

Prehospital Care and its Association with Patient Outcomes in Emergency Department of Cardiac Hospital, Kathmandu

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Abstract

Emergency medical care is a critical component of healthcare systems, especially in resource-limited settings like Nepal. This study aimed to evaluate the mode of arrival and its impact on short-term outcomes of cardiac patients presenting to Cardiac center ED. The study was conducted as a prospective observational study among 200 patients with cardiac illness in the emergency department of Manmohan Cardiothoracic Vascular and Transplant center (MCVTC) from July 17 to September 16, 2025, by means of a standardized questionnaire. Analysis was done using descriptive and inferential statistics. The most common clinical presentation were chest pain/SOB (54 %), referred from another healthcare facility through ambulance were 7% (n =14), Only 18 patients used ambulance services, which were with 7 trained EMT, Duration from the call to ambulance arrival were within 10-30 minutes 7.0%, ACLS equipped ambulances 7.5%, about 6.5% patients initially managed during transportation, 11 patients required Emergency resuscitation. Admission for critical areas 23.5%. About 35% patients managed with Inotropes, need for surgery 4.5%, 10 patients needed Mechanical Ventilation and Mortality in ED within 24 hours was 2.5%. There were statistically significant association between Ambulances equipped with Advanced Life Support and Need for Surgery ($p=0.021$), and between Intervention during transportation and need for inotropic support ($p=0.048$). The EMS services were underutilized. The majority of the ambulances lacked the necessary personnel and equipment to perform prehospital intervention. It suggests pre-hospital care needs to be improved through strengthening ambulance services and improving public awareness of the importance of early emergency medical services.

Keywords: Ambulance utilization, Cardiac illness, Care outcomes, Emergency department, Emergency medical services, Prehospital care

Introduction

Patients' clinical treatment outcomes can be greatly enhanced by prehospital first aid and subsequent transportation (Lin et al., 2023). Prehospital treatment is essential for lowering traumatic injury, mortality, particularly in low- and middle-income nations. The provision of prehospital paramedic care has no effect on the incidence of MI, length of hospital stays, or death of patients who arrive to the EMS system with cardiac illness in an urban setting with short (less than 10 minutes) typical transit times. Even poorer results for patients transferred by EMS have been reported in other studies (With & Illness, 1995).

The mode of transportation, the prehospital treatment received, and the procedures used to transfer patients with acute heart failure (AHF) to hospital emergency departments (EDs) were crucial in examining the correlations between various parameters (Kelly et al., 2016). The underutilization of prehospital treatment is caused by injury-related and sociodemographic factors. Qualitative insights

highlight community and systemic issues that need greater research in bigger, more representative studies (Ayenew et al., 2025). This article will interpret some of the most recent innovations in the intensive care unit, in-hospital trauma treatment, and pre-hospital emergency medicine, along with how these advancements have improved results. Patients who contact emergency medical services (EMS) are unaware of the final evaluation that takes place once they get to the hospital and how it connects to field evaluation (Magnusson et al., 2018).

Many patients in Nepal rely on non-ambulance transport (taxis, private vehicles, etc.), often leading to delays in life-saving care. The availability of trained paramedics in ambulances was limited, affecting prehospital stabilization. Evaluating the mode of arrival and its impact on patient outcomes will provide crucial insights into emergency care gaps and areas for improvement. This study will contribute to policy recommendations for improving pre-hospital and in-hospital emergency services (Lin et al., 2023).

Emergency medical care is a critical component of healthcare systems, especially in developing countries. Pre-hospital emergency services are still inadequate, which causes treatment delays and poorer patient outcomes. According to studies, only a decreasing percentage of patients use the ambulance service for emergency services. The ambulance resources that are available lack the necessary training and personnel (Lin et al., 2023). The mode of transportation to emergency departments and pre-hospital interventions significantly impact patient survival and prognosis (Phungoen et al., 2023). The results of using emergency medical services (EMS) to transport patients to the emergency department have been inconsistent (Ravindra et al., 2022).

Patient survival and prognosis are greatly impacted by pre-hospital interventions and the route of transit to emergency department. The ambulance resources that are available, lack the necessary training and personnel.

The study aimed to evaluate the mode of arrival, pre-hospital care, initial management, and short-term outcomes of critical patients presenting to the tertiary care emergency department. The study was a prospective observational type conducted over two months, including patients who present with life-threatening conditions requiring immediate interventions. Findings will help identify gaps in pre-hospital and emergency care, potentially guiding future healthcare policies and resource allocation.

Literature Review

Pre-hospital care includes helping injured and critically ill patients at the site and while they are being transferred to medical institutions. Pre-hospital care requires knowledge and readiness. As a result, 13.3% (4 out of 30) of patients had access to pre-hospital (PH) care. The idea of pre-hospital treatment is not well-liked by consumers. The study site has inadequate PH care and services. Access was shown to be correlated with the cost of transportation and the distance between the location and the hospital. Additionally, service delivery, workforce, financing, infrastructure, communication, coordination, and information were associated with both barriers and facilitators (Bhattarai et al., 2021).

A vital part of contemporary healthcare systems, emergency medical services (EMS) offer immediate, life-saving measures prior to patients receiving definitive hospital care. For patients suffering from trauma, cardiac arrest, stroke, or other acute medical emergencies, the pre-hospital

phase of care, often referred to as the "golden hour," is thought to be crucial in deciding survival and recovery outcomes (Care et al., 2021).

The chain of survival for out-of-hospital cardiac arrest (OHCA) has been shortened in a number of ways in recent years. These include giving dispatcher-assisted CPR (DA-CPR), training first responders, and putting defibrillators in public areas. With varying survival rates, out-of-hospital cardiac arrest (OHCA) is a major worldwide issue. Asia, for instance, has the lowest survival to discharge percentage (2%), followed by North America (6%), Europe (9%), and Australia (11%). The average global return of spontaneous circulation (ROSC) rate is 29.7%, the survival to hospitalization rate is 22–24%, and the survival to discharge rate is 7.6–8.8%. According to a global meta-analysis, Pre-hospital and hospital treatment are the two primary processes that impact the prognosis and survival following OHCA. Early detection of cardiac arrest is part of pre-hospital care (Deri et al., 2022).

Emergency Medical Services (EMS), especially prehospital care have been neglected for several years in many developing nations. Particularly in South Asian countries, the lack of organized prehospital management continues to be a significant obstacle to prompt and efficient emergency care to numerous developing nations are currently going through urbanization and shifting population demographics have increased the requirement for prehospital systems, resulting in higher death rates from heart disease and trauma (Lingappa et al., 2025).

Globally, cardiac illness is a major cause of morbidity and mortality, with pre-hospital settings accounting for 35–45% of deaths. Although emergency protocols have advanced, pre-hospital emergency medical services assessment techniques frequently rely on narrow metrics that do not fully capture the quality of care. In addition to logistical considerations, pre-hospital care involves Emergency Medical Services (EMS), staff coordination, clinical expertise, and sound decision-making. Further highlighting the need for specialized quality assessment techniques suited to cardiovascular emergencies is the high time sensitivity and variable presentation of ACS, which increases the risk of misdiagnosis, delayed triage, or inadequate therapy (Yadollahi et al., 2025)

In Nepal, pre-hospital emergency care is still in its infancy. Analysis of the current system underscores that inconsistent policy implementation, inadequate infrastructure, and a lack of uniform training are the primary obstacles to its expansion. Significant differences are shown by comparative cross-regional study, which reveals that cities have comparatively better access than rural locations. Even though pre-hospital emergency care has advanced in recent decades, much more work has to be done to guarantee prompt access to emergency medical services. Notable barriers to the development of pre-hospital care include poor infrastructure, scarce resources, and the lack of uniform formal training. Further research is necessary to establish the best appropriate prehospital care approach for Nepal's distinct geographical and socioeconomic characteristics. Ultimately, coordinated efforts across government agencies (Karki et al., 2026). Pre-hospital services used to be confined to patient transportation and fundamental first aid. However, the paradigm has changed in favour of evidence-based advanced life support (ALS) skills in the field due to the professionalization of paramedicine, especially since the 1970s (Al-Shaqsi, 2010). Critical procedures including advanced airway management, defibrillation, haemorrhage control, medicine administration, and trauma stabilization are

being taught to paramedics, greatly improving the patient outcome (Newgard et al., 2022) . Pre-hospital trauma care lead by paramedics can lower avoidable deaths, according to research, particularly when guidelines prioritize quick transport to trauma centers with concurrent stabilization (No et al., 2020).

Paramedics are crucial in treating respiratory distress, asthma flare-ups, COPD emergencies, and suspected strokes in addition to trauma and cardiac arrest. According to Alam et al. (2019), pre-hospital provision of bronchodilators, oxygen therapy, and advanced airway management lowers problems and stabilizes patients before they enter the hospital. Furthermore, paramedics are being taught more and more to identify stroke symptoms using validated assessment instruments, such as the FAST scale. This allows for the early activation of stroke pathways, which are closely associated with to better recovery and less impairment (Rudd et al., 2015). A striking finding is the geographic disparity in research and outcomes. Low- and middle-income countries (LMICs) lag behind because to inadequate infrastructure, deficiencies in training, and a lack of resources, whereas high-income countries show compelling evidence of paramedic efficacy. However, inadequate infrastructure and a shortage of qualified paramedics hinder trauma care in many low and middle income countries (LMICs), leading to notable differences in outcomes (Sriram et al., 2016).

Efficient emergency care directly increases survival rates, lowers morbidity, and improves recovery outcomes in a wide range of emergencies by providing prompt, evidence-based interventions like cardiopulmonary resuscitation, defibrillation, trauma stabilization, airway management, and stroke recognition. Their contributions go beyond the care of individual patients to include system-level advantages including decreasing treatment delays, maximizing the use of resources, and enhancing the resilience of the health system in the face of pandemics and disasters (Care et al., 2021). Most hospitals have a similar ROSC rate and a high incidence of cardiac arrest. Statistically significant variables linked with outcomes of Patient care in ED were, sex, place of cardiac arrest, Trauma, Witnessed event, Duration of CPR and Intubation (Park et al., 2014). The primary cause of prehospital treatment is cardiovascular disorders, which account for a startlingly high proportion of unscheduled hospital stays and unexpected, unexplained deaths. Emergency medical services (EMS) must swiftly and effectively manage this excessive patient demand while adhering to clinical criteria and receiving recognized training, such as basic and advanced cardiac life support (BCLS and ACLS) (Vegas et al., 2023).

In addition to having a high comorbidity and hospital admission rate, patients with dyspnea who are evacuated by ambulance account for a sizable share of the caseload. Although there were many other diagnoses in this study, individuals with heart failure, lower respiratory tract infections, or COPD accounted for more than 60% of the total. This affects paramedic training, care paradigms, and service planning (Kelly et al., 2016).

A computer-aided, priority-based dispatch system is used to process calls from the upgraded 9-1-1 system, classifying them based on their critical nature. Additionally, clinical conditions are used to classify patients who are transferred to the hospital. The Mecklenburg Board of County Commissioners oversees the EMS agency and has required response time requirements for every emergency priority category. Therefore, the benchmark of 10:59 minutes for emergency, life-threatening calls is the main emphasis of the study topic. When the address and chief complaint are confirmed or 30 seconds after

the call is received, whichever comes first, the response time clock to gage compliance starts. When the transport ambulance shows there, the clock stops (Blackwell et al., 2009).

Literature Review

Emergency medical care is a most important part of healthcare department. In order to provide the best possible emergency medical services (EMS) care in the prehospital setting, several operational and clinical components must be integrated and carried out by many people from various locations. Online and offline medical guidance is applicable to call taking and dispatching, scene response, on-scene patient care, triage and hospital destination determinations, ongoing treatment during transport, and transfer to definitive care. One prominent target for possible process improvement is ambulance response time. Although it is still obvious that response time is a crucial performance indicator, it is not a reliable indication of disease severity or mortality on its own. There are few studies that investigated at the association between prehospital response and the effectiveness of response time by different levels of care provision.

Methods

Prospective observational study was chosen to assess the mode of arrival, initial resuscitation measures, and outcomes in patients admitted to the Emergency department of MCVTC. Sampling method was Non-Probability, Purposive Sampling. Data was collected who were visited in cardiac department of Emergency of MCVTC.

The Manmohan Cardiothoracic Vascular and Transplant Center granted formal approval prior to data collection. Before any data was collected, each respondent provided written informed consent.

Inclusion Criteria:

- Patients presenting to the emergency department with diagnosed cardiac illness.
- All age groups and both sexes.
- Patients or legally authorized representatives providing informed consent.

Exclusion Criteria:

- Patients transferred out within 30 minutes of arrival.
- Patients refusing consent.

Sample size: The average patient flow in the emergency department of MCVTC was approximately 50 patients per day, Since MCVTC is a specialty hospital that treats vascular and thoracic illnesses, including cardiac Cases, However, an average of 6 patients with cardiac disease fulfilled the study eligibility criteria each day, according to a review of previous emergency department records. The necessary sample size was determined to be 186 people using a finite population sample size formula with a 95% confidence level, a 5% margin of error, and an expected prevalence of 50%. The ultimate sample size was approximately 200 participants after considering a 10% non-response rate. The instrument consisted of six sections; which includes following variables;

Section 1: Patient Demographics

Date and time, age, sex, ethnicity, occupation, education Level, economic Status

Section 2: Clinical Presentation and Category

Chief complaint, Duration of symptoms, Vital Signs on arrival, referred case from another center

Section 3: Mode of Arrival to the Emergency Department

Mode of Transportation, ambulance use, presence of Emergency Medical Technicians (EMTs), Duration from the call to ambulance arrival, Reason for not using an Ambulance, Interventions during transportation, Ambulances equipped with Advanced Life Support (ALS)

Section 4: Initial Emergency Management in Emergency: need for emergency resuscitation, Initial Assessment and Intervention, time taken to treatment, admission

Section 5: Patient Outcome Parameters

Length of emergency department Stay, Final disposition, need for mechanical ventilation, Vasopressors use, Need for surgery, 24-Hour Mortality, Major complications during ED Stay.

Section 6: Patient/Attendant Perception on Emergency Services

Satisfaction with emergency care, perception of ambulance services

Validated instruments were used.

Data were collected using a Structured questionnaire, direct observation and medical record review, with no direct intervention on patient management. Patient confidentiality strictly maintained. No additional risk is posed to participants beyond the standard emergency care they received. Emergency protocols followed, and no delay in patient treatment occurred due to study-related data collection. At the end of data collection, the researcher thanked each participant for their cooperation and provision of their important time. Data were checked for accuracy and entered into IBM SPSS- 25 version for data analysis. Descriptive and inferential statistics were used to analyze the data. The association between Mode of arrival and Selected variables was determined using the chi-square test. Data interpretation was carried out based on data analysis. The Manmohan Cardiothoracic Vascular and Transplant Center granted formal approval prior to data collection. Before any data was collected, each respondent provided written informed consent. Dignity, privacy and confidentiality were maintained throughout the data collection process.

Results

Table 1 represents regarding the age of 200 Cardiac patients, 87.5 % of the respondents were between 21-80 years of age. The median age of the respondent is 59, minimum age: 18 years, maximum age: 91 years. Among them more than half 57.5 % were male. Regarding Ethnicity, less than half (47.5%) of the respondents were Brahmin/ Chhetri. Likewise, 25% had Secondary level (6-10 class) education. Regarding occupation, more than half 102 (51.0%) were service holder. About income status, less than half (38.5%) of respondents' family had income status Lower-Middle (NPR 15,000 – 30,000/month).

Table 1: Respondent's Socio-demographic Characteristics (n=200)

Characteristics	Number	Percent
Age group		
<20	5	2.5
21-80	175	87.5
>81	20	10.0
Sex		
Male	115	57.5

Female	85	42.5
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Ethnicity

Brahmin/Chhetri	95	47.5
Janajati	86	43.0
Madhesi	13	6.5
Muslim	6	3.0

Educational status

Cannot read and write	29	14.5
Primary level (1-5 class)	42	21.0
Secondary level (6-10 class)	50	25.0
Higher Sec. level (upto 12 class)	50	25.0
University	29	14.5

Occupation

Service	102	51.0
Homemaker	43	21.5
Agriculture	26	13.0
Business	15	7.5
Others*	14	7.0

Income status

Lower	36	18.0
Lower- Middle	77	38.5
Middle	66	33.0
Upper-Middle	18	9.0
Upper	3	1.5

***Students, from job, labour work**

Lower (< NPR 15,000/month)

Lower-Middle (NPR 15,000 – 30,000/month)

Middle (NPR 30,000 – 60,000/month)

Upper-Middle (NPR 60,000 – 120,000/month)

Upper (> NPR 120,000/month)

Table 2 : Respondents' Illness related Characteristics (n=200)

Characteristics	Number	Percent
Clinical presentation		
CAD (chest pain/SOB)	108	54.0
Hypertension	52	26.0
Arrhythmias	24	12.0
Post Cardiac Surgery (<1 month)	4	2.0
Fever	12	6.0

Duration of symptoms Before Arrival

Below 1 hour	21	10.5
1 to 6 hours	105	52.5
6 to 12 hours	61	30.5
12 to 24 hours	12	6.0
Above 24 hours	1	0.5

Referred case from another center

Yes	14	7.0
No	186	93.0

Category of Cases

Cardiology	182	91.0
Cardiac surgery	18	9.0

Table 2 depicts the most common Clinical presentation were chest pain/SOB (54%), Hypertension (26%), Arrhythmias (12%), Post Cardiac Surgery (<1 month) (2%) and Fever (6%). About 105 patients arrived in ED between 1 to 6 hours of symptoms onset. Ninety-three percent (93%) of these patients were not referred from another hospital and came straight to our facility. Seven percent (n = 14) of the patients who were referred from another medical facility were transferred between hospitals via ambulance. Among these 91% were cardiology cases.

Figure 1 : Mode of transportation Used by Patient to Reach the Emergency Department (n=200)

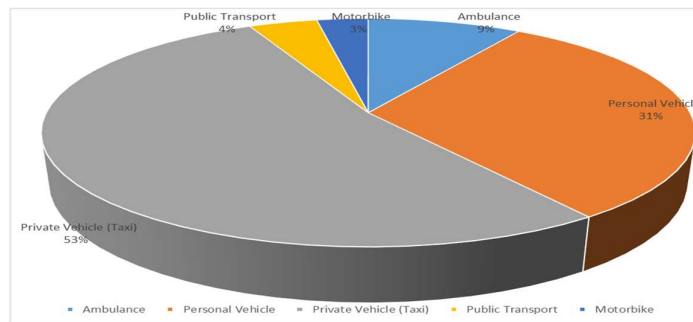


Figure 1 illustrates the patients' favorite method of transportation was found private vehicle (53%), followed by personal vehicles (31%). A smaller proportion of patients' arrived by ambulance (9%), public transport (4%) and motorbike (3%).

Table 3: Mode of Arrival to the Emergency Department (n=200)

Characteristics	Number	Percent
Not used Ambulance	182	91.0
Used ambulance services		n=18
Government	5	2.5
Private	3	1.5
Hospital-based	10	5.0
		n=18

Trained Emergency Medical Technicians in ambulance

No	4	2.0
Yes	14	7.0

Among 18 patients who used ambulance services 5% used Hospital-based Ambulance services and 7% were with trained Emergency Medical Technicians.

Table 4: Initial Emergency Management

Characteristics	Number	Percent
Duration from the Call to Ambulance Arrival		n=18
<10 min	4	2.0
10-30 min	14	7.0
Intervention during Transportation		n=200
Yes	13	6.5
No	187	93.5
Ambulances equipped with Advanced Life Support (ALS)		n=18
YES	15	7.5
No	3	1.5
Initial Emergency Management in ED		
Time taken for initial assessment and intervention		
<5min	53	26.5
5-10 min	98	49.0
15-30	47	23.5
>30 min	2	1.0
Emergency resuscitation required in ED		
Yes	11	5.5
No	189	94.5

Table 4 showed among the patients used ambulance services for ACS patients, Duration from the Call to Ambulance Arrival were within 10-30 minutes 7.0% followed by <10 minutes were 2%. About 6.5% patients initially managed during Transportation. ALS with the ability to provide emergency care, including defibrillation was only 7.5 %. About 49% Patients received treatment within 5 to 10 minutes of arrival in ED Eleven patients required Emergency resuscitation.

Table 5: Patient Outcome Parameters (n=200)

Characteristics	Number	Percent
Final Disposition		
Admitted to General Ward	66	33.0
Admitted to ICU /CCU	47	23.5
Discharged	45	22.5
Transferred to Another Facility	13	6.5
Transferred to Cath lab	19	9.5

Expired in the Emergency Department	5	2.5
Brought Dead	5	2.5
Need for Mechanical Ventilation		
Yes	10	5.0
No	190	95.0
Need for Vasopressors/Inotropes		
Yes	70	35.0
No	130	65.0
Need for Surgery		
Yes	9	4.5
NO	191	95.5
24-Hour Mortality		
YES	5	2.5
NO	195	97.5
Major Complications During ED Stay		
Cardiac Arrest	7	3.5
Arrhythmias	18	9.0
Respiratory Failure	8	4.0
Sepsis	9	4.5
Stroke	8	4.0
Multi-Organ Failure	1	0.5
No Complications	149	74.5

Table 5 showed regarding final ED disposition was hospital admission for General Ward 33% followed by 23.5% admitted to critical areas (ICU /CCU). About 35% patients managed with Vasopressors/Inotropes, need for surgery 4.5% and 10 patients needed Mechanical Ventilation and Brought death 2.5%. Expired in ED within 24 hours was 2.5%. About 74.5% were not developed complications whereas 9% developed arrhythmia during stay in ED.

Table 6: Association between Mode of Arrival with Selected Variables (n=18)

Variables	Patient parameters	outcome	χ^2	P-value
Have trained Emergency Medical Technicians in Ambulances	Need for Mechanical Ventilation			
	yes	No		
Yes	5	8	.064	.800
No	3	2		

Ambulances equipped with Advanced Life Support Need for Surgery

	Yes	No		
Yes	0	15	5.294	.021 [#]
No	1	2		

Fisher's Exact Test[#]

Table 6 depicts that there was statistically significant association between Ambulances equipped with Advanced Life Support and Need for Surgery (p=0.021[#]).

Table 7: Association between Mode of Arrival with Selected Variables (n=200)

Variables	Patient outcome parameters		χ^2	P-value
Intervention during transportation	24-hour mortality			
	yes	No		
Yes	1	19	1.020	.312
No	3	177		
Intervention during transportation	Need for inotropic drug support			
	Yes	No		
Yes	11	9	3.907	.044 [#]
No	59	121		

Note: Fisher's Exact Test[#] (p<0.05 at 95% confidence level)

Table 7 depicts that there was statistically significant association between Intervention during transportation and need for inotropic drugs support (p=0.044[#]).

Discussion

In the present study, about 105 patients presenting in ED between 1 to 6 hours of symptoms onset. The majority of these patients were not referred from another hospital (93%), instead, they came straight to our facility. Seven percent (n = 14) of the patients who were referred from another medical facility were transferred between hospitals via ambulance. Majority of patients (91%) not used Ambulance and only 18 patients used ambulance services. Among the patients who used ambulance services, which were with 7 trained Emergency Medical Technicians. Just 7.5% of the ambulances used for ACS patients had ACLS equipment that could provide emergency care, like defibrillation. Emergency resuscitation (CPR) was administered to 5.5%. These findings demonstrate that individuals with acute coronary syndrome (ACS) received insufficient pre-hospital emergency care and ambulance use. The majority of patients with ACS depended on private vehicles rather than ambulance services, despite the fact that prompt transportation and early emergency management are critical. This could be a sign of a lack of knowledge about the significance of ambulance transport, or a lack of access to or availability of ambulance services. Furthermore, the lack of ACLS equipment and qualified emergency medical staff in ambulances increases the possibility that patients are unlikely to receive critical life-saving treatments while being transported.

This study showed that private vehicles (53%) were the most commonly used mode of transportation. This reliance on private transportation may prevent patients from receiving potentially life-saving measures while in travel and delay access to proper emergency care.

The results of an Indian study by Ravindra P et al. (2022) corroborated the study conclusions that Seventy-two percent of these patients were arrived at the hospital directly, 64.5% of patients who were referred from another medical facility (n = 1082) were transferred between hospitals via ambulance, 16.2% of the ambulances used to transport these referred patients lacked an ACLS, and 87.1% of them had no medical professional accompanying them. According to the prehospital data analysis, 49% of these patients came in ways other than by ambulance. Just 3.4% of ambulances carrying patients arrived with ACLS, and 83.3% of ambulances had no medical personnel on board. The patients' preferred mode of transportation was found to be a personal vehicle 45.6%. A pitiful 29.8% showed up in the ambulance (Ravindra et al., 2022). In Sweden, 83% of patients who were picked up by ambulance were taken to a hospital, and 14% of those patients had a condition that required immediate attention. Twelve percent of these cases had a potentially improper field evaluation, but the remainder were evaluated as perhaps appropriate (Magnusson et al., 2018). According to a pilot surveillance study on ambulance utilization conducted in Pakistan, just 4.1% of patients arrived at the emergency department in an ambulance (Zia et al., 2015)(Zia et al., 2015).

These variations highlight how emergency service organizations and healthcare facilities affect transportation patterns. The results show that Nepal's pre-hospital emergency medical system needs to be strengthened by increasing the number of ambulances equipped with ACLS, improving EMT training, building an efficient referral network, improving ambulance accessibility and response times, and educating the public about ACS symptoms. Patients with cardiac illness may see better clinical results and fewer therapy delays as a result of these advancements.

Further, according to other objectives to analyze the pre-hospital care received and its impact on outcomes and to evaluate patient outcomes, including mortality, admissions in critical units, and complications.

According to the current study, the most common Clinical presentation were chest pain/SOB (54 %) who received a final diagnosis of CAD, Hypertension (26%), Arrhythmias (12%), Post Cardiac Surgery (<1 month) (2%) and Fever (6 %). Regarding final ED disposition was in hospital admission for General Ward 33% followed by 23.5% admitted to critical areas (ICU /CCU). This supports the findings of Kelly AM et al.'s (2016) study, which found that patients with shortness of breath account for a sizable amount of ambulance caseloads and have high rates of comorbidity and hospital admission. Although there were many other diagnoses in this study, individuals with heart failure, lower respiratory tract infections, or COPD accounted for more than 60% of the total. Hospital admission (including ICU) accounted for 76.4% of ED disposition, whereas ICU admission accounted for 5.6%. This affects paramedic training, care paradigms, and service planning (Kelly et al., 2016). The findings may be due to more serious cardiovascular emergencies are treated in tertiary cardiac facilities. Increased hospital and intensive care unit admissions are a result of higher acuity. The study site, patient demographic, healthcare system, ambulance use, and referral patterns could all be reasons for differences from earlier research.

Finding of the study reported that just 7.5% of the ambulances had ACLS equipment that could provide emergency care, like defibrillation. Only 5.5 % received Emergency resuscitation (CPR). About 5% need for mechanical ventilator support followed by 5% treated with Vasopressors/Inotropes, need for surgery 4.5%. These results are in line with study carried out by Hurst & Lendrum (2021) revealed that the advantages of early resuscitation and stabilization under the supervision of senior professionals are well-established and regarded as uncontroversial in hospitals, so this shouldn't really be shocking. Even though the introduction of services like EMRTS in Wales deserves scholarly research and practical assessment, we believe it is crucial that we go beyond this to comprehend how to best develop these care systems (as well as their capacity for intervention and diagnosis) to better assist our patients.

Based on Similar study presented that there were 6106 patients in all, with a mean (SD) age of 80 years. Of these, 56.5% were female, 47.2% arrived in private vehicles, 37.8% in no medical ambulances (NMA), and 15.0% in medical ambulances (MA). Females, age over 80, a history of AHF, chronic obstructive pulmonary disease, functional reliance, New York Heart Association class III–IV, sphincter incontinence, difficult breathing, orthopnea, cold skin, and sensory depression or restlessness were all linked to ambulance use. Oxygen was administered to 73% of patients carried in MAs, followed by diuretics 29%, vasodilators 13.5%, and noninvasive ventilation 4.7% also which were managed in critical areas after admission as well as during stay in ED. The form of transport that a patient with AHF is assigned to a hospital emergency department depends on their characteristics. There seems to be a connection between assignment and severity. There could be more treatment administered during MA transit (Miró et al., 2017). Which may be explained by variations in cases. Additionally, the rise in critical care unit admissions might have been influenced by the accessibility of specialized cardiac services. These results emphasize the necessity of prompt referral, early stabilization, and quick emergency assessment in order to enhance patient.

This study finding contradict with a cohort study's findings of Blackwell et al.,(2009) revealed no proof of higher mortality and a greater need for critical Protocols for serious patients during transit when their ALS response time is more than 10:59 minutes. There should be further investigation into the relationship between reaction time and patient outcomes for BLS versus ALS first responders.

The prehospital factors linked to the long-term mortality of patients with acute cardiovascular illness were identified in this study. Our findings offer crucial information for the creation of particular codes or scores for cardiovascular conditions in order to reduce the risk of death. (Vegas et al., 2023). When compared to other research, the study area's use of emergency medical services was comparatively low. Predictors of using emergency medical services included living in an urban area, possessing a Red Cross Association ambulance number, being aware of the availability of free government ambulances, and ever using ambulance services (Mekonen et al., 2024). The majority of patients (84.2 %) arrived at hospitals via taxi or on foot, reflecting reliance on non-EMS transport. Rural residence (AOR = 4.80), lower education (AOR = 0.54), violence/quarrel-related injuries (AOR = 2.60), motor vehicle accidents (AOR = 2.00), gunshot injuries (AOR = 8.61), and penetrating injuries (AOR = 0.34) were significantly associated with prehospital care use. Lack of emergency communication systems and limited awareness during initial contact and dispatch (Scene); a shortage

of ambulances, lengthy response times, and dependence on non-EMS transport for prehospital treatment and transportation. A lack of personnel and resources that indirectly impact prehospital response within facility-based emergency care linkages and the necessity of public education and advocacy. The underutilization of prehospital treatment is caused by injury-related and sociodemographic factors. The study identifies community and systemic issues that need for greater research using bigger, more representative studies. (Ayenew et al., 2025). In the present study found Brought death 2.5% and Expired in ED within 24 hours was 2.5% correlate with the a Cross- sectional study done by Phungoen Pet al., showed result that mortality rate was considerably higher in the EMS group 235(1.52%) than in the non-EMS group 323(0.1%) with p-value ($p < 0.001$) (Phungoen et al., 2023). Essential to aware that ambulances have trained paramedics, need knowledge about importance of transport patient by ambulances to improve quality of care to patient with acute cardiac illness.

The most common cause of death worldwide is cardiac disease. Pre-hospital care programs have been established in high-income nations to treat acute cardiac disease symptoms such acute coronary syndrome (Patel et al., 2016). It is unclear, therefore, if pre-hospital acute cardiac disease care in Nepal is governed by laws, policies, rules, or standards. In order to complete this study, an Internet search and direct correspondence were used to find publicly available emergency care guidelines and laws pertaining to pre-hospital acute cardiac disease care. Although Nepal has laws requiring acute care for trauma and other crises, there are little laws or standards governing pre-hospital acute cardiac disease care. It is imperative that policymakers in Nepal create comprehensive, multi-stakeholder policies for pre-hospital emergency cardiovascular care.

Conclusion

Based on the study results, this study concluded that only 9 percent respondents utilizing EMS services. Significant association between Ambulances equipped with Advanced Life Support and Need for Surgery, Intervention during transportation and need for inotropic support. However, half of participants 50% of Patient/Family Perception on Emergency Services Were aware that ambulances have trained paramedics, need knowledge about importance of transport patient by ambulances to raise the standard of treatment for patients suffering from acute cardiac disease.

The study highlights significant gaps in emergency medical services (EMS) for cardiac patients in Nepal and offers data on the state of prehospital emergency treatment. The results can help politicians create national guidelines and regulations to improve prehospital emergency care, such as increasing the number of ambulances with Advanced Life Support (ALS) equipment and qualified Emergency Medical Technicians (EMTs). In order to improve patient outcomes, the study helps healthcare organizations improve emergency transport systems, referral systems, and prehospital management procedures.

The findings highlight the need for public awareness programs to encourage timely use of ambulance services during cardiac emergencies, thereby reducing delays in definitive treatment. The study provides baseline evidence for future multicenter research and quality improvement initiatives aimed at evaluating the effectiveness of EMS and improving emergency cardiovascular care in Nepal.

Authors' Contribution

All authors contributed to the study design, data analysis, interpretation, manuscript preparation, and approved the final version. No external funding was received.

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Declaration of Conflict of Interest

The authors declare no conflict interests.

Data Availability Statement

All relevant data are included in the article or supplementary materials. Additional data were obtained from online datasets with appropriate permission.

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