Original Research Article

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Correlation of Cause of Death Issued in Medico Legal Deaths in Hospitals and Cause of Death Found at Autopsy

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ABSTRACT

Background: The death certificate is essential for legal investigations and public health planning. This study examines the accuracy of causes of death reported by hospitals versus post-mortem findings and evaluates the completeness of death certificates.

Method: A prospective, descriptive study was conducted in 99 cases, with hospital-issued death certificates, brought for medico-legal autopsy to the Department of Forensic Medicine, Institute of Medicine, Maharajgunj Medical Campus. Cases which were brought dead to the hospital but still were issued with death certificates and cases where the cause of death remained undetermined even after autopsy were excluded. Data was recorded in a pro-forma and analyzed using the SPSS software Version 20.

Result: The study involved individuals aged 13 to 30 years, mostly male. Private hospitals issued 66.7% of death certificates, with 55.6% by house officers. Only 62.6% met WHO standards. Autopsies were performed within 24 hours in 67.7% of cases, revealing blunt force head injury as the leading cause of death (26.3%). There was a 67.7% discrepancy between hospital and autopsy causes of death, with house officers and government hospitals showing notable inconsistencies.

Conclusion: Factors like the use of standard or non-standard death certificates, the designation of doctors, and the type of hospital issuing the certificates influence the discrepancies between the causes of death listed by hospitals and those determined after autopsies. This study aims to enhance the existing knowledge on the accuracy of death certificates and is likely the first systematic study of its kind in Nepal, laying the groundwork for future research.

Key words: forensic; death; medico legal deaths; autopsy.

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INTRODUCTION

Death is traditionally defined as the cessation of life, marked by the stoppage of blood circulation and vital functions.[1] In 1968, the Harvard Ad-Hoc Committee introduced the concept of brain death, characterized by unresponsiveness, absence of movements and breathing, lack of reflexes, and a flat EEG.[2] Legally, death is defined as the irreversible cessation of the nervous, circulatory, and respiratory systems. A death certificate is a crucial legal and medical document that records an individual's death, including personal details and the cause of death. It is vital for legal and insurance purposes and plays a key role in public health by aiding in disease tracking, policy planning, and epidemiological studies.[3] The cause of death section on a certificate has two parts: Part 1 details the chain of events leading to death, while Part 2 lists other significant conditions contributing to death. Despite its importance, nearly two-thirds of global deaths (38 million out of 56 million annually) remain unregistered, especially in developing countries like Nepal, where many deaths occur outside hospitals and are rarely certified. Common errors in death certificates-such as multiple causes per line, incorrect sequences, and illegible handwriting-compromise the reliability of mortality data and hinder effective health policy execution. Accurate certification following WHO guidelines is essential for reliable data and informed public health planning.[4] The objective of this study was to document the cause of death at the hospital and post-autopsy, assess the completion and accuracy of death certificates, and compare the cause of death on certificates with findings from autopsies.

METHODS

Thia study was conducted to investigate hospital deaths registered for medico-legal autopsy at the Department of Forensic Medicine, Maharajgunj Medical Campus.

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The research focused on hospital deaths within the Kathmandu Valley and nearby districts, which were brought to the campus for autopsy and had death certificates issued. Utilizing convenience sampling, the sample size was approximated to 100 cases based on 96 death certificates collected over four months from hospital deaths, excluding those where cause of death was unascertainable or where certificates were not issued. Key variables included discrepancies between hospital-issued and autopsy-determined causes of death, the experience level of issuing doctors, and the standard and timing of death certificates. In this study data was collected using self structured questionnaire. Collected data was entered in SPSS. Data was analyzed using descriptive and inferential statistics. In descriptive statistics for categorical variable frequency and percentage. While for continuous variable mean and standard deviation. In the inferential statistics, to find the association between categorical variable chi-square test. p-value <0.05 was considered as statistically significant.

RESULTS

Out of the total, 10 (10.1%) were <12 years. The largest number of deaths, 36 (36.4%), occurred in the 13-30 year age group, followed by 28 (28.3%) in the 31-50 year age group. The ages of 2 deceased individuals were not recorded on their death certificates, and the average age of the deceased was 35.83 years. Of the deceased, 69 (69.7%) were male, 26 (26.3%) were female, and the sex of 4 (4%) was not specified. Out of 99 death certificates, 29 included abbreviations in the cause of death, while 70 did not. A total of 55 (55.6%) death certificates were issued by house officers, 27 (27.3%) by residents and consultants, and the doctor's designation was not listed in 17 (17.2%) cases. According to World Health Organization standards, 62 (62.6%) death certificates were compliant, while 37 (37.4%) were not. Of the certificates, 22 (22.2%) were from government hospitals, 11 (11.1%) from semi-government hospitals, and 66 (66.7%) from private hospitals. Most deceased were hospitalized for 24 hours to 7 days, with the duration not mentioned in 39 cases. Autopsies were performed within 24 hours for 67 (67.7%) cases and after more than 24 hours for 32 (32.3%) cases. The antecedent cause of death should be recorded in the correct sequence on the death certificate. There was a discrepancy between hospital and autopsy causes of death in 44 (44.4%) cases. The antecedent cause of death was accurately recorded and matched with the autopsy results in 55 (55.6%) cases (Table 1).

Table 1. Sociodemographic characteristics (n=99)	
Age	**Frequency (%)**
0-12	10(10.1)
13-30	36(36.4)
31-50	28(28.3)
>51	23(23.2)
Not mentioned	2(2)
Sex	
Male	69(69.7)
Female	26(26.3)
Not mentioned	4(4)
Use of abbreviation	
Present	29(29.3)
Absent	70(70.7)
Designation	
House officer	55(55.6)
Resident and Consultant	27(27.3)
Not mentioned	17(17.2)
Death Certificate	
Standard	62(62.6)
Non standard	37(37.4)
Hospitals	
Government	22(22.2)
Semi-Government	11(11.1)
Private	66(66.7)
Time interval between hospital stay and death	
<24 hours	20(2,.2)
24 to 7 days	26(7,.7)
>7 days	14(7,.7)
Not mentioned	39(39.4)
Time interval between death and autopsy examination	
<24 hours	67(67.7)
>24 hours	32(32.3)
Discrepancy between the hospital and post-autopsy cause of death	
Absent	67(67.7)
Present	32(32.3)
Discrepancy the hospital's antecedent and post autopsy cause of death	
Absent	56(56.6)
Present	44(44.4)

Blunt force injury to the head was identified as the cause of death in 26 cases (26.3%), making it one of the most common types of fatal injuries in our department.

Most of these cases resulted from road traffic accidents. Other blunt force injuries included: the neck in 3 cases (3.0%), the spine in 2 cases (2.0%), the chest in 3 cases (3.0%), the abdomen in 7 cases (7.1%), the pelvis in 1 case (1.0%), and the lower limbs in 3 cases (3.0%). Combined blunt force injuries were observed as follows: head and chest in 2 cases (2.0%), head and abdomen in 4 cases (4.0%), chest and abdomen in 1 case (1.0%), and head, chest, and abdomen in 3 cases (3.0%). Sharp force injuries were noted with head and neck injuries, each in 1 case (1.0%). Burn injuries were the leading cause of death in 27 cases (27.3%), reflecting their prevalence in our country, where burn victims often succumb to infections after treatment. Hanging was the cause of death in 1 case (1.0%), although the number of hanging cases arriving at our department is higher compared to burn deaths. Most hanging deaths are brought directly to the mortuary, bypassing the hospital. Other causes included electrocution in 6 cases (6.1%), drowning in 1 case (1.0%), lung disease in 2 cases (2.0%), liver disease in 1 case (1.0%), and valvular heart disease in 1 case (1.0%). Additionally, coronary artery disease, infective spondylitis, and upper gastrointestinal bleed were each the cause of death in 1 case (1.0%) (Table 2).

Table 2. Cause of death after autopsy

Cause of death	Frequency (%)
Blunt force injury to head	26(26.3)
Blunt force injury to neck	3(3)
Blunt force injury to spine	2(2)
Blunt force injury to chest	3(3)
Blunt force injury to abdomen	7(7.1)
Blunt force injury to pelvis	1(1)
Blunt force injury to lower limbs	3(3)
Sharp force injury to neck	1(1)
Burn	27(27.3)
Hanging	1(1)
Electrocution	6(6.1)
Drowning	1(1)
Lung disease	2(2)
Liver disease	1(1)
Valvular heart disease	1(1)
Coronary artery disease	1(1)
Infective spondylitis	1(1)
Upper gastro-intestinal bleed	1(1)
Blunt force injury to head & chest	2(2)
Blunt force injury to head & abdomen	4(4)
Blunt force injury to chest & abdomen	1(1)
Blunt force injury to head,chest & abdomen	3(3)
Sharp force injury to head	1(1)

Following table showed the association between Comparing cause of death with selected variables. This showed that Designation of doctor issuing certificate, Category of hospitals, According to WHO standard were found to be statistically significant (Table 3).

Table 3. Association between Comparing cause of death with selected variables

Variables	Comparing cause of death		Chi-Square	p-value
	Discrepancy absent	Discrepancy present		
Age				
0-12	8(11.94)	2(6.25)	4.173	0.383
13-30	25(37.31)	11(34.37)		
31-50	15(22.39)	13(40.62)		
>51	16(23.88)	7(21.87)		
Not mentioned	2(2.99)			
Sex				
Male	46(68.66)	23(71.87)	0.144	0.93
Female	17(25.37)	9(28.12)		
Not mentioned	3(4.48)	1(3.12)		
Designation of doctor issuing certificate				
House officer	32(47.76)	23(71.87)	10.538	0.005
Resident and consultant	25(37.31)	2(6.25)		
Not mentioned	10(14.93)	7(21.87)		
Category of hospitals				
Government	7(10.45)	15(46.87)	17.824	<0.001
Semi Government	7(10.45)	4(12.5)		
Private	53(79.10)	13(40.62)		
According to WHO standard				
Standard	52(77.61)	10(31.25)	19.888	<0.001
Non standard	15(22.39)	22(68.75)		
Time interval between death and autopsy examination				
<24 hours	48(71.64)	19(59.37)	1.49	0.222
>24 hours	19(28.36)	13(40.62)		

DISCUSSION

Death certification and death registration are separate but interrelated processes vital for creating a comprehensive death investigation system and ensuring accurate death statistics. Death certification, performed by medical doctors, creates a permanent legal record of the deceased's identity, cause, manner, and final disposition of death. This record is crucial for legal issues like inheritance, pensions, and insurance claims, and it can be used in court. It also provides personal closure and peace of mind to families and is essential for generating accurate mortality and morbidity statistics that guide public health policies. On the other hand, death registration, conducted by family members at designated government offices, is

also important for official records and complements the information provided by death certification. The need for standardized death certificates became apparent in 1866 when New York City's independent Board of Health discovered numerous unsigned burial permits being sold to criminals for burying victims. In Nepal, the Death Information Form only requires basic details about the deceased, their spouse (if applicable), and the informant, omitting crucial information from the medical death certificate, highlighting a significant inadequacy. A study by Ossei P.P.S, finding that the majority of deceased individuals were aged 40 to 59.[5] The study indicated higher mortality rates for the elderly (80 years and above) compared to children (below 1 year), with individuals aged 1 to 19 also showing higher prevalence. In contrast, the present study shows that the highest number of deceased were aged 13-30 years, likely due to their higher activity levels. Neeraj Gupta et al found that 5.3% of death certificates lacked age information, and similarly, 2.02% of death certificates in this study did not include age.[6] Research by CM Alten et al and Lesion Maharjan et al indicates that age does not significantly impact major errors in death certificates, which aligns with the present study's findings. Ossei P.P.S, Agyeman-Duah E, and Obese-Antwi D also reported higher male mortality rates, with 54% of deceased being male. The current study mirrors this, with 69.7% male and 26.3% female deceased, and 4% of death certificates omitting sex information. Neeraj Gupta et al noted 8.7% missing sex information, while the present study found 4.04% omissions. Both studies show no significant correlation between sex and errors in death certification. Neeraj Gupta et al observed that abbreviations were the least common error in death certificates, whereas Hazard RH et al found that 50.7% of their sample used abbreviations.[6] The present study reports 29% of death certificates using abbreviations, but no significant correlation with the designation of the doctor. Lesion Maharjan et al found no significant correlation between hospital stay and death certificate errors. The present study, with 39.4% of death certificates lacking admission dates, could not assess the impact of hospital stay duration on errors. Neeraj Gupta et al identified improper sequencing as a common error, similar to Hazard RH et al's findings.[7] The current study also found 12.12% of certificates with sequencing issues, attributed to doctors' lack of knowledge and skill. Ossei P.P.S. reported that 128 out of 617 death certificates were incomplete, with young physicians more likely to issue incomplete certificates. The present study also found 48.5% of death certificates incomplete, with missing information on age, sex, doctor's designation, and admission dates. Chantal CHJ Kuijpers et al[8] and Ana P.C.P. Carlotti et al found varying rates of discrepancies between clinical and postmortem diagnoses, with significant decreases in major discrepancies over time. In the current study, 67.7% of cases had different causes of death listed on hospital-issued certificates compared to autopsy results. Fabio Tavora et al found higher major discrepancies in private and community hospital settings compared to university hospitals. In this study, private hospitals had the fewest discrepancies, contrary to other findings. Lakkireddy DR et al found low competency in issuing WHO-standard death certificates among residents. Similarly, Maharjan et al found that house officers were more receptive to training improvements than general practitioners.[9] The present study shows that house officers issued more discrepant death certificates compared to residents and consultants. Riley H. Hazard et al noted poor quality in medical records, with 31.6% needing sequence changes.[10] This is similar to the current study, where 26.6% of certificates had non-sequential filling. The study also found 38 certificates listing cardiopulmonary arrest as the immediate cause of death, contrary to international standards. This issue likely stems from inadequate physician training.

CONCLUSIONS

This study analyzed 99 autopsy cases to compare causes of death stated in hospital-issued certificates with those determined post-autopsy. Exclusions included cases without certificates, those where patients were dead on arrival, and decomposed bodies. Most cases involved individuals aged 13-30, predominantly male, with private hospitals issuing

most certificates. Medical officers were the primary certificate issuers, with many certificates lacking doctor designations. Deaths were typically certified within 24 hours of death. The autopsy revealed causes like blunt force injuries and various diseases, with most death certificate causes matching autopsy findings. Discrepancies were noted in 13 certificates, mainly from house officers and government hospitals, indicating variability in certification standards.

Limitation

The study examined only death certificates, not medical records, focusing on the accuracy of causes of death stated. Physicians must diagnose, pronounce, and certify deaths, but errors in MCCD forms often occur due to varying hospital standards and personnel. Incorrect certification can distort mortality statistics, affect health policies, and lead to legal issues. Improvements could be achieved through mortality conferences and educational workshops. The study excluded 21 cases of poisoning with undetermined causes and emphasized that 'brought dead' cases should be managed by police, not certified by hospitals.

Conflict of Interest: None

REFERENCES

1. KrishanVij. Textbook of Forensic Medicine and Toxicology, 2014, 6th edition:71-74 [DOI]
2. Apurba Nandy. Principles of Forensic Medicine including Toxicology.2015, 3rd edition, 222-223
3. Ad Hoc Committee of Harvard Medical School to examine the definition of Brain Death: A definition of irreversible coma. JAMA. 1968. 205.337-340.
4. Mahapatra P, Shibuya K, Lopez AD, Coullare F, Notzon FC, Rao C, et al. Civil registration systems and vital statistics: successes and missed opportunities. Lancet. 2007;370(9599):1653–63. doi: 10.1016/S0140-6736(07)61308-7.
5. Ossei P, Agyeman-Duah E, Obese-Antwi D. Death certificates errors in academic hospital; Review of 617 cases at KomfoAnokye Teaching Hospital (KATH), Kumasi. International Journal of Medicine and Medical Sciences. 2017;9 (4):41-46.
6. Gupta N, Bharti B, Singhi S, Kumar P, Thakur J. Errors in Filling WHO Death Certificate in Children: Lessons from 1251 Death Certificates. Journal of Tropical Pediatrics. 2013;60(1):74-78.
7. Hazard R, Chowdhury H, Adair T, Ansar A, Quaiyum Rahman A, Alam S et al. The quality of medical death certification of cause of death in hospitals in rural Bangladesh: impact of introducing the International Form of Medical Certificate of Cause of Death. BMC Health Services Research. 2017;17 (1)
8. Kuijpers C, Fronczek J, van de Goot F, Niessen H, van Diest P, Jiwa M. The value of autopsies in the era of high-tech medicine: discrepant findings persist. Journal of Clinical Pathology. 2014;67(6):512-519.
9. Hazard R, Chowdhury H, Adair T, Ansar A, Quaiyum Rahman A, Alam S et al. The quality of medical death certification of cause of death in hospitals in rural Bangladesh: impact of introducing the International Form of Medical Certificate of Cause of Death. BMC Health Services Research. 2017;17 (1).
10. Maharjan L, Shah A, Shrestha K, Shrestha G. Errors in cause-of-death statement on death certificates in intensive care unit of Kathmandu, Nepal. BMC Health Services Research. 2015; 15 (1)

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