One Health Journal of Nepal

Original Article Open Access

Proportion of Brought-in-Dead Cases among Patients presenting at the Emergency Department at a Tertiary Care Hospital in Kathmandu, Nepal

Ramesh Kumar Maharjan[1*], Rashmisha Maharjan[2], Matthew Griggs[3]

[1]Department of Emergency Medicine, Tribhuvan University Teaching Hospital, Maharajgunj Medical Campus, Institute of Medicine, Tribhuvan University, Kathmandu, Nepal

[2]Nepal Disaster and Emergency Healthcare International Training Center, Lalitpur, Nepal

[3]University of Plymouth, United Kingdom

ABSTRACT

Introduction: Brought dead (BID) cases, patients declared deceased upon arrival at a health facility before receiving any medical care, represent a significant yet underexplored indicator of emergency system performance. Despite their frequency, there is limited research linking BID cases to deficiencies in prehospital emergency care (PHEC), a system that remains largely underdeveloped in Nepal.

Methods: This is a cross-sectional study was conducted at Tribhuvan University Teaching Hospital (TUTH) in Kathmandu. Phase I involved a retrospective analysis of 322 BID cases (2017–2019). Follow up162 by telephone interviews with bereaved families. Phase II analyzed BID - records from 2019–2022 (n=509). Survey data explored health-seeking behaviour, ambulance use, and emergency response knowledge.

Results: From 2019–2022, BID cases accounted for 45.1% of all emergency department deaths at TUTH with SD 21.65 years; male (57%); arrived via informal transport (59%) and no participants reported using the national emergency number (102) to initiate an ambulance response. Public awareness of first aid and emergency procedures was minimal. BID cases were reported from both within and outside Kathmandu, with wide variability in travel times. In 86% of cases, no cause of death was documented.

Conclusions: The notably high levels of BID patients witnessed at TUTH highlight critical gaps in Nepal's prehospital emergency care, including poor public awareness, inadequate ambulance utilisation and systemic delays. Addressing these challenges through improved public education, emergency response infrastructure and accessible PHEC could reduce avoidable prehospital deaths and improve emergency care outcomes.

OPEN ACCESS

***Correspondence:**
Dr Ramesh Kumar Maharjan, Department of Emergency Medicine, Tribhuvan University Teaching Hospital, Maharajgunj Medical Campus, Institute of Medicine, Tribhuvan University, Kathmandu, Nepal.
Email:
drmfamily2021@gmail.com

Submitted Date: 2025-05-11
Accepted Date: 2025-07-25

ORCID of corresponding author:
0000 0002 8826 1808

Keywords: *Brought-in-Dead; Emergency Department; Nepal*

INTRODUCTION

A significant yet under examined issue in emergency care is the occurrence of patients who are brought dead (BID), also referred to as 'brought in dead' or 'dead on arrival'. These terms describe individuals found to be deceased upon arrival at an emergency healthcare facility, prior to receiving any facility-based medical care. Research into the understanding of BID characteristics is limited and there have been no dedicated studies examining the relationship between their occurrences and the availability of high-quality pre-hospital Emergency care (PHEC)[(1)]. Globally, more than half of deaths and a third of disability in low- and middle-income countries (LMICs) could potentially be prevented through more effective PHEC and facility-based emergency medical services[(2)]. In Nepal, however, there is currently no formal PHEC system, and access remains severely constrained due to a lack of trained personnel, inadequate transportation, and a fragmented, uncoordinated infrastructure[(3-6)].

While BID cases are also reported in high-income countries with advanced prehospital emergency

services, their frequency is significantly lower than in countries lacking such infrastructure[6]. Site-specific studies from various LMICs have documented the absence or inadequacy of PHEC for patients declared dead on arrival[7-9] These patterns not only reflect systemic deficiencies in the available emergency medical services but may also be associated with sociocultural barriers, low health literacy, and misperceptions about illness severity[10]. The aim of this study is to analyse available data on BID cases to better understand the scale and significance of these deaths, while also exploring potential links between these cases and gaps in Nepal's PHEC system. The specific objectives of this study are to describe the time interval between the onset or recognition of an emergency at home and the patient's arrival at the emergency department, as well as to explore whether patients visited a nearby health facility prior to presentation. Additionally, it aims to identify the modes of transportation used to reach the hospital, assess the utilisation of the national pre-hospital emergency call number, and determine whether first aid was administered before arrival.

METHODS

This study employed a cross-sectional design, conducted in two separate phases. Phase I combined a retrospective data analysis of hospital records with a prospective, cross-sectional survey. Phase II was an entirely retrospective review of hospital records. Both phases were conducted in the Department of Emergency Medicine at Tribhuvan University Teaching Hospital (TUTH), Institute of Medicine, located in Kathmandu, Nepal.

Study Population (Exclusion and Inclusion Criteria)

The study population for both phases consisted of all patients who were brought in dead (BID) to the Department of Emergency Medicine.

- **Inclusion Criteria:**
  - All BID cases documented in the Department of Emergency Medicine's Register Book during the specified study periods.
  - For the survey component in Phase I, cases with available and correct contact information of bereaved relatives were included.
- **Exclusion Criteria:**
  - Cases with incomplete or missing data in the register book.
  - For the survey component, cases where family members could not be contacted or declined to participate.

Sample Size Calculation

- **Phase I:** A census of all BID cases (N=468) from the hospital's register book over a two-year period (June/July 2017 to May/June 2019) was included in the retrospective analysis. For the survey component, a potential interview sample of approximately 234 cases was selected.
- **Phase II:** This phase included all BID data collected from existing hospital records at TUTH over a three-year period (June/July 2019 to May/June 2022).

Sampling Technique

- **Retrospective Records Review:** A census approach was utilized for the retrospective components of both Phase I and Phase II. This means every available BID case from the specified time periods was included in the analysis.
- **Survey Component (Phase I):** A convenient sampling method was used for the telephone interviews. Every second case listed in the BID register with contact information was selected for a potential interview.

Data Collection Technique and Tool

- **Phase I:**
  - **Retrospective Records:** Data was extracted from the Register Book in the Department of Emergency Medicine and digitally entered.
  - **Survey Component:** Structured interviews were conducted via telephone. This aimed to gather additional data on health-seeking behavior, awareness of emergency response procedures, and the utilization of Pre-Hospital Emergency Care (PHEC) services.
- **Phase II:** Data was drawn from existing hospital records at TUTH.

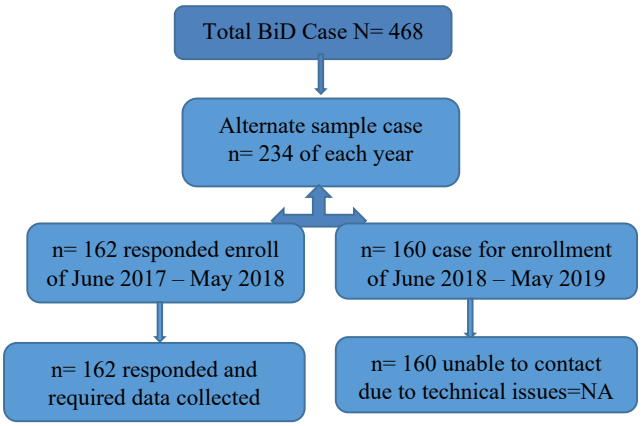
Analysis

All quantitative data was analyzed using Microsoft Excel 2024. Basic descriptive statistical methods were employed to summarize the data. The analysis of the retrospective data focused on patient demographics and characteristics, while the analysis of the survey data explored contextual factors not captured in the records.

Ethical Consideration

Ethical approval was obtained from the Institutional Review Board of the Institute of Medicine, Tribhuvan University (IRC Ref No.: 364/(6-11) E2/076/077) on March 11, 2020. A prospective design requiring informed consent from bereaved relatives was not ethically or practically feasible for the retrospective data collection. For the survey component, participation

was voluntary, and the interviews were designed to minimize emotional distress. All data was anonymized to protect the confidentiality of participants and respect the bereavement process.



RESULTS

There are average 45,625 emergency patients with 228 mortality in each year in the Emergency Department of TUTH. The results of Phase 1 Survey study of the DB as follows (Table 1). 322 BID patients were included in the phase I data spanning the pre-pandemic period (2017–2019), with162 families responding to the survey questions (Table 1). BID patients during this period were transported from both within (54.5%) and outside (42.5%) the Kathmandu Valley, reflecting the hospital's role as a national referral centre; as such journey times varied greatly. The age range spanned all groups, with the age of SD 21.65 years of age of BID cases with males accounting for 57% of cases. 86% of deaths had no documented cause, and public knowledge of emergency response was extremely limited—only 1–2% of respondents were aware of basic first aid or the importance of hospital transfer, and none knew the national emergency number (102). This finding was reflected in the mode of transportation of BID patient, with the majority arriving at TUTH by informal means. The 'Yes" means know it all, 'No' means not at all knows and 'Not Known' means the responder has knowledge, experience or understanding but not done.

Table 1: Survey Data June 2017- June 2019

Brought Dead (BID) - Particulars	Data Collection & presentation		Percentage Analysis
	June 2017 to May 2018	June 2018 to May 2019	
BID Time of Arrival	n= 162	n= 160	Mean%
Morning Shift 9:00 – 15:00	37 (23%)	43 (27%)	25
Afternoon Shift 15:00 – 21:00	55 (34%)	51 (32%)	33
Night Shift 21:00 – 9:00	70 (43%)	66 (41%)	42

Brought Dead (BID) - Particulars	Data Collection & presentation		Percentage Analysis
BID from in and outside Kathmandu Valley			
BID from Kathmandu Valley	88 (54%)	87 (55%)	54.5
BID from Outside of Kathmandu Valley	71 (44%)	67 (41%)	42.5
BID from Abroad	3 (2%)	6 (4%)	4
Age Group Distribution			
0 – 15 Years	10 (6%)	6 (4%)	5
16 – 30 Years	22 (14%)	10 (6%)	10
31 – 45 Years	28 (30%)	25 (16%)	23
45 – 60 Years	30 (19%)	39 (24%)	21.5
61 – 75 Years	47 (29%)	43 (27%)	28
76 – 90 Years	23 (14%)	31 (19%)	16.5
>91 Years	2 (1%)	3 (2%)	1.5
Unknown	0	3 (2%)	1
Mean Age	53.9	57.9	55.9
Median Age	56	60	58
SD of Age	22.4	20.9	21.65
Minimum Age of BID	2	1	1.5
Maximum Age of BID	98	100	99
Gender of BID Cases			
Male	90 (56%)	93 (58%)	57
Female	72 (44%)	67 (42%)	43
Underlying Problem of BID Case			
Known	23 (14%)	NA	14
Unknown	139 (86%)	NA	86
Knowledge to take the BID Patient nearby Hospital			
Yes	3 (2%)	NA	2
No	24 (15%)	NA	15
Not Known	135 (83%)	NA	83
Knowledge to perform First Aid			
Yes	2 (1%)	NA	1
No	22 (14%)	NA	14
Not Known	138 (85%)	NA	85
Mode of Transportation of BID Case			
Ambulance	49 (30%)	NA	30
Own Vehicle	11 (7%)	NA	7
Taxi and Others	96 (59%)	NA	59
Helicopter	6 (4%)	NA	4
Knowledge of Calling Pre-Hospital Service 102			
Yes	0 (0%)	NA	0
No	27 (17%)	NA	17
Not Known	135 (83%)	NA	83
Time duration of Travel of Patient to reach ED, TUTH (BID Case Arrival)			
< 30 minutes	49 (30%)	NA	30
30 – 60 minutes	26 (16%)	NA	16
1 – 6 hours	18 (11%)	NA	11
7 – 12 hours	11 (7%)	NA	7
13 – 24 hours	29 (18%)	NA	18
> 24 hours	29 (18%)	NA	18

During Phase II Survey study between 2019 and 2022, the Department of Emergency Medicine (DEM) at TUTH a total of 106,488 patients were recorded in the emergency department, with males comprising 52.6% and females 47.4% of the total caseload (Figure 1). Across this period, there were 619 DEM deaths and 509 cases classified as BID cases, accounting for nearly half of all recorded deaths (Figure 2).

Figure 1: *3 Years Census of Emergency Patients of DEM, TUTH from June-July 2019 – May-June 2022 (According to Nepali Fiscal Year)*

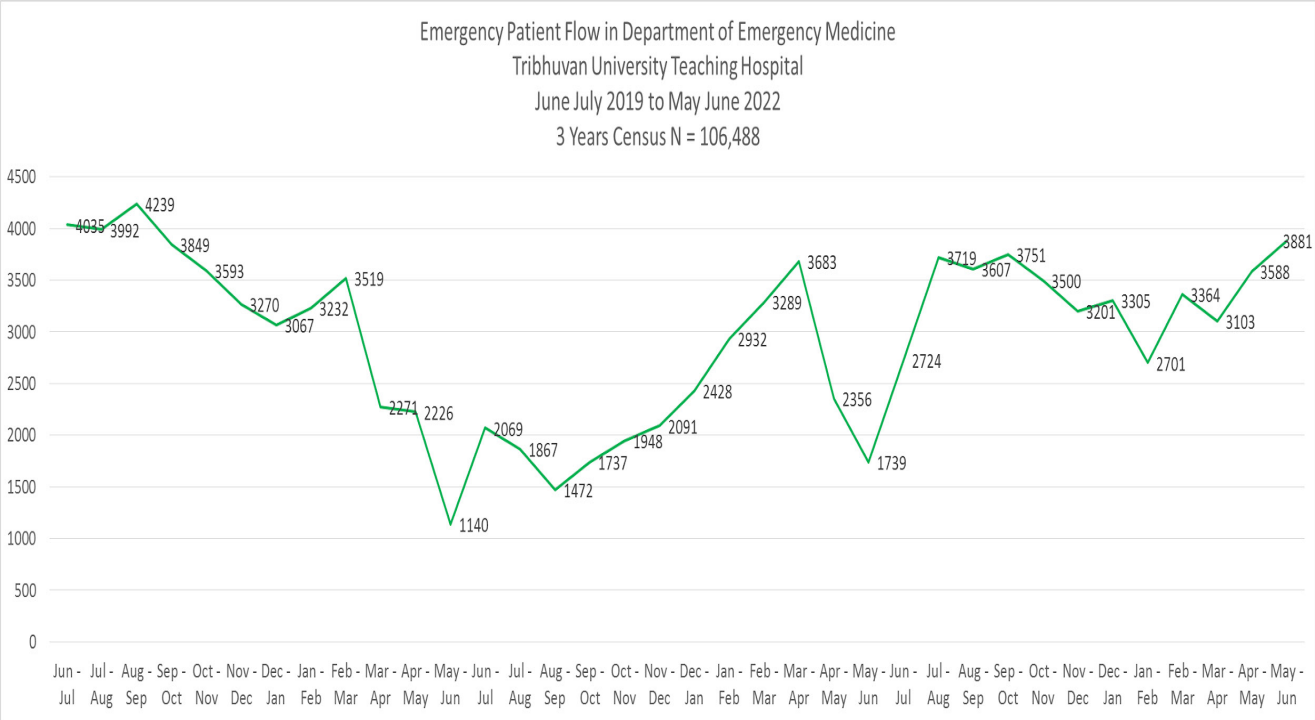
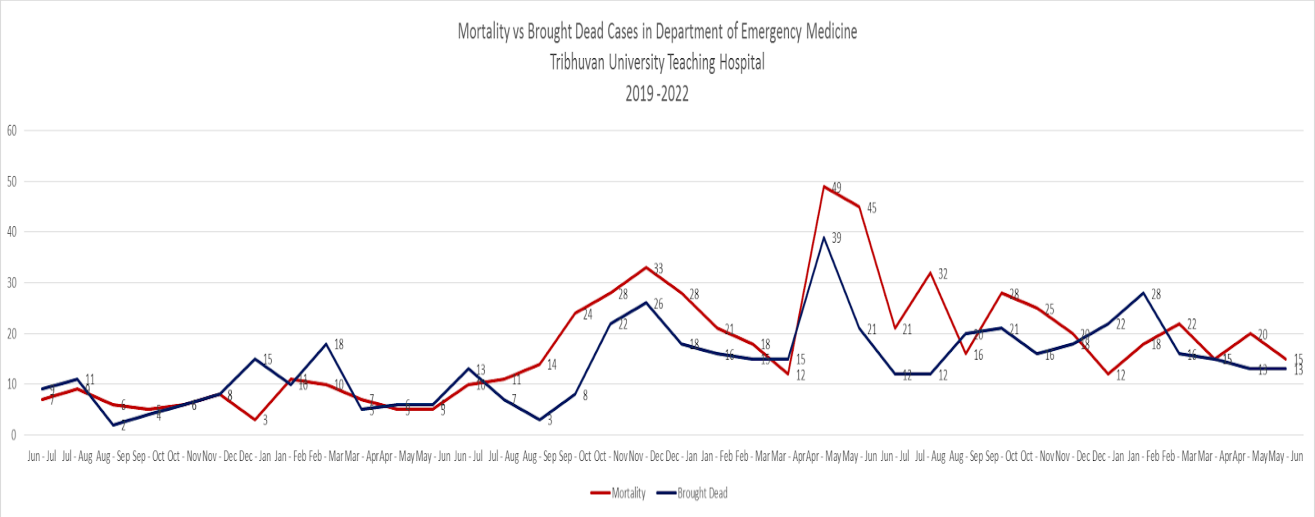


Figure 2: *3 Years Mortality Census Death and BID in DEM, TUTH from June-July 2019 – May-June 2022 (According to Nepali Fiscal Year)*



The department experienced fluctuations in patient volume and mortality trends corresponding with the COVID-19 pandemic. This period saw a substantial rise in both in-hospital DEM deaths (293) and BID cases (203), compared to 82 and 100 respectively in 2019–2020. In 2021–2022, total patient numbers remained elevated compared to pre-pandemic levels. (Figure 3)

Table 2: Mortality vs BID during Covid-19 Period June 2019 - May 2022

Year	Total ED Patient	Total Death in ED	ED Mortality Rate	Total BID	BID Mortality Rate	Total Deaths	Mortality Rate
2019-20	38433	82	2.1%	100	2.6%	182	4.7%
2020-21	27611	293	10.6%	203	7.4%	496	18.0%
2021-22	40444	244	6.3%	206	5.1%	450	11.1%
Total	106488	619	5.8%	509	5.0%	1128	10.6%
Mean			6.3%	Mean	5.0%	Mean	11.3%
SD			4.3%	SD	2.4%	SD	6.7%

Figure 3: *3 Years Mortality Census during Covid-19 Period of DEM, TUTH from June-July 2019 – May-June 2022 (According to Nepali Fiscal Year)*

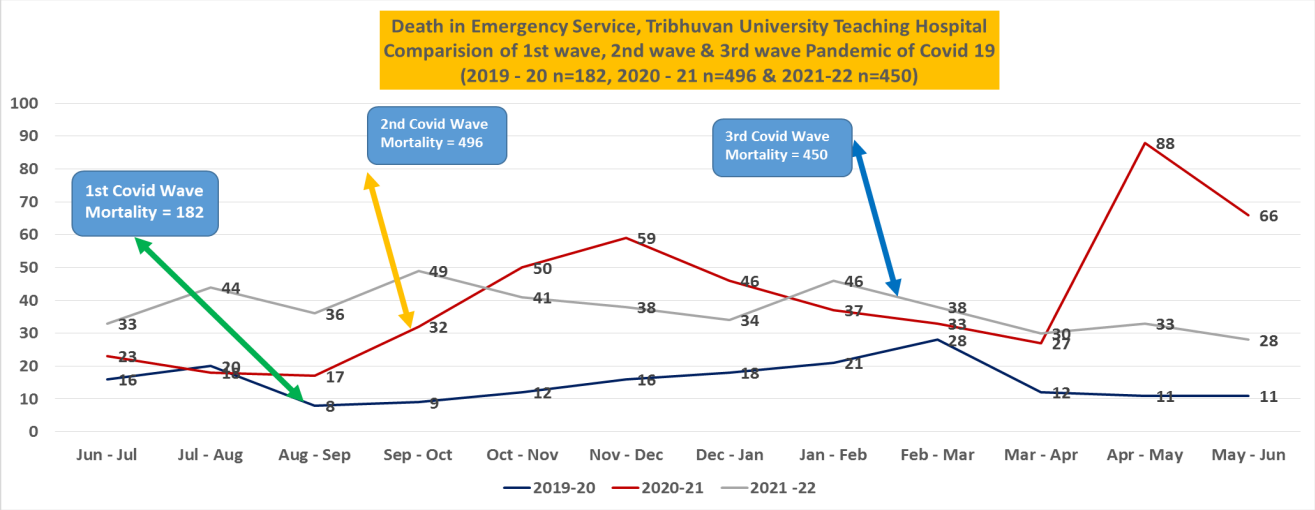
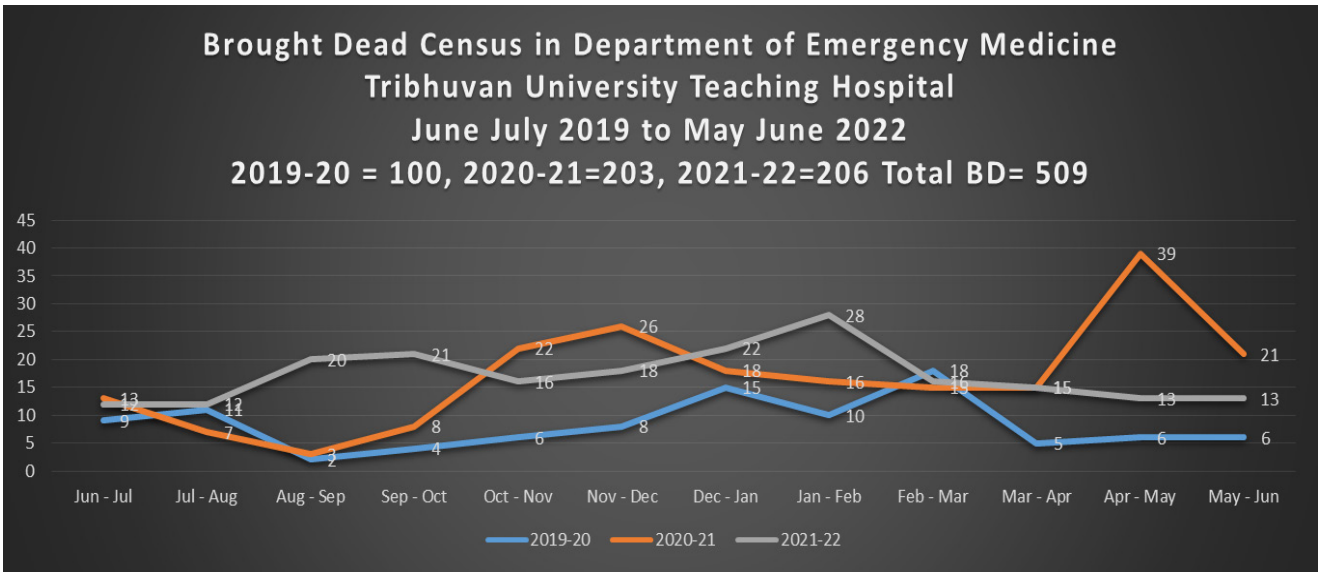


Figure 4: *3 Years Brought Death Census during Covid-19 Period of DEM, TUTH from June-July 2019 – May-June 2022 (According to Nepali Fiscal Year)*



DISCUSSION

The proportion of Brought Dead (BID) cases has been reported variously across various study sites in low- and middle-income countries (LMICs)[7-9, 11,12]. However, At Tribhuvan University Teaching Hospital (TUTH), the rates observed were notably higher than other studies, with an average of one to two cases every two days and all deaths recorded at the Emergency Department during phase II of the study. These figures for BID patients exceed those reported in a previous 2011 study from TUTH[13] and likely to reflect the inclusion of data

from the Covid-19 pandemic within the study period. Nevertheless, when combined with pre-pandemic survey data, the high number of cases seen in the more recent data underscores persistent gaps in the PHEC system and limited health literacy within the sample population.

In this study, majority of BID patients were transported by taxi or other informal means, whilst only one-third arrived by ambulance. Studies from other low- and middle-income countries (LMICs) similarly report low rates of ambulance utilisation among BID cases[7-9,11]. An exception is a study from India, which documented an unusually high ambulance utilisation rate of 77%, with most of these vehicles being well-resourced and staffed by trained medical personnel[12]. By contrast, in Nepal, the PHEC system remains largely underdeveloped. Ambulances are typically poorly equipped and operate as patient-funded transport, often providing little more than a stretcher and a minimally trained driver[14]. Very few even minimal ambulances are staffed by Emergency Medical Technicians (EMTs)[15]. Therefore, even BID patients who arrived by ambulance were extremely unlikely to have been attended by a trained medical professional or transported in a well-equipped vehicle.

The findings also indicate low public awareness of how to initiate an ambulance response. None of the families involved in BID cases reported calling the '102' national emergency number. Despite recent efforts to promote it within Kathmandu, the toll-free service established in 2013, remains largely underutilised, highlighting the limited understanding of the role and significance of PHEC in Nepal[16]. Recent qualitative studies have highlighted this limited understanding, revealing that first responders tasked with providing injury care frequently faced mistrust and even resistance from bystanders, who feared potential social and legal repercussions if the patient's outcome was unfavourable[17,18]. Thus, even when a response is initiated, systemic and sociocultural barriers may undermine its effectiveness and likely contribute to the high incidence of brought dead (BID) cases observed in this study.

In the majority of cases, the deceased's underlying health condition was unknown to family members, highlighting delays in health-seeking behaviour and/or a lack of diagnostic capacity at the community level. Moreover, the sample population demonstrated a clear lack of first aid knowledge, a finding echoed across other study sites within the country, highlighting a significant gap in basic emergency care capacity at the community level[18]. Limited understanding of health conditions and poor awareness of what constitutes a medical emergency are well-documented barriers to timely emergency care access in LMICs[8]. These findings align with the model proposed by Calvello *et al.,* which links poor emergency care outcomes to a combination of factors, including failure to recognise the need for care and difficulty accessing health facilities; factors shaped by socioeconomic, cultural, and infrastructural barriers[10]. One way to improve this situation could be to introduce community training in emergency recognition and basic first response, that has been shown to improve outcomes[19,20]. While these challenges may reflect broader deficiencies in primary healthcare services, the presence of an effective PHEC system could support earlier recognition of critical illness and facilitate a more appropriate clinical response.

Notably, a negligible number of families or accompanying individuals were aware of the need to transport the patient to the nearest hospital. Of the BID patients presenting to TUTH, almost half of the BID arrived after less than one hour of travel time and can be considered as coming from the metropolitan area of Kathmandu and its environs. This short period of travel suggests that whilst patients were recognised as requiring urgent transportation to the emergency department, essential interventions may not have been initiated and the need for transport to the nearest hospital not considered. Similarly, where longer travel times were recorded, it suggests clinical deterioration during transit that was neither adequately recognised nor responded to, including by diverting to a closer emergency facility. Although referral status was not recorded, it is plausible that many had prior contact with healthcare providers before arriving at TUTH, given that half of BID patients came from outside the Kathmandu Valley.

While these findings underscore the urgent need to strengthen public health education and improve access to PHEC, there remains significant scope for further research into health-seeking behaviours and the provision of PHEC within the country, both of which may influence pre-hospital mortality.

This study is subject to several limitations. Incomplete or inconsistent hospital records, particularly regarding clinical details and timing, hinder the reliability of the data. The reliance on retrospective data further limits the ability to establish causal relationships. Additionally, data collected during the COVID-19 pandemic may reflect temporary disruptions, potentially skewing the overall incidence of brought-dead (BID) cases and obscuring broader systemic issues in PHEC.

The absence of documented causes of death in major of BID cases further constrains the analysis of mortality factors. Moreover, the use of non-probability sampling and telephone interviews introduces potential selection and recall bias, with responses possibly influenced by emotional distress. Although TUTH functions as a national referral centre, the sample may underrepresent rural populations—particularly those in remote areas—where emergency care is even more limited.

CONCLUSIONS

BID cases are more than the deaths in the ED during the emergency management signifies that the Pre-Hospital Emergency Care Service is very primitive phase in Nepal. Therefore, this study emphasize in development of Pre-Hospital Emergency Care System in Nepal. This study further recommend to do BID Registry Development in entire hospitals of Nepal for conclusive policy making and implementation to minimise the preventable deaths in Pre-Hospital Emergency Care Period in Nepal. Factors such as delayed transport, limited public awareness of first aid, underutilisation of ambulance services and low engagement with emergency care systems, all point to systemic weaknesses contributing to the high incidence of brought dead presentations those need more elaborative in coming further study of BiD. Enhancing pre-hospital care, through measures such as public health education, improved emergency response infrastructure, and accessible transport, may be critical to reducing preventable pre-hospital deaths.

ACKNOWLEDGEMENT

We would lik eto acknowledge all the staffs of department of Emergency Medicine, TUTH.

CONFLICT OF INTEREST

None

FUNDING

This study was funded with the authors' own contributions.

REFERENCES

1. Bove DG, Sørensen N, Timm H, Herling SF, Gjersøe P. Patient Characteristics of Persons Dead on Arrival Received in a Danish Emergency Department: A Retrospective Review of Health Records. J Emerg Nurs. 2021 Jul;47(4):582-589.e1. doi: 10.1016/j.jen.2021.01.007. Epub 2021 Feb 26. PMID: 33642054.
2. Government of Nepal, Ministry of Health and Population. *The National Ambulance Guideline 2078* [Internet]. Kathmandu: GON MOHP; 202. Available from: https://publichealthupdate.com/nepal-ambulance-guideline-2078/#:~:text=The%20National%20Ambulance%20Guideline%202078,provide%20ambulance%20service%20in%20Nepal
3. Bhandari D, Yadav NK. Developing an integrated emergency medical services in a low-income country like Nepal: a concept paper. *Int J Emerg Med*. 2020;13(1):7. doi:10.1186/s12245-020-0268-1
4. Baral S, Sapkota N, Shrestha S, et al. Emergency medical services in Nepal: a study of current practices and future needs. *J Nepal Med Assoc*. 2023;61(243):1–8. doi:10.31729/jnma.6611
5. Calland JF, Nathens AB, Young JS, Neal ML, Goble S, Abelson J, Fildes JJ, Hemmila MR. The effect of dead-on-arrival and emergency department death classification on risk-adjusted performance in the American College of Surgeons Trauma Quality Improvement Program. J Trauma Acute Care Surg. 2012 Nov;73(5):1086-91; discussion 1091-2. doi: 10.1097/TA.0b013e31826fc7a0. PMID: 23117375.
6. Orish VN, Ansong JY, Anagi IB, Onyeabor OS, Okorie C, Sanyaolu AO, et al. Cases of brought in dead patients in the accident and emergency unit of a referral hospital in the Western Region of Ghana. *Open Access Libr J*. 2014;1:e1179. doi:10.4236/oalib.1101179
7. Khursheed M, Ashraf T, Shoaib M, Imran N, Sarfraz M, Idrees Z, et al. Dead on arrival in emergency department: A retrospective chart review of a tertiary care hospital in Pakistan. *BMC Emerg Med*. 2015;15(Suppl 2):S8. Available from: http://www.biomedcentral.com/1471-227X/15/S2/S8
8. Lwin AMM, Santikarn C, Aung TL, et al. PW 0946 Pre-hospital care for severely injured patients in Myanmar. *Inj Prev*. 2018;24(Suppl 2):A247–A248. Available from: https://injuryprevention.bmj.com/content/24/Suppl_2/A247.3
9. Calvello EJ, Skog AP, Tenner AG, Wallis LA. Applying the lessons of maternal mortality reduction to global emergency health. *Bull World Health Organ*. 2015;93(6):417–423. doi:10.2471/BLT.14.146571
10. Patel SK, Singh J, Visshwakarma K. Brought dead cases in tertiary care hospital in central India. *Indian J Crit Care Med*. 2017;21(1):62–63. doi:10.4103/0972-5229.198333
11. Kumar P, Nallasamy K, Jayashree M, Praveen Kumar. Brought in dead cases to a tertiary referral paediatric emergency department in India: a prospective qualitative study. *BMJ Paediatr Open*. 2020;4:e000606. doi:10.1136/bmjpo-2019-000606
12. Maharjan RK. Mortality pattern in the emergency department in Tribhuvan University Teaching Hospital, Kathmandu, Nepal. *Prehosp Disaster Med*. 2011;26(3):1–5. doi:10.1017/S1049023X11005206
13. Bhandari D, Yadav NK. Developing an integrated emergency medical services in a low-income country like Nepal: a concept paper. Int J Emerg Med. 2020;13(1):7. https://doi.org/10.1186/s12245-020-0268-1
14. Banstola A, Mytton J, Joshi E, et al. Emergency medical services in Nepal: a study of current practices and future needs. J Nepal Med Assoc. 2021;59(233):1-8. https://doi.org/10.31729/jnma.6611
15. Wilson N, Cunningham A, Coleman E, Patterson C, Nnajiuba H, Guerrero A, Frith D. Challenges facing a new prehospital care service in the developing world: the Nepali Ambulance Service (NAS). *Scand J Trauma Resusc Emerg Med*. 2013;21(Suppl 1):S13. doi:10.1186/1757-7241-21-S1-S13
16. Smart, G., Banstola, A., Raut, R., Ghimire, K., Mytton, J., Joshi, E., & Joshi, S. (2022). Post-Crash First Response by Traffic Police in Nepal: A Feasibility Study. International journal of environmental research and public health, 19(14), 8481. https://doi.org/10.3390/ijerph19148481
17. Pandey B, Banstola A, Smart G, Joshi SK, Mytton J. Barriers and facilitators to learning and using first aid skills for road traffic crash victims in Nepal: a qualitative study. *Natl Inst Health Care Res*. 2024. doi:10.3310/UTKW7640
18. Ramu, K., Mandeep, P., Derek, L., Timmy, L., Roshan, P., Logan, B., Camille, L., Janette, B., Bibhav, A., Adam, R. A. and Michael, J. M. (2025) 'Adapting and implementing a pre-hospital trauma program for community health responders: A pilot study from rural Nepal'. *Injury*, p. 112229. Available at: https://doi.org/10.1016/j.injury.2025.112229.
19. Hirshon JM, Risko N, Calvello EJ, Stewart de Ramirez S, Narayan M, Theodosis C, et al. Health systems and services: the role of acute care. *Bull World Health Organ*. 2013;91(5):386–388. doi:10.2471/BLT.12.112664
20. https://nhrc.gov.np/wp-content/uploads/2022/02/BoD-Report-Book-includ-Cover-mail-6_compressed.pdf