, for instance workshops, conferences, symposia, courses, educational meetings and frequent reading to help one remain updated (Absaleem-2020). Medical accreditation bodies and licensing authorities have made CPD points a mandate for renewal of licenses for healthcare providers. For instance, nursing council of Kenya requires that all practicing nurses and midwives should have 20 CPD points per year. CPDs are expected to be funded by institutions. An ideal CPD should ensure that the healthcare providers,

knowledge and skills are up-to-date for safe practice. It contributes to clinical competence and improved performance. A study carried out in Canada showed that many health care workers attended CPD just to meet licensure requirements (Ahmed, 2013).

Summary of Literature Review and Knowledge Gap

There were efforts towards defining gaps in trauma care preparedness. Some studies addressed country-based assessment using world health organization guidelines to identify gaps and prioritize areas of improvement. However, there was need for facility-based evaluation of Trauma care preparedness among health care providers at County level.

3.0 METHODOLOGY

3.1 Study design

Analytic cross-sectional design was used.

3.2 Study Area

The study was conducted in 11 selected Hospitals in Kakamega County. 1 County referral Hospital, 4 County hospitals and 3 Sub- county hospitals and 3 faith-based level 4 hospitals.

3.2 Study Population

Health care providers (Doctors, clinical officers and nurses) working in accident and emergency department participated in the study.

Inclusion Criteria: Doctors, clinical officers and nurses who had worked at the emergency department for more than six months.

Exclusion Criteria: Doctors, clinical officers and nurses Interns.

Sample determination: The sample size was determined using Fisher's method. The final sample size was 183 respondents.

3.3 Sampling procedure: Census method was used to select 11 Hospitals in Kakamega County. Systematic sampling method was used to select the health care providers.

3.4 Data collection tools

Data was collected using structured questionnaires and observation checklists to assess health care providers' skills on trauma care.

3.5 Data Analysis

Collected data was compiled and entered into a computer for analysis. using Statistical Package for the Social Science software version 22. Descriptive and Inferential statistics were used. Data was analyzed using bivariate analysis. Odds ratio was used to test the strength of association between health care providers' factors and trauma care preparedness. p-value below 0.05 was considered as a level of significance. A one-way analysis of variance (ANOVA) was used to test differences in mean scores on type of health facility and team skills and type of health facility and mean scores on physical resources. Higher mean scores reflected better trauma care preparedness. For ANOVA, F test of ≤ 0.05 was used to test statistically significant differences

between means for the categories of the health facilities that were surveyed. Data was presented in tables and bar graphs.

4.0 RESULTS

4.1 Socio- demographic characteristics of study participants

Table 1 shows socio-demographic characteristics of study participants. A total of 183 doctors, clinical officers and nurses took part in the study. A comparable proportion of those aged 20 – 29 (37.1%) and 30 – 39 (37.7%) took part in the survey. The ages ranged between 20 and 55 years with a mean of 33.4 (\pm 7.8 SD) and median age of 32.0. There were slightly more males (51.4%) than females (48.6%) with most them married (60.1%). Distribution by type of health facility shows county hospitals leading by 41.5% followed by Mission hospitals (26.9%), sub county hospitals by 21.3% and referral hospital at 10.3%.

Table 1: Socio-demographic characteristics of study participants (n = 183)

Variable	Categories	N	%
Age group in years	20 – 29	68	37.1
	30 – 39	69	37.7
	40 – 49	38	20.8
	\geq 50	8	4.4
Mean age in years \pm SD (Range) <i>Median</i>		33.4 \pm 7.8 (20.0 – 55.0)	32.0
Gender	Male	94	51.4
	Female	89	48.6
Marital status	Single	69	37.7
	Married	110	60.1
	Separated	1	0.6
	Widow/Widower	3	1.6
Type of health facility	Referral	19	10.3
	County	76	41.5
	Sub-county	39	21.3
	Mission (FBO)	49	26.9

4.2 To assess health care providers' knowledge on trauma care.

To assess health care providers' knowledge on trauma care, four thematic areas were examined. These included knowledge on airway management, breathing, circulation and disability. A total of 20 questions were asked and the answers marked. scores were given in percentages then grades awarded according to the nursing council grading system (75 – 100% Distinction, 65-74% = credit, 50 - 64 = pass, 49 and below = Fail). Table 2 shows the scores. 20 out of 183 (10.9%) had a Distinction, 30 out of 183 (16.4) had a Credit, 73 out of 183 (42.6%) had a pass and 55 (30.1%) out of 183 failed which is an considerable percentage.

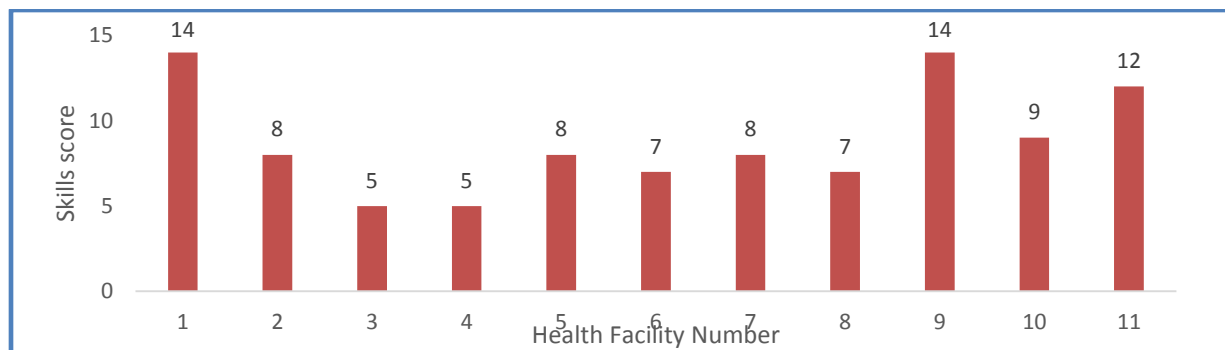
Table 2 Health care providers' knowledge on trauma care

Grades	Categories	N	%
Distinction	75-100%	20	10.9
Credit	65-74%	30	16.4
Pass	50-64%	78	42.6
Fail	49 and below	55	30.1
TOTAL		183	100

4.3 To assess health care providers' team skills on trauma care.

To assess health care providers' team skills on trauma care, four thematic areas were examined. These included airway management (9 items); breathing (8 items); circulation and shock (13 items); and disability (1 item) with a total of 31 items scored 1 if the corresponding procedure was performed and zero (0) if not performed by the team in each of the 11 facilities that participated in the study.

Figure 1 shows the scores by health facility. Health facility #1 and #9 were the leading in competency score of 14 each out of 31 which is underperformance (45.2%). They were followed by health facility #11 with a score of 12 (38.7%) and the least being facilities #3 and #4 with a score of 5 each or 16.1% which is relatively poor performance.

**Figure 1 : Team skills scores by health facility**

One-Way analysis of mean team skills scores by type of health facility

A one-way analysis of variance (ANOVA) was used to test differences in mean team scores by type of health facility (Table 2). Facility type was categorical variable while summation of scores per type of facility being continuous dependent variable broken down by the levels of the independent variable. Mean statement was used to output the mean competency score for each level of type of health facility. Results show that the mean of the competency scores for the four types of health facilities differs significantly among the four types of health facilities ($F = 0.01$). The team from referral hospital had the highest mean of 14.0 with the second highest being mission hospitals with a mean of 11.7. County hospitals scored the lowest competency mean of 6.5.

Table 2 One-Way analysis of mean team skillss scores by type of health facility

Type of facility	Number of facilities	Mean	SD	F Value	F Test
Referral Hospital	1	14.0	-	8.3	0.01
County Hospitals	4	6.5	1.7		
Sub-County Hospitals	3	7.3	0.6		
Mission Hospitals	3	11.7	2.5		

Overall mean competency score = 8.8; Minimum = 5.0; Maximum = 14; Total expected score = 31

4.4 Training experience

Table 3 illustrates training experience of respondents. Slightly more than half (50.8%) were nurses with one-third (33.3%) being clinical officers and 15.9% being doctors. Over two-thirds (67.8%) had attained diploma level of training with 16.5% being undergraduates. Graduates comprised of 2.2% of study respondents. More than a third (38.2%) had worked for less than one year compared to 32.8% who had been employed for 2 years. The more experienced trauma care workers with four or more years of experience were 11.5%. Asked about having any trauma related training, 67.7% had not had any training. Only one-in-five (20.7%) had had the basic BLS training with 8.1% having had ACLS. About attending CPD on trauma care; only 29.1% had attended CPD on trauma care, majority (70.9%) had not. Of those who had attended CPD on trauma care, half (50.9%) had received updates on trauma in the past one year compared to 49.1% who had taken two years or more before getting any updates on trauma care.

Table 3 Training Experience

Variable	Categories	N	%
Cadre	Doctor	29	15.9
	Clinical Officer	61	33.3
	Nurse	93	50.8
	Total	183	100.0
Training level	Certificate	25	13.7
	Diploma	124	67.8
	Degree	30	16.5
	Masters	4	2.2
	Total	183	100.0
Professional experience in years	≤ 1	70	38.2
	2	60	32.8
	3	32	17.5
	4	14	7.7
	≥ 5	7	3.8
Total	183	100.0	
Trauma related courses	BLS	41	20.7
	ACLS	16	8.1
	PALS	1	0.5
	ATLS	5	2.5
	Others (First aid)	1	0.5
	None	134	67.7
Total	198	100.0	
Has attended CPD on Trauma Care	Yes	53	29.1
	No	129	70.9
	Total	182	100.0
when received updates on trauma care in years.	≤ 1	27	50.9
	≥ 2	26	49.1
	Total	53	100.0

4.5 Bivariate analysis on Accident and Emergency department health care providers' factors influencing trauma care preparedness

Table 4 shows results on bivariate analysis on human factors influencing trauma care preparedness in the health facilities that were surveyed. Trauma care preparedness which was the study outcome was defined as a score of at least 50% on the four areas that were examined i.e. feeling on being prepared to attend to mass casualties, team performing primary survey on trauma patients, having guidelines on primary survey on trauma patients strongly agreeing that regular courses on trauma care are useful in preparation for trauma care with each having a score of 1 and overall expected score of 4.0.

Three human factors stood out as having statistically significant association with trauma care preparedness. These included training on trauma care, attending CPD and duration when last update was received. Respondents who had not had any training on trauma care compared to their colleagues who were trained were 70% less likely to have been prepared (OR: 0.3; 95% CI: 0.2 – 0.7; $p = 0.002$). Participants who attended CPD on trauma care preparedness were 3.2 times more likely to have been prepared than their counterparts who had not: 1.6 – 6.7; $p = 0.0008$, the results being highly statistically significant. Equally, respondents who were more prepared than their counterparts who had not attended such courses (OR: 3.2; 95% CI had received updates on trauma care preparedness in the previous one year had higher odds of being more prepared for trauma care (OR: 2.5; 95% CI: 1.0 – 6.3; $p = 0.04$). A borderline statistically significant result was also obtained on marital status with married respondents being 40% less likely to have been prepared (OR: 0.6; 95% CI: 0.3 – 1.1; $p = 0.07$). Other factors such as age group, gender, type of health facility, staff cadre, level of professional training and years of work experience did not yield statistically significant association with attaining higher scores on trauma care preparedness.

Table 4 Bivariate analysis on Accident and Emergency health care providers' factors influencing trauma care preparedness

Independent variable	Categories	Total (n)	*Trauma care preparedness		OR	95% CI	p-value
			Prepared (%)	Not-prepared (%)			
Age group in years	< 32	90	61.1	38.9	1.5	0.8 – 2.7	0.2
	≥ 32	93	51.6	48.4			
Gender	Male	94	56.4	43.6	1.0	0.6 – 1.8	0.98
	Female	89	56.2	43.8			
Marital status	Married	110	50.9	49.1	0.6	0.3 – 1.1	0.07
	Others	73	64.4	35.6			
Type of hospital	Referral	19	63.2	36.8	1.3	0.5 – 3.7	0.5
	Others	164	56.5	44.5			
	County	76	51.3	48.7			
	Others	107	59.8	40.2			
	Sub-county	39	56.4	43.6			
	Others	144	56.3	43.7			
	Mission	49	61.2	38.8			
Staff cadre	Nurse	93	55.9	44.1	1.0	0.5 – 1.7	0.9
	Doctors/COs	90	56.7	43.3			
	Others	134	54.5	45.5			
Level of professional training	Diploma	124	52.4	47.6	0.6	0.3 – 1.2	0.1
	Others	59	64.4	35.6			
Years of experience	≤ 2	130	56.2	43.9	1.0	0.5 – 1.9	0.9
	> 2	53	56.6	43.4			
Training on trauma care	None	135	49.6	50.4	0.3	0.2 – 0.7	0.002
	Others trainings	48	75.0	25.0			
Attended CPD	Yes	53	75.5	24.5	3.2	1.6 – 6.7	0.0008
	No	130	48.5	51.5			
When last received updates on trauma care	≤ 1	27	74.1	25.9	2.5	1.0 – 6.3	0.04
	> 1	156	53.2	46.8			

***Preparedness score of ≥ 50% in the four areas examined**

5.0 DISCUSSION

5.1 Trauma related training

Availability of appropriately trained staff ensure continuity of care. It prevents staff from responding without up-to date training or without fundamental skills required for providing care. WHO tool kit recommends that training in trauma is appropriate and effective. In this study, only 20.7% (n=183) had the Basic Life Support training with 8.1% (n=183) having had Advanced Cardio-vascular Life Support. In addition, respondents who had not had any training on trauma care compared to their colleagues who were trained were 70% less likely to have been prepared (p = 0.002). In a study carried out in Australia, Canada, England and New Zealand, 74% had training. This difference could be attributed to the presence of well-established trauma centers in the first world countries and availability accessibility and affordability of the trauma related training.

5.2 Attending Continuing Professional Development on trauma care

Participants who attended CPD on trauma care preparedness were 3.2 times more likely to have been prepared for trauma care: ($p = 0.0008$), than their counterparts who had not. In addition, 29.1% of the participants had attended CPD on trauma care. This is similar to the study carried out in India whereby only one staff had attended CPD on trauma care services (Uthkarsh 2016). The similarity could be attributed to their economic status.

5.3 Duration when last update was received

Frequent knowledge acquisition and practice enhance performance of health care providers. Practice and repetition enhance recall from memory storage (Karpicke, 2016). This study showed that respondents who had received updates on trauma care in the previous one year had higher odds of being more prepared for trauma care (OR: 2.5, $p 0.04$).

5.4 Marital status

The study revealed that married respondents were 40% less likely to have been prepared for trauma care. This is contrary to study carried out in Sabia which showed that citizens who are married were more prepared for emergencies than those who were not (Cvetkovic, 2016). The difference could be attributed to the measures put in place during emergency preparation. Further research in this area with a larger study population is required.

6.0 CONCLUSION AND RECOMMENDATION

Conclusion

The study revealed that trauma care training, attending CPD on trauma care, when one last received updates on trauma care and marital status have a significant relationship with healthcare providers' trauma care preparedness

Recommendations

The hospital management should ensure that trauma care Training opportunities and short courses like Basic Life support and Advanced Cardiac Life support are available, accessible and affordable to the health care providers working in emergency department. Frequent trauma related Continuous Professional Development should be conducted within the hospital and health care providers encouraged to attend. Health care providers should get frequent updates on trauma care. Results in this study showed that married respondents were 40% less likely to have been prepared for trauma care. Therefore, there is need for further research in this area with a larger population.

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REFERENCES

- Absaleem, M.A., Almoalwi, M.N., Siddiqui, A.F., Alsaleem, M.A., Alsamghan, A.S., Awadalla, N.J., &Mahfouz, A.A. (2020). Current Practices and Existing Gaps of Continuing Medical Education among resident Physicians in Abha City, *Saudi Arabia. Int.j. Environ. Res.Public Health*, 17,8483;
- Ahmed, K., Wang, T. T., Ashrafian, H., Layer, G.T., Darzi, A., &Athanasίου, T. The effectiveness of continuing medical education for specialist recertification. *Can Urol Assoc J*, 20 13;Jul-Aug 7(7-8)286-272.
- Balch, O. (2013). *Road deaths, cancer and diabetes becoming Africa's hidden epidemics*. Global development.
- Blankson, P.K., Amoako,J.K.A., &Asah-Opoku, (2019). Epidemiology of injuries presenting to the accident centre of Korie-Bu Teaching Hospital, Ghana. *BMC Emerg med* 19,39.
- Centers for Disease Control & Prevention, (2017).*National Center for Injury Prevention and Control. Web-based injury statistics Query and Reporting System WISQARS) Fatal Injury Data*.
- Cvetkovic V. M (2016). Marital status of citizens and floods: Citizen preparedness for response to natural disasters. *Vojno delo*, 8.
- Davis K.A., Fabian TC, &Cloffi WG (2017).The toll of death and disability in the united states-the “ *neglected disease of Modern society*, still neglected after 50 years,” *JAMA surg*;152(3):221-222.
- Gatheka,G.K., Ngaruiya,C., Mwai,W., Kendagor, A., Owondo, S., Nyanjau, I., ... &Kibachio, J.(2018). Prevalence and predictors of injuries in Kenya; findings from the national STEPs survey.*BMC Public Health* 18,1222.
- Goraya, M.A. (2018). *Pakistan :Cultivating skills for enhanced trauma care. International committee of the Red Cross*
- Hadley, K.N., Wesson, K.A., Abudulgafor, S.M., Bachani, S. M., Akungali, D., Jalusu, N., Masasabu, J.W., &Adrian A, H. (2016). *Trauma Systems in Kenya: A qualitative Analysis at the District Level*
- Holtz C, (2016) *Global Health Care issue and Policies*, Jones and Barlett Jan-Mar, 29(10:58-63.
- Huho, J.M., Mushan, J.N., &Musyimi, P.K.,(2016) “*Profiling disasters inKenya and their causes*.” <http://karuspace.karu.ac.ke/handle/20.500.12092//1885>
- Karpicke, J.D., (2016). “ *A powerful way to improve learning and memory*.” *Psychological Science and Agenda/ June 2016*,
- Khanbhai, M., &Lutomia, M.B.L.(2012) *Mortorcycle Accident injuries seen at Kakamega Provincial Hospital in Kenya*. ISSN 2073-9990 East Cent. *Afr.j.surg*. March/ April, volume17(1)

- Laytin, A.D., &Debebe, F. (2019). *The burden of injury in low-income and middle-income countries: knowing what we know, recognizing what we don't know*, *Emergency Medicine Journal*, April.
- Luchidio, M.T., Kahuthia, G.R., &Gatebe .E.(2013) Impact of training Bodaboda operators and safety status in Kakamega County, Kenya. *International Journal of Advance Research,IJOAR .org* Volume 1,issue 9, September.
- Mock, C., LOrmand, J.D., Gooshen, J., Joshipura, M., & Peden, M. (2019).*Guidelines for essential trauma care Geneva*, World Health Organization.
- Moran C.G., Lecky, F., Bouamra, O., Laurence, E.A., Woodford, M. (2008). Changing the system- major trauma patients and their outcomes in the NHS (England) 2008-17E *Clinical Medicine*, vol. 2-3,p13-21, August 6.
- Muindi, L., (2018) *Emergency courses offered at AIC Kijabe hospital*.
- Tsofa, B., Goodman, C., Gilson, L., &Molyneux, S. (2017) Devolution and its effects on health workforce and commodities management-early implementation experiences in Kilifi County, Kenya. *Int J Equity Health*, 16: 169.
- Uthkarsh, P.S.,Gururaj, G., Reddy, S.S., &Rajanna, M.S. (2016). *Assessment and availability of Trauma care services in a Districtv Hospital of South India* ; A field observational study. *Bull Emerg Trauma*. Apr; 4(2): 93-1
- Webster,Merriam (2019.) internet. <http://www.merim-webister.com.dictionaty/trauma>