ORIGINAL RESEARCH

SITUATIONAL ANALYSIS OF MEDICAL CERTIFICATION OF CAUSE OF DEATH (MCCD) SCHEME IN MUNICIPAL CORPORATION OF AHMEDABAD

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ABSTRACT

Background: *Medical Certification Cause of Death (MCCD) Scheme is an important tool to obtain reliable and scientific information in terms of causes of mortality. In India still MCCD are registered only in 14% case of all death. The present study was conducted to assess the accuracy and completeness of the Medical Certificate of Cause of Death (MCCD) forms, study the leading causes of death derived from the MCCD forms and to find out the life expectancy at birth in male and female.*

Methodology: *A total of 7392 MCCD forms were available during one year from the Ahmedabad Municipal Corporation's Registrar Birth and death office and all of them were scrutinized for the completeness of the certificate and tried to find out the cause of death in which underlying cause of death was written. Data collected was analyzed using Epi-Info software (version 6.04d). Appropriate statistical tests were applied.*

Results: *Out of total 7392 MCCD forms, 7336 (99.2%) mentioned age and 7299 (98.7) mentioned sex of the deceased person. Only 151(2.04%) forms were completely filled. The completeness for immediate cause, antecedent cause, and underlying cause was 95.56%, 66.67% and 40% respectively. Main leading cause of death in the present study was disease of circulatory system 868(29.35%), followed by Neoplasm (16.54%) and Certain infectious and parasitic disease (16.44%).*

Conclusion: *The present study showed incompletely and inaccurately filled MCCD forms. Therefore adequate training and proper sensitization of the private and government doctors regarding the usefulness of MCCD data is required.*

Key words: *MCCD, Birth and Death Registration, Underlying cause of death*

INTRODUCTION

Mortality statistics is essential for the welfare of the community, health planning, management of health programs and to build up scientific database for medical research. It also helps to know the impact of health services, to evaluate health indicators like infant mortality rate [IMR], maternal mortality rate [MMR] and to find out magnitude of emerging and re-emerging diseases.[1]

It is obligatory for each and every doctor to issue a cause of death certificate in the death of his patient. Incomplete or inaccurate entry in these certificates poses difficulty in obtaining reliable information pertaining to causes of mortality[2]. Therefore MCCD scheme, which is basically a part of International Classification of Diseases [ICD] and health related problems formulated by WHO is an important tool to obtain reliable and scientific information in terms of causes of mortality. Because of this importance, a provision has been made in the registration of Birth and Death (RBD) Act, 1969 for certification by a medical practitioner. [3]

In the state of Gujarat, MCCD scheme has been implemented from January 2008, in all the Municipal Corporations and 25 district hospitals.[4]

Some research shows that in Gujarat only 5-10% deaths were classified according to ICD classification.[5] Hence, the present study was conducted to study 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. The objectives of the study were to assess the completeness of the Medical Certificate of Cause of Death (MCCD), to study the leading causes of death derived from the MCCD form and to find out the life expectancy at birth in male and female.

MATERIAL AND METHODS

Observational Descriptive Study was carried out in urban area of Ahmedabad Municipal Corporation which consists of six zones namely Central, North, South, West, New West and East. MCCD forms of all death cases are filled up routinely by the doctors and then these forms are sent to the Medical Record and Statistical Department then to the registrar birth and death office. 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.

A total of 7392 MCCD forms during one year were available from the Ahmedabad Municipal corporation's Registrar Birth and Death office and all of them were scrutinized and checked for the completeness, major gaps in the filling the form and then coded according to the International Statistical

Classification of Diseases [ICD]. Latest edition of Physician's Handbook on Medical Certification of Cause of Death (MCCD) was referred for the evaluation purpose.[4] A checklist (Name, Sex, Age, Address, Date of death, Immediate cause of death, Antecedent cause of death, Underlying cause of death, Other associated cause of death, Interval in-between, Death associated with pregnancy or not, Delivery, Mode of death, Doctor's sign and designation, Date of verification and registration number) was used to collect data. Data were entered in Microsoft Excel and analyzed using Epi-Info software (version 6.04d). Appropriate statistical tests were applied.

RESULTS

A total of 7392 MCCD forms were studied, out of which 4531 (62%) were male deaths and 2768 (37.4%) were female deaths. The analytical outcome of the study revealed that out of total 7392 MCCD forms, 7336 (99.2%) mentioned age and 7299 (98.7) mentioned sex of the deceased person.(Table 1)

Mean age of males at death was 50.76 ± 21.35 years while it was 49.34±22.51 years for females. Mean age in total population was 50.17 ±21.81 years. Men outlived women and the difference in mean age of males and females was statistically significant (Z=2.67 p<0.01)

Immediate cause of death was mentioned in 95.6% of the cases. Terms used to describe modes of death like cardiac arrest, cardiac shock, sudden cardiac failure, respiratory failure, respiratory paralysis, respiratory arrest etc. that should have been avoided, were mentioned in 82.2% cases. The underlying cause of death includes any disease or injury which initiated the chain of events leading directly to death. It was mentioned in 40% of the cases only. The interval between onset and terminal event of various conditions mentioned was written in only 7.2% cases. The doctor certifying death is required to put his signature, mention his/her full name & designation along with date and preferably should use his/her seal bearing registration number, at the bottom of the certificate. About 91% certificates had the signature of the doctor but only 24.55% certificates had the seal with registration number of the physician (Table 2). Out of 7392 forms, only 2957 forms (40%) had the information regarding underlying cause of death according to ICD-10 classification (Table 3)

Table 1: Age & Sex Wise distribution of deceased persons

Age at death* (Years)	Male		Female		Total	
	No.	%	No.	%	No.	%
<1	22	0.49	7	0.25	29	0.39
1 to 4	286	6.31	195	7.04	481	6.59
5 to 14	223	4.92	190	6.86	413	5.66
15 to 24	286	6.31	228	8.24	541	7.04
25 to 34	423	9.34	255	9.21	678	9.3
35 to 44	681	15.03	369	13.33	1050	14.39
45 to 54	757	16.71	360	13.01	1117	15.3
55 to 64	1203	26.55	769	27.78	1972	27.02
65+	650	14.35	395	14.27	1045	14.32
Total	4531	100	2768	100	7299	100

Table 2: Accuracy of each variable in the filled MCCD forms

Sr. No.	Variable	Filled Forms (n= 7392)			
		Yes		No	
		No.	%	No.	%
1	Name	7376	99.78	16	0.2
2	Sex	7299	98.74	93	1.26
3	Age	7336	99.24	56	0.76
4	Date of death	7385	99.91	7	0.1
5	Immediate cause of death	7064	95.56	328	4.6
6	Interval between immediate cause and death	657	8.89	6735	91.11
7	Antecedent cause of death	4928	66.67	2464	33.33
8	Interval between antecedent cause and death	329	4.45	7063	95.55
9	Underlying cause of death	2957	40	4435	60
10	Interval between underlying cause and death	493	6.67	6899	93.33
11	Other associated cause of death	1971	26.66	5421	73.34
12	Interval between other condition and death	657	8.89	6735	91.11
13	Death associated with pregnancy or not	6570	88.88	822	11.12
14	Mode of death	6078	82.22	1314	17.78
15	Doctors sign	6735	91.11	657	8.89
16	Designation	3450	46.67	3942	53.33
17	Date of verification	4107	55.56	3285	44.44
18	Registration Number	1807	24.45	5585	75.55
19	Address	4764	64.45	2628	35.55

Table 3: Underlying Cause of Death according to ICD-10 Classification

Underlying cause of death	Male		Female		Total (n=7392)	
	No.	%	No.	%	No.	%
Certain Infectious And Parasitic Diseases (A00-B99)	334	16.39	152	16.54	486	16.44
Neoplasms(C00-D48)	356	17.47	133	14.47	489	16.54
Endocrine, Nutritional and Metabolic Diseases (E00-E89)	57	2.8	38	4.13	95	3.21
Diseases of the nervous system (G00-G98)	66	3.24	41	4.46	107	3.62
Diseases of the circulatory system (I00-I99)	585	28.7	283	30.8	868	29.35
Diseases of the respiratory system (J00-J98)	210	10.3	83	9.03	293	9.91
Diseases of the digestive system (K00-K92)	184	9.03	60	6.53	244	8.25
Diseases of the genitourinary system (N00-N99)	110	5.4	70	7.62	180	6.09
Certain Conditions originating in the perinatal period (P00-P96)	72	3.53	32	3.5	104	3.51
Congenital malformation, deformations and chromosomal abnormalities (Q00-Q99)	11	0.54	7	0.76	18	0.61
Injury, poisoning and certain other consequences of external causes (S00-T98)	12	0.58	7	0.76	19	0.64
External causes of morbidity and mortality (V01-Y98)	31	1.52	8	0.87	39	1.32
Others	10	0.49	5	0.54	15	0.51
Total	2,038	100	919	100	2957	100

DISCUSSION

Proper completion & accuracy of death certificate is essential to collect mortality statistics. To meet this need the doctors are trained to fill up death certificate all over the globe. However despite repeated instructions, trainings / workshops to clinician, errors are committed in writing the correct underlying cause of death.

Hence this study included evaluation of completeness of death certificate, assessment of errors found in medical & non-medical part of certificate, & study of causes of these errors. This study revealed that only 2% certificates were completely filled. Similarly, Mohammed EL-Nour et al[6] found 1.8% certificates completely filled in a study conducted in pediatric hospitals of Khartoun state of Sudan during 2004. While Venu et al[7] from VS General Hospital of Ahmedabad reported that only 1.2% of certificates were completed, Bhavin et al[8] from Civil Hospital, Surat mentioned that only 0.5% of certificates were completed in an internationally acceptable manner.

Mumbai Vital Statistics department (2005) evaluated 20,362 Medical certification of cause of death certificate, out of that 51 (0.25%) were missing gender while 22 (0.10%) were missing age.

Patel et al[9] from a teaching hospital, Vadodara reported that 30 % of deceased were found in more than 65 years of age group while in present study it was only 14.32%. Patel et al[9] stated that 52.5 % were males which is in accordance with the present study.

Completeness of variables such as immediate cause, antecedent cause and underlying cause were 95.56%, 66.67%, 40% respectively in MCCD forms in this study. Sibai et al[10] reported that immediate, antecedent and underlying cause of death

were mentioned in 44.3%, 61.7% and 82.9% of death certificates, respectively. Venu et.al[7] reported that immediate, antecedent and underlying cause of death were mentioned in 99.8%, 97.7% and 98.4% of death certificates, respectively. In the study of Bhavin et al[8], immediate, antecedent and underlying cause of death were mentioned in 88.1%, 84.0% and 85.4% of death certificates respectively. The completeness for all three causes was not as 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.

Another area of concern is failure to mention the interval between onset and terminal event of death. A time estimate for each cause of death is crucial in providing complete picture of the cause of death and determining underlying cause of death. Since these entries give the chronology of events and ensure the correctness of the sequence which can prevent major error of improper sequencing, attending doctor should pay attention to this element carefully. At least one minor error was found in all the death certificates in this study, whereas studies[11,12,13] reported minor error ranged from 78% to 98%. By far the most common was the absence of time interval between the onset of disease and death, which occurred in 7.2% of cases in this study. Other studies[14, 15, 16] also found the same result with absence of time interval as most prevalent minor error (65%-98%). In majority (80%) of cases, mechanism of death like cardio-respiratory arrest, respiratory failure and heart failure were entered as

the immediate cause of death, which was comparable with a study from Gujarat.[8] However, in other studies this was reported in 13%-22% cases.[17,18,19] It was quite surprising to see this error in such abundance. In the death certificate itself, instruction is written under the heading of immediate cause in Part I that state the disease, injury or complication which caused death, not the mode of dying such as heart failure, asthenia, etc. Further, the difference between cause of death and mode of dying is covered in MBBS curriculum and explicitly mentioned in textbooks and literature, still doctors get confused.

A total of 151 MCCD forms (2.04%) were found completely filled in this study which was low as compared to reported by Venu et al[7], and high as compared to Bhavin et al[8]

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%).

In the present study Diseases of the circulatory system (29.35%), Neoplasm (16.54%) and Certain Conditions originating in the perinatal period (3.5%) were higher than Patel et al[9] study which reported it respectively 17.5%, 2.5% and 2.5%.

Guidelines of the MCCD as well as Indian Medical Council (Professional conduct, etiquette, and ethics) Regulation 2002, insist that every medical certificate including the cause of death certificate should bear the seal of the doctor which should bear the registration number.[4] This study observed 91% of certificates had legible signature mentioned at the bottom of certificate. El-Nour et al[6] reported that in 82% and shah et al reported that in 99.99% of the death certificate signature of doctors was present. Similarly, Pediatric hospitals of Sudan had observed 18% of certificates were not signed by doctors.[13] In Beirut, almost 50% of certificates did not contain signature of certifier.[10]

All inclusive, this picture points towards 'attitude' of certifier. In the present study we found that the doctors are finding it difficult to correctly fill the MCCD forms. Most of the doctors are confused between the terms "cause of death" and "modes of death". The differences are explicitly mentioned in textbooks and literature and extensively covered in MBBS curricula. Although the MCCD guideline specifically mentions that, the cause of death should not be confused with the modes of death; the dilemma still persists. Many doctors qualify with little or no formal training in death certification, whereas others may be inexperienced or have had insufficient practice. This might be the reason for occurrence of errors in death certificates. Other reasons may be that doctors had lack of understanding regarding importance of medical certificate of cause of death in mortality statistics for epidemiology, public health policy and research; or carelessness and reluctance on their part to fill in such forms. Studies showed that a simple educational intervention can improve the accuracy of death certificate completion and reduce major and minor error rates in the cause of death section.[20, 21, 22]

CONCLUSIONS

The MCCD scheme is an important step in regularizing and maintaining uniformity of issuing the cause of death certificate by medical practitioners. However our study revealed that magnitude of errors was overwhelming. It reflects inadequate practice, training and lack of awareness about importance of medical certificate of cause of death, carelessness and negligence on the part of attending doctors. To minimize these errors 'attitude' & 'skill' of doctors need to be improvised. Therefore, proper sensitization of the private and government doctors regarding the usefulness of MCCD data as well as adequate and refresher trainings is required. All death certificates should be subjected to supervision, if required. An extra effort needs to be put forth towards re-orienting them for inculcating positive attitude and addressing the lacunae in the scheme. If it is not done, it will not serve the purpose of being an important tool to obtain scientific and reliable information in terms of causes of mortality.

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