
FREQUENCY LEVEL OF PREHOSPITAL CARE GIVEN TO TRAUMA PATIENTS VISITING AT TERTIARY CARE HOSPITAL, KARACHI

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ABSTRACT

Background: Prehospital care is critical to improving survival after trauma, yet its provision remains limited in many low- and middle-income countries. We examined the frequency and distribution of prehospital care among trauma patients presenting to a tertiary care hospital in Karachi, Pakistan.

Methods: We carried out a hospital-based cross-sectional study involving 147 trauma patients aged 18–70 years. Using a structured questionnaire, we collected data on demographic characteristics and the care patients received at home, in ambulances, and at primary or secondary health centers before hospital arrival. We performed descriptive analyses and used chi-square tests to explore associations between patient characteristics and receipt of prehospital care.

Results: Most patients were aged 46–70 years (61.2%), female (51.7%), and living in urban areas (84.4%). Only 15% received care at home, 26.5% in ambulances, 23.1% in primary health centers, and 34.7% in secondary health centers. Men were significantly more likely than women to receive ambulance care ($p = 0.01$). Urban residents were significantly more likely than rural residents to receive care in secondary health centers ($p = 0.01$). Age was not significantly associated with care at any prehospital level.

Conclusion: Prehospital care for trauma patients was rare, with clear disparities by gender and place of residence. Expanding ambulance networks, training first responders, and improving access to secondary health centers in rural areas could strengthen the trauma care system and improve outcomes.

Keywords: Trauma, prehospital care, gender disparities, ambulance services, urban–rural differences.

INTRODUCTION

The majority of fatalities from trauma, heart attacks, strokes, and other time-critical medical conditions occur during the first hour—often referred to as the “golden hour”—and typically take place outside the hospital setting.¹ Therefore, prehospital care forms an essential component of emergency medical services and plays a pivotal role in influencing patient outcomes.² In many low- and middle-income countries (LMICs), the significance of prehospital emergency care is frequently overlooked, leading to a considerable number of preventable deaths from time-critical conditions such as traumatic injuries, cardiovascular emergencies, and obstetric complications.³⁻⁴

Prehospital care is vital not only for trauma patients but also for individuals with obstetric emergencies, as well as those suffering from communicable and non-communicable diseases.⁵ A significant share of injury-related deaths, particularly those resulting from road traffic accidents (RTAs), occurs in low- and middle-income countries (LMICs), with many of these fatalities taking place before the patient reaches a hospital.⁶ This high mortality rate may be attributed to inadequate road safety measures and the absence of timely, appropriate medical care for injured individuals.⁷ The treatment of accident victims begins before they reach the hospital, and it is widely recognized that timely and effective prehospital care can significantly reduce the morbidity and mortality linked to road traffic accidents.⁸

Emergency services become even more critical in situations where barriers such as lack of health insurance limit access to preventive and routine healthcare, resulting in reduced availability of essential medical services.⁹ In developing countries, healthcare needs, available resources, and cultural factors are likely to influence the scope, organization, operations, and financing methods of emergency medical services.¹⁰ Emergency care systems in developing countries tend to prioritize cost-effective and basic medical services over the provision of high-quality care, in contrast to the more advanced models commonly seen in developed nations. Therefore, almost no literature exists for a government run, quality conscious pre-hospital care system in developing countries.¹¹

Prehospital care is often the first point of contact between a patient and the healthcare system and plays a critical role in reducing mortality and morbidity associated with acute illnesses and injuries. Clinical research in prehospital care is essential to ensure that the care provided to patients in this environment is evidence-based and effective. This type of care is typically delivered by EMS personnel, who are trained to provide a range of treatments and interventions to stabilize patients and prepare them for transport to a hospital. Prehospital care plays a vital role in improving patient outcomes, as early intervention can often mean the difference between life and death. Data from this study would help us in developing the evidence-based guidelines and protocols that can help to improve the quality of care provided in the prehospital environment, reduce the risk of adverse events, and improve patient outcomes.

MATERIAL AND METHODS

The study was a cross-sectional analysis conducted at the Department of Emergency Medicine, JPMC, Karachi, from April 2025 to August 2025. A total of 147 trauma patients were included in the study. This sample size was determined using WHO software, based on a pilot study where 42.5% of patients received care at a primary health center, with a margin of error set at 8% and a confidence level of 95%.

Participants were selected using non-probability consecutive sampling. Eligible patients were between 18 and 70 years of age, of either gender, and presented to the emergency department with a history of trauma. Several exclusion criteria were applied to refine the sample: patients who refused consent, had known malignancies or metastatic disease, previously treated cancers, penetrating injuries, recent trauma or prior abdominal surgeries, those transferred directly to surgery without initial CT scans, pregnant patients, patients who died during their hospital stay, and those who left against medical advice were all excluded.

The study began following approval from CPSP and the hospital’s Ethical Review Committee. Patients presenting with trauma and undergoing initial trauma assessment were approached for inclusion. Informed consent was obtained from each participant before recruitment. Details of the study were thoroughly explained to all patients. Data collection involved interviewing patients or their family members to gather information on the type and level of prehospital care received prior to the emergency visit. This information was categorized based on the operational definitions provided. All data were carefully documented using a structured proforma designed specifically for the study.

Data analysis was performed using SPSS version 25.0. The Shapiro-Wilk test was used to assess normality for all quantitative variables. For normally distributed data, mean and standard deviation were calculated, while median and interquartile range (IQR) were used for non-normally distributed variables. Categorical variables, including gender, residence status, and levels of prehospital care, were presented as frequencies

and percentages. To control for potential effect modifiers such as age, gender, and residence, stratification was applied. Following stratification, chi-square or Fisher’s exact tests were used, with a p-value of ≤ 0.05 considered statistically significant.

RESULTS

In this study involving 147 trauma patients, most participants (61.2%) were aged between 46 and 70 years, while 38.8% were between 18 and 45 years. Females accounted for a slightly higher proportion of cases (51.7%) compared to males (48.3%). The majority resided in urban areas (84.4%), with a smaller proportion from rural settings (15.6%). Across all settings, prehospital care remained limited: 15% received care at home, 26.5% in an ambulance, 23.1% in a primary health center, and 34.7% in a secondary health center. Age did not show any significant association with the provision of care in any setting, suggesting that the availability of services, rather than age, shaped prehospital care delivery.

Table 1: Distribution of baseline characteristics among the study participants.

Variables	n (%)
Age	
18 to 45 years	57 (38.8)
46 to 70 years	90 (61.2)
Gender	
Male	71 (48.3)
Female	76 (51.7)
Residence status	
Urban	124 (84.4)
Rural	23 (15.6)
Care given at home	
Yes	22 (15)
No	125 (85)
Care given in ambulance	
Yes	39 (26.5)
No	108 (73.5)
Care given in primary health center	
Yes	34 (23.1)
No	113 (76.9)
Care given in secondary health center	
Yes	51 (34.7)
No	96 (65.3)
Total	147 (100)

Gender differences emerged in ambulance care, where a significantly higher proportion of males received treatment compared to females (36.6% vs. 17.1%, $p = 0.01$). This pattern may reflect differences in injury mechanisms, occupational hazards, or societal norms influencing emergency transport decisions. Care at home, in primary health centers, and in secondary health centers did not differ significantly by gender. Residence status showed little effect on prehospital care, except for secondary health center care, where urban residents were significantly more likely to receive treatment than rural residents (39.5% vs. 8.7%, $p = 0.01$). This likely reflects the closer proximity of secondary-level facilities, better transport links, and stronger health system infrastructure in urban areas.

Table 2: Distribution of patient characteristics according to the care given at home groups.

Variables	Care given at home Yes n (%)	Care given at home No n (%)	P value
Age			0.10
18 to 45 years	12 (21.1)	45 (78.9)	
46 to 70 years	10 (11.1)	80 (88.9)	
Gender			0.27
Male	13 (18.3)	58 (81.7)	
Female	09 (11.8)	67 (88.2)	
Residence status			0.35
Urban			
Rural	20 (16.1) 02 (8.7)	104 (83.9) 21 (91.3)	

The results demonstrate considerable gaps in prehospital trauma care, with low utilization across all care settings and continued reliance on non-ambulance transport to tertiary facilities. The significant associations between gender and ambulance care, and between residence and secondary health center care, point to structural and geographic barriers as key determinants of access. Strengthening emergency medical services, expanding trained first responder programs, and improving the integration of primary, secondary, and tertiary care facilities could address these disparities and enhance timely, equitable trauma care delivery.

Table 3: Distribution of patient characteristics according to the care given in ambulance groups.

Variables	Care given in ambulance Yes n (%)	Care given in ambulance No n (%)	P value
Age			0.11
18 to 45 years	11 (19.3)	46 (80.7)	
46 to 70 years	28 (31.1)	62 (68.9)	
Gender			0.01
Male	26 (36.6)	45 (63.4)	
Female	13 (17.1)	63 (82.9)	
Residence status			0.95
Urban	33 (26.6)	91 (73.4)	
Rural	06 (26.1)	17 (73.9)	

Table 4: Distribution of patient characteristics according to the care given in primary health center groups.

Variables	Care given in primary health center Yes n (%)	Care given in primary health center No n (%)	P value
Age			0.20
18 to 45 years	10 (17.5)	47 (82.5)	
46 to 70 years	24 (26.7)	66 (73.3)	
Gender			0.57
Male	15 (21.1)	56 (78.9)	
Female	19 (25)	57 (75)	
Residence status			0.47
Urban	30 (24.2)	94 (75.8)	
Rural	04 (17.4)	19 (82.6)	

Table 5: Distribution of patient characteristics according to the care given in secondary health center groups.

Variables	Care given in secondary health center Yes n (%)	Care given in secondary health center No n (%)	P value
Age 18 to 45 years 46 to 70 years	20 (35.1) 31 (34.4)	37 (64.9) 59 (65.6)	0.93
Gender Male Female	24 (33.8) 27 (35.5)	47 (66.2) 49 (64.5)	0.82
Residence status Urban Rural	49 (39.5) 02 (8.7)	75 (60.5) 21 (91.3)	0.01

DISCUSSION

This study demonstrates that most trauma patients presenting to the tertiary hospital were middle-aged or older adults. There were slightly more females than males, and a strong predominance of urban residents. Despite this profile, pre-hospital care remained uncommon across all levels of service. Very few patients received assistance at home, in ambulances, or at primary or secondary health centers before arriving at the hospital. Neither age nor gender significantly influenced care at home or at primary health centers. However, men were more likely to receive ambulance care, and urban residents more often received care at secondary health centers.

Our results align with previous work from Ethiopia and other low- and middle-income countries (LMICs) showing similar gaps in prehospital trauma systems. Meskere et al. reported that limited ambulance coverage and a shortage of trained first responders restricted access to early intervention in Addis Ababa.¹² Likewise, Sultan et al. found that fewer than one-third of trauma patients used ambulances, citing poor coordination, inadequate public awareness, and logistical barriers.¹³ In our context, ambulance use was similarly low. This echoes Khattak et al.'s findings in Pakistan that many patients prefer private transport, even when ambulances are available, though satisfaction is high among those who use them.¹⁹

The gender difference in ambulance utilization observed here may reflect sociocultural norms, occupational risks, and patterns of injury severity. Algerian et al. demonstrated that ambulance transport can reduce in-hospital complications when services are prompt and well-equipped.¹⁴ However, where systems are underdeveloped, unequal access risks widening outcome disparities. Geographic differences in secondary health center care mirror findings from Uthkarsh et al. in South India, where rural patients had less access to intermediate trauma care because of distance, limited resources, and referral bottlenecks.¹⁵ These inequities carry clinical consequences. Prompt pre-hospital intervention is a critical determinant of survival in severe injuries such as traumatic brain injury (TBI).¹⁸⁻²⁰ Messelu et al. identified prehospital delays and insufficient stabilization as predictors of mortality in Ethiopian trauma ICUs.¹⁶ Evidence across LMICs shows that strengthening prehospital infrastructure improves survival and reduces preventable deaths. This was done through expanded ambulance fleets, training programs, and community outreach.¹²⁻¹³

Addressing these gaps requires coordinated policy action. Scaling up emergency medical services, strategically placing secondary health centers, and integrating rural communities into referral networks could ensure more equitable access. Overcoming systemic and sociocultural barriers will be essential to building an inclusive prehospital trauma care system capable of improving outcomes for all trauma patients, regardless of gender or place of residence.

LIMITATIONS

We conducted this study in a single urban tertiary hospital. This limits the generalizability of the findings to rural or resource-limited settings. In addition, our reliance on self-reported information from patients or attendants may have introduced recall bias, particularly in cases involving severe injury.

CONCLUSION

We found that pre-hospital care for trauma patients was infrequent. There were clear disparities by gender and residence. Strengthening ambulance networks, improving first responder capacity, and extending coverage to rural areas could address these gaps and improve trauma outcomes.

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