

ORIGINAL ARTICLE

PATTERNS AND DETERMINANTS OF PRE-HOSPITAL CARE AMONG TRAUMA PATIENTS TREATED IN TIKUR ANBESSA SPECIALIZED HOSPITAL, EMERGENCY DEPARTMENT

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ABSTRACT

Background: Injury remains the major cause of death and disability worldwide, and places an enormous burden on countries with limited resources in which Ethiopia is included.

Objective: It is obvious that pre-hospital care is an essential part of the treatment process in many acute disease and trauma

Methods: Cross sectional study design using structured interviewing questionnaire which was conducted in 437 Trauma patients who came to emergency department of Tikur Anbesa Specialized Hospital from February 1 to March 30, 2013.

Results: Only 73(16.7%) patients got some kind of basic care like stop bleeding, positioning, immobilization by ambulance staff 41(51.2%), relatives 24(30%) and police and bystanders 14 (20.3%). Commonest means of transportation in which 59% of cases arrived by taxi while about 14.4% were brought in by ambulance. Most patients arrived to definitive care from the scene after the (the golden) hour of injury, has passed; only 81(18.5%) of patients arrived in less than and within one hour.

Conclusion: Proportion of patients, who received care before they arrived in the hospital was very small. Time of arrival to definitive care was prolonged and use of ambulances for transportation was minimal.

Keywords: Pre-hospital care, Trauma, Emergency department and Golden hour

INTRODUCTION

Injury remains the major cause of death and disability worldwide, and places an enormous burden on countries with limited resources in which Ethiopia is included (1-3). Every year, approximately 5 million people worldwide die from injuries (3). In addition to the millions who die each year, millions more are temporarily or permanently disabled. This trend is expected to increase in coming years (2). In fact this burden will be exaggerated if pre-hospital care is not available or not well organized. It is obvious that primary prevention is the best way to avoid or to reduce rates of death or disability from life-threatening injuries. However, it is impossible to extinct injuries rather it is possible to mitigate the consequences of serious injury, including long-term morbidity or mortality through providing prompt and effective pre-hospital care (3, 4).

Particularly in the developing world, rates of injury are high due to numerous contributing factors (4). Currently, more than 90% of road traffic injury deaths occur in developing countries, where approximately 80% of injury deaths occur in the pre-hospital setting (2, 5).

Like other developing countries, injuries in Ethiopia are common but little attention is being given to this problem (6). Road traffic accidents are the commonest cause of injury in urban areas of Ethiopia with 199 fatalities per 10,000 licensed vehicles per year (6).

Therefore, pre-hospital care has to be given an enormous attention, for the reason that it is an essential part of the treatment process in many acute diseases and trauma. Studies claimed that care out of hospital in a systematized way was started during the French revolutions (7). Then after in 1950s with the develop-

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ment of anesthesiology and advances within military medical emergency services during the first and second world war, first aid has been improved (8-10). Today, pre-hospital care is provided in most parts of the world in a manner of basic and advanced life support. Classification of pre-hospital care in to advanced and basic life support is usually based on the methods used (11).

Acute Life Support (ALS) refers to sophisticated pre-hospital care using invasive methods, such as intravenous fluids, medications and intubation and also it uses either a ground ambulance (GA) or a helicopter for transportation of patients. On the other hand basic Life Support (BLS) is medical care which is used to assure a patient's vital functions until the patient has been transported to appropriate medical care. Based on care providers ALS-level pre-hospital care has usually been implemented by physicians or paramedics, while BLS-level care is given by paramedics or emergency medical technicians. However, in most cases ALS units use the same techniques as BLS units (5) and there are different tiers of care between and within countries (12). Where no formal pre-hospital system exists, the first tier of care may consist of lay-people in the community, who has been taught basic first aid techniques (known as first responders).

This study attempted to assess patterns and determinants of pre-hospital care among trauma patients in TASH, Emergency Department.

MATERIALS AND METHODS

A hospital; based cross-sectional study was conducted from February 1, 2013 to March 30, 2013 in Tikur Anbesa Specialized Hospital. TASH is located in the capital city of Ethiopia, Addis Ababa Emergency department is one of the departments of the hospital which was established in August 2008 since then it is giving services for acute and acute on chronic cases. Currently (at the time of the study) the department gives emergency services for about 40 to 50 patients per day with the dominance of trauma patients.

All patients who attained the emergency department of TASH during February and March 2013 were the source population. Sample size was used as seasonal reference, from February 2013 to March 2013, during which 474 trauma patients registered and of them 437 patients interviewed.

The data collection was done using a pre- tested structured interviewing questioner. The questionnaire was composed of socio-demographic information of the victim, injury information, and information about pre-hospital care. The interview was primarily focused on the victim and as alternative the person who came with the victim for unconscious victims. Nurses were trained and used as data collectors.

Data cleansing was done manually during data collection daily after collection and checked for its completeness, accuracy, clarity and consistency repeatedly during and after entry. Entry and analysis of data was done using SPSS version 16. Graphs and frequency tables were used to organize data.

Ethical clearance was obtained from Addis Ababa university research and publication committee with supporting letters for the concerned body. Written consent has been obtained from the respondents' prior to data collection. Respondent's confidentiality was kept secret and for that reason their name was not recorded anywhere else.

RESULT

A total of 437 injury cases were interviewed, of these cases 300 (68.6%) were males and 137 (31.4%) were females. The age group, 30-34 were most frequent with 116 (26.5%) followed by age group 35-39 with frequency of 70(16.0) while age group 60-64 was the list frequent (2.7%). The majorities were from Addis Ababa 251 (57.4%) and the rest 186(42.6%) were from out of Addis Ababa.

Out of all cases, 130 (29.8%) were self referred, the rest were from different sources: regional hospital 120 (27.5%), Addis Ababa hospital 74 (16.9%), private health institution and health centers 75 (17.2%), police 36(8.2%) and 2 were from other sources. The commonest means of transportation to arrive to definitive care (the first health facility for referred patients) from the scene: most frequent means was taxi 258 (59.04%). Private cars accounted for 59(13.50%) whereas about 63(14.42%) were taken in by ambulance and the rest patients were brought in through other means such as heavy track, walk in, carried and others.

About 156 (35.7 %) cases were injuries due to road traffic accidents, 119 (27.2%) due to falling down accident. The third more frequent injury type was fighting which accounts about 19.2% (84) whereas

poisoning, gunshot and foreign body swallow were the smallest which account for 3.2% and 1.6 % respectively. There were also others like homicide, sexual assault, burn (one case) machine injury which all account 3.4% of the total.

Concerning time elapsed from the occurrence of injury 81(18%) arrived in the first hour while 249 (56.98%) arrived within one to two hours, 58 (13.27%) within two to three hours and 41 (11.21%) after three hours of injury. The overall mean arrival time for all patients was 116.9 minutes with a standard deviation of ± 6.68 minutes (range, 20 min -39 hours) (Table 1).

Table 1 Means of transportation to Tikur Anbessa Hospital and Time of arrival from the scene to definitive care Cross tabulation, among trauma patents.

Means of transportation	Time arrival from the scene to definitive care				Mean (minutes)	Total
	Within 1hr and less	1-2hrs	2-3 hrs	More than 3 hrs		
Ambulance	19(30.2)	25(39.7)	10(15.9)	9(14.3)	62.68\pm3.029	63
Taxi	35(13.6)	157(60.9)	38(14.7)	28(10.9)	124.20 \pm 9.974	258
Heavy track	4(14.3)	15(53.6)	1(3.6)	8(28.6)	214.25 \pm 36.461	28
Private care	13(22.0)	34(57.6)	9(15.3)	3(5.1)	111.90 \pm 9.444	59
Walk in	2(20.0)	7(70.0)	0	1(10.0)	91.70 \pm 17.386	10
Other means	8(42.1)	11 (57.9)	0	0	84.60 \pm 14.185	19
Total	81(18.5)	249(57.0)	58(13.3)	49(11.2)	116.97 \pm 6.681	437

Only 73 (16.70%) patients had witnessed as having got some kind of care before they arrive to definitive care like stopping bleeding 50(68.5%), immobilization or splinting of fracture 22 (30.1%), assisting or making position that the patient wants 6 (8.2%), giving anti- pain (one case), removing foreign body from wound etc. were types of care given. These cares were given by trained first aider or ambulance staffs 41(51.2%), relatives 24 (30%), police 8 (10%), Bystanders 6 (8.7%).

For patients who did not got pre-hospital care (N=364), reasons were asked and most concern was lack of knowledge or fear of procedure 290 (80.1%), lack of equipment 141 (39.0%) and less than 10% of cases haven't got care due to fear of medico-legal case and other reasons like to deliver the victim as fast as possible (Table2).

Table 2: Pre-Hospital Care Received among Trauma Patents Addis Ababa, Ethiopia.(n=437)

Variable	Alternatives	Number	Percent (%)
Pre-hospital care	Yes	73	16.7
	No	364	83.3
Types of pre-hospital care	Responses		
		Number (N=73)	Percent
	Stop bleeding	50	53.8
	Assisting or making position the patient wants	6	6.5
	Immobilization/splinting	22	23.7
	Undefined	9	9.7
Care providers	Others	6	6.5
	Relatives	24	30.0
	Bystanders	6	7.5
	Police	8	10.0
	Trained first aider or ambulance staff	41	51.2
Reasons raised for not giving or getting pre-hospital care. (n=364)	Others	1	1.2
	Lack of knowledge or fear of procedure	290	60.9
	Lack of equipment	141	29.6
	Fear of medico-legal case	31	6.5
	Others	14	2.9

Note : Multiple response are possible

More victims have had pre-hospital care in those who were from Addis Ababa as compared with victims out of Addis Ababa [OR=2.855, CI: 1.598-5.102] p-value 0.000, who brought in by ambulance [OR= 13, 95% CI (2.683,62.999) p=0.01] and from types of injury it was shown that from five poisoned patients' almost three received first aid.

Thus in this investigation it was found only poisoning from causes of injury had a positive relationship with received care [OR= 2.667, 95% CI: (0.59, 12.04)]. Comparing patients who received first aid or care in terms of origin of referral; no one source was favored for the prevalence of pre-hospital care.

Table 3. Selected socio demographic determinants of pre-hospital care, Tikur Anbessa Hospital , Addis Ababa, Ethiopia, Feb- Mar 2013.

Variable	Got pre-hospital care		Crude OR (95%CI) and P-value
	Yes (%)	No (%)	
Sex			
Male	56(18.7)	244(81.3)	0.617(0.344, 1.108)
Female	17(12.4)	120(87.4)	1.00
Age			
≤29	46 (18.8)	199 (81.2)	0.71 (0.422, 1.188)
>29	27 (14.1)	165 (85.9)	1.00
Address			
A.A	56(22.3)	195(77.7)	2.855(1.598,5.102) *
Out of A.A	17(9.1)	169(90.9)	1.00

Note: * =significantly associated

Table 4 represents means of transportation, types of injury and source of referral in relation to pre-hospital care, Tikur Anbessa hospital, Addis Ababa, Ethiopia, Feb- Mar 2013.

Variable	Pre-hospital care			Crude OR (95%CI) and P-value
	Yes (%)	No (%)	Total (%)	
Means of transportations				
Ambulance	42(66.7)	21(33.3)	63(100)	13(2.683,62.999)*
Taxi	20(7.8)	238(92.2)	258(100)	0.546(0.115,2.592)
Bus (heavy track)	3(10.7)	25(89.3)	28(100)	0.780(0.115,5.271)
private car	4(6.8)	55(93.2)	59(100)	0.473(0.078,2.865)
walk in	1(10)	9(90)	10(100)	0.722(0.057,9.217)
Carried	1(25)	3(75)	4(100)	2.167(0.144,32.528)
Others	2(13.3)	13(86.7)	15(100)	1.00
Types of injury				
RTA	21(13.5)	135(86.5)	156(100)	0.311(0.097,1.000)
Fall down	16(13.4)	103(86.6)	119(100)	0.311(0.094,1.027)
Fitting	14(16.7)	70(83.3)	84(100)	0.400(0.118,1.351)
Stab injury	5(17.9)	23(82.1)	28(100)	0.435(0.103,1.844)
Poisoning	8 (57.1)	6(42.9)	14(100)	2.667(0.592,12.042)*
Gunshot	3(21.4)	11 (78.6)	14(100)	0.545(0.103,2.892)
F. B.S	1(14.3)	6(85.7)	7(100)	0.333(0.031,3.579)
Other	5(33.3)	10(66.6)	15(100)	1.00
Origin of referral				
A. A hospital	8(10.8)	66(89.2)	74(100)	0.121(0.007,2.132)
R. hospital	16(13.3)	104(86.7)	120(100)	0.154(0.009,2.585)
P.H or clinic	4(8.9)	41(91.1)	45(100)	0.098(0.005,1.875)
H. centers	5(16.7)	25(83.3)	30(100)	0.200(0.011,3.758)
Police	14(38.9)	22(61.1)	36(100)	0.636(0.037,11.020)
Self	25(19.2)	105(80.8)	130(100)	0.238(0.014,3.939)
Others	1	1	2	1.000

DISCUSSION

Overall prevalence rate of pre-hospital care was 73 (16.7%). This is in keeping with other studies from the study conducted in Kenya 16.0% (20).

However, this figure is markedly greater than rates reported by other studies: South western Nigeria 8.6% (18), but it is lower than study conducted in Vietnam; Hanoi in which about 48% of victims received care at the scene (22). Similarly a study done in India (19) shows high prevalence of pre-hospital care (26.4%) compared to our study (16.7%). Such variations in the prevalence of pre-hospital care could be linked to level of development, awareness level of the public in a given country, epidemiological factors and methods of data collection. It also might be the availability of emergency medical service and its accessibility, which is yet underdevelopment in Ethiopia.

By types of care and care providers: it is not surprising that almost all care provided were basic as half of care providers were from the public (relatives-30%, police- 10% and bystanders-7.5%) and other half were ambulance staffs with limited or unfurnished ambulances. Stopping bleeding, immobilization assisting or making position the patient wants, and other cares like giving anti- pain (one case), removing foreign body from wound etc. are almost the same as studies done in south western Nigeria (18) where wounds irrigation with water, wound coverage by clothing materials, and splinting fractures with wooden bars were accomplished. But it is contrary with cares from the developed countries like UK and USA where pre-hospital care is provided by trained personnel and with well furnished ambulances (9, 17, 25). Hence there should be a need to organize the emergency medical service with personnel and furnishing ambulances with equipment.

For patients who did not got pre-hospital care, have lack of knowledge or fear of procedure 290 (80.1%), lack of equipment and fear of medico-legal case and other like to deliver the victim as fast as possible all less than 10% were mentioned reasons. Similar studies from Kampala- Uganda showed 44% of the reason which was almost similar to our study due to lack of equipment and 37% were due to lack of knowledge (26).

Means of transportation to definitive care were also analyzed. Similar to other studies (18, 24), in the present study taxi was the commonest method that used to arrive to definitive care. It is known that the ideal means of transportation for patients in general is assumed to be ambulance due to the fact that ambulances have equipments that are helpful in the care system that is way the name moving hospital is given (8,10). This study also shows this fact as more than half 42(66.7%) of 63 patients who came with ambulance received first aid, even though the care was yet at its basic level, and the time spent before patients arrive to definitive care was short (62.68 ± 3.029 minutes) compared to other means and the overall mean arrival time (116.97 ± 6.68). However, patients who transported by ambulance were insignificant 63 (14.42%) compared to both Seattle and Monterrey where 96% of victims were transported by ambulance and USA and Britain in general (9, 17, and 25). But it was higher than the study done in Vietnam; Hanoi (22) in which only 4% of cases were transported by ambulance. Other studies showed various rates of this method: in south western Nigeria 8% (18), and west Azerbaijan province of Iran 10.6% (24). This variation may be due to level of development and awareness level of the community towards ambulance usage. This is a great concern as far as raising the issue of patient care during transportation and at the scene.

Looking at time arrival of victims to definitive care, this study has found that the majority of cases arrived after the golden hour of injury has passed (13). In the golden hour concept the first one hour after injury is a crucial time in preserving the life of the patient and/or for preventing of further injuries (13). Therefore, our result shows that as there is wide room for improvement in the present patient care system. In addition, The overall mean arrival time for all patients was 116.97 ± 6.68 minutes (range, 20minutes to 39 hours) which was significantly prolonged than the mean time found in other studies like Seattle 31.1 ± 9.8 minutes, Monterrey 73.0 ± 37.7 minutes, Nigeria 93.6 minutes and Kenya 30 minutes (17, 18, 20). The possible explanation for this might be; the presence of an organized emergency medical service in the aforementioned countries, the means of transportation used as most patients in Seattle and Monterrey uses ambulances which may decrease the time spent compared with other means of transportation. This was also observed in our finding that time spent for patients who used ambulance was 62.68 ± 3.029 minutes which is significantly lower than the overall time arrival. And the other reason could be variations in the accessibility of health institutions and avail-

ability of infrastructures like road in the given country. As it is assumed that the shorter time spent in the pre-hospital setting the better outcome the patient will have, mechanisms to decrease the time spent in the pre-hospital setting such as using ambulance, increasing public awareness about golden hour etc. should be areas of emphasis.

Conclusion and recommendation: In summary, this study tries to show the level of pre-hospital care by assessing the patterns of the care, and therefore, even without considering the quality of the care, the proportion of patients who received care was very small. For patients who did not receive care in the pre-hospital setting, the most reason identified was lack of knowledge/ fear of the procedure which shows need of creating awareness for the general public and the road authority has to put an obligation to have first aid training for all drivers and traffic police, who are the first encounter of victims in road traffic accident. Furthermore the use of ambulance for patient transportation was insignificant and the time arrival was prolonged from all of which it is possible to conclude that much has to be done to improve the level of pre-hospital care.

Limitation of the study: This study was limited to the adult emergency department of TASH. Furthermore, it is a hospital based study for that it only considered patients who came alive. Finally there was shortage of studies with similar methodological approach and on subjects with similar compositions to compare results.

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