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Original Research Article

How to evaluate the medical certification of death in a hospital: an analysis of 53 death certificates at AIIMS, Bhopal, India

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ABSTRACT

Background: The AIIMS Bhopal has been established under PMSSY to provide the quality health care services. However, since the inception of hospital services from November 2014 till the month of October 2016 a total of 53 patients died due to various causes. The objective was to find out the different causes of death and its documentation at a tertiary care hospital in order to establish common causes of mortality and reporting errors in standard documentation of the death and feedback in this regard.
Methods: This is a retrospective study with evaluation of death certificates in 53 deaths. The errors were analyzed as per the Haque's scale and the scale devised by the authors.
Results: The major cause of death reported was multiorgan failure where more than one system was affected As per the Haque's scale the errors reported were for Grade 0 in 0%, Grade 1A in 31.03%,Grade 1B in 100%,Grade II in 79.31%,Grade III in 68.97%,Grade IV in 79.31% and Grade V in 62.07% of total death certificates.
Conclusions: The certifying doctors must be adequately trained and/or fill the death certificate under the supervision of experts to ensure proper entries to avoid any kind of contraventions, confusion and conflicts.

Keywords: Haque's scale, Hospital death, MCCD, Mortality

INTRODUCTION

It is important to record each and every hospital death in all the hospitals dealing with patient care services in India including AIIMS Bhopal which has been established under PMSSY in 2012 in a standard format as mortality data form an integral part of the vital statistics system.[1] They are one of the basic components of population growth.[2] Further, the cause specific mortality rates are key indicators of the health trends in population dynamics and are provided on scientific basis by the system of medical certification of cause of death. The medical death certificate data is useful in many ways like assessing the effectiveness of public health programmes providing a feed-back for future policy and implementation, better health planning and management and for deciding priorities of health and medical research programmes.

It is also useful to know the impact of health services and to evaluate health indicators like infant mortality, maternal mortality etc. It helps to understand the trend and changing mortality pattern of various diseases as well as to find out the magnitude of newly emerged diseases like HIV/AIDS. Registration of Births and Deaths Act, 1969 has a provided for implementation of MCCD under section 10(2) and 10(3). It is obligatory to the attending physician/surgeon to certify death in form No. 4/4A. It is the legal responsibility of the head of institutions to submit MCCD to the local Registrar.[3]

Aims and objectives of the study

The study was conducted to find out different causes of mortality and its reporting at tertiary care hospital to have establish actual causes of death and the errors in the standard documentation of the death as per the WHO format of death certificates by the physician attending the patients since the inception of the hospital services in November 2014 to October 2016.There were a total of 53 deaths reported during this period.

METHODS

This is a retrospective study conducted at All India Institute of Medical Sciences (AIIMS) Bhopal, Madhya Pradesh, India. The death certificates of 53 patients who died at this facility have been evaluated for errors and standard completion of various components of death certificates. The following parameters were studied:

- The demographic profile of the deceased data: Name, age, gender, pregnant or not etc.
- The health and administrative data: date of admission, interval between onset of disease and death, signature, full name, designation and address of certifying doctor etc.
- The medical certification of cause of death data: the immediate cause, the underlying cause, the antecedent cause and contributing cause of death, manner of death, and the use of any illegible and incomplete entry.

The following scale for grading the errors in documentation has been used as described in Table 1.

Table 1: Grading scale (Haque's) used to assess the error.[4]

Grade	Errors	Components of death certificate (S.N. as per Table 3)
Grade 0	No errors	1-17
Grade IA	Incomplete or inaccurate demographics only	1-4
Grade IB	Inappropriate health and administrative information only	5-13
Grade II	Co morbidities (antecedent or contributing causes) incomplete	14-15
Grade III	Co morbidities (antecedent or contributing causes) not listed	14-15
Grade IV	Inappropriate immediate cause of death or only mechanism (s) or mode of death	16
Grade V	Underlying cause of death incorrectly attributed or placed in improper sequences	17

Table 2: Grading scale devised by the authors used to assess the error.

Component of death certificate	Grade	Sub grade	Components of death certificate (S.N. as per Table 3)
Completion of full certificate	0	0-Satisfactory	1-17
ICD classification	0	0-underlying cause of death	19
Deceased particulars	I	Ia-Name	1-4 and 13
		Ib-Age	
		Ic-Sex and death associated with pregnancy	
		Id-residential Address	
Certifying doctors particulars	II	IIa-signature and full name	7-11
		IIb-designation	
		IIc-registartion no	
		IId-residential address	
Time of death particulars	III	IIIa- Interval between onset and death	5-6 and 12
		IIIb- Date of verification/ certification/ Date of death	
Cause of death particulars	IV	IVa- Manner of death	14-18
		IVb- Antecedent cause of death	
		IVc- Other associated conditions contributing to death but not related to the disease or conditions causing it	
		IVd- Immediate cause of death	
		IVe- Underlying cause of death	

Death certificate used in India[5]

Registration of Births and Deaths Act, 1969 has a provision for MCCD under section 10(2) and 10(3). All the hospitals in India are currently following the WHO provided format of death certificates with slight modification to record all the hospital deaths. The certificate as to the cause of death required under sub-section (3) of Section 10 shall be issued in form number 4 for institutional deaths and 4A for non- institutional deaths and the Registrar shall, after making necessary entries in the register of births and deaths, forward all such certificates to the chief registrar or the officer specified by him in this behalf. Beside the medical part, the form also includes some minimum demographic and identification particulars about the deceased. The forms have a detachable portion separated by perforation mark containing information on fact of death.[6]

Physician's responsibility

Medical death certificates can be filled by medical officers, resident doctors, general physicians and specialists. The quality of the information that can be obtained from the death certificates depend upon the personnel who completes them after the death of the patient. In non-medico-legal cases, the attending doctor issues the death certificate. However, no death certificate should be issued by the attending doctor in medico-legal cases before the autopsy procedure. In such cases the cause of death is mentioned by the Autopsy surgeon in the Autopsy report after post-mortem examination of the body. The patient should have either been under the treatment of the medical officer when he/she died or should have been seen by the medical officer within the last 14 days and the medical officer was aware of his medical condition. If the medical officer is called to examine the patient after his death or the patient dies by the time the medical officer reaches him, the medical officer cannot sign the death certificate.[7] Under section 39 Cr PC: All deaths occurring during surgery or under anaesthesia are to be considered unnatural and should be reported to the police. A doctor can be punished under section 202 IPC for not informing the police.[8]

The physician's primary responsibility is to complete the medical part of the certificate regarding all diseases, morbid conditions or injuries which either resulted in or contributed to death. Causes of death are classified, coded and grouped according to the tenth revision of the International Classification of Diseases (ICD-10) recommended by WHO. In practice, the ICD has become the international standard diagnostic classification for all general epidemiological and many health management purposes.[9] The purpose of the ICD is to permit systematic recording, analysis, interpretation and comparison of morbidity and mortality data collected in different countries or areas and at different times This safeguard is intended to enable the doctors to bestow sufficient care and attention in writing the certificate so that mortality statistics will reflect the best medical opinion, concerning causes of death. The certifier will ensure that all the necessary particulars are given, besides his own statement regarding the chain of events pinpointing the underlying cause of death and then sign the certificate. The detachable portion of form containing only the fact of death without disclosing the cause of death may either be signed by the certifier or the medical officer of the hospital or handed over to the relatives of the deceased.

Ensuring completeness of information

While giving the casual chain of events in the statement of cause of death, a complete case history is not required but, if information is available, enough details may be given to enable proper classification of the underlying cause. As a general rule, record diagnoses as precisely as the information permits, incorporating relevant details from histological or autopsy reports. Where an important detail is unknown the fact should be stated.

RESULTS

There was no unnatural death reported as medico legal cases were referred to other centres dealing with that type of cases after giving emergency treatment if required. The total natural deaths reported in the study period were 53, out of which Multisystem failure/multiorgan failure had been reported as the commonest cause of death (50.94%) followed by cardiac (20.75%) and CNS (11.32%) related causes (Figure 1).

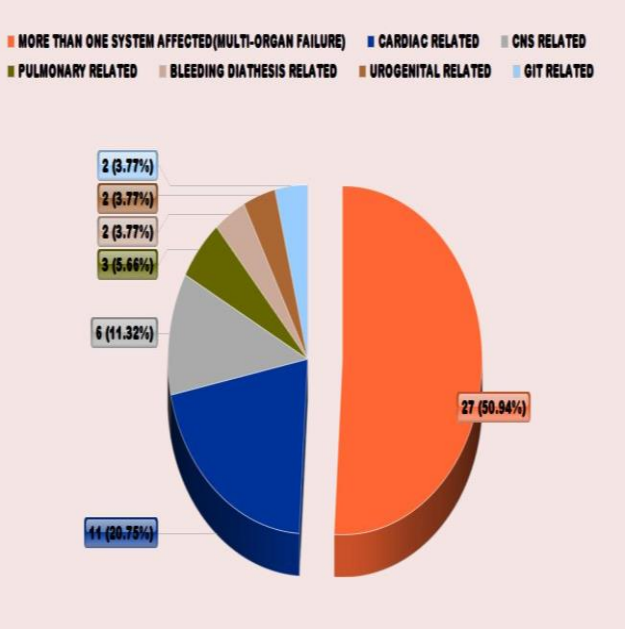

Figure 1: Distribution of cases as per etiology of death mentioned in death certificate.

Table 3: The details of information provided in the death certificates.

S.N.	Component of death certificate	Left blank	Incomplete entry	Complete entry
1.	Name	-	13	40
2.	Sex	1	-	52
3.	Age	-	3	50
4	Death associated with pregnancy or not	24	-	29
5	Date of death	-	7	46
6.	Interval between onset and death	23	14	16
7.	Doctor's signature	_	_	53
8.	Doctor's designation	34	6	13
9.	Doctor's registration Number	32	3	18
10.	Full Name of the doctor	9	2	42
11.	address of the certifying doctor	25	18	10
12.	Date of verification/ certification	7	_	46
13.	Address of the deceased	1	40	12
14.	Antecedent cause of death	6	28	19
15.	Other associated conditions contributing to death but not related to the disease or conditions causing it	27	09	17
16.	Immediate cause of death	-	42	11
17.	Underlying cause of death	23	13	17
18.	Manner of death*	40	-	13
19.	Underlying cause of death as per ICD 10 classification**	53	-	-

Table 4: No of death certificates with the errors as per the Haque's scale.

Grade	Errors	No of death certificates	Components of death certificate (S.N. as per Table 3)
Grade 0	No errors	00	1-17
Grade IA	Incomplete or inaccurate demographics only	24	1-4
Grade IB	Inappropriate health and administrative information only	43	5-13
Grade II	Co morbidities (antecedent or contributing causes) incomplete	37	14-15
Grade III	Co morbidities (antecedent or contributing causes) not listed	33	14-15
Grade IV	Inappropriate immediate cause of death or only mechanism (s) or mode of death	42	16
Grade V	Underlying cause of death incorrectly attributed or placed in improper sequences	36	17

Table 5: No of death certificates with the errors as per the scale devised by the authors.

Grade	Sub grades	No. of death certificates with errors	Total	Components of death certificate (S.N. as per Table 3)
0	0	53	00	1-17
0	0	53	53	19
I	Ia	13	53	1-4 and 13
	Ib	3		
	Ic	25		
	Id	41		
II	IIa	11	53	7-11
	IIb	40		
	IIc	35		
	IId	43		
III	IIIa	37	44	5-6 and 12
	IIIb	7		
IV	IVa	40	53	14-18
	IVb	34		
	IVc	36		
	IVd	42		
	IVe	3		

The most common entry left blank was cause of death as per ICD 10 classification in 100% followed by manner of death in 75.47% and doctor's designation in 64.15% of death certificates. The most common incomplete entry was related with immediate cause of death, address of deceased and antecedent cause of death in 79.24%, 75.47% and 52.83% of death certificates respectively. The most complete entry was doctor's signature followed by sex and age of the deceased in 100%, 98.11% and 94.34% of death certificates respectively (Table 3).

As per the Haque's scale the errors reported were for grade 0 in 0%, grade 1A in 31.03%, grade 1B in 100%, grade II in 79.31%, grade III in 68.97%, grade IV in 79.31% and grade V in 62.07% of total death certificates (Table 4) and as per the authors devised scale as grade 0, 1, 2 and 4 the errors were reported in 100% of death certificates and for the grade 3 in 83.02% of death certificates (Table 5).

DISCUSSION

Many of the times confusion and conflicts arise because of errors in death certificates and it is difficult to trace the certifying doctors for recertification as majority of them change their working place till that time and it is difficult to trace them due to insufficient entry regarding their addresses on the death certificates so it is better to ensure the error free entry on death certificates at first place only. There have been media reports and studies which have revealed that approximately 50-60% of medical certificates of cause of death submitted to death registering authorities are incorrectly filled up.[10] In the present study 100% of the death certificates were found with the errors and the form 4A was used in 37 cases and form 4 in rest of 16 cases as death certificate to enter the death related details with no column for entry of ICD 10 coding. In another study, the results revealed that out of 40 death certificates, not a single was free from any error and major errors occurred in 23 (57.5%) cases with improper sequencing (55%) as most frequent while the most common minor error was the absence of time interval between the onset of disease and death (92.5%). No significant association was found between major errors and factors like age, sex, ward and underlying cause of death.[11] In other studies error rates were 32% to 99.2%.[12-17]

Analysis considering only the underlying cause of death resulted in a median chance-corrected concordance between the cause of death in medical death certificates versus the gold standard of 54.3% (95% uncertainty interval [UI]: 52.2, 55.6) for neonates, 38.5% (37.0, 40.0) for children, and 66.5% (65.9, 66.9) for adults. The accuracy resulting from the same analysis was 0.756 (0.747, 0.769) for neonates, 0.683 (0.663, 0.701) for children, and 0.780 (0.774, 0.785) for adults.[18] A study illustrated that all the studied DNFs contained errors, and 96.5% of them had at least two types of errors. All DNFs contained errors related to the medical certification of the cause of death, 96.5% of them had administrative data errors, and 22.2% had demographic data errors.[19] The completeness of variables such as immediate cause, antecedent cause and underlying cause were 99.8%, 97.7% and 98.4% respectively in MCCD forms. Accuracy of immediate, antecedent and underlying cause of death was 44%, 55% and 69.9%, respectively and only 1.2% of the MCCD forms were fully accurate as per guidelines of Manual on MCCD, 2009.[20] In the present study the signature of doctor was present in 100% of death certificates but their registration and designation was either missing or incomplete in 66.04 and 75.47% of cases respectively and the major cause of death was multisystem failure/multiorgan failure in 50.94% followed by cardiac reason in 20.75% cases. In a study about 91% certificates had the signature of the doctor but only 24.55% certificates had the seal with registration number of the physician and out of 7392 forms, only 2957 forms (40%) had the information regarding underlying cause of death according to ICD-10 classification and the main leading cause of death in this study was diseases of circulatory system 868(29.35%) followed by neoplasm (16.54%) and certain infectious and parasitic disease (16.44%)[21]. Patel et al. reported that in 17.5% cases, circulatory causes were responsible for death.[22]

Limitations

- It's a retrospective study.
- The study is limited to single a single tertiary public health care facility in central India. Further multicenter studies required for optimization of the results.
- Limited to analysis of only 53 deaths during this duration.

CONCLUSION

Medical certification of death is an essential and mandatory part of reporting of vital statistics of a hospital. Though most of the times the certifying doctors try to fill the death certificates properly but in absence of adequate experience and training in completion of this important certificate left them only partially completed. This partial completion of the certificate has potential to create a lot of confusion and problems later on and may lead to legal troubles. This may also lead to conflict between the doctor blaming each other when doctors from more than one discipline are involved in management of a case and death happens. To avoid all of this, proper training and supervision by experienced persons must be given to the certifying doctor so that they could satisfactorily complete all the entries on the death certificates to achieve the objective for which they had been designed for.

Recommendations

- The doctors must be sensitized, motivated and trained to complete the death certificate properly.
- The seniors who are supervising the junior doctors must regularly cross check the completion of death certificate.
- Regular workshop/conferences/CME must be organised to train the certifying doctors.
- The death certificate may be suitably modified to accommodate more information as per the WHO format or other standard formats followed in India.
- The death certificate may be suitably amended to incorporate the information on ICD-10.
- Regular auditing of death certificates by a professional expert.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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