

## A Study of the Assessment of Hospital Referrals before Death amongst Cases Coming for Autopsy at a Tertiary Care Hospital

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Received: 01-12-2025 / Revised: 15-01-2026 / Accepted: 21-02-2026

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Conflict of interest: Nil

### Abstract

**Background and justification:** With an overall increase in the global burden of diseases leading to increased morbidity and mortality, there has been an ever-growing demand of more manpower in the health sector. With increasing demand for specialty-based care and limited resources to meet the demand, an effective and efficient referral system is essential.

**Objectives:** The study has been done to estimate the number of referrals in relation to the cause of death, to find out the number of cases with referrals in between tertiary care centres and to estimate the distance between the initial health centre and the hospital where the death is occurring.

**Methodology:** It was a retrospective autopsy record-based study of 1 year duration in which cases where there were at least one or more than one referral during the course of treatment were taken. Cases where there was inadequate information regarding hospital referrals, brought dead cases and cases where the patients left against medical advice during the course of treatment were excluded.

**Results:** 125 cases of head injury, 129 cases of polytrauma, 79 cases of burns, 105 cases of poisoning and 118 other cases were referred to four different hospitals. In 520 cases, the distance between the initial health centre and the last hospital where the patient died was 151-200 kilometers.

**Conclusion:** An increase in hospital referrals while aiming to provide necessary care can paradoxically contribute to mortality if not managed effectively.

**Keywords:** Mortality; referral; tertiary care centre; hospital.

**DOI:** 10.25258/ijcpr.18.3.40

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### Introduction

With increasing prevalence of chronic diseases and due to an overall increase in the global burden of diseases leading to increased morbidity and mortality, there has been an ever-growing demand of more manpower in the health sector. More number of doctors and other healthcare professionals demand a multi-structured and well organised healthcare system starting from the baseline subcentre level eventually leading up to the tertiary care hospitals.

A well-organised multi-structured healthcare system has to have its focus on the quality of care and good quality of care and treatment demands proper resources and infrastructure too. In developing countries like India, though there is a huge input of multiple healthcare professionals annually still it has been observed that due to lack of proper resources and other associated factors the

patients are referred from one healthcare centre to the other despite adequate manpower being available at the healthcare centre from where the patient is being referred to [1]. This study does not aim to point out the deficiencies in the existing health care system however it aims to represent the data of referral system in relation to the different types of deaths in medicolegal cases that we receive so that any intervention if needed, it can be done by the concerned authorities.

Improving access to specialty care has been identified as an important issue as outcome of the patients might be compromised owing to delay in treatment or management. Not just this, proper coordination between primary health care facility and specialty-based health care facility should also be ensured for effective and timely management. Easy and short distance accessibility of specialty-

based healthcare facilities is a vital factor as the transportation of morbid patients over long distances can delay timely and appropriate management leading to mortality.

There are multiple reasons as to why a patient might be referred to a specialty-based healthcare facility including inability in arriving at a proper diagnosis, proper management advice and treatment beyond the scope of the primary care physician.

With increasing demand for specialty-based care and limited resources to meet the demand, an effective and efficient referral system is essential to ensure smooth flow of patients across the primary-specialty care interface. Referrals should be necessary, appropriate, timely and well communicated to prevent mortality [2].

General health care practitioners and primary health care providers have been the gatekeepers in relation to acute hospital admissions. Even with improved hospital infrastructure, the increased number of referrals is still a matter of concern causing burden not only on the healthcare system but also causing grave impact on the economical as well as mental wellbeing of both the patients and their family members.

Government is issuing time to time guidelines to decrease the tendency of referrals but in practical field the picture has not changed yet. Though there are many reasons of referral as listed above, as to how such multiple number of referrals are interfering with the timely management of the patients leading to mortality is the main topic of concern in this study.

Although few studies both international-based as well as national-based are available focussing on the effects of the referral system on the outcome of patient care, still no autopsy based retrospective study has been done neither in India nor in West Bengal which particularly focusses on the relationship and the effects of multiple hospital referrals on mortality.

Through this study, the relationship between the pattern of mortality and the number of hospital referrals can be established which can help the health care systems to manage and refer the patients in a rational, timely and effective manner.

**Aim of the study:** To find out the number of hospital referrals and their association with the pattern of mortality in medicolegal cases.

**Objectives of the study:** 1. To estimate the number of hospital referrals in relation to the cause of death.

2. To estimate the distance between the initial health centre and the hospital where the death is occurring.

### Materials and Methodology

**Study Design:** Retrospective autopsy record-based study.

**Study Period:** January 2024 to December 2024.

**Study Area:** Department of Forensic Medicine and Toxicology, NRSMCH, Kolkata.

**Study Population:** All cases which were brought for medicolegal autopsy at the Department of Forensic Medicine and Toxicology, NRSMCH.

**Inclusion Criteria:** Cases where there was at least one or more than one referral during the course of treatment.

### Exclusion Criteria:

1. Cases with inadequate history or with inadequate information regarding hospital referrals.
2. Brought dead cases without any previous admission history.
3. Cases where the patients left against medical advice (LAMA) during the course of treatment.

**Sample size and sampling procedure:** All the cases which came for medicolegal autopsy at our tertiary care hospital morgue from January 2024 to December 2024 have been taken into account considering both the inclusion and the exclusion criteria.

**Data collection:** Data was collected from:

- Hospital records.
- Police inquest and requisition related information.
- Medicolegal autopsy reports.
- Information related to approximate distance from place of occurrence to place of death was calculated using Google maps.

Data was then recorded in a pre-designed proforma.

**Data analysis:** All the data were plotted in excel sheet and the analysis was performed using the latest version of SPSS software (version 29). The results have been represented in the form of tables and charts.

**Human subject protection:** Approval from the esteemed Institutional Ethics Committee was obtained bearing the Memo no. NRSMC/IEC/222/2024.

### Results

The results have been represented in the form of tables as given below.

As is seen from Table 1, 14 cases (4.2 % of the head injury cases) were referred to one hospital, 94 cases (28.2 % of the head injury cases) were referred to two hospitals, 99 cases (30 % of the head injury cases) were referred to three hospitals and 125 cases (37.6 % of the head injury cases) were referred to four hospitals. As is shown in Table 1, 27 cases (8.1 % of the polytrauma cases) were referred to one hospital, 83 cases (25 % of the polytrauma cases) were referred to two hospitals, 93 cases (28 % of the polytrauma cases) were referred to three hospitals and 129 cases (38.9 % of the polytrauma cases) were referred to four hospitals.

As is shown in Table 1, 11 cases (4.3 % of the burn cases) were referred to one hospital, 115 cases (45.1 % of the burn cases) were referred to two hospitals, 50 cases (19.6 % of the burn cases) were referred to three hospitals and 79 cases (31 % of the burn cases) were referred to four hospitals.

As is shown in Table 1, 4 cases (2 % of the poisoning cases) were referred to one hospital, 47

cases (23.7 % of the poisoning cases) were referred to two hospitals, 42 cases (21.3 % of the poisoning cases) were referred to three hospitals and 105 cases (53 % of the poisoning cases) were referred to four hospitals.

As is shown in Table 1, 33 cases (16.7 % of the other types of cases) were referred to two hospitals, 47 cases (23.7 % of the other types of cases) were referred to three hospitals and 118 cases (59.6 % of the other types of cases) were referred to four hospitals.

Table 2 depicts that the distance between the initial health centre and the last hospital where the patient died was < 50 kilometres for 56 cases (4.3 % of the study population), 50 to 100 kilometres for 203 cases (15.4 % of the study population), 101 to 150 kilometres for 332 cases (25.2 % of the study population), 151 to 200 kilometres for 520 cases (39.5 % of the study population) and more than 200 kilometres for 204 cases (15.6 % of the study population).

**Table 1: showing the distribution of the number of hospital referrals with respect to the different types of cases in the study population.**

Number of referrals in head injury cases		
Number of times the cases had been referred between different hospitals	Number of head injury cases which had been referred	Percentage (%)
Referred to one hospital	14	4.2
Referred to two hospitals	94	28.2
Referred to three hospitals	99	30.0
Referred to four hospitals	125	37.6
Total	332	100
Number of referrals in cases of polytrauma		
Number of times the cases had been referred between different hospitals	Number of cases of polytrauma which had been referred	Percentage (%)
Referred to one hospital	27	8.1
Referred to two hospitals	83	25.0
Referred to three hospitals	93	28.0
Referred to four hospitals	129	38.9
Total	332	100
Number of referrals in cases of burn		
Number of times the cases had been referred between different hospitals	Number of cases of burn which had been referred	Percentage (%)
Referred to one hospital	11	4.3
Referred to two hospitals	115	45.1
Referred to three hospitals	50	19.6
Referred to four hospitals	79	31.0
Total	255	100
Number of referrals in cases of poisoning		
Number of times the cases had been referred between different hospitals	Number of cases of poisoning which had been referred	Percentage (%)
Referred to one hospital	4	2.0
Referred to two hospitals	47	23.7
Referred to three hospitals	42	21.3
Referred to four hospitals	105	53.0
Total	198	100
Number of referrals in other types of cases		

Number of times the cases had been referred between different hospitals	Number of other types of cases which had been referred	Percentage (%)
Referred to one hospital	0	0
Referred to two hospitals	33	16.7
Referred to three hospitals	47	23.7
Referred to four hospitals	118	59.6
Total	198	100

**Table 2: showing the distribution of the number of cases in relation to the distance between the initial health centre and the last hospital where the death is occurring.**

Distance between the initial health centre and the last hospital where the death is occurring	Number of cases	Percentage (%)
<50 kilometres	56	4.3
50-100 kilometres	203	15.4
101-150 kilometres	332	25.2
151-200 kilometres	520	39.5
>200 kilometres	204	15.6
Total	1315	100

### Discussion:

In a study conducted by Blinkenberg et.al, of all 265,518 acute hospital referrals from GPs or OOH doctors in 2017, GPs accounted for 43% and OOH doctors 57%. The overall referral rate per contact was 0.01 from GPs and 0.11 from OOH doctors, with large variations by referral diagnosis. Abdominal pain (D01) (8%) and chest pain (A11) (5%) were the most frequent referral diagnoses. For abdominal pain and chest pain referrals the most frequent discharge diagnosis was the corresponding ICD-10 symptom diagnosis, whereas for pneumonia, appendicitis, acute myocardial infarction and stroke referrals the corresponding disease diagnosis was most frequent. Women referred with chest pain were less likely to be discharged with ischemic heart disease than men [3]. In a study conducted by Poulouse et.al, of 842 patients, 52% were female and 56% were aged 65 years or older. Terminal cancer was the diagnosis for most patients (86%). Three hundred ninety patients (46%) died outside the hospital setting.

A referral-to-death interval of  $\geq 30$  days (as opposed to  $< 30$  days) was associated with an increased likelihood of dying at home (odds ratio [OR] 2.21, 95% CI 1.34–3.67 for males and OR 3.33, 95% CI 2.07–5.35 for females) or in an inpatient hospice facility (OR 2.02, 95% CI 1.13–3.60 for males and OR 2.69, 95% CI 1.55–4.66 for females) compared with death in hospital. Male patients' age, ethnicity, and marital status were found to be the contributing factors in predicting death at home [4].

In a study conducted by Isaacs et.al, almost 86% of patients showed improvement after treatment at referral centres while twelve referred patients did not seek treatment after getting symptomatic relief. Two referred patients, one with uncontrolled diabetes and the other with AMI died. IHD in rural areas need special attention [5]. This study has

been done to address the paucity in literature regarding the association of the number of hospital referrals with the cause of death. In our study, as is seen from Table 1, 14 cases (4.2 % of the head injury cases) were referred to one hospital, 94 cases (28.2 % of the head injury cases) were referred to two hospitals, 99 cases (30 % of the head injury cases) were referred to three hospitals and 125 cases (37.6 % of the head injury cases) were referred to four hospitals.

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It is clearly seen from Table 1 that 11 cases (4.3 % of the burn cases) were referred to one hospital, 115 cases (45.1 % of the burn cases) were referred to two hospitals, 50 cases (19.6 % of the burn cases) were referred to three hospitals and 79 cases (31 % of the burn cases) were referred to four hospitals.

Table 1 depicts that 4 cases (2 % of the poisoning cases) were referred to one hospital, 47 cases (23.7 % of the poisoning cases) were referred to two hospitals, 42 cases (21.3 % of the poisoning cases) were referred to three hospitals and 105 cases (53 % of the poisoning cases) were referred to four hospitals.

Table 1 also shows that 33 cases (16.7 % of the other types of cases) were referred to two hospitals, 47 cases (23.7 % of the other types of cases) were referred to three hospitals and 118 cases (59.6 % of the other types of cases) were referred to four hospitals.

The increasing number of referrals between various health centres and hospitals can be attributed to a number of factors like: inadequate infrastructure with non-availability of resources to deal with complex medicolegal and emergency cases, inadequate number of specialist doctors and shortage of manpower in general, lack of proper specialised care due to increased load and influx of patients coupled with an absence of a proper strict referral protocol which would enable the hospitals to refer cases to other hospitals judiciously

Table 2 depicts that the distance between the initial health centre and the last hospital where the patient died was < 50 kilometres for 56 cases (4.3 % of the study population), 50 to 100 kilometres for 203 cases (15.4 % of the study population), 101 to 150 kilometres for 332 cases (25.2 % of the study population), 151 to 200 kilometres for 520 cases (39.5 % of the study population) and more than 200 kilometres for 204 cases (15.6 % of the study population).

This long distance between referrals in various cases can be owed to the fact that there is poor connectivity and transportation in many peripheral and rural areas along with lack of proper ambulatory services in these areas. Lack of manpower, inadequate infrastructure coupled with lack of proper critical care in these peripheral health centres and hospitals often contribute to situations where the relatives of such patients are asked to access higher hospitals in urban areas with better expert care in order to save the life of the patient.

#### Conclusion and recommendations:

An increase in hospital referrals while aiming to provide necessary care, can paradoxically contribute to mortality if not managed effectively. This is due to several interconnected factors.

Firstly, the existing healthcare infrastructure particularly at tertiary levels can become overwhelmed leading to delays in timely and appropriate care for referred patients. Secondly, the referral process itself, if inefficient or poorly coordinated, can result in critical time loss, especially in emergency cases.

Factors such as lack of adequate transportation, poor communication between referring and receiving facilities, and absence of standardized referral protocols exacerbate these delays.

Moreover, inappropriate referrals of patients who could be managed at lower levels strain the resources of higher centres potentially compromising the quality of care for those with more critical needs.

Patients referred from private facilities may have a higher risk of mortality, possibly due to variations

in referral practices and pre-referral stabilization. Additionally, long travel distances to referral hospitals, particularly in rural areas, are associated with increased mortality, especially in vulnerable populations like newborns.

To mitigate mortality associated with increased hospital referrals, a multi-pronged approach is essential:

- **Strengthening Primary Healthcare:** Investing in and improving the infrastructure, resources, and capabilities of primary and secondary healthcare centres is crucial. This includes ensuring the availability of trained manpower, essential diagnostics, and treatment facilities at these levels to manage a wider range of conditions and reduce the need for referrals for minor ailments.
- **Implementing Efficient Referral Systems:** Establishing clear, standardized referral protocols with defined criteria for referrals at each level of care is necessary. This should include guidelines for pre-referral stabilization, proper documentation, and effective communication mechanisms between facilities. Innovations like electronic referral systems can streamline the process, reduce delays, and improve information exchange.
- **Leveraging Telemedicine:** Teleconsultation and remote monitoring can play a significant role in reducing unnecessary physical referrals. Telemedicine can facilitate timely advice from specialists to primary care physicians, guide management at lower levels, and help in deciding if a physical transfer is indeed necessary.
- **Improving Transportation Networks:** Ensuring access to timely and appropriate transportation, especially for patients in rural and remote areas, is critical. This may involve strengthening ambulance services and exploring innovative transportation solutions.
- **Capacity Building and Training:** Continuous training and capacity building for healthcare professionals at all levels are essential for accurate diagnosis, appropriate management, and effective implementation of referral protocols.
- **Community Awareness:** Educating the community about the appropriate levels of care for different conditions and the importance of following the referral pathways can help reduce self-referrals to higher centres for non-emergency cases.
- **Data-Driven Monitoring and Feedback:** Establishing systems for monitoring referral patterns, tracking patient outcomes post-referral, and providing feedback to referring facilities can help identify areas for

improvement in the referral process and overall healthcare delivery.

By focusing on these strategies, it can be ensured that hospital referrals serve their intended purpose of providing specialized care to those who need it most, without inadvertently contributing to increased mortality due to delays, overburdened facilities, or inefficient processes. Strengthening the foundational levels of healthcare and optimizing the referral pathway are key to improving overall health outcomes and reducing preventable deaths.

#### Limitations of the study:

1. The same study could have been done on a larger sample size which would have helped us in arriving at better precise results regarding association of the number of hospital referrals and other factors like distance between referrals with mortality.
2. The present study was conducted over a duration of one year. The same study could have been conducted over a longer duration of time to increase the validity of the results.

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