RESEARCH

EVALUATION OF MEDICAL CERTIFICATION OF CAUSE OF DEATH IN ONE OF THE TEACHING HOSPITALS OF AHMEDABAD.

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ABSTRACT

Death certification is a public health surveillance tool and is very important because morbidity and mortality statistics often come from death-certification data.The present study evaluated the filled in MCCD forms in one of the teaching hospitals of Ahmedabad.

Aims: To improve the quality of Medical Certification of Cause of Death.

Objectives:

➢ To evaluate the completeness and accuracy of Medical Certification of Cause of Death (MCCD).

➢ To recommend necessary corrective measures to improve completeness and accuracy of MCCD form.

Methods and Material: An observational descriptive study of 3212 deaths which occurred in V S General Hospital, Ahmedabad during the period of 1stJanuary 2009 and 31stDecember 2009 was done. MCCD forms filled up by the doctors were studied and observations were made in the pre-designed proforma. Each case paper was reviewed carefully and personal observations were made for evaluation purpose. Data was entered in the Microsoft excel and SPSS software was used for analysis. Z test was used for a test of significance. Results: During the study period of one year 3,212 (7.7%) deaths took place. 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. Only 1.2% of the MCCD forms were fully accurate as per guidelines of Manual on MCCD, 2009. Conclusions: Overall accuracy in filling up of MCCD forms need to be improved. Regular training of all post graduate students on MCCD to clarify their doubts regarding filling up of forms.

INTRODUCTION

The International Classification of Diseases (ICD) is the standard diagnostic tool for epidemiology, health management and clinical purposes. It is used to monitor the pattern and trend of diseases and other health problems. The accuracy of cause-of-death statistics substantially depends on the quality of cause-of-death information in death certificates, primarily completed by medical doctors. [1] Medical certificate of cause of Death (MCCD) provides statistical data regarding causes of death. [2] On the basis of underlying cause mentioned in MCCD forms, diseases are classified and code is given as per International Classification of Diseases (ICD). Death certification is important public health surveillance tool because morbidity and mortality statistics often come from death-certification data. [3] A provision has been made in the Registration of Births and Deaths (RBD) Act, 1969 for

certification by a medical practitioner who has attended the deceased during the last illness.

Medical Certification of Cause of Death (MCCD) in India is carried out under the government Medical Certification Scheme. Under this scheme, medical practitioners are given the training regarding correct and proper filling up of MCCD forms. In Gujarat, MCCD scheme is implemented in six government teaching hospital namely Ahmedabad, Vadodara, Surat, Jamnagar, Rajkot and Bhavnagar government hospitals and two corporations Ahmedabad and Surat. [4] The hospital where we carried out the study is the teaching hospital and being a teaching hospital, all the concerned doctors were covered by the government launched awareness program. But there is no provision for the concerned officials to appraise the efficacy of the training program. Literature pertaining to

the effectiveness of this awareness program is scant and virtually non-existent. Hence, we conducted a survey to find out the effectiveness of the program by studying the various components of the cause of death certificate, certified by the doctors who have already been trained under the scheme.

MATERIALS AND METHODS

Observational Descriptive Study was carried out at Medical Record and Statistical Department of one of the tertiary health institutes of Ahmedabad. MCCD forms of all the deceased patients who died in hospital between 1st January 2009 and 31st December 2009 were examined. Total 3,212 deaths have occurred in the hospital during the year 2009. MCCD forms of all death cases are filled up routinely by the doctors from the respective departments and then these forms are sent to the Medical Record and Statistical Department. Cause of death certificates issued by treating physician, along with the history and treatment records were studied and analyzed to evaluate the accuracy and completeness in filling up of the forms as per the prescribed guidelines. Latest edition of Physician's Handbook on Medical Certification of Cause of Death (MCCD) [4] was referred for the evaluation purpose.

Data was entered in Microsoft Excel and analysis was done using SPSS statistical software. To evaluate the overall completeness and accuracy of MCCD forms, a scoring system was developed and used to analyse all forms. In this system a score of 'one' was given to each variable in the above form for completeness and for a correct entry. Thus, maximum score for completeness in MCCD form was 18 (Table I), while maximum score for accuracy in MCCD forms was 16 (Table III). On the basis of total score of each form they were divided into four different categories.

These categories were as follows:

Categories	Score of the form (%)
completely filled /accurate	100
slightly incomplete / inaccurate	80 – 99
Notably incomplete / inaccurate	40 – 79
Grossly incomplete / inaccurate	<40

First of all each variable was categorised into one of the four status. These four categories of the variables were as follows:

1. Mentioned correctly (were considered accurate as well as complete),
2. Mentioned incorrectly (were considered as complete but inaccurate),
3. Left blank and was correct (they were rightly left blank hence were considered as accurate and also qualified for completeness)
4. Left blank but was incorrect. The columns, which were left blank in MCCD forms and were also found incorrect, were considered as incomplete as well as inaccurate both. The findings mentioned in the case paper were kept as gold standard for evaluation of MCCD forms.

RESULTS AND DISCUSSION

During the study period of one year 41,188 patients were admitted and 3,212 (7.7%) deaths took place. Month-wise mortality rate due to all causes ranged from 6.2% to 9.0%. MCCD forms of all the patients who died at V S General hospital have been analysed.

In this study variables related to identification information were filled out in 95-100% of death certificates. El-Nour et al [5] reported that variable of

identification information about death and deceased was filled in 92.8% of the certificates. Completeness of variables such as immediate cause, antecedent cause and underlying cause were 99.8%, 97.7% and 98.4% respectively in MCCD forms in this study.(Table I)

Table I: Independent status for Completeness of Each Variable in MCCD forms (n=3212)

Sr. No	Variables	Completeness found in MCCD forms		
		No.	Percentage (%)	95% Confidence Interval
1	Name of deceased	3212	100	-
2	Sex	3212	100	-
3	Age	3197	99.5	99.2-99.7
4	Date and time of death	3212	100	-
5	Immediate cause	3207	99.8	99.7-99.9
6	Interval between immediate cause and death	67	2.1	1.5-2.5
7	Antecedent cause	3140	97.7	97.2-98.2
8	Interval between antecedent cause and death	255	7.9	7.0-8.8
9	Underlying cause	3161	98.4	97.9-98.8
10	Interval between underlying cause and death	1781	55.4	53.7-57.1
11	Other associated Significant condition	3060	95.2	97.9-98.7
12	Interval between other condition and death	2609	81.2	79.8-82.5
13	Death associated with pregnancy	3060	95.2	97.9-98.7
14	Was there a delivery	3004	93.5	92.6-94.3
15	External cause (violence) mentioned	3206	99.8	99.6-99.9
16	How did injury occur	2574	80.1	78.7-81.5
17	Doctor's signature	3211	99.9	99.9-100
18	Date of verification	3211	99.9	99.9-100

Sibai et al [6] reported that immediate, antecedent and underlying cause of death were mentioned in 44.3%, 61.7% and 82.9% of death certificates, respectively. Completeness for the Variable "how did injury occur" was seen in 2574 (80.1 %) of the forms.The completeness for all three causes was very high in this study as compared to other studies. It is important to mention here that MCCD forms for antecedent and underlying causes were considered complete, when they were either filled up or left blank correctly. Case papers of these MCCD forms also supported that there was no such cause to mention. Hence, when they were correctly left blank, they were considered as complete. This could be the reason for increased proportion of completeness reported in this study. Signature and name of the certifying doctor and date of verification were complete in 99.9 % forms. El-Nour et al [5] reported that in 82% of the death certificate signature of doctors was present. Overall completeness after giving score to each variable showed that, only 20(1.2%) MCCD forms were found completely filled. But, on lowering the criteria of completeness to a condition (slightly incomplete) where less than 20% variable were left blank and were wrong, such completeness with slightly incomplete was found in three fourths (73.9%) MCCD forms. No MCCD form was grossly incomplete. One-fourth (24.8%) forms were notably incomplete where more than 20% and less than 60% variables were left blank. (Table II)

Table II: Extent of Completeness of the MCCD form (n=3212)

Completeness of MCCD form			Frequency of MCCD forms	
Level of completeness	Range of score (Max. 18)	Percentage of completeness	No	Percentage (%)
Completely form	18	100	20	1.2
Slightly incomplete	15– 17	80 – 99	2376	73.9
Notably incomplete	7 – 14	40– 79	796	24.8
Grossly incomplete	<7	<40	0	0.0
Total			3212	100.0

Overall accuracy of each variable ranged from 2.1% to 100 %. Accuracy of variable such as name of deceased, sex, age, date of death etc. were from 95 to 100%. Only 1416(44%) MCCD forms were accurate for immediate cause. Antecedent cause was accurate in 1778(55%) of the forms and underlying cause was accurate in 2246(69.9%) (Table III).

Table III: Accuracy of each variable in the MCCD forms

Sr. No	Variables	Accuracy of each variable		
		No.	Percentage (%)	95% confidence interval (%)
1	Name of deceased	3208	99.8	99.7-99.9
2	Sex	3212	100	-
3	Age	3197	99.5	99.2-99.7
4	Date of death	3083	95.9	95.5-96.6
5	Immediate cause	1416	44.0	42.4-45.8
6	Interval between immediate cause and death	64	2.0	1.5-2.4
7	Antecedent cause	1778	55.0	53.6-57.0
8	Interval between antecedent cause and death	254	7.9	6.9-8.8
9	Underlying cause	2246	69.9	68.3-71.5
10	Interval between underlying cause and death	1898	59.1	57.3-60.7
11	Other significant condition	3024	94.1	93.3-94.9
12	Interval between other condition and death	2609	81.2	79.8-82.5
13	Death associated with pregnancy	3023	94.1	93.3-94.9
14	Was there a delivery	2972	92.5	91.6-93.4
15	External cause (violence) mentioned	3103	96.6	95.9-97.2
16	How did injury occur	2574	80.1	78.7-81.5

El-Nour et al [5] reported that out of 400 certificates 17.5%, 40.8%, 86.8% of forms were accurate for immediate cause, antecedent cause and underlying cause respectively. It was not possible to check accuracy of few variables viz. name, address & signature of issuing doctor and also date of issuing certificate. Time Interval was not mentioned in 98.1%, 92.0% and 25.4% respectively for Immediate cause, Antecedent cause and Underlying cause of the death. (Table III) Therefore, it is necessary to highlight with sound reasoning the importance of the mentioning of time interval in the MCCD forms at the time of training of doctors.

Scoring of accuracy of each variable of MCCD form revealed that only 35(1.1 %) of the MCCD forms were found 100% accurate. But, on lowering the criteria of accuracy to a condition (slightly inaccurate) where less than 20% columns were wrong, such slightly inadequacy was found in 41.5% MCCD forms. Only 11 (0.3%) MCCD forms were grossly inaccurate. (Table IV)

Table IV: Extent of overall accuracy in the MCCD form (n=3212)

Level of accuracy	Range of score (Max. 16)	Proportion of accuracy (%)	No.	Percentage (%)
Accurately filled	16	100	35	**1.1**
Slightly inaccurate	13 – 15	80 – 99	1332	41.5
Notably inaccurate	6– 12	40 - 79	1834	57.1
Grossly inaccurate	<6	<40	11	0.3
Total			3212	100.0

Shantibala et al [7] reported that major error was observed in 38.3% and minor error was observed in 77.6% of the MCCD. Burger et al [8] reported that errors were found in 91.7% of certificates, and 43.4% had at least one major error, most commonly an illogical cause of death sequence. However, Irene [9] reported that only 4.3% of certificates were completed in an internationally acceptable manner. Pritt et al [10] stated that multiple errors were identified in 82% of the death certificates reviewed. When impact of "Advising Post-Mortem" on accuracy of each variable in the MCCD form was studied, it was noted that accuracy of immediate cause, antecedent cause and underlying cause were much lower in MCCD forms where post-mortem was advised. No significant difference was observed in the case of accuracy of variables pertaining to socio demographic information (Table V)

Table V: Impact of referral of case for post mortem on the accuracy of each variable in the MCCD forms

Variables	Accuracy of each variable in the MCCD forms					
	Postmortem not advised (n=2559)		Postmortem advised (n=653)		Z value	P value
	No.	Percentage (%)	No.	Percentage (%)		
Immediate cause	1401	54.9	14	**2.1**	52	<0.00001
Antecedent cause	1774	69.3	9	**1.4**	67.9	<0.00001
Underlying cause	2188	85.5	18	**2.8**	83	<0.00001

Cardio-respiratory arrest (CRA) was mentioned as cause of death in 763(23.7%) MCCD forms. The doctors from 9 different departments were interviewed to study their knowledge and practice of filling up of MCCD forms. It was observed that out of 60 resident doctors who were interviewed, 52(86.7%) knew correct definition of immediate cause. Antecedent cause was known to 25 (41.6%) and underlying cause to 20 (33.4%) resident doctors. Further analysis of data revealed that only 10(16.6%) of the respondent knew correct definition of all the three causes of death.

CONCLUSIONS AND RECOMMENDATIONS

Regular training of all post graduate students on MCCD, after they enter the post graduate course. Also there is a need for refresher training of all resident doctors on yearly basis on MCCD to clarify their doubts regarding filling up of forms. More emphasis should be given during training, on time interval between the onset of the condition and death for each condition viz. immediate cause, antecedent cause and underlying cause.

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