ORIGINAL RESEARCH

A cross-sectional study assessing the knowledge, attitudes, and practice of first aid in trauma care among professional intercity drivers in the North-West Region of Cameroon

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East Cent Afr J Surg. 2021;26(1):15-21
https://doi.org/10.4314/ecajs.v26i1.3

Abstract

Background
First aid (FA) provided by trained layperson first responders to individuals injured in road traffic accidents has been shown to improve injury outcomes, especially in resource-limited settings. This study aimed to assess the knowledge, attitude, and practice of FA provided to injured individuals among professional intercity drivers in the North-West Region of Cameroon (NWRC) and to identify barriers that may impede effective delivery of FA by these drivers.

Methods
Using a cross-sectional study design, we conducted interviews regarding the knowledge, attitudes, and practices of FA in a convenience sample of 600 professional intercity drivers in the NWRC in February 2018. Interviews were done using a context-appropriate, structured questionnaire. In each section, questions were scored as 1, 0.5, or 0 for correct (or positive), partially correct, and incorrect (or negative) responses, respectively. Total scores in each section were scaled to a range of 0 to 10. Mean scores were obtained for drivers' knowledge, attitudes, and practice of FA. Analyses included paired-samples *t* tests and multinomial regression.

Results
We enrolled 589 drivers; the mean age of drivers was 38 years. In total, 107 (18.2%) had prior training in FA, and most drivers (83.2%) received FA training while in driving school. The mean scores for knowledge and practice were significantly lower than the mean score for attitude ($P<0.001$). FA kit possession was significantly associated with prior provision of FA to individuals injured in road traffic accidents (OR, 2.32; 95% CI, 1.61-3.34). Almost all drivers (95.9%) agreed that provision of FA improves injury outcomes, and 90% of them were willing to attend workshops on FA training.

Conclusions
FA knowledge and practice among professional intercity drivers in the NWRC is inadequate despite high scores for attitude towards FA. Training workshops on FA and the integration of basic FA training into driving school curricula may improve FA knowledge among professional intercity drivers in Cameroon.

Keywords: first aid, road traffic injury, professional drivers, Cameroon

Introduction

Most low- and middle-income countries (LMICs) have limited emergency medical services (EMS) and prehospital trauma care in both urban and rural areas. In these resource-limited settings, trained laypersons who provide first aid (FA) may improve trauma outcomes.[1]-[4] This has been demonstrated in a layperson FA responders programme implemented in South Africa.[5] However, FA is frequently not administered or administered incorrectly. A systematic review from 2012 reported that only 10.7% to 67% of people with traumatic injuries received FA, and 83.7% of FA was administered incorrectly.[6] These findings

highlight the need to understand the knowledge, skills, and technical elements that are required to successfully implement community-based FA responder programmes.

At the time of this report, Cameroon's EMS, *Service d'Aide Médicale d'Urgence* (*SAMU*), was limited to the country's 2 largest cities of Yaoundé and Douala, with plans in place to extend SAMU to the main cities in all 10 regions of the country. However, SAMU does not always function effectively and has poor coverage of emergency prehospital care in Yaoundé.[7] A low percentage of patients with traumatic injuries are transported to health facilities by ambulances (<3%-62%) as per studies carried out in Yaoundé.[8],[9] In Douala, transport of injured patients is often delayed (the average time to arrival at hospital is 75 min).[10] The North-West Region of Cameroon (NWRC) has a population of over 2 million and has no EMS. One study reported that, in the NWRC, patients with traumatic injuries were frequently transported to hospital by public bus (42.3%), taxi (35.9%), and motorbike (5.9%).[11] Thus, in Cameroon, lives are likely being lost due to poor prehospital care and prolonged delays in transporting injured patients to the nearest health facility.[12],[13]

An estimated 11% of global disability adjusted life years (DALYs) are due to injuries,[14] and road traffic injuries (RTIs) contribute most to injury-associated DALYs.[15] LMICs account for 48% of the world's vehicles but 90% of RTIs.[16] Globally, about 1.25 million RTI deaths occur annually, and in the absence of sustained action, RTIs are predicted to be the seventh leading cause of death by 2030.[17] In Cameroon, RTIs are the leading cause of trauma, accounting for between 36.4% and 59.1% of traumatic injuries in the country.[9],[18],[19] Given the limited coverage of prehospital care by SAMU, alternative approaches, such as laypersons serving as first responders, merit consideration.[20] In Cameroon, professional drivers are numerous and already frequently involved in transporting patients with traumatic injuries to health facilities.[11] If trained to provide FA at road traffic accident sites, professional drivers may be effective first responders, filling an important public health gap until an organized EMS is established.[21]

This study aimed to assess the knowledge, attitudes, and practice of FA among professional intercity drivers in the NWRC and to identify barriers that may impede effective delivery of FA by these drivers.

Methods

Study design and setting

This cross-sectional study was conducted in February 2018 in Bamenda, the regional headquarters of the NWRC. Bamenda is linked by an extensive road network to other cities, divisions, and regions, and it is served by many interregional bus transportation providers. Bus seating capacity ranges from 14 to 70 seats. Buses with higher seating capacity are primarily used for interregional transportation; those with smaller seating capacity are primarily used for interdivisional transportation.

Study population

This study was conducted among professional intercity drivers who drive from Bamenda to other divisions within the NWRC (interdivisional drivers) or to other regions (interregional drivers). The study's principal investigator (M.A.A.) interviewed representatives of the professional drivers' unions in January 2018 and determined that there were about 1000 professional drivers registered in Bamenda at the time. The study included drivers who met the following criteria: (a) aged 21 years or older, (b) had been driving professionally for at least 6 months, and (c) were registered in a professional drivers' union.

Study procedures and sampling

Six research assistants (RAs) with prior experience in survey data collection underwent a 2-day training programme on informed consent and data collection procedures; all RAs were fluent in English and Pidgin English, which are languages widely used in the NWRC. Data collection was conducted using a structured, paper-based English-language questionnaire, adapted from similar survey tools.[22],[23] The questionnaire was piloted on taxi drivers before study implementation. During pilot testing, each RA interviewed 10 taxi drivers; pilot test responses were reviewed by the study's principal investigator, and adjustments were made to improve clarity. Two weeks later, this process was repeated using the updated questionnaire.

The final questionnaire included the following sections: (a) sociodemographic factors, such as age, sex, marital status, and highest level of formal education; (b) driving factors, such as mode of driver training (formal vs informal), type of route (interdivisional vs interregional), vehicle ownership (self or someone else), and duration of driving experience; (c) FA knowledge and training, including knowledge of the definition of FA, FA procedures at the site of an accident, and the best position in which to transport an unconscious patient; (d) attitudes towards FA, including willingness to provide FA to injured individuals and willingness to engage in FA training; (e) FA practice, including prior experience providing FA, and possession of a well-stocked FA kit in the vehicle (the contents of FA kits were assessed by RAs); and (f) driving habits, including alcohol consumption, use of seat belts, and consideration of vehicle capacity limits. Questions assessing knowledge, attitudes, and practice were scored as 0 for incorrect (or negative) responses and 1 for correct (or positive) responses; partially correct responses were scored as 0.5. In each section of the questionnaire, scores were summed and scaled to a minimum value of 0 and a maximum value of 10; scores ≥5 were considered high, while those <5 were considered low.

Data collection was conducted from 5 to 9 February 2018, during which time each RA conducted 100 1-on-1, confidential interviews in a convenience sample of drivers who were waiting for vehicles to be loaded (50 interviews each with interdivisional drivers and interregional drivers). Interviews were conducted at bus stations between 9 AM and 4 PM daily, as these times were outside of rush hours. Writ-

Table 1. Age and driving experience of professional intercity drivers in Bamenda, Cameroon, surveyed in February 2018 (N=589)

Variable	n (%)
Age, years	
21-30	122 (20.7)
31-40	245 (41.6)
41-50	185 (31.4)
51-60	33 (5.6)
≥61	4 (0.7)
Driving experience, years	
≤5	116 (19.7)
6-10	126 (21.4)
11-15	119 (20.2)
16-20	127 (21.6)
21-25	61 (10.4)
26-30	25 (4.2)
31-35	12 (2.0)
36-40	2 (0.3)
≥41	1 (0.2)

Table 2. Highest levels of education among professional interdivisional and interregional drivers in Bamenda, Cameroon, surveyed in February 2018 (N=589)

Highest level of formal education	n (%)
Interdivisional drivers	**290 (49.2)**
None	6 (2.1)
Primary	155 (53.4)
Secondary	122 (42.1)
Tertiary	7 (2.4)
Interregional drivers	**299 (50.8)**
None	10 (3.3)
Primary	158 (52.8)
Secondary	123 (41.1)
Tertiary	8 (2.7)

ten informed consent was obtained from each driver before starting any study procedure. Data collection was supervised by the study's principal investigator.

Data management and analysis

The principal investigator reviewed all questionnaires for correctness and completeness. Data were entered into a study database using SPSS Statistics for Windows, version 23 (IBM Corp., Armonk, NY, USA). Descriptive statistics were generated; mean questionnaire scores were compared using paired *t* tests. A single multinomial logistic regression model was used to identify factors associated with prior experience providing FA at a road traffic accident site. The model was optimized using stepwise backward selection wherein candidate variables with *P* values ≥0.2 were removed from the final model; variables with *P* values <0.05 were considered statistically significant. The dependent variable for the model was prior experience providing FA, coded as ''Yes", ''No", or ''I have never had the opportunity". Independent variables included in the model were participant age, driving experience, good attitude towards FA, good knowledge of FA, FA kit in vehicle, and prior training in FA.

Ethical considerations

Ethical approval for this study was obtained from the Research Ethics Committee of Queen Mary University of London and the Institutional Review Board of the Faculty of Health Sciences of the University of Buea.

Results

In total, 600 participants were enrolled in the study, among whom 589 (98.2%) completed an interview. The mean (±SD) age of the drivers was 38.4±8.1 years; only 1 female driver participated in the study. Drivers had a mean of 13.4±7.9 years of driving experience, and all drivers were professionally licensed (Table 1). Interregional drivers made 1-way trips once or twice per day, while interdivisional drivers made 1 to 4 such trips per day, and in some instances, as many as 8 trips per day. For most drivers, the highest level of formal education was primary school; education levels did not differ significantly between interdivisional and interregional drivers (Table 2). Most drivers (n=434, 73.7%) were married, about half (n=309, 52.5%) learned to drive without attending driving school; many drivers (n=465, 78.9%) drove a vehicle owned by someone else.

Knowledge of first aid for individuals injured in a road traffic accident

The mean score for knowledge of FA was 4.6±1.7; fewer than half of the drivers (n=272, 46.2%) had a high level of FA knowledge (i.e., a score of 5 or higher). Only 107 drivers (18.2%) had prior training in FA, and their mean knowledge score (6.5) was significantly higher than the mean knowledge score (4.2) of those without prior training in FA (*P*<0.001). In total, 89 of the 107 drivers (83.2%) with prior training in FA had obtained this training while in driving school.

In total, 387 drivers (65.7%) knew the correct definition of FA. Most drivers (n=426, 72.3%) indicated that they would initially manage fractures (of the arm or leg) by immobilization and splinting, while 40 drivers (6.8%) indicated that they would immediately transport the injured person to the hospital. Bleeding wounds (n=309, 52.5%) and breathing problems (n=262, 44.5%) were identified by many drivers as the primary cause of rapid mortality among people with

Table 3. Summary of knowledge assessment responses among professional intercity drivers in Bamenda, Cameroon, surveyed in February 2018 (N=589)

Questionnaire item	n (%)
What to do first at an accident site	
Take a picture or record a video	1 (0.2)
Run to the injured person(s)	280 (47.7)
Call for help	148 (25.1)
Ensure safety of the accident site	155 (26.3)
Drive carefully past it	2 (0.3)
I do not know	3 (0.5)
What to do first when evaluating an injury at an accident site	
Check for bleeding	196 (33.3)
Check for wounds	27 (4.6)
Carry the victim to the vehicle	77 (13.1)
Check if the victim can breathe	276 (46.9)
I do not know	13 (2.2)
Best initial way to stop bleeding of the arm or leg	
Tie with a rope/cloth only	295 (50.1)
Pour water on the bleeding wound	28 (4.8)
Press the bleeding site and raise it up	126 (21.4)
Raise it up and tie with a rope/cloth	140 (23.8)
Best position to transport an unconscious person	
Lying down on his/her back	333 (56.5)
Lying down on his/her side	168 (28.5)
Lying down on his/her abdomen	33 (5.6)
Seated upright	24 (4.1)
I do not know	31 (5.3)
Best initial care for a person with breathing difficulties	
Blow air into his/her mouth	343 (58.2)
Remove anything blocking the mouth/ nostrils	117 (19.9)
Give him/her water to drink	15 (2.5)
Put a spoon in his/her mouth	67 (11.4)
I do not know	47 (8.0)

RTIs. At the scene of an accident, 533 drivers (90.5%) would first attend to injured individuals with breathing problems before attending to others. Responses to additional knowledge domain questions are shown in Table 3.

Attitudes towards first aid for individuals injured in road traffic accidents

The mean score for attitude towards FA was 7.2±1.3, and almost all drivers (n=574, 97.5%) had a positive attitude (i.e., a score ≥5). Almost all drivers (n=565, 95.9%) agreed that the provision of FA improves injury outcomes; most drivers were willing to provide FA at the scene of an accident (n=573, 97.3%) and to attend a training seminar on FA (n=529, 89.8%). Reported barriers to providing FA to injured individuals included limited knowledge on FA, fear of legal reprisal for causing harm to the injured person, and a lack of personal protective equipment (PPE) (Table 4). Most drivers (n=429, 72.8%) reported that RTIs are preventable, and most (n=434, 73.6%) wished that something could be done in Cameroon to reduce RTIs.

In total, 370 drivers (62.8%) reported that they had changed their driving habits due to their experiences with road traffic accidents. About half of the drivers (n=290, 49.2%) had never been involved in a road traffic accident; 168 drivers (28.5%) had been involved in 1 road traffic accident, and 131 drivers (22.2%) had been involved in 2 or more such accidents. Among the drivers who had been involved in road traffic accidents, 70.6% reported always having been the driver, and 11.7% reported always having been the passenger in road traffic accidents. Some drivers reported that little could be done to prevent road traffic accidents as they did not attribute these accidents to human error; 255 drivers (43.3%) believed that witchcraft was the cause for all (n=88) or some (n=167) road traffic accidents.

Practice of first aid for individuals injured in road traffic accidents

The mean score for FA practice was 4.7±2.5, and about half of the drivers (n=317, 53.8%) had practice scores ≥5. Half of the drivers (n=298, 50.6%) reported prior provision of FA to individuals with RTIs, while 173 (29.4%) and 118 (20.0%) drivers had never provided FA or never had the opportunity to provide FA, respectively. FA kits were found in 375 of the drivers' vehicles (63.7%), and ownership of an FA kit was significantly associated with a high practice score (P<0.001). Based on the 10-point scale used to assess the quality of FA kits, 199 drivers (53.1%) had good scores (≥7 points), 106 (28.7%) had moderate scores (5-6 points), and 70 (18.7%) had poor scores (≤4 points). Items found in more than 50% of the FA kits included adhesive plaster, disposable gloves, sterile dressing gauze, cotton wool, nonalcoholic wound cleansing wipes, and scissors. Other common items (not included in the 10-point criteria) found in FA kits were condoms and drugs (e.g., paracetamol, diclofenac, and ibuprofen). The FA kits of interregional drivers were significantly more complete than those of interdivisional drivers (P<0.001).

Table 4. Potential barriers to the provision of for road traffic injuries, as ranked by professional intercity drivers in Bamenda, Cameroon, surveyed in February 2018 (N=589)

Barrier	Rank, n (%)			
	First	Second	Third	Fourth
Not knowing what to do	211 (35.8)	79 (13.4)	55 (9.3)	67 (11.4)
Fear of legal reprisal for causing the accident	137 (23.3)	78 (13.2)	66 (11.2)	66 (11.2)
Lack of personal protective equipment	121(20.5)	76 (12.9)	112 (19.0)	72 (12.2)
Fear of legal reprisal for causing harm to the injured party	76 (12.9)	197 (33.4)	68 (11.5)	39 (6.6)
Other reason different from the above	5 (0.8)	1 (0.2)	5 (0.5)	1 (0.2)
There is no reason not to provide first aid	24 (4.1)	24 (4.1)	24 (4.1)	24 (4.1)
No response	15 (2.5)	134 (22.8)	259 (44.0)	320 (54.3)

Table 5. Factors associated with prior experience providing first aid for road traffic injuries among professional intercity drivers in Bamenda, Cameroon, surveyed in February 2018 (N=589)

Factor	Odds ratio (95% CI)	*P* value
Good knowledge of first aid	1.38 (0.29-2.48)	0.09
Has a first-aid kit in vehicle	2.32 (1.61-3.34)	<0.001
Has prior training in first aid	1.57 (0.97-2.57)	0.07

CI, confidence interval

Driving habits

Self-reported alcohol use before driving was not common. More than half of the drivers (n=336, 57.0%) never drank, 123 (20.9%) drank rarely, 119 (20.2%) sometimes drank, and 11 (1.8%) drank frequently. In total, 354 drivers (60.1%) reported using seat belts most of the time or always, 153 (26.0%) used seat belts sometimes, and 81 (13.9%) used seat belts only at checkpoints or not at all. Almost half of the drivers (n=275, 46.7%) reported that they sometimes carried an excess of passengers (i.e., more than the seating capacity); 87 drivers (14.8%) carried an excess of passengers most of the time or always, and 227 (38.5%) rarely or never carried an excess of passengers.

Factors associated with prior experience with providing first aid or a high first-aid practice score

In the multinomial logistic regression analysis, only ownership of an FA kit was significantly associated with prior experience providing FA at a road traffic accident (Table 5).

Discussion

Our study findings suggest that opportunities exist to improve the care of people injured in road traffic accidents via the training and support of professional drivers in Cameroon. We found that approximately half of the intercity drivers in Cameroon had high levels of knowledge and experience related to providing FA to individuals injured in road traffic accidents, and almost all drivers had a positive attitude towards providing FA. Ownership of an FA kit was the only factor significantly associated with prior experience providing FA to individuals injured in road traffic accidents. A lack of knowledge regarding FA, fear of legal reprisal for causing RTIs, and a lack of PPE, ranked as first, second, and third, respectively, as barriers to FA provision.

We compared our study findings to those of similar studies conducted elsewhere in Africa and observed that professional drivers in Cameroon, with a mean age of 38 years, were older than those in Ethiopia (where a study found that 92.2% of professional drivers were under the age of 35 years) but younger than those in Nigeria (where the mean age of professional drivers has been reported to be 45 years).[22],[24] More drivers from Cameroon knew the correct definition of FA compared with drivers from Ethiopia (67.7% vs 46.9%),[22] although this difference may, in part, be due to the present study's broader definition of FA as any care provided to injured persons at an accident site. Nevertheless, compared with drivers in the study conducted in Ethiopia, more drivers from Cameroon knew the best position to transport an unconscious and injured person (28.5% vs 20%).[22] Knowledge of fracture care among professional drivers also appears to differ among countries. Most drivers in Cameroon (72.3%) and Nigeria (76.3%) identified immobilization and splinting as the best approach to the initial management of fractures (of the arm or leg), compared with 40.9% of drivers in Ethiopia.[22],[24] Further, few drivers in Cameroon (6.8%) thought that immediate transport to the hospital was the best approach for initial fracture management, compared with 48.2% of drivers in Ethiopia.[22] Immobilization and splinting is usually the preferred initial management for long-bone fractures before transportation to a health facility. This difference may be due to the perception in Cameroon that hospital care is expensive,[11] which may discourage drivers from transporting individuals with injuries to nearby pay-per-service health facilities. Indeed, in Cameroon, 20% of patients with surgical needs seek care from traditional healers before going to a hospital.[11]

A national health insurance scheme may help mitigate delays in treatment-seeking[25]-[28] and encourage laypersons providing FA to quickly transport individuals with injuries to hospital.

Our findings suggest that, if properly trained, Cameroonian professional drivers may be a key group that can serve as layperson first responders for individuals injured in road traffic accidents. Other studies from Africa and elsewhere have reported success in training professional drivers to deliver FA in this manner.[29]-[33] In the present study, a high level of knowledge regarding FA and having an FA kit in the vehicle were associated with prior experience providing FA at the scene of a road traffic accident, but formal education and years of driving experience were not associated with such experience. This finding implies that if training is adapted to suit people with little or no formal education, it can enable many individuals to provide basic FA.[34] We speculate that drivers who receive such training will be more likely to carry well-stocked FA kits in their vehicles. Our finding that almost all drivers had a positive attitude towards FA and were willing to participate in FA training highlights that a poor attitude is not among the existing barriers to FA provision in this setting. Rather, a lack of knowledge regarding FA, fear of legal reprisal for providing FA at the scene of an accident, and a lack of PPE prevent some drivers from providing FA. Fear of legal consequences and a lack of PPE have been reported as barriers to FA provision in other studies of layperson-administered FA.[22],[35],[36] Increasing the awareness among professional drivers of existing Good Samaritan laws in Cameroon may increase their willingness to provide FA to individuals with RTIs, as research suggests that physicians who are aware of these laws are more likely to provide emergency care outside of the hospital environment.[37]

The limitations of this analysis should be considered. The sample of drivers included in the study may not be representative as it was obtained through convenience sampling. Nevertheless, the study sample represents approximately 60% of all professional drivers in Bamenda who were union members and, thus, is likely a reasonable representation of our target population. This was a preliminary study, and the data collection tool has not been validated. Further, questionnaire responses included in this analysis were based on self-reports that could not be verified through direct observation.

Conclusions

Although most professional intercity drivers in the NWRC had positive attitudes towards providing FA to individuals injured in road traffic accidents, the knowledge and practice of FA among these drivers was inadequate. Training programmes may improve FA knowledge and practice among professional drivers in the region. Such programmes should focus on FA procedures, preparation of FA kits, and improving awareness of Good Samaritan laws. Consideration should be given to integrating these programmes into the driver training curriculum. Regional investment in the training of laypersons, including professional drivers, as first responders could improve the outcomes of individuals injured in road traffic accidents.

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Peer Reviewed

Competing Interests: S.M.W. is a member of the ECAJS editorial board but was not involved in the processing, review, or decision-making for this article.

Received: 9 Jun 2020 • **Revised:** 2 Dec 2020

Accepted: 11 Dec 2020 • **Published Online**: 8 Jan 2021

Cite this article as: Awa MA, Wren SM. A cross-sectional study assessing the knowledge, attitudes, and practice of first aid in trauma care among professional intercity drivers in the North-West Region of Cameroon. *East Cent Afr J Surg*. 2021;26(1):15-21. doi:10.4314/ecajs.v26i1.3