African Journal of Emergency Medicine 10 (2020) 127–131

Contents lists available at ScienceDirect

African Journal of Emergency Medicine

journal homepage: www.elsevier.com/locate/afjem

Original article

An assessment of Nurses' knowledge, attitude and practice of emergency care related to road traffic accident victims at three selected hospitals in Rwanda

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ARTICLE INFO

Keywords:
Knowledge
Attitude
Practice
Nurses
Emergency Management
Road Traffic Accident

ABSTRACT

Introduction: Quality emergency nursing care is an important variable in reducing death and disability due to road traffic accidents (RTA), yet little is known about emergency nursing care within the Rwandan context. This study aims to describe the knowledge, attitude and practice (KAP) of nurses of the emergency care of RTA patients.

Method: We employed a cross sectional design to survey the full cohort of nurses working in Accident and Emergency (A&E) units in three selected Rwandan hospitals (N = 51).

Results: This study revealed that the knowledge and practice of nurses is either high or very high and the majority of them (73.657%) had a positive attitude towards emergency management of RTA patients. Being trained before working in A&E units was associated with a significant increase in the likelihood of being at the level of practice which is (1) very high (OR = 5.35, 95%, CI = 5.20–5.50), (2) high (OR = 1.60, 95%, CI = 1.17–2.19) (3), moderate (OR = 5.35,95%, CI = 4.15–6.88) and (4) low (OR = 1.33,95%, CI = 1.33–133) and it decreased more than 99.9% the likelihood of being at low level of practice in all levels.

Discussion: The study showed that training had a significant effect on practice and this is supported by previous studies. Training interventions to improve the management of RTA patients by nurses working in A&E should be regularly audited to ensure ongoing quality of care.

African relevance

- Road Traffic Accident (RTA) death in Rwanda reached 3.16% of total deaths. We need to decrease the mortality and disabilities via adequate emergency management of RTA victims
- Such research is conducted on local people therefore produces context driven evidence to improve quality of care of RTA victims.
- The findings and recommendations of this study will inform appropriate intervention in terms of preventive and curative measures of RTA related deaths and disabilities

Introduction

Road Traffic Accidents are serious problems worldwide and are worse in low and middle income countries, Rwanda included. RTA patients need immediate and adequate care. Nurses' responsibilities include the provision of emergency care to such vulnerable patients. Injury is the most important cause of death and disability worldwide and a high percentage of people who are injured live with impairment or lifetime disabilities. The RTA is the first amongst five leading causes of death in patients aged 15–29 years old followed by drowning, burns, poisoning and falls [1]. The RTA deaths are rated at 1.24 million per year worldwide and this can be due to lack of inclusive road traffic safety laws in many countries [1]. In East Africa, RTA is one of the main causes of injury related deaths [2].

Injury and deaths due to RTA are one of the major public health problems in Rwanda and RTA is the fourth among the 50 top causes of death in Rwanda [3] with a mortality rate of 32.1 per 100 000 population [4]. The complications associated with RTA patients occur mostly in the first few hours following the accidents but this can be alleviated by timely, correct, effective and efficient management of these patients [5].

Worldwide, nurses are viewed as significant health care personnel essential in building an emergency care team, including an RTA emergency management team. However, the guidelines regarding emergency management of RTA and the one regarding the schedule of

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https://doi.org/10.1016/j.afjem.2020.03.003
Received 28 November 2019; Received in revised form 3 February 2020; Accepted 31 March 2020
Available online 25 May 2020
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nurses training programs are not available in all health settings [6]. In Rwanda, most of the trauma patients are being managed by nurses and they are the ones who, for instance, attend the patient first in the field of accident, triage them, initiate the emergency treatment and ensure transport to the health settings but the published literature concerning KAP in relation to emergency nursing care of RTA patients is still limited. Most of the research done focuses on assessing the way clients received care in an emergency rather than the KAP of nurses in providing this emergency care. Therefore, this study aimed to assess the nurses' KAP of emergency care related to RTA patients at three selected Rwandan hospitals.

Methods

The study chose a quantitative, cross sectional and descriptive design. The research setting included three public hospitals in Rwanda which provide 24 hours emergency care and were selected based on the fact that they receive high numbers of RTA patients because they are located near the main road and when there is an accident, they are among the first to send nurses to the field and the ambulance can reach there easily. Hospital 1 is a referral hospital, with 250 beds and its A&E unit has hosting capacity of 30 beds and 26 nurses. Hospital 2 is a provincial hospital with 130 beds and the A&E unit has a hosting capacity of 12 beds and 15 nurses. Hospital 3 is a district hospital, with 115 beds and the A&E unit has 10 beds and 15 nurses.

The total population consisted of 56 nurses; two nurses were on long leave during data collection hence 54 questionnaires were administered to all participants. The entire population was used as the sample and 51 completed questionnaires were returned.

A tool developed by Rominski et al. [12] was used after some modifications were made, with permission. A team of specialists in an A &E service including the clinical facilitators validated the tool. This tool was further pre-tested among 10 A&E nurses of other hospitals with the same characteristics as the participants to accommodate cultural and contextual differences in Rwanda. Adaptations to the Rwandan context were made according to the findings of the pilot study. The results from the pilot study were excluded in the data analysis. The internal validity was 0.8 using Cronbach's Alpha.

The knowledge and practice scale of BASAK [7] was used to rate the participants' knowledge and practice scores. The participants' responses regarding knowledge assessment were marked out of hundred and those who obtained more than 90% were considered having very high level of knowledge; 80 to 89.99% were high level of knowledge; 70 to79.99% moderate level of knowledge, 60.00 to 69.99% low level of knowledge and less than 60% very low of knowledge. Each item indicating a positive attitude was scored one out of one and the negative one zero out of one.

The questionnaire was in English and consisted of four sections: A) six questions of sociodemographic data; B) 10 questions to assess knowledge of nurses on emergency care of RTA patients, C) 7 questions about attitude of nurses on emergency care of RTA patients and D) included 11 questions to assess perceived practice of nurses on emergency care of RTA patients.

Data collection process started by obtaining permission and approval to conduct the study from the University of Rwanda, College of Medicine and Health Sciences and from the research committee of each hospital. A meeting was then arranged with management to explain the process with unit managers and nurses to collect data during a break or tea times to avoid disruption of ward activities. The completed questionnaires were stored in secured areas in each hospital and collected by the researchers at the end of each day.

The Statistical Package for the Social Sciences (SPSS) version 21 software was used for analysing the data. Descriptive statistics were used to describe sociodemographic data and KAP of nurses. Inferential statistics using statistical tests such as chi square were utilised to measure associations and multinomial logistic regression for the prediction of relationships among dependent and independent variables. The confidence interval of 95% and statistical significance of < 0.05 were chosen.

Ethics principles were observed as the participation was voluntary and informed consent was signed by every participant before data collection. Withdrawal from the study was permitted at any time without any penalty. Anonymity and confidentiality of information was observed through use of codes instead of names and keeping the research data locked in a cabinet. Potential risk such as inconvenience during their free time to answer the questionnaire was considered minimal and was explained in advance to uphold beneficence, maleficence and participant's rights of dignity and diversity.

Results

Demographic data

The response rate was 94% as 54 questionnaires were administered on 5 separate occasions and 51 were returned. Most of the participants (43/84.3%) were younger than 40 years and 35(68.4%) were married while 16(31.4%) were single. The gender representation was almost equal with males being 26(51%) and females being 25(49%). A large majority (42/82.4%) had an Advanced Diploma. Most of the participants (29/56.9%) had less than one year experience and only 22(43.1%) had more than one year. Participants who were exposed to prior training in A&E care of trauma patients were 35(68.6%) and 38(74.5%) were trained on triaging of the trauma patient in-service.

Nurses' knowledge of emergency care of road traffic accident victims

On asking participants when they would suspect a spinal cord injury, a large proportion (34/66.7%) responded incorrectly citing multiple trauma. In response to a question whether a victim is severely injured, the majority of participants (39/76.5%) correctly reported that the victim would not be awake, would not follow commands and have a change in heartbeat.

To recognize whether the victim is breathing, a large majority (44/86.3%) correctly reported that they would check if the chest is moving up and down. A large majority (46/90.2%) reported correctly that rapid pulse would let them know if the victim had circulatory shock. ABCDE (Airway, Breathing, Circulation, Disability and Exposure) was reported correctly by the majority (45/88.2%) as what to assess during quick assessment of the injured victim of RTA.

Nurses were asked to identify some equipment used in an emergency and their usage from the pictures. The majority (27/52.9%) identified correctly the hard board to support the back when injured while 19(37.2%) were unable to name it and 5(9.8%) named the equipment incorrectly as a 'hand band'. Among them 42(82%) reported the purpose of the hard board correctly. The majority (44/86.3%) identified the cervical collar correctly while 7(13.7%) were not able to name it. A large majority (50/98.0%) reported that this equipment (cervical collar) is used to support the neck when injured, while 1(2%) reported that the equipment is used for neck weakness. A big majority (47/92.2%) identified the oxygen cylinder correctly. The total of participants reported correctly that it is used to assist breathing by giving oxygen. The vast majority (48/94.2%) identified a bag valve mask correctly and 47(92.2%) reported correctly that it is used to assist breathing, 36(70.6%) identified the oropharyngeal airway correctly and 44 (86.3%) knew its use as for avoiding the tongue blocking the respiratory airways.

The participants were asked to name the back slab covered with a crepe bandage and its usage and the majority (37/72.5%) reported correctly that the equipment was a back slab and a crepe bandage was reported by 3(5.9%) participants while 11(21.6%) were not able to name the equipment. A large majority (49/96.1%) reported correctly that the back slab covered by a crepe bandage is used for arm injury and

Table 1
The effect of being trained before working in A&E units on level of perceived practice (N = 51).

Level of practice[a]		B	Std. Error	Wald	Df	Sig.	Exp(B)	95% Confidence interval for Exp(B)	
								Lower bound	Upper bound
Very high	Intercept	19.383	1.531	160.355	1	.000			
	[trained before = 1.00]	−16.744	1.189	198.227	1	.000	5.350E-008	5.201E-009	5.503E-007
	[trained before = 2.00]	0[b]	.	.	0	.	.	.	.
High	Intercept	18.130	1.643	121.739	1	.000			
	[trained before = 1.00]	−15.645	1.335	137.252	1	.000	1.605E-007	1.172E-008	2.199E-006
	[trained before = 2.00]	0[b]	.	.	0	.	.	.	.
Moderate	Intercept	18.535	1.592	135.616	1	.000			
	[trained before = 1.00]	−16.744	1.304	164.911	1	.000	5.350E-008	4.154E-009	6.889E-007
	[trained before = 2.00]	0[b]	.	.	0	.	.	.	.
Low	Intercept	17.437	1.095	253.368	1	.000			
	[trained before = 1.00]	−15.827	.000	.	1	.	1.337E-007	1.337E-007	1.337E-007
	[trained before = 2.00]	0[b]	.	.	0	.	.	.	.

[a] The reference category is: Very low.
[b] This parameter is set to zero because it is redundant.

1(2.0%) said toothache while 1(2.0%) did not know its usage. The above knowledge results were scored into grades according to Basak et al. [7] as mentioned above and the majority (39.3%) scores were high (80 to 89.9%).

Nurses' attitude about emergency care of road traffic accident victims

The results showed that 43(84.3%) strongly agreed that it is necessary to provide first aid immediately for RTA victims at the scene. Among participants 32(62.7%) strongly agreed that they are willing to provide emergency care to RTA victims, 26(51%) strongly disagreed fearing blood and that that they can be infected by blood borne diseases, 31(60.8%) strongly disagreed that they are not willing to provide emergency care to RTA because of not being sufficiently trained, 31(60.8%) strongly disagreed to not willing to provide emergency care to RTA for fear of applying wrong treatment and causing harm, 15(29.4%) agreed that community members are the first line responders to assist in life saving, 24(47.1%) strongly agreed that in the case of an accident, they think the community's role is to communicate the accident but never to touch the victim. Thirty eight (73.66%) participants had a positive attitude with only 13(26.34%) having negative attitude towards the emergency care of RTA victims.

Nurses' perceived practice of emergency care of road traffic accident victims

Participants were asked if they had been involved in the emergency care of RTA victims at the scene or at hospital. Forty five (88.2%) reported that they had been involved in emergency care.

A small majority (28/54.9%) reported correctly that when they are called to provide emergency care at the scene of the RTA with mass casualties they would first quickly check the surrounding for safety. A small proportion of participants (24/47.1%) reported correctly that during triaging they would start with providing emergency care to victims who are severely injured, who cannot move, are unable to speak or lift up their arms.

When participants were asked how they would handle victims with back and neck injury at the scene, a large majority (49/96.1%) reported correctly that they would roll the victim onto the hard board and apply the neck collar. However with no neck injury suspicion, only a small majority (32/62.7%) correctly said that they would help the victim breathe by chin lift, head tilt to allow air entry.

A large majority (44/86.3%) reported correctly that they would palpate to feel if the big blood vessels are beating at the neck, to check if the victim's heart is beating or not.

When the victim has large lacerations on their legs with severe bleeding, the majority of nurses (48/94.1%) reported correctly that they would apply a bandage or linen at the site.

When participants were asked how to move the victim to the hospital, the majority (49/96.1%) reported correctly that they would use an ambulance. During transportation and within the first 24 hours, the majority (34/66.7%) reported correctly that they would administer intravenous (IV) fluids, such as Normal Saline 0.9% with a big IV line to correct hypotension. The majority (43/84.3%) reported correctly that they would stabilize the bleeding victim, give anti-tetanus vaccine and serum, administer antibiotics and take the blood sample as further emergency treatment.

Scores for the aforementioned practice results were calculated as reflected in Table 2 below and the majority (41.1%) of the scores were very high.

Relationships between demographic characteristics and KAP of nurses at A& E

The relationship between demographic characteristics and KAP was assessed. Variables that showed significant association with KAP were recruited to multinomial regression test to identify their independent effects on KAP. The only demographic information that was significantly associated was the level of practice and being trained on emergency management of trauma before (chi^2 = 12.632, P = 0.006). As shown on Table 1, prior training was associated with a significant increase in the likelihood of being at a level of practice which is 1) very high (OR = 5.35,95%, CI = 5.20–5.50), 2) high (OR = 1.60,95%, CI = 1.17–2.19), 3) moderate (OR = 5.35,95%, CI = 4.15–6.88) and 4) low (OR = 1.33,95%, CI = 1.33–133). It decreases evidently more than 99.9% the likelihood of being at very low level of practice at all levels.

Discussion

Sociodemographic data

Regarding education of the participants, more than a half had completed an advanced diploma in Nursing Sciences. This is consistent with the study by Rominski et al. [12] in which the majority (70.3%) had a diploma in Nursing Sciences, while only 2.7% had a master's degree. Considering the education system in the Rwandan context, the majority of universities provide advanced diploma in nursing sciences where the trainees are formally trained for three years to be qualified in order to overcome the shortage of nurses in different health settings. In addition is a shortage of highly qualified lecturers to train high level nurses [13]. The present study showed that the most experienced nurses only had working experience of more than one year in the A&E service.

This is supported by the study done by Rominski et al. [12] where the majority (54.1%) of the nurses working in A&E units had less than a year's working experience. This finding could indicate that young nurses are preferred in A&E probably because of their energy and ability to work quickly and run if need be than what one would find with older nurses as cited by Stokowski [14] *"older nurses may be persuaded to continue working if they are offered less strenuous jobs"*.

Having more than 30% of nurses working in A&E units without formal training on emergency management of RTA patients has negative impact on proper management of such patients. Furthermore, the ones trained are not specialists in emergency, they only received in service training [15,16].

Knowledge

All patients involved in a RTA should have a high index of suspicion for spinal injury which can only be ruled out after advanced assessment. Having more than a half of nurses who are not aware of that is accompanied by many risks and complications when caring for RTA patients [17].

More than a half could triage the red code patients accurately in their answer indicating that patients in this category would be able to receive immediate medical attention due to a life threatening condition [18].

The literature recommend that breathing be assessed through rise and fall of the chest [19], the circulatory shock could be identified through palpation of a rapid pulse [20] and Akhtar [21] recommends ABCDE as a quick assessment sequence for the injured patients of RTA and a large majority in this study responded accurately on these aspects.

Nurses' attitude related to emergency care of RTA patients

The positive attitude was found among nurses independently on their experience. Other studies showed the positive attitude among experienced and trained nurses [10,32] and this is contrary to our study that showed no association between attitude with training and experience. The nurse's common feature should always be to have an open heart to provide care to everyone in need.

Nurses' perceived practice related to emergency care of RTA patients

The literature recommends that the rescuers must ensure that the environment is safe in order to stay safe while providing emergency care [24] and while triaging the RTA patients, they would start by providing emergency care to patients who cannot move, raise their arms up or speak. These patients should receive immediate health support before being referred to the nearest health setting to receive advanced life support [18].

In relation to the prevention of airway obstruction for patients without neck injury, the findings of present study are supported by other literature that support the use of a chin lift, head tilt manoeuvre in order to prevent airway blockage by the tongue and to facilitate air movement into respiratory structures [25].

Vital signs especially assessment of heart beat is very crucial in management of unconscious patients and having nurses who know how to assess the pulse is a good indicator for the management of RTA patients [15].

The large majority reported that they could apply the bandage or linen at the site in case of a large laceration on the leg with severe bleeding. This is supported by the International Federation of Red Cross (IFRC) [24] on decreasing the severity of bleeding and associated complications of heavy haemorrhage.

Regarding the transport of patients from the scene of accident to the hospital, the findings are supported by IFRC [24] which recommended to put the patient onto the hard board and apply neck collar to minimize further neurological injuries. Furthermore the public transport can be associated with secondary injuries and further complications as they do not have all materials necessary for the safe transportation of injured RTA patients [27].

During transport and within the first 24 hours, the administration of IV fluids such as Normal Saline 0.9% with big IV line should be maintained as supported by Brandel [28] who argues that in case of an accident, blood and body fluids are lost due to injuries, leading to hypotension, disturbed blood component concentration and vital organ damage if appropriate actions are not taken to replace the blood and fluid loss.

> "Isotonic fluids such as Normal Saline or Ringers Lactate provide the greatest volume expansion and Dextrose is used in the pre-hospital environment for medication infusions of Dopamine or Amiodarone" [29]

In relation to other interventions within the first 24 hours post RTA, the findings are supported by IFRC [24], World Health Organization (WHO) [17] and Ingole et al. [30] who state that for emergency management of wounds in post-traumatic events, both tetanus immunization and tetanus immunoglobulins should be administered independently of their vaccination history as many of them would not know their tetanus vaccination history.

Relationship between demographic characteristics and KAP

The current study showed that being trained in emergency management of trauma patients was significantly associated with the level of practice. In other words, the training prior to the treatment of RTA patients resulted in improved nursing practice and that the trained nurse has a very low probability of poor practice in emergency care of RTA patients in participating institutions. These findings have been supported by Arreola-Risa et al. [31] who stipulated that the training and practice have the potential of strengthening the level of performance of health professionals working at A&E service. Furthermore, Arreola-Risa et al. [31] revealed that the training program in Mexico contributed to decreased mortality from 1.8% to 0.5% for all trauma patients managed in A&E units. The training further assisted in maintaining and strengthening good practice in management of RTA patients [31].

As the study was scheduled on academic calendar, we used a self-report to assess practice rather than observation. There is also a limitation of generalization as the study used only three Rwandan hospitals with a limited number of nurses.

Conclusion

As conclusion, generally the knowledge and practice of nurses working at A&E services in the management of RTA patients in the selected settings is either high or very high. They also have positive attitude towards RTA patients. Training has been demonstrated to enhance good practice. Therefore to employ nurses in A&E services, training in emergency care of RTA patients should be considered and followed by regular refresher training.

Further studies should be done in this field using a larger sample size with mixed methods for data collection including observation to produce more reliable results.

Authors' contribution

Authors contributed as follows to the conception or design of the work; the acquisition, analysis, or interpretation of data for the work; and drafting the work or revising it critically for important intellectual content: CN contributed 45%; BRB 35%; and DG contributed 20%. All authors approved the version to be published and agreed to be accountable for all aspects of the work.

Declaration of competing interest

The authors declare no conflict of interest.

Acknowledgment

We are thankful to Doctor Sarah Rominski who provided the tool and permission to use it in this study. Our special thanks to Professor Petra Brysiewicz who assisted in the preparation of this manuscript.

Dissemination of results

Results from this study were shared with the University of Rwanda/ School of Medicine and Health Sciences including the participating institutions.

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