ORIGINAL ARTICLE

Improvement in Medically Certified Death: Results from a Pilot Study in the State of Malacca, Malaysia

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SUMMARY

A systematic approach to death registration and reporting is essential for studies and comparison within or between countries. One of the accepted methods in the system is to have medically certified death. The objective of this study was to improve the proportion of medically certified death (MCD) in the state of Malacca. Structured questionnaires were used by Medical Assistants (MAs) in the investigation of the cause of death for non-medically certified deaths. Data on certification of death by MAs in Malacca was analysed and compared with the total deaths obtained from the Department of Statistics. Possible determinants of deaths were investigated. Total deaths in the state of Malacca during the study period from 2000 – 2001 were 5941. About 35% (883/2493) of the total deaths in year 2000 and 45% (1550/3448) in 2001 certified by MAs were examined. By districts, 50.6% were certified in the district of Malacca Tengah, 13.4% Jasin and 36.0% Alor Gajah in 2000; 65.9% occurred in Malacca Tengah, 11.0% Jasin and 23.2% Alor Gajah in 2001. This project helped to increase the percentage of the medically certified deaths in Malacca from 49.8% in year 1998, 49% in 1999 to 73% in 2000 and 85% in 2001. The proportion of MCD in Malacca in 2000 (73%) may be increased to 93% if all MCDs done by MAs were accepted by the Department of Statistics. There is still a high proportion (23.6%) of ill-defined conditions such as old age and sudden death being diagnosed by MAs. The study shows that the quality of mortality data particularly in the percentage of medically certified deaths can be improved.

KEY WORDS:
Medically certified death, Non-medically certified death, Pilot study in Malacca, Medical Assistant, Determinants of deaths

INTRODUCTION

A well-developed and systematic approach to death registration and reporting is essential for studies and for comparison within or between countries. Mortality is one of the key and important vital statistics used to measure the health status of a country. One of the ideal methods accepted in the system is to have medically certified death. Therefore, the accuracy and adequacy of the medically certified death reporting system are vital to the overall mortality statistics. Of 192 WHO member states, 115 have reported annual mortality data for a year more recent than 1995[1].

The World Health Organisation reported that only 70 countries have death registration systems that are considered to be essentially complete, and produce timely annual statistics on cause specific mortality[2]. China and India have established Sample Registration Systems that provide useful data at national level. However, they do not serve the primary purpose of establishing civil status for all national residents since they represent only a fraction of national population[3].

In Malaysia, all deaths must be registered with the National Registration Department through the Police Department before burial permits are issued. However, not all registered deaths are medically certified and most of these non-medically certified deaths occur at home. The Department of Statistics reported that medically certified deaths comprised 43 and 45 percent in 1996 and 1997 respectively and increased in 1999 to 55.6 percent[9].

One of the methods which can improve these situations in Malaysia is a verbal autopsy. In doing the verbal autopsy (VA), these methods were first adapted to the Malaysian context and then implemented to ascertain causes of death that occurred in Malaysia. Causes of death were derived from completed VA questionnaires by physicians trained in ICD-based cause of death certification. VA diagnoses were validated in the sample hospital deaths for which reference diagnoses were available from the medical record review. Validated study findings were used to adjust VA-based causes of death derived for deaths that had occurred outside hospitals. Results were used to estimate cause-specific mortality patterns for deaths outside hospitals in Malaysia.

In response to this problem, the Ministry of Health, Malaysia initiated a pilot study to improve the medically certified death system. It was implemented in the state of Malacca after several discussions with various relevant government agencies such as the Malacca State Health Department, National Registration Department, the National Statistics Department and Police Department. This study identified mechanisms and the necessary components on how to improve the system without significant changes in the existing available resources.

MATERIALS AND METHODS

The current practice of death certification and notification for rural and urban areas are slightly different. In rural areas

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most of the deaths were reported mainly by relatives, village heads or police personnel and registered at the police stations or office of the Aborigines. They were then submitted to the National Registration Department with copies to the Department of Statistics for compilation. However, in urban areas, they were mostly certified by midwife, nurse, medical assistant or medical doctor. They were then registered either at the police stations or City Halls in the case of deaths occurred in Kuala Lumpur, Penang and Malacca. Since the registration of mortality was done outside the hospitals by non-medical professionals, most of these cases were classified as non-medically certified deaths (NMCDs).

In this study, medical assistants were specially trained to interview close relatives, review medical/hospital records of the deceased subject using a standard questionnaire to collect information on the symptoms and signs the subject experienced before death. This information was then summarised and interpreted to give a likely cause of death for that subject.

The study was conducted in the state of Malacca for two years from 2000-2001 and involved three districts i.e. Melaka Tengah, Jasin and Alor Gajah. The medical assistants (MAs) from the nearest health clinic visited the house either alone or together with police personnel. The MAs investigated the possible causes of death and certified all deaths that occur outside the hospital. The diagnosis and identification of cause of death was made based on the ICD – 10 classifications after reviewing related documents, medical records, interviewing relatives and consulting the medical and health officer in-charge. Therefore, a number of non-medically certified deaths (NMCD) were reclassified as medically certified death (MCD). All deaths certified by MAs were compiled at the state level. Subsequently, the Malacca State Registration Department recorded the death as medically certified. The outcomes of the certification of death were evaluated including the analysis of MCDs and NMCDs and composition certified by MAs.

The MCDs certified by the Department of Statistics at the Malacca state and national levels were used as comparison results with the MCDs certified by MAs in this study.

RESULTS

The total deaths in the state of Malacca during the study period in year 2000 – 2001 as reported to the Department of Statistics were 5941 with 2493 deaths in 2000 and 3448 in 2001. The number of deaths examined by the MAs was recorded as have taken place outside the hospital and at home. About 73% (1817/2493) were medically certified and 27% (676/2493) non-medically certified in 2000. In 2001, of 3448 death reported to the Statistics Department, 85% were reported as MCD and 15% are NMCD and all the data certified by the MAs matched the data from the Statistics Department. Medical doctors reported 49.7% while MA's reported 35.4% of certified deaths. For NMCD, police recorded 14.24% and others about 0.76%.

For the year 2000, about 35% (883/2493) of the total deaths were examined by MAs and 45% (1550/3448) in 2001. Among the certified deaths examined by MAs in 2000, 49.9% were males and 50.1% females; 52.8% and 47.2% for males and females respectively in 2001. By districts, MAs certified 50.6% of the total deaths in the district of Melaka Tengah, 13.4% in Jasin and 36.0% in Alor Gajah for the year 2000; 65.9% Melaka Tengah, 11.0% Jasin and 23.2 % in Alor Gajah in 2001.

Of the 35% total deaths that occurred at home examined by MAs in 2000 only 21% (522/2493) could be matched to all the data reported by the Department of Statistics. This is due to incomplete records or information on the identifier, i.e., [(incomplete IC number – 304 (12.2%), IC number was not recorded – 40 (2%) and old IC number – 17(1%)]. Among 21% (522) of deaths matched with total deaths reported by the Department of Statistics in Malacca for year 2000, 16% matched with MCD and 5% matched with NMCD. The percentage of the MCD in Malacca will be increased from 73% to 78% if this 5% certified death by MAs is considered as MCD. If 14% (361/2493) out of 35% (883/2493) total deaths that occurred at home examined by the MAs which could not be matched for the reason noted above are included as MCD as one assumption (i.e., deaths certified by MAs were considered as MCDs) the percentage of the MCD in Malacca will be raised to 93%.

There were differences in the number of deaths reported by doctors and those reported by MAs in groups below one year of age and in the group between 70 to 80 years.

It was shown that infectious diseases is low in deaths certified by the MA's (3.27%) compared to medically certified death in Malacca in 2000 (11.31%) and medically certified death for Malaysia in 1998 (11.69%). There were no maternal deaths, intentional and unintentional injuries certified by MA's. The ill-defined condition is high in deaths certified by MA's (23.55%) compared to medically certified death in Malacca for 2000 (7.04%) and medically certified death for Malaysia in 1998 (8.27%). Prenatal death is low in deaths certified by MA's (0.34%) than in medically certified death in Malacca for 2000 (4.56%) and medically certified death for Malaysia in 1998 (4.59%). Death due to diabetes were high in deaths certified by MA's (5.1%) compared to medically certified death in Malacca in 2000 (2.03%) and medically certified death for Malaysia in 1998 (1.67%).

Some diseases show similar trends when comparisons between certification of death by MA's in Malacca year 2000, medically certified death in Malacca in year 2000 and medically certified death for Malaysia in 1998, as in Cardiovascular (CVD) diseases (34.09%, 33.73%, 27.96%), Cancer (8.16%, 8.96%, 9.73%) and death due to Urogenital diseases (2.83%, 2.66%, 2.59%).

In 2001 the top five common causes of death reported were the ill-defined condition (20.5%) followed by ischaemic heart disease (12.2%), septicaemia (9.8%), cerebrovascular disease (9.6%), and heart failure (6.29%) (Table I).

Death due to septicemia reported by MAs was low (0.7%) compared to doctors (18.8%). However, the ill-defined conditions, diabetes, hypertensive heart disease and heart failure were reported high by MAs compared to doctors (Table II).

Medical officer reported 49.7% while Medical Assistants reported 35.4% of certified deaths in 2001 (Table III).

Table I: Top ten causes of death in Malacca certified by MAs in year 2001

	Causes of death	Frequency	Percent
1	Ill-defined condition	706	20.48
2	Ischaemic heart disease	422	12.24
3	Septicaemia	337	9.77
4	Cerebrovascular disease	331	9.60
5	Heart failure	217	6.29
6	Acute lower respiratory infections	135	3.92
7	Road traffic accidents	121	3.51
8	Hypertensive heart disease	93	2.70
9	Diabetes mellitus	92	2.67
10	Trachea/bronchi/lung	80	2.32
	Total deaths	3448	100

Table II: Comparison of the (top ten) causes of death in Malacca certified by Medical Assistants and doctors, 2001

Rank	Causes of death in Malacca, 2001	Dr (%)	MA (%)
1	Septicaemia	18.8	0.7
2	Ischaemic heart disease	18.1	8.1
3	Cerebrovascular disease	10.2	10.7
4	Acute lower respiratory infections	4.7	4.3
5	Ill-defined condition	3.4	26.2
6	Heart failure	3.0	11.4
7	Trachea/bronchi/lung	2.5	2.2
8	Other neonatal conditions	2.2	0.2
9	Other respiratory disease	1.9	2.6
10	Other urogenital	1.9	1.8

Table III: Percentage of certified death by profession in Malacca, 2001

Profession	Frequency	Percent
Coroner	1	0.03
Health Officer	5	0.15
Medical Officer	1707	49.51
Others	25	0.73
Medical Assistant	1219	35.35
Police	491	14.24
Total	3448	100

DISCUSSION

Accurate and complete information on the cause of death is necessary for effective planning and evaluation of health care programmes[1,2,10]. While information is accurate and complete for deaths occurring in hospitals, it is not so for deaths occurring at home because subjects who died in their homes were normally certified by non-medical professionals (i.e., commonly by police officer, village headman, teacher or pensioner in Malaysia). The quality of information on cause of death is often doubtful, as many deaths that occur at home do not have the 'cause of death certified' by a medical practitioner, but rely on 'lay reporting' by relatives[2].

There is a marked difference in deaths reported by medical doctors and those reported by MAs in the groups below one year of age and in the group between 70 to 80 years, which are more likely to have occurred in hospital. However, generally there is not much difference in most age groups between those deaths certified by MA's and those certified by medical doctors.

In recent years, the verbal autopsy questionnaire has been widely used for collecting such information, mainly in situations where the medical certification of death is incomplete. The verbal autopsy method relies on information gathered from a standardised interview with a relative or caretaker; trained coders review the data and supply standardised diagnostic algorithms to arrive at a cause of death[4,5,6,11,12].

Our findings show that some certified deaths done by MAs in 2000 were not considered as MCDs by the Department of Statistics. Therefore, the MCDs in that year (2000) appear low (73%) when compared to 2001 (85%). The possible reasons for not being considered as MCDs are lack of awareness among the officers involved and also deaths occurred at home were remain counted as NMCDs although it was notified by MAs during the multistage compilation from the MA certification up to the end receiver levels.

We found that the identity card (IC) number is very important during documentation since it is the only information identifier. It was shown that these cases could not be matched with the standard death reported during the analysis because of several reasons namely incomplete IC number, IC number not recorded and usage of the old IC number.

Previous studies have shown that validation on the cause of deaths is important and necessary before the results are accepted[12,13]. Comparison between certification of death by MAs and by doctors with medically certified death for

Malaysia in 1998 used as a base line shows some similarities and irregularities in percentages. Therefore, we feel that the quality of the diagnosis made by MAs has to be reviewed and revised by the experts. The deaths occurring in the hospital in 2000 in the age group below one year of age and in older age groups suggest that there are obvious differences in the diagnosis made by the MAs compared to that made in hospital by the physicians. Our findings also revealed that the major differences are in cause of death due to 'ill-defined condition', infectious diseases, diabetes and deaths due to pre-natal causes. There was no cause reporting of death due to maternal deaths, unintentional injuries and intentional injuries made by the MA's. These can be explained by the facts that the deaths due to injuries have to be referred to hospital for legal reasons and maternal deaths need further investigations.

Some of the diseases show similar trends when reported by MA's or physicians. These diseases include cardiovascular diseases, cancer and death due to urogenital diseases. This is because this type of disease needs treatment at the hospital and the deaths due to these diseases are clearly stated in the medical records which are accessible to the deceased relatives or the caretaker.

There is an apparent improvement in the reports made by the MA's in 2001 and the MCD that occurred outside the hospital or in house. However, the 'ill-defined condition' remains a leading cause of death for Malacca in 2001. The study shows that the cause of death due to septicaemia is reported more often by medical officers without explaining the co-morbidity of the indirect cause of septicaemia. The authors feel that the quality of causes of death reporting needs to be reviewed by a panel of experts, not only for those made by the MA's but also by the medical officers as well.

RECOMMENDATION

Since there is a discrepancy in the proportion of death records reported by MAs and the Department of Statistics due to irregularities in the identity card number, it is recommended that every person involved including the medical assistant needs to record properly the identification card (IC) number since the National Registration Department only uses and recognises new IC numbers.

For medically certified deaths, there are discrepancies on the cause of death assigned by doctors and MAs. We recommend that a special expert panel is to be established to verify the cause of death assigned to deceased by MAs in order to ensure its credibility and validity. Therefore, subsequently all deaths certified by MAs should be considered as medically certified and then accepted by the National Registration Department and Department of Statistics. The members of the expert panel may include clinicians, pathologists and epidemiologists.

The authors feel that a verbal autopsy is to be conducted in Malacca to review and revise all death reports for a particular period so that it will improve the quality of the cause of deaths. We would like also to suggest this exercise is to be extended to other states so that it will help to improve the overall quality of medically certified deaths in the country.

CONCLUSION

This project helped to increase the percentage of the medically certified deaths in Malacca from 49.8% in year 1998, 49% in 1999 to 73% in 2000 and 85% in 2001. The proportion of MCD in Malacca in 2000 (73%) may be increased to 93% if all MCDs done by MAs were accepted by the Department of Statistics. There is still a high proportion (23.6%) of ill-defined conditions such as old age and sudden death being diagnosed by MAs. The study shows that the quality of mortality data particularly in the percentage of medically certified deaths can be improved. Therefore, it is recommended that this project is to be expanded to other states throughout the country.

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