

Post-crash emergency care: Availability and utilization pattern of existing facilities in Aligarh, Uttar Pradesh

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ABSTRACT

Context: Road traffic injuries is estimated to be the ninth leading cause of death across all age groups globally. People in need of trauma care, after a road crash, are most likely to survive if they receive definitive care within the first hour (Golden hour) after the crash. Essential prehospital care includes prompt communication, treatment, and transport of injured people to formal healthcare facilities. **Aims:** To assess the availability and utilization pattern of existing facilities for post-crash emergency care in Aligarh. **Settings and Design:** The present study was undertaken on two National highways- NH-91 and NH-93 and the connecting bypass roads of Aligarh district of Uttar Pradesh. **Subjects and Methods:** All the individuals who met road traffic accident (RTA) between the earmarked areas from 1st October, 2018 to 30th September, 2019 and reported for treatment (either on their own or brought by relatives, passersby, ambulance or police) to the selected hospitals were included in the study. **Statistical Analysis Used:** Data presented in the form of frequency tables and percentages. **Results:** Out of 665 patients interviewed during the study period, 556 (83.61%) patients were males and 109 (16.39%) were females with M: F ratio been 5.10:1. Among the first responders, 448 (67.36%) were lay persons and 42 (6.31%) were police personnel. 261 (39.25%) of patients received help within 10-30 min of RTA. Use of toll-free no. was limited to 265 (39.84%) patients. Ambulance was the mode of transport in 155 (23.30%) of RTA cases. 589 (88.58%) of patients reported to Government hospitals. **Conclusions:** Post-crash emergency care is in nascent stage in Aligarh district of Uttar Pradesh. Toll free numbers and ambulances are available but proper utilization and quality of care is lacking. Lay person is the most important personnel in improving the post-crash care.

Keywords: Golden hour, post-crash emergency care, road traffic accident, road traffic injuries

Introduction

The number of road traffic deaths remains unacceptably high with 1.35 million deaths globally each year. Road traffic injuries (RTIs) is the eighth leading cause of death across all age groups globally. It is also the leading cause of death for children and young adults between 5 years and 29 years of age.^[1] As per report of Ministry of Road Transport and Highways,

Government of India (GoI), 4,70,975 people were injured in 4,64,910 road accidents in India in 2017 and 1,47,913 people lost their lives in the same year. Amongst the states, Uttar Pradesh tops the list of fatal road accidents.^[2]

Majority of the RTI deaths is due to unreachability for basic and integrated emergency services, which lead to failure in utilizing golden hour.^[3] People in need of trauma care, after a road crash, are most likely to survive if they receive definitive care within the first hour (Golden hour) after the crash.^[4] The risk of death or severe injury is believed to increase after this period.^[5,6]

Indeed, each year, many of the 1.2 million lives lost could be saved and much of the ensuing disability suffered by the 50

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million injured could be prevented if rapid and competent prehospital services were available at the crash scene.^[7]

Care of injuries after a crash has occurred is extremely time sensitive. The aim of this definitive post-crash care is to avoid preventable death and disability, limit the severity of the injury and the suffering caused by it, and ensure the crash survivor's best possible recovery and reintegration into society.^[8]

Improving post-crash care requires ensuring access to timely prehospital care, and improving the quality of both prehospital and hospital care, such as through specialist training programmes.^[9]

In India, more than 80% of road traffic accident (RTA) victims do not receive any emergency medical care within the critical first hour after an accident. Even the most sophisticated and well equipped pre hospital trauma care systems can do little if bystanders fail to recognize the seriousness of a situation, call for help, and provide basic care until help arrives.^[10,11]

The public health system of India is not well equipped to handle the mounting numbers of road traffic accident cases. Emergency trauma care services is fragmented in India. Free of cost Ambulance facilities provided by government are neither well-resourced nor staffed by trained personnel capable of managing post-crash care. In India, due to inadequate trauma care system as compared to countries with well-established systems, treatable RTIs are six times more likely to fail.^[12]

The present study funded by Indian Council Of Medical Research (ICMR) was carried out to perform the situation analysis of the set up in place for early rescue of patients of RTAs with the following objective: To assess the availability and utilization pattern of existing facilities for post-crash emergency care in Aligarh district of Uttar Pradesh.

Subjects and Methods

The study was undertaken on two National highways- NH-91 and NH-93 and the connecting bypass roads of Aligarh district of Uttar Pradesh. A stretch of 60 km on NH-91 (extending from Community Health Centre (CHC), Gabhana to Community Health Centre, Akrabad) and 47 km on NH-93 (extending from Community Health Centre (CHC), Sasni to Community Health Centre, Jawan) was selected for the study. Permission was sought from Chief Medical Officer (CMO), Aligarh district to include all the health facilities located within the earmarked areas on NH-91 and NH-93 and connecting bypass roads. CMO of Hathras district was contacted to seek permission to include CHC of Sasni which comes under Hathras district.

The following Government hospital and health centres were included in the study:

(i) Jawaharlal Nehru Medical College and Hospital (JNMC), (ii) Malkhan Singh District Hospital, (iii) Pandit Deen

Dayal Upadhyay Joint Hospital, (iv) CHC, Akrabad, (v) CHC, Gabhana, (vi) CHC, Jawan, (vii) CHC, Sasni, and (viii). Primary Health Centre (PHC), Chherat.

After initial line listing of private hospitals located within the earmarked area, hospital In-charge were contacted and apprised about the study. Two of these hospitals gave consent to be part of our study. As per the protocol names of these hospital were kept confidential and codes of Private hospital-01 (NH-93) and Private hospital-02 (NH-91) were used for all purposes.

Thus, a total of eight government hospitals and two private hospitals situated between the earmarked areas were included in the study. The duration of the study was one year from 1st October, 2018 to 30th September, 2019.

All the individuals who met RTA between the earmarked areas from 1st October, 2018 to 30th September, 2019 and reported for treatment (either on their own or brought by relatives, passersby, ambulance, or police) to the selected hospitals were included in the study. Resource persons who could provide first-hand information about the RTA patients were identified at every center. After screening of eligible patients they were contacted either in ward or casualty. They were told the purpose of the study and were invited to participate in the same. Informed verbal consent was taken from patient or concerned attendants or relatives after they were assured that confidentiality would be maintained. When the condition of the patient did not permit the interview, the parents, relatives, or attendants present were interviewed. Convenience sampling was used for including the individual. The interviewer aimed to include all the individuals meeting the above criteria and wishing to participate but those who could be contacted at the health facility. Ethical approval was obtained from the Institutes Ethics Committee. The interview was conducted bedside or at a convenient place recommended by the staff of the hospital/health center.

The study tool included:

- (i) Pre-structured proforma: The questionnaire assessing the availability and utilization of post-crash services was standardized, validated, and pre-tested by a pilot study prior to the start of the data collection.
- (ii) Epicollect5 mobile app:

Operational definition of RTA used in the study was: A collision involving at least one vehicle in motion on a public or private road that results in at least one person being injured or killed.^[7,13]

Results

A total of 665 patients were interviewed during the study period. Majority of the patients were interviewed at Jawaharlal Nehru Medical College and Hospital followed by District hospital, Aligarh. Out of the 10 centers selected for the study,

04 centers did not enrol any RTA patient during the study period [Table 1].

556 (83.61%) patients were males and 109 (16.39%) were females with M: F ratio been 5.10:1. Mean age of the patients was 32.05 years. Majority of the patients were Hindus by religion, married by marital status and belonged to rural background [Table 2].

First person to respond at the time of crash

More than two-third, 448 (67.36%) of the respondents identified the lay person or common man as the first person to respond after the crash. Apart from the person accompanying the patient, other notable responders were police personnel and roadside shopkeepers or dhabawalas [Table 3].

How did the rescuer come to know about the accident

Out of 655 patients, rescuer was already present at the site of the accident in 370 (56.49%) cases, followed by those accompanying the patient and passers by [Figure 1].

Name of health facility	n (665)
Jawaharlal Nehru Medical College and Hospital (JNMC)	355
Malkhan Singh District Hospital	239
Pandit Deen Dayal Upadhyay Joint Hospital	17
CHC, Akrabad	17
CHC, Sasni	11
CHC, Gabhana	-
CHC, Jawan	-
PHC, Cherrat	-
Private Hospital 01	-
Private Hospital 02	26

Sociodemographic characteristic	n (%)
Gender	
Male	556 (83.61%)
Female	109 (16.39%)
Total	665 (100)
Religion	
Hindu	452 (67.96)
Muslim	196 (29.48)
Sikh	17 (2.55)
Total	665 (100)
Marital Status	
Married	442 (66.47)
Unmarried	221 (33.24)
Separated	01 (0.15)
Widow/Widower	01 (0.15)
Total	665 (100)
Residence	
Urban	232 (34.88)
Rural	433 (65.12)
Total	665 (100)

Time lag between accident and receiving first help at the site of accident

Among the 665 respondents, only 72 (10.99%) received first help at the site of accident within 10 min. However, majority of the patients received some sort of help between 10 min and 60 min of crash [Figure 2].

Use of toll free number

The use of toll-free number was appreciated in 265 (39.84%) cases but in 344 (51.73%) cases no toll-free number was dialled. Among the 265 cases where the toll-free number was dialled, 108 was the most frequent number noted in 165 cases. In 28 cases police was called by dialling 100 and in 23 cases National Highway Authority of India (NHAI) was called after the accident [Table 4].

Pre-hospital care received

Only 3 patients among the 665 respondents received some sort of help at the site of the accident.

Mode of transport used and time taken to reach the health facility

Majority of the patients reached the health facility by private vehicles as noted in 312 (46.91%) cases. However, use of ambulance was limited to 155 (23.30%) of all accidents followed by police van in 137 (20.60%) of cases [Table 5]. 570 (85.71%) of the patients reached the first contact health facility within 1 h of accident. The pattern was similar irrespective of type of road whether it was National Highway or bypass or a connecting road [Figure 3].

Evaluation of facilities available in the ambulance

Paramedical staff was available in 128 out of 155 ambulances which transported the patient to the health facility. However, doctor was available in only 04 ambulance. Availability of cardiopulmonary resuscitation (CPR) and medical aid services too were uncommon in ambulances. Only 01 patient received any kind of aid in the ambulance [Figure 4].

Type of health facility first contacted

Data shows that patients relied more on government health facility with 589 (88.58%) patients contacting the government

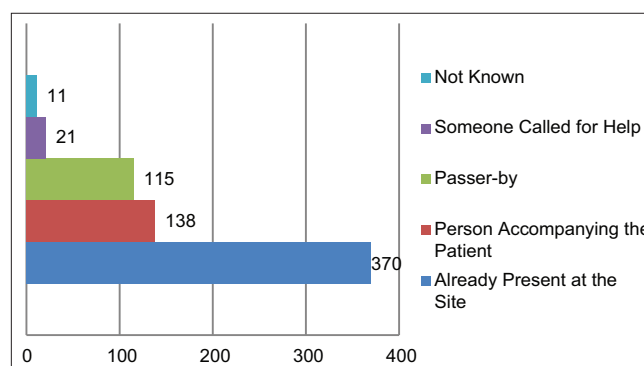


Figure 1: How did the Rescuer come to know about the accident (n= 655)

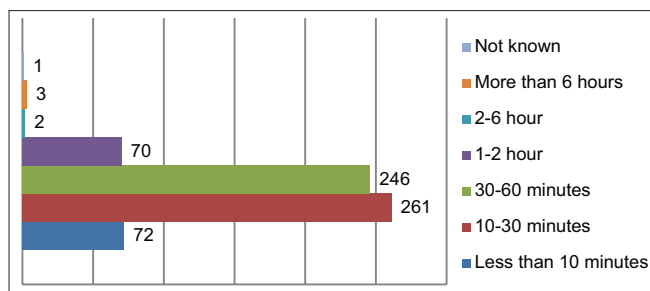


Figure 2: Time lag between accident and receiving first help at the site of accident

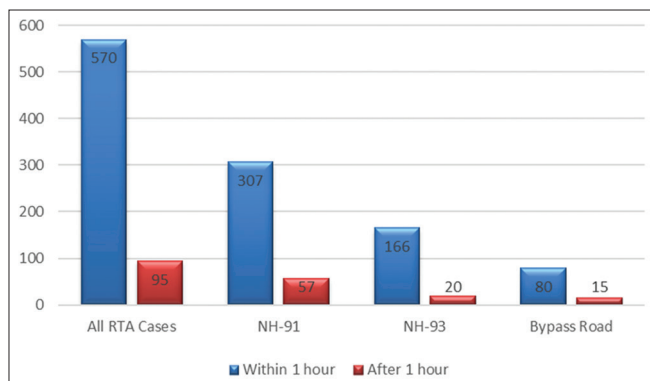


Figure 3: Time lag between crash and reaching the first health facility

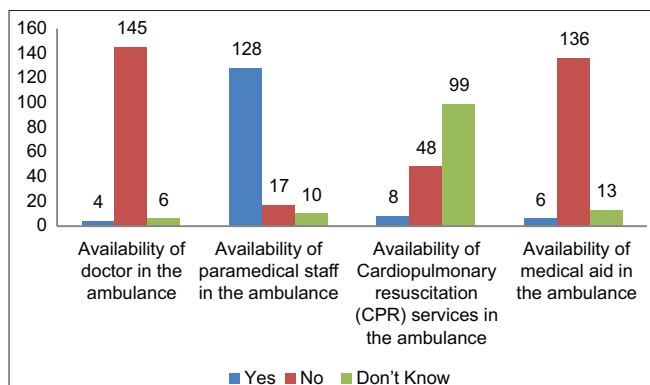


Figure 4: Status of facilities available in the ambulance

health facilities after the accident. Only 75 (11.28%) patients interviewed paid first visit to private health facility [Table 6].

Evaluation of services available at the health facilities

Doctors were available at the health facility with 623 (93.69%) of patients been attended by the doctors at the health facility. Most of the health facilities were able to provide both medical and surgical aid facilities. Facilities of biochemical and radiological investigations were also available at most of the health centres.

174 (26.16%) of patients were referred to higher center from the first health facility they contacted after the crash. Out of 174 patients who needed referral, delay in actual referral was appreciated by 36 (20.66%) patients. However, in more than

Table 3: Identification of the first person to respond at the time of crash

Person responded at the time of crash	n (%)
Lay person	448 (67.36)
Person Accompanying the Patient	140 (21.05)
Nearby Shop Keeper	14 (2.10)
Driver	09 (1.35)
Police	42 (6.31)
Ambulance	02 (0.30)
None	01 (0.15)
Not Known	09 (1.35)
Total	665 (100)

Table 4: Frequency of use of toll free number after the crash

Any Toll free no. dialled	n (%)
Yes	265 (39.84)
No	344 (51.73)
Not Known	56 (8.42)
Total	665 (100)

Table 5: Mode of transport used to reach the health facility

Mode of transport	n (%)
Ambulance	155 (23.30)
Police Van	137 (20.60)
Private Vehicle	312 (46.92)
Public transport	56 (8.43)
Others	02 (0.30)
Not Known	03 (0.45)
Total	665 (100)

Table 6: Distribution of RTA cases with type of health facility first contacted

Type of health facility first contacted	n (%)
Government	589 (88.58)
Private	75 (11.28)
Not Known	01 (0.15)
Total	665 (100)

two-third of all referrals, vehicle for transportation to the higher center was provided by the referring hospital [Table 7].

Discussion

A total of 665 patients were interviewed during the study period. 556 (83.61%) patients were males and 109 (16.39%) were females with mean age of patients was 32.05 years. More than two-third, 448 (67.36%) of the respondents identified the lay person or common man as the first person to respond after the crash. This rescuer or first responder was already present at the site of the accident in 370 (56.49%) cases. Thus, a common man can be the most important facilitator in providing early care after RTA. Similar observations about layperson as first responder were noted in other studies.^[14]

Table 7: Evaluation of services available at the health facilities

Type of service	n (%)
Who attended the patient at the health facility (n=665)	
Doctor	623 (93.69)
Paramedical Staff	28 (4.21)
Don't know	14 (2.10)
Total	665 (100)
Treatment received at health facility	
Medical Only	163 (24.51)
Both medical and Surgical	494 (74.28)
None	04 (0.60)
Don't Know	04 (0.60)
Total	665 (100)
Health facility equipped with biochemical investigations	
Yes	643 (96.70)
No	07 (1.05)
Don't Know	15 (2.25)
Total	665 (100)
Health facility equipped with Radiological investigations	
Yes	636 (95.64)
No	12 (1.80)
Don't Know	17 (2.55)
Total	665 (100)
Referred to higher centre (n=665)	
Yes	174 (26.16)
No	490 (73.68)
Don't Know	01 (0.15)
Total	665 (100)
Delay in referral (n=174)	
Yes	36 (20.66)
No	135 (77.59)
Don't Know	03 (1.72)
Total	174 (100)
Provided vehicle for referral to higher centre (n=174)	
Yes	117 (67.25)
No	55 (31.60)
Don't Know	02 (1.15)
Total	174 (100)

These first responders can be formally trained to recognize an emergency, call for help and if possible provide first aid treatment until formal help arrives. This may be very effectively done through strengthening of the primary care. They can prevent further crash, control the crowd at the sites and also arrange for transporting the injured persons to a hospital if no ambulance is available.^[8] Traffic police officers can be important first responders for post crash care; as they step onto the scene, they experience the role of rescuer as well as that of a traffic police officer.^[15]

Majority of the patients received some sort of help within 60 min of crash. This was in most cases provided by the lay persons. However, the quality of care was lacking in almost all the cases. The use of toll-free number was appreciated in 39.84% cases. 108 was the most frequent number dialled in 165 cases followed by dial 100 and 1033 of National Highway Authority of

India (NHAI). This shows underutilization of toll free number services which at times may play a substantial role in providing aid within the golden hour. Causes of under usage of these services needs further exploration and corrective measures have to be taken for the same. Sensitization of community at large and lay person in particular to availability of toll-free services for trauma through Information, education and communication (IEC) activities may also lead to improvement in utilization of these services. This again warrants the strengthening of primary care in our country.

570 (85.71%) of the patients reached the first contact health facility within 1 hour of accident. Similar observations were made in a study at Ethiopia where a good number of victims (146) reached to an initial health institution within one hour after the crash while 18 (11%) of them reached beyond the first hour.^[16]

Only 03 patients among the 665 respondents received some sort of prehospital care at the site of the accident. This represents non-availability of mechanism for providing care to patients immediately after the crash. Similarly in Ethiopia all the 164 victims didn't receive any prehospital care.^[16] However, this is in contrast to findings of ICMR study held at Pune and Bangalore where 41% of patients injured on municipality roads, 64% injured on highways, and 75% injured on rural roads received first aid care.^[12] Prehospital care can be improved only when we have first responders who have formal training in providing the same. The training can include basic education on the initial assessment of a trauma patient in the form of AIIMS Trauma First Responder (TFR) course.^[3] Traffic police officers provided some initial management and helped injured victims reach the health facility for proper care. So if adequately trained in trauma care, the police personnel can significantly contribute to prehospital care.^[13]

Majority of the patients reached the health facility by private vehicles as noted in 312 (46.91%) cases. However, use of ambulance was limited to only 155 (23.30%) of all accidents followed by police van in 137 (20.60%) of cases. Lower utilization of ambulance was also reported in findings of ICMR where only 19% of the victims were transported by ambulances while 44% were transported by private vehicles or taxis and 28% by auto rickshaws.^[12] Majority of the victims used commercial vehicle to reach an initial health institution 66 (40.2%) followed by a private vehicle 44 (26.8%).^[16]

Apart from the paramedical staff which was available in 128 out of 155 ambulances, neither doctor nor cardiopulmonary resuscitation (CPR) and medical aid services were noted in the ambulances. Ambulances are specifically designed for carrying patients to hospital. The vehicle should have enough space to keep the patient's back straight, and there should be an accompanying person who should be able to take care and resuscitate the patient if necessary which was clearly not found in present study.^[8]

Data shows that patients relied more on government health facility with 589 (88.58%) patients contacting the government health facilities after the accident. Only 75 (11.28%) patients interviewed contacted the private health facility. As per the findings of ICMR, most of the injured (97%) were taken care at the primary care level by the doctors.^[12]

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Conflicts of interest

There are no conflicts of interest.

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