Assessment of medical certificate of cause of death at a tertiary care centre in Mumbai, India

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Abstract
Introduction: India, the second most populous country in the world shares proportionate global mortality with deficient mortality data. In view of limited literature about quality of cause of death data from our country, a study was undertaken to find out completeness of records of Medical Certificate of Cause of Death (MCCD) and to find out disparity between them and clinical records.

Materials and Methods: A Cross sectional record based study was conducted at a tertiary care hospital in Mumbai. Randomly selected 20% of records of the patients died after admission to the tertiary care hospital during calendar year of 2016 were included while medicolegal deaths were excluded. Demographic variables, variables related with cause of death were assessed for accuracy and administrative variables were added to these while assessing completeness. The study was conducted after obtaining Institutional Ethical Committee approval and data was analysed appropriately.

Result: All 410(100%) MCCD forms assessed were notably incomplete and inaccurate. Time interval between mortality causes and death was mentioned in 2(0.48%) certificates only and that was also inaccurate. Other major errors were mode of dying mentioned as an immediate or antecedent cause of death 353(86%) and 170(41%) respectively, multiple causes and use of short forms 229(56%) and 143(35%) respectively.

Conclusion: A sustainable training programme with inbuilt quality assurance mechanism for improving medical certification of cause of death at institutional level should be imparted.

Keywords: Medical Certificate of Cause of Death (MCCD), Assessment, India.
India, the second most populous country in the world will be surpassing China by 2022, in terms of population growth with proportionate increase in global mortality. Hence it is definitely a need of the hour to boost the existing death certification mechanism with focus on quality assurance at all level. Published evidence from elsewhere countries supports training interventions improve death certification.15,21 In order to achieve this objective multifaceted research with robust monitoring in death certification is crucial. However there is a limited relevant published evidence from our country.15-17,19, 21 Hence a study was conducted to assess MCCD in a tertiary care hospital in Mumbai. Objectives of same were to find out completeness of death records as well as disparity between clinical records and MCCD.

Materials and Methods
A Cross sectional record based study was conducted at a tertiary care hospital in Mumbai. For feasibility purpose death records of calendar year 2016 were selected. Among them randomly selected 20% records of the patients who succumbed to natural death after admission to the tertiary care hospital were included except medicolegal case.

Fourteen variables including demographic and death related details of deceased in MCCD to assess accuracy. In addition to this, signature, name, registration number of Resident Medical Officer and Date of verification were assessed for completeness.

While assessing completeness of MCCDs, for each blank (excluding blank but correct and filled (including blank but correct) variable, score of “0” and “1” scores were given respectively. In this way certificates scoring “17” labelled as completely complete while score of “14-16” as slightly incomplete, MCCDs with score of “7-13” and “<7” were considered as notably incomplete and grossly incomplete respectively. Similarly while assessing accuracy of MCCDs, for each wrongly filled and correctly filled (also includes blank but correct) variable, score of “0” and “1” scores were given respectively. In this way certificates scoring “14” labelled as completely accurate while score of “11-13” as slightly inaccurate. MCCDs with score of “6-10” and “<6” were considered as notably inaccurate and grossly inaccurate respectively.

Data was collected during June-December 2017 and was entered in Microsoft Excel and analysed appropriately. All necessary permissions including Institutional ethical was obtained.

Results
During the study period, 3340 deaths took place of which 1288 were medicolegal cases. Analysis of 20% of 2052 clinically certified deaths was carried out (n=410). It included death records of 159(38%) female and 251(62%) male deceased patients.

Assessment of completeness of MCCD was shown as in table number 1.

Table 1: Assessment of Completeness of Variables in MCCD forms (n=410)

| S. No | Variables                        | Completeness found in MCCD (n=410) |
|-------|----------------------------------|-------------------------------------|
|       |                                  | No. (%)    | Details of incompleteness No. (%) |
| 1     | Name of deceased                 | 409(99.75) | 1(0.25)                         |
| 2     | Age                              | 406(99.02) | 4(0.98)                         |
| 3     | Sex                              | 407(99.26) | 3(0.74)                         |
| 4     | Date of admission                | 406(99.02) | 4(0.98)                         |
| 5     | Date of death                    | 396(96.58) | 14(3.42)                        |
| 6     | Time interval between causes and death | 2(0.48)   | 408(99.52)                     |
| 7     | Immediate cause of death         | 409(99.75) | 1(0.25)                         |
| 8     | Antecedent cause of death        | 403(98.29) | 7(1.71)                         |
| 9     | Underlying cause of death        | 375(91.46) | 35(8.54)                        |
| 10    | Contributory cause of death      | 368(89.75) | 42(10.25)                       |
| 11    | Name of Medical officer          | 410(100)   | 0(0)                            |
| 12    | Signature of medical officer     | 410(100)   | 0(0)                            |
| 13    | Registration Number of medical officer | 410(100) | 0(0)                            |
| 14    | Manner of death                  | 410(100)   | 0(0)                            |
| 15    | Pregnancy in case of female deceased | 0(0)    | 159(100)                        |
| 16    | If delivered or not              | 0(0)       | 0(0)                            |
| 17    | Date of verification             | 410(100)   | 0(0)                            |

As seen in table number 1, many variables were incomplete because details were not mentioned.

Level of completeness of MCCD were analysed and mentioned in table 2.
Table 2: Level of completeness of MCCD forms (n=410)

| Level of completeness     | Range of score | Completeness (%) | No | Percentage |
|---------------------------|----------------|------------------|----|------------|
| Completely complete       | 17             | 100              | 0  | 0          |
| Slightly incomplete       | 14—16          | 82—95            | 0  | 0          |
| Notably incomplete        | 7—13           | 40—76            | 410| 100        |
| Grossly incomplete        | <7             | <40              | 0  | 0          |
| Total                     |                |                  |    |            |

Results of Level of accuracy of MCCD were mentioned in table 3.

Table 3: Assessment of Accuracy of Variables in MCCD forms (n=410)

| S. No | Variables                        | No. (%)  |
|-------|----------------------------------|----------|
| 1     | Name of deceased                 | 361(88.04) |
| 2     | Age                              | 395(96.34) |
| 3     | Sex                              | 404(99.26) |
| 4     | Date of admission                | 404(98.53) |
| 5     | Date of death                    | 395(96.34) |
| 6     | Time间隔 between Causes & Death | 0(0)     |
| 7     | Immediate Cause of death         | 39(9.5)  |
| 8     | Antecedent Cause of death        | 189(46.09) |
| 9     | Underlying Cause of death        | 241(58.78) |
| 10    | Contributory Cause of death      | 375(91.46) |
| 11    | Manner of Death                  | 410(100)  |
| 12    | Pregnancy in case of female deceased | 0(0)   |
| 13    | If delivered or not              | 0(0)     |
| 14    | How did injury occur?            | 0(0)     |

Major errors related to accuracy of MCCD were time interval between Causes and Death was not written, mode of dying was mentioned as Immediate, Antecedent and Underlying cause and use of short forms in them.

Following table number 4 shows level of accuracy of MCCD forms

Table 4: Level of Accuracy of MCCD forms (n=410)

| Level of accuracy   | Range of score | Accuracy (%) | No. | Percentage |
|---------------------|----------------|--------------|-----|------------|
| Completely accurate | 14             | 100          | 0   | 0          |
| Slightly inaccurate | 11—13          | 78—93        | 0   | 0          |
| Notably inaccurate  | 6—10           | 40—71        | 410 | 100        |
| Grossly inaccurate  | <6             | <40          | 0   | 0          |
| Total               |                |              |    |            |

Discussion
During the study period 3340 deaths took place, accounting 6% against total admissions in that year. The total certified deaths were 2052 and in 1288 cases post mortem was carried out. Analysis of 20% of clinically certified deaths was carried out.

All death certificates were almost complete as per socio demographic variables as compared to other studies conducted elsewhere. 19,22 In this study, date of admission and death were mentioned in 406(99.02%) and 396(96.58%) respectively in the records assessed while in other studies date of death was mentioned in 99.9% and 95.9% records. 17,21

Completeness of variables such as immediate cause, antecedent cause and underlying were 409(99.75%), 403(98.29%) and 375(88.04%) respectively. In a study conducted in India, the MCCD forms were complete in 99.8%, 97.7% and 98.4% for variables like immediate cause, antecedent cause and underlying cause respectively while the same were complete in 95.9%, 27% and 1.1% MCCD forms in another study conducted in India respectively. 17,19

Time intervals between causes and death were mentioned in only two certificates (0.48%) in our study while in other studies in India, it was mentioned in 7.2% - 74.7%. 16,21,23

Completeness of MCCD was 100% as per as variables like Variables like Name of doctor, Signature of doctor,
Registration Number of doctor and his Designation were considered equivalent to other study. In our study, information about important variables like in case of female death, pregnancy status and whether delivered or not, was not available at all. While in a study conducted elsewhere in India, pregnancy status and delivery status were reported in 95.2% & 93.5% respectively.

Overall completeness showed that all certificates were notably incomplete as compared to other study which had used similar kind of grading for assessing completeness, showed majority of certificates were 96.19% notably incomplete and 73.9% slightly incomplete. Overall accuracy about socio-demographic information variables varies from 88% to 98.53%. Major error was in terms of incomplete, wrongly mentioned name in 49(11.95%) MCCD. Absence or wrong mention of age and sex in 15(3.6%) and 6(1.4%) respectively in this study. A similar kind of study conducted at Gujarat revealed 0.2% and 0.5% error in name and age respectively while gender accurately mentioned in all certificates while another study observed 0.2%, 1.26% and 0.76% in this respective context in India.

In our study, mode of dying was mentioned as immediate cause in 371(90.48%) certificates and as an antecedent cause and an underlying causes of death in 193(47.07%) and 17(4.14%) death records assessed respectively.

In all three causes, 164(40%) short forms and 266(65%) multiple causes were mentioned respectively. At 64(15.60%) places, contributory causes were not mentioned which were mentioned in clinical notes.

Accuracy for immediate, antecedent and underlying cause found to be 39(9.5%), 189(46%) and 241(58.78%) respectively while other study from elsewhere in the world observed 17.5%, 40.8% and 86.8% respectively. Studies conducted elsewhere in India observed 44%, 55% and 69.9% accuracy respectively and another study observed 95.56%, 66.67% and 40% accuracy respectively in this context.

While time interval between immediate antecedent and underlying causes of death and death was mentioned in only 2(0.48%) records, however it was not accurate (0%). However studies conducted elsewhere in India observed 2%, 7.9% and 59.1% accuracy respectively and another study observed 8.89%, 4.45% and 6.67% accuracy respectively in this context.

Overall accuracy showed that all certificates were notably inaccurate as compared to other study which had used similar kind of grading for assessing accuracy, majority of certificates were notably inaccurate(57%).

Limitations
The study involved assessment of randomly selected limited number of death records of only one year from a tertiary care hospital in India. Secondly it did not involve assessment of MCCDs in case of medicolegal deaths. Feasibility and time constraints did not permit training interventions for improving quality of cause of death data.

Conclusion
Findings of the study conclude that there is an urgent need of sensitisation and refresher training for doctors to improve quality of MCCD with a major emphasis on interactive workshops. These training interventions should be backed by a mechanism for appraisal on continued basis.

Acknowledgments
We thank all the authorities who had given permissions and necessary support to conduct the study.

Conflicts of Interest: None.

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How to cite this article: 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.