JOURNAL OF FORENSIC MEDICINE SCIENCE AND LAW

Official Publication of Medicolegal Association of Maharashtra

Editor-in-chief
Dr Ravindra Deokar

Associate Editors
Dr Sadanand Bhise
Dr Sachin Patil

**MULTISPECIALITY, MULTIDISCIPLINARY, NATIONAL
PEER REVIEWED, OPEN ACCESS, MLAM (SOCIETY) JOURNAL
Indexed with Scopus (Elsevier) & Index Copernicus (Poland)**

Original Research Article

Cross Sectional Study to Estimate Proportion of Soundness and Completeness of Medical Certificate of Cause of Death

Ranjit M Tandle[a*], Anand Pawar[b]

[a]Professor & Head, [b]Assistant Professor, FMT, SMBT Institute of Medical Sciences and Research Centre, Dhamangaon, Nashik Maharashtra, India.

Abstract

Background: The medical certificate of cause of death (MCCD) is an important document of medicolegal significance that a doctor certifies following the death of his or her patient. The quality of death certificates is influenced by number of factors including medical education, physician knowledge and hospital resources. Therefore, writing the cause of death statements without errors is essential to build accurate mortality data that is important to measure the effectiveness of various mortality reduction programs. **Methodology:** The present study is Cross sectional hospital-based study where MCCD certificates from January 2021 to December 2021 from medical record department is collected for analysis of completeness and correctness. **Results:** A total of 456 MCCD forms were reviewed and analyzed in the present study. Out of which 291 (63.81%) were males and 165(36.18%) were females. Department wise data analysis revealed that intensive care units contributed majority of deaths (30.70%) followed by medicine department (27.27%). On analyzing the correctness of administrative data interval between condition and death was mentioned in 88.81% correctly. Analysis of correctness of cause of death showed correct entry of immediate cause of death as 98.63%, antecedent cause of death 89.69% and other significant condition 89.03%. Manner of death was correctly mentioned in 86.18% cases only. **Conclusion:** The MCCD scheme is a vital step in regularizing and maintaining uniformity of issuing cause of death certificate by medical practitioners. In the present study we found that incompleteness and inaccurate entries in MCCD are less than 15 %. The knowledge and skill of the staff engaged in issuing MCCD was found to be adequate.

1.   Introduction

The medical certificate of cause of death is an important document of medicolegal significance that a doctor certifies following the death of his or her patient. These documents serve as the perpetual record of the death of a person comprising important information relating to the

*Corresponding author: Dr Ranjit M Tandle, Professor and Head Forensic Medicine and Toxicology, SMBT Institute of Medical Sciences and Research Centre, Nashik, Maharashtra, India. Email: ranjit_tandle@rediffmail.com (M):9403616754.

demographics of the deceased and the cause of death statements.[1,2] Mortality statistics is essential for the welfare of the community, health planning, management of health programs and to build up scientific data base for medical research. It also helps to know the impact of health services, to evaluate health indicators like infant mortality rate, maternal mortality rate and to find out magnitude of emerging and reemerging diseases.[3] The standard cause of death certificate in India follows the recommendations of world health organization and the causes of death are classified according to international classification of diseases. The medical certificate of cause of death (Form 4 for institutional deaths and Form 4A for non-institutional deaths-Registration of birth and death act) is as per ICD 11. There is mandatory provision for every doctor to issue a cause of death certificate after death of his patient. Incomplete or inaccurate entry in these certificates poses difficulty in obtaining reliable information pertaining to causes of mortality.[4]

It is reported that resident physicians or junior physicians, in particular, are often known to make errors in completing the death certificate and a significant proportion of them are known not to have received prior formal training in drafting death certificates.[5] Therefore, it is important for medical students, the future doctors, to be trained in completing the medical certificate of cause-of-death as this document primarily serves various important purposes for the legal heirs of the deceased and secondly is a vital source for mortality statistics.[6] Writing an erroneous underlying cause of death substantially impacts the cause of death statistics.[7] Therefore writing the cause of death statements without errors is essential to build accurate mortality data that is important to measure the effectiveness of various mortality reduction programs.[8] The quality of death certificates is influenced by number of factors including medical education, physician knowledge and hospital resources.[9] Objectives of this study were to determine the common errors in MCCD at institutional level as per Form 4 of WHO format, to ascertain the gaps if any and to encourage physicians to improve issuing of certificates in adequacy and completeness.

2. Material and methods

Study design- Cross sectional hospital based.
Study area- Tertiary care hospital in North Maharashtra. **Study duration**- 3 months: October to December 2023.

Study sample- All death records from medical records department of SMBT IMSRC from January 2021 to December 2021.
Study sample size- 456 issued MCCD certificates.
Statistical Tools-Data was entered in Microsoft excel spreadsheet, tabulated and described as percentages.

3. Results

A total of 456 MCCD forms were reviewed and analyzed in the present study. Out of which 291 (63.81%) were males and 165(36.18%) were females. Department wise data analysis revealed that intensive care units contributed majority of deaths (30.70%) followed by medicine department (27.27%). Age group of 51-60 years contributed to majority deaths. Name, age, sex variable was filled up in all the cases. Date of death was filled in 450 (98.68%) cases. Immediate cause of death was filled up in 443(97.14%) cases. Interval between immediate cause and death was mentioned in 405(88.81%) cases only. The antecedent cause of death includes any disease or injury which initiated the chain of events giving rise to immediate cause of death.

It was mentioned in 434(95.17%) cases. Death associated with Pregnancy or not was mentioned in 454(99.56%) cases. The doctor certifying death is required to put his signature, Full name and designation along with date and preferably should use his or her seal bearing registration number at the bottom of certificate.

Table 1: Department wise data distribution (n=456)

S. No.	Department	No. (%)
1	Surgery	103(22.58)
2	Orthopedic	42(9.21)
3	Obstetrics and Gynecology	13(2.85)
4	Medicine	129(28.28)
5	Pediatric	16(3.50)
6	ENT	7(1.53)
7	Intensive care unit	140(30.70)
8	Any other	6(1.31)

Table 2 Age wise data distribution

Age at death (Years)	Male		Female		Total	
<1	7	1.53%	5	1.09%	12	2.63%
1-10	0	0%	2	0.4%	2	0.43%
11-20	3	0.65%	3	0.6%	6	1.31%
21-30	16	3.50%	10	2.19%	26	5.70%
31-40	43	9.42%	9	1.97%	52	11.40%
41-50	43	9.42%	26	5.70%	69	15.13%
51-60	69	15.1%	36	7.89%	105	23.02%
61-70	52	11.4%	32	7.01%	84	18.42%
70+	58	12.7%	42	9.21%	100	21.92%

Doctor's signature was found in 452 (99.12%) cases but designation was mentioned in 88.81 % and registration number in 86.18% cases only. On analyzing the correctness of administrative data

interval between condition and death was mentioned in 88.81% correctly. Analysis of correctness of cause of death showed correct entry of immediate cause of death as 98.63%, antecedent cause of death 89.69% and other significant condition 89.03%. Manner of death was correctly mentioned in 86.18% cases only.

Table 3: Accuracy of each variable in the Filled MCCD forms

Sr. No.	Variable	Filled forms			
		Yes		No	
		No.	%	No.	%
1	Name	456	100	0	0
2	Age	456	100	0	0
3	Sex	456	100	0	0
4	Date of death	450	98.68	6	1.31
5	Immediate cause of death	443	97.14	13	2.85
6	Interval between immediate cause and death	405	88.81	51	11.18
7	Antecedent cause of death	434	95.17	22	4.82
8	Interval between antecedent cause and death	423	92.76	33	7.23
9	Other associated condition	413	90.57	43	9.42
10	Interval between other condition and death	402	88.15	54	11.84
11	Death associated with pregnancy or not	454	99.56	2	0.43
12	Doctor's sign	452	99.12	4	0.86
13	Designation	405	88.81	51	11.18
14	Date of verification	413	90.57	43	9.42
15	Registration number	393	86.18	63	13.81
16	Adress of deceased	448	98.24	8	1.75

Table 4: Data distribution according to correctness of administrative details

Sr. no.	Component of death certificate	Correct entry	%	Incorrect entry	%
1	Name of deceased	456	100	0	100
2	Age of deceased	456	100	0	100
3	Sex of deceased	456	100	0	100
4	Intervals	405	88.81	51	11.18
5	Death associated with pregnancy or not	454	99.56	2	0.43
6	Signature of doctor	452	99.12	4	0.86
7	Name of doctor	423	92.76	33	7.23
8	Designation of doctor	405	88.81	51	11.18

Table 5: Data distribution according to correctness of cause of death

Sr no.	Component of death certificate	Correct entry	%	Incorrect entry	%
1	Immediate cause of death	427	93.64	29	6.35
2	Antecedent cause of death	402	89.69	54	11.84
3	Other significant condition	406	89.03	50	10.96
4	Manner of death	393	86.18	63	13.81

4. Discussion:

Completeness and correctness of medical certification of cause of death is essential to collect mortality statistics. To fulfill this need doctors are trained to fill up the certificate during their under graduation by department of forensic medicine and toxicology as per CBME curriculum the interns were also trained for various medicolegal documentation and communication with various public authorities including police during their compulsory internship rotation program. However, despite multiple trainings the clinicians commit errors while filling the correct causes of death in MCCD.[10]

Therefore proper training of the RMP is of great importance for filling the cause of death certificate without any errors. [11] MCCD enables us to describe disease pattern within specified population but the absence of reliable data on cause of death hinders the structuring of health-related policies and decisions regarding healthcare.[12] Maximum mortality was in intensive care unit followed by medicine department. The mortality in these departments may be due to more admissions in these departments. This is consistent with study by Meenal Kulkarni and Jaydev Nayse.[13] In the present study 40.34 %of deceased were found in more than 60 years of age group which is in accordance to Patel et al from a teaching hospital Vadodara.[14] Researchers studied the awareness on medical practices and medicolegal issues amongst the medical doctors.[15,16,17]

Completeness of variables such as immediate cause, antecedent cause and other significant condition were 97.14%,95.17%,90.57% respectively. The study conducted by Pallavi Uplap et al have found the results as 99.75%,98.29% and 88.04% respectively. The findings of the present study are consistent with findings of study of Pallavi Uplap et al[18] and Ganswa A S et al.[12] In the present study completeness of column death associated with pregnancy was 99.56% which is consistent with Amit Patil Et al (91.37%).[19] Information of pregnancy and delivery are needed in case death of women occurs during child bearing age (15-49). Even though there might not be any relationship between pregnancy and death. In present study findings related to correctness of immediate, antecedent cause of death and other significant condition are comparable with other studies conducted elsewhere in India.[10,20,21]

5. Conclusion:

The MCCD scheme is a vital step in regularizing and maintaining uniformity of issuing cause of death certificate by medical practitioners. In the present study we found that incompleteness and inaccurate entries in MCCD are less than 15 %. The knowledge and skill of the staff engaged in issuing MCCD was found to be adequate.

Recommendations:

- Medical institution should regularly audit the MCCD certificates issued for accuracy and completeness.
- Hospital administration shall conduct training and workshops to orient physicians for correct certification of death.
- To minimize the errors, we recommend digitalization of all medico legal documents including MCCD and Hospital administration to ensure issuance of MCCD only after review by senior trained faculty.
- We recommend to evaluate the impact of training, orientation programs on Quality of MCCD issued in future.

References:

1. World Health Organization. Twentieth world health assembly. Geneva,1967. [Cited 1st June 2021]. Available from: https://apps.who.int/iris/handle/10665/85801

2. World Health Organization. International statistical classification of diseases and related health problems. 10th revision. Volume 2. Geneva, 2011. [Cited 1st June 2021]. Available from: https://www.who.int/classifications/icd/ICD10Volume2_en_2010.pdf

3. 3.Office of the Registrar General of India, Vital Statistics Division. Physicians' Manual on Medical Certification of Cause of Death. 4th edi. New Delhi: Ministry of Home Affairs, Government of India; 2000.

4. ICD-11 for Mortality and Morbidity Statistics. [Cited 1st June 2021]. Available from: icd.who.int/browse/2024-01/mms/en

5. Lakkireddy DR, Basarakodu KR, Vacek JL, Kondur AK, Ramachandruni SK, Esterbrooks DJ et al. Improving death certificate completion: a trial of two training interventions. J Gen Intern Med. 2007; 22:544-8.

6. Madadin M. Medical students' knowledge of the cause of death certification: A descriptive cross-sectional study from Saudi Arabia. Int J Gen Med. 2021:14-9663-9.

7. Gamage US, Adair T, Mikkelsen L, Mahesh PK, Hart J, Chowdhury H, et al. The impact of errors in medical certification on the accuracy of the underlying cause of death. PLoS One. 2021;16(11): e0259667.

8. MacDorman MF, Thoma M, Declercq E. Improving US maternal mortality reporting by analyzing literal text on death certificates, United States,2016–2017. PLoS One. 2020;15: e0240701.

9. Ministry of Health and Family Welfare, Government of India. Pradhan Mantri Swasthya SurakshaYojana (PMSSY) [Internet]. New Delhi: Ministry of Health and Family Welfare, Government of India; 2020 [cited 05th August 2020]. Available from: http://pmssy-mohfw.nic.in

10. Jain K, Bala DV, Trivedi K, Chandwani H. Situational analysis of medical certification of cause of death (MCCD) scheme in municipal corporation of Ahmedabad. Indian J Forensic Community Med. 2015;2(2):95-9.

11. Deokar RB, Patil SS, Bhise SS. Medicolegal cases in hospitals. J Forensic Med Sci Law. 2018; 27(2): 1-2.

12. Ganasva AS, Bariya BR, Shringarpure K, Damor JR. Assesment of Medical Certificate of Cause of Death (MCCD) In Vadodara Municipal Corporation, Gujarat, India. Int J Curr Res Rev. 2015; 7(24): 18.

13. Kulkarni M, Nayse J. Trend and pattern of mortality among patients admitted in a tertiary care hospital. J Community Health Manag. 2016;3(4):199-202.

14. Patel A, Rathod H, Rana H, Patel V. Assessment of medical certification of cause of death at a new teaching hospital in Vadodara. Natl J Community Med. 2011,2(3):349-53.

15. Deokar RB, Mankar DD, Patil SS. Evaluation of Perception of Doctors and Hospital Administrators on Their Experience of Handling Medicolegal Cases. J Forensic Med Sci Law. 2021;30(2):46-51.

16. Choudhary UK, Malani A, Rathod V, Husain BN, Choudhary N, Mali A. Study of Medico- Legal Awareness among the Medical Professionals. J Forensic Med Sci Law. 2023;32(1):54-60.

17. Chhetri TB, Chhetri TR , Ahmed SM. Knowledge, Attitude and Practice of Medical Ethics and Medico-Legal Issues by Clinicians: A Cross-Sectional Study at a Tertiary Healthcare Centre In Maharashtra. J Forensic Med Sci Law. 2023;32(2):56-62.

18. Uplap P, Wani D, Sankhe L. Assessment of medical certificate of cause of death at a tertiary care centre in Mumbai, India. Indian J Forensic Community Med. 2019 ;6(2):70-4.

19. Patil A, Chaudhari VA, Raskar K, Bavlecha A. Audit of medical certificate of cause of death at a tertiary care teaching hospital. J Indian Forensic Sci. 2019 ;41(3): 197:200

20. Shah VR. Evaluation of medical certification of cause of death in one of the teaching hospitals in Ahmedabad. Innovative J Med Health Sci. 2013;2(5):99.

21. El Nour AE, Mohammed A, Yousif I, Ali AH, Makki M. Evaluation of death certificates in the pediatric hospitals in Khartoum state during 2004.Sudan J Public Health. 2007;2(1):29-37.