

## Knowledge of Medical Certificate of Cause of Death amongst Doctors and Errors in Certification

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### Abstract

**Context:** Medical certificate of cause of death (MCCD) is a vital document issued by a doctor for which World Health Organization has prescribed a standard format. There are many rules and regulations about filling and issuing this certificate. Accuracy in certifying the cause of death is desirable at many levels as it affects international health statistics.

**Aims:** 1) To compare knowledge and awareness about rules, regulations, and format of medical certificate of cause of death amongst doctors. 2) To audit medical certificates of cause of death issued.

**Settings and Design:** Cross sectional study hospital based carried out between September to December 2014.

**Methods and Material:** Faculty members, residents, and interns attending the MCCD training session filled a pre structured, semi open ended, self-administered questionnaire. An audit of medical certificates of cause of death issued between September to December 2014 was done.

**Statistical analysis used:** Data entered in Microsoft excel. SPSS 19.0 statistical software was used for analysis

**Results:** Of 91 participants, 22% were from paediatric department, 35% had between 1-5 years of work experience. Statistically significant association was seen between department and knowledge of full form of MCCD, immediate & contributory cause of death, Form IV & IV A, & separate stillbirth form ( $p < 0.05$ ). Statistically significant association was found between work experience, uses of MCCD, immediate and antecedent cause and use of form IV and IVA ( $p < 0.05$ ). Of the 98 certificates reviewed 92% did not mention time interval. Only 7% certificates were free of error.

**Conclusions:** There is a need to adopt multi faceted approach to increase knowledge and awareness about rules, regulations of MCCD in doctors to improve accuracy and reliability of data.

**Keywords:** Medical Certificate of Cause of Death, MCCD Audit, MCCD Errors, Educational intervention.

**Key Messages:** The role of data derived from Medical Certificate of Cause of Death in the international health scenario and policy making needs to be emphasised in the minds of certifying doctors. Multi faceted educational and administrative intervention is the needed to make this data reliable and accurate.

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disposal of the body, and settle the deceased's estate.<sup>[2]</sup> MCCD aids the judicial system in civil cases e.g. compensation, insurance claims etc.<sup>[3]</sup>

The lesser known but equally important purpose of MCCD data is for obtaining mortality data. Mortality data is needed for surveillance of infectious diseases, undertaking control measures and to understand the trend and changing mortality pattern. This aids in monitoring the effectiveness of immunization and other prevention programmes.<sup>[3,4]</sup> Cause specific mortality rates are key indicators of the health trends in the population. They help in assessing the effectiveness of public health programmes and provide a feedback for future policy and implementation. They are essential for better health planning and management and deciding priorities of health and medical research programmes.<sup>[2]</sup> Thus it is vital in the interests of the international health scenario that the data in the MCCD is complete and reliable. This study was undertaken to assess knowledge and awareness about rules, regulations and format of MCCD amongst doctors of various clinical departments, and to conduct an MCCD audit.

### Introduction

The standard cause of death certificate in India follows the recommendations of World Health Organisation and the causes of death are classified according to the International Classification of Diseases (ICD).<sup>[1]</sup> The Medical Certificate of Cause of Death [MCCD] (Form 4 for Institutional deaths and 4A for Non-institutional deaths - Registration of Births and Death Act) is as per the ICD-10 format.<sup>[1]</sup>

It is the responsibility of the treating physician to issue MCCD in the correct manner and as per the prevailing rules and regulations.<sup>[2]</sup> In order to be able to do so he/she should be aware about the objectives, rules and regulations, and nomenclature used in MCCD.

The data contained in MCCD serves many purposes apart from being a permanent legal record of the fact of death and enabling relatives to arrange for

## Subjects and Methods

- Study Design: Cross sectional hospital based.
- Study Area: Tertiary care hospital in Pune city.
- Study Duration: 4 months: September - December 2014
- Study Sample: Faculty members, residents, and interns (who have completed major clinical postings) attending the MCCD training session (n=91).
- Inclusion Criteria: All attendees willing to participate.
- Study tool: Pre structured, semi open ended, self-administered questionnaire.
- The medico-legal consultant of the hospital conducts annual training and discussion sessions on MCCD. We conducted the study amongst the attendees of this workshop. After explaining the objectives of the study, we administered the questionnaire to all who were willing to participate. We also audited MCCD issued between the months of September to December 2014 (n=98).

## Statistical Analysis

We entered the data in Microsoft excel. SPSS 19.0 statistical software was used for analysis. The frequencies along with percent frequency distributions were generated. Statistical significance between two variables was tested using Chi square and Fischer's exact test. P value <0.05 was considered significant.

## Results

- Table 1 shows that almost one-fourth participants in the study were from paediatric department (22%) followed by obstetrics and gynaecology (20.9%).
- Work experience of doctors varied from less than one year to more than twenty years. Eighteen had more than 15 years of work experience as seen in Table 2.
- Table 3 shows correct responses. Fifty-three (58%) doctors were able to answer that MCCD stands for Medical Certificate of Cause of Death. All interns answered this correctly, followed by medicine faculty (75%). Doctors issue medical certificate of cause of death and Municipal Corporation issues a death certificate. Only 39 (43%) doctors could answer this correctly. Merely 27(30%) identified all four as uses of MCCD. Fifty-eight (64%) answered that MCCD was needed for disposal of dead. Only 22(24%) were aware that a doctor should have attended the patient 14 days preceding death to be able to issue MCCD. Most incorrectly assumed it to be 7 days. Understanding about the meaning of immediate, antecedent, and contributory cause of death was assessed in question five. Forty-four (48%) doctors

could answer this correctly. Most interns could define immediate and antecedent cause of death (100% and 66.7%) respectively. Sixty percent of paediatric faculty could explain contributory cause of death. Doctors should not mention cardiac arrest, shock as cause of death as per WHO and MCCD guidelines. [2] All interns, 75% each of paediatric, and medicine faculty were aware of this. We got 51(56%) correct responses. Twenty-five (27%) knew use of Form IV and IVA as per guidelines. None of the interns, orthopaedic and dermatology faculty was aware of this. There is a separate provision for stillbirth as per the MCCD Government guidelines. [2] Sixty-seven (74%) doctors knew this (95% from Pediatric department and 84% interns).

- We audited medical certificates of cause of death issued between September to December 2014 for errors (n=98) (Table 6). Majority (63%) were issued by Medicine department. In 12 out of the 98 (12.2%) certificates, age was either not mentioned or was corrected. Twenty-nine (29.6%) certificates had more than two errors, most common being no time interval mentioned and multiple cause of death in part a. Only seven (7.1%) of the 98 certificates audited had no error.

**Table 1: Distribution According to Department (n=91)**

Department	No. (%)
Dermatology	03 (03.3)
Ophthalmology	04 (04.4)
Interns	06 (06.6)
Medicine	08 (08.8)
Orthopaedics	08 (08.8)
Surgery	18 (19.8)
Obstetrics and Gynaecology	19 (20.9)
Paediatric	20 (22.0)
Not Mentioned	05 (05.5)

**Table 2: Distribution According to Years of Work Experience (n=91)**

Work experience in years	No. (%)
<1 yr	17 (18.7)
1-5 yrs	32 (35.2)
>5 yrs	29 (31.9)
Not Mentioned	13 (14.3)

**Correct Responses to Questions (n=91)**

Sr. No.	Question	Correct responses (%)
Q1.	What is full form of MCCD?	53 (58)
Q2.	What do doctors issue ?- <b>MCCD</b> or Death certificate	39 (43)
Q3.	What is the importance of issuing MCCD a) <b>Health Statistics</b> b) <b>Disposal of dead</b> c) <b>Transplantation of organs</b> d) <b>For National Health Programs</b>	27 (30)
Q4.	How many days before death should the doctor have examined the patient to issue MCCD? a) 7 days b) <b>14 days</b> c) 20 days d) 5 days	22 (24)
Q5.	What is a) Immediate cause of death? b) Antecedent cause of death? c) Contributory cause of death?	58 (64) 39 (43) 36 (40)
Q6.	Can a doctor mention the following as cause of death? • Shock - Yes/ <b>No</b> • Cardiac Arrest - Yes/ <b>No</b>	51 (56)
Q7.	What is use of a) Form IV b) Form IV A <b>a-Institutional Deaths</b> <b>b-Non Institutional Deaths</b>	25 (27)
Q8.	Is there a separate form for stillbirth? ( <b>Yes/No</b> )	67 (74)

\* Correct answer highlighted in bold

**Table 4: Correlation between department and knowledge of MCCD (n=86)**

	Department								Total (86)	P value
	Dermatology (3)	Interns (6)	Medicine (8)	Obstetrics & Gynaecology (19)	Ophthalmology (4)	Orthopaedics (8)	Paediatric (20)	Surgery (18)		
Q1.	0	6	6	14	1	2	14	10	53	0.001(S)
Q2.	1	3	3	12	1	2	13	4	39	0.090
Q3.	0	0	1	7	0	3	10	4	25	0.141
Q4.	1	3	1	1	1	2	8	4	21	0.141
Q5 a.	0	6	3	11	1	4	15	16	56	0.002(S)
Q5 b.	0	4	2	10	0	1	11	9	37	0.080
Q5 c.	0	1	1	10	1	0	12	8	33	0.016
Q6 a.	0	4	6	9	1	1	15	13	49	0.008(S)
Q6 b.	3	4	3	13	2	4	7	9	45	0.320
Q7 a.	0	0	2	9	0	0	11	3	25	0.007(S)
Q7 b.	0	0	2	9	0	0	11	3	25	0.007(S)
Q8.	2	5	3	14	2	4	19	14	63	0.025(S)

\*Responses where department mentioned were considered.

S – Significant

**Table 5: Correlation between work experience and knowledge of MCCD (n= 78)\***

	Work Experience in years			Total (78)	P-value
	< 1 year (17)	1 - 5 year (32)	> 5 years (29)		
Q1.	9	14	25	48	0.002(S)
Q2.	5	10	19	34	0.012
Q3.	1	6	18	25	< 0.001(S)
Q4.	5	4	9	18	0.192
5a.	10	14	28	52	< 0.001(S)
Q5b	5	5	25	35	< 0.001(S)
Q5c.	3	9	20	32	0.001(S)
Q6a.	6	18	24	48	0.004(S)
Q6b.	9	15	18	42	0.541
Q7a.	1	4	18	23	< 0.001(S)
Q7b.	1	4	18	23	< 0.001(S)
Q8.	13	20	24	57	0.185

\*Responses where work experience mentioned were considered.

S – significant

**Table 6: Errors in MCCD (n=98)**

Error observed in MCCD		No. (%)
a)	No age mentioned/ Correction made in age	12 (12.2)
b)	Incorrect sex mentioned	04 (04.1)
c)	No time interval mentioned	91 (92.9)
d)	Multiple cause of death mentioned in part a	52 (53.1)
e)	Multiple cause of death mentioned in part b	21 (21.4)
f)	Multiple cause of death mentioned in part c	01 (01.0)
g)	Multi organ failure mentioned as cause of death	07 (07.1)
h)	Cardiogenic shock mentioned as cause of death	03 (03.1)
i)	Septic shock mentioned as cause of death	07 (07.1)
j)	Multiple (>2) errors	29 (29.6)

## Discussion

As we derive national morbidity and mortality statistics from MCCD, it is essential to ensure completion and accuracy of the 'cause of death' section.<sup>[3]</sup> Nowhere in the medical education curriculum is the importance of this data in MCCD emphasized in the minds of the future doctors. In fact, in our study, only 27 (30%) knew all the purposes served by MCCD.

In some western countries if the attending doctor had not seen the patient within the 14 days preceding death, and had not seen the body after death either, the registrar is obliged to refer the death to the coroner before it can be registered.<sup>[4]</sup> It is the statutory duty of the doctor, who had attended in the last illness to issue the MCCD after death of the patient.<sup>[4]</sup> There is no clear legal definition of "attended", but it is generally accepted to mean a doctor who has cared for the patient during the illness that led to death and is familiar with the patient's medical history, investigations, and treatment.<sup>[4]</sup> In the current study, only 22 (24%) knew this regulation, which is medico-legally vital.

Understanding about immediate, antecedent and contributory cause of death was found in 58(64%), 39(43%) and 36(40%) study participants. One-fourth- 24 (26%) got all three correct. Swapnil Agarwal et.al. revealed a conflict of opinion about meaning of the terms - causes, modes, and manners of death.<sup>[5]</sup> In the study by Dr Venu Shah, 52(86.7%), 25(41.6%) and 20(33.3%) knew the correct definition of immediate, antecedent and underlying cause respectively.<sup>[6]</sup> It is the underlying cause of death which gets the final mention during International Classification of Disease (ICD10) which is a must know for all doctors. Thus correctly identifying and mentioning the underlying cause of death in the MCCD reflects in accurate mortality statistics when submitted to health authorities.<sup>[2]</sup>

Swapnil Agarwal et. al. found terms used to describe modes of death like cardiac arrest, cardiac shock, respiratory failure, etc. that should have been avoided, mentioned in 254 (86%) cases.<sup>[5]</sup> Half (56%) of doctors in our study, mostly from paediatric and surgery department, answered that shock or cardiac arrest should not be mentioned as cause of death.

Many have studied errors in MCCD.<sup>[7-16]</sup> Most studies have classified major errors as those with incomplete or incorrect cause of death, mode/mechanism of death mentioned instead of cause of death, incorrect sequencing, and duration of disease not mentioned.<sup>[7-9,12-17]</sup> Minor errors were missing or corrected age or sex, or use of abbreviations etc.<sup>[7-9,12-17]</sup>

The commonest error (92%), we came across in our study was time interval (between the onset of disease and death) not being mentioned. This was more than study findings of Shantibala K et. al.(65.3%), Amul B Patel et. al.(26%) and Pritt et. al.(52%).<sup>[7-9]</sup>

In our study, 53.1% certificates had multiple causes written in the immediate cause of death/part a. This was much more than findings of Madhao G. Raje (8%).<sup>[12]</sup> B Swift and K West found 10.9% certifiers filled Part II inappropriately.<sup>[13]</sup> Tsung-Hsueh Lu et.al, found 146 (4%) certificates where multiple causal sequences were given in part I.<sup>[11]</sup>

In Australia, 'major errors' (when underlying cause of death is not conveyed appropriately) were found in 16% certificates. Twenty-five percent were inaccurately worded for cause of death (i.e. no cause, multiple causes, sequence unclear, single cause but relevant details absent etc.).<sup>[14]</sup> Amul B Patel noted major errors in 23(57.5%) certificates, commonest being improper sequencing (55%).<sup>[8]</sup> Ahmed Suleman Haque observed 124 (62%) certificates with inappropriate immediate and underlying cause of death. The same number had a combination of such errors that significantly changed the death certificate interpretation and would therefore have major public health implications.<sup>[10]</sup>

Christian P Selinger noted incorrect age (5%) and consultant name not mentioned (48.6%).<sup>[15]</sup> Even our study had 6.4% certificates with age not mentioned or some correction made to it. We also observed discrepancy between name and sex in 4% cases.

Two studies found 32.5% and 21% certificates with abbreviations.<sup>[10,14]</sup> In contrast, no certificate we scrutinized had abbreviations.

Only 7.4% of our audited certificates had no error. Amul B Patel, Pritt et. al., and Ahmed Suleman Haque found less than 2% error free certificates.<sup>[8,9,10]</sup> Tsung-Hsueh Lu et.al, Madhao G. Raje, B Swift and K West,

found 61%, 79%, 55%, error free certificates respectively.<sup>[11,12,13]</sup>

### Conclusions & Recommendations

In our institution, annual MCCD orientation programme includes an interactive session with mock certificate writing, followed by discussion on the correct diagnosis and cause of death and the errors made by the participants. The low percentage of correct responses about MCCD rules and format in our study highlights the need for regular follow up sessions to increase knowledge. Studies have proven the benefit of educational intervention and MCCD training on the knowledge and quality of the data filled in MCCD.<sup>[11,16]</sup> Myers and Farquhar demonstrated a 15.7% decrease in the error rate following a 1- time educational intervention.<sup>[16]</sup>

Adopting a multifaceted approach may improve the quality of MCCD data. Although death certification is included in the curriculum for undergraduate medical course, it has little practical application at that time (II MBBS). Introduction of formal training session in the curriculum especially for interns and post graduate students, and hands on training every six months for the faculty are some strategies that can be adopted. It has to be emphasized that inaccurate mortality data have extensive, but unquantified, international implications beyond the more obvious health care uses.<sup>[14]</sup>

Mere educational intervention will not suffice. Regular auditing of MCCD should be done followed by discussion with the certifying doctor. This requires dedicated, trained staff in Medical Records Department. Physicians should be made aware about the various resources available for guidance on proper certification of death.<sup>[2,17,18]</sup>

All doctors should realize that Medical Certificate of Cause of Death is an important scientific tool and has far reaching impact (on international health). Thus, it is the physician's primary responsibility to complete the medical certificate of cause of death correctly.

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