Original Research

Death certification practice in Qatar

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SUMMARY

Objective: To evaluate the knowledge and practice of death certification among physicians in Qatar.
Study design: Cross-sectional study.
Methods: Knowledge and practice of death certification were assessed in a group of 317 physicians, selected at random, using a self-administered questionnaire.
Results: Only 22.7% of physicians had received formal training in death certification. More than 60% of physicians knew which healthcare workers were entitled to complete the cause of death section of the form, and 37% of physicians were aware of the conditions for referral to a forensic physician. The most common difficulties facing physicians, when completing death certification forms, were dealing with complicated cases (47.3%), lack of training (43.5%) and failure to understand the terms used in the form (39.6%). Only 21.5% of physicians identified the cause of death correctly in the case scenario; 53.2% of physicians made major errors and 62.8% made minor errors.
Conclusion: Lack of training appears to play a major role in the poor completion of death certification forms. Educational/administrative interventions and training activities are needed.

Introduction

The death certification form is a public health surveillance tool and an important source of mortality information at national level. Most physicians do not receive training in completion of this form. Consequently, inaccuracies in the information entered on death certification forms affect the quality and value of the derived data (see Appendix 1).

Despite development of guidelines by the World Health Organization and other organizations, errors in death certification are common1 and have been noted worldwide.2 Errors can occur at various stages of the process and include incomplete certification, illegible handwriting and inaccurate cause of death.3

Inadequate death certification has been attributed to: inexperience; insufficient practice; incorrect completion of Parts I and II; and insufficient knowledge or accuracy of coding. Inaccurate death certification can lead to misallocation of resources in healthcare programmes, public expenditure and research. Information about death certification in Qatar is...
lacking; as such, this study was conducted to evaluate the knowledge and practice of death certification among physicians in Qatar.

**Methods**

This cross-sectional study was undertaken in the five hospitals of Hamad Medical Corporation (HMC): Hamad General Hospital, Women’s, Al Amal, Al Rumailah and Al Khor Hospital. Approximately 1073 physicians work for HMC, excluding those assigned solely to administrative work.

**Sample size and sampling technique**

A simple random sampling technique was performed. The following equation was used to calculate the sample size:

\[ n = \frac{DEFF \times Np \times (1 - p)}{Z^2 \times (1 - d^2) + \frac{1}{C0}} \]

where: N: Population size, P: Hypothesized % frequency of outcome factor in the population, d: Confidence limits, Z: Statistic for level of confidence, DEFF: Design effect = 1. With a 95% level of confidence and 0.05 absolute precision on either side of proportion \( p(d) \) was used. The expected proportion (effect size) was set at 50%. This calculation indicated a sample size of 284, and this was increased by 30% to allow for non-respondents, resulting in a sample of 370 physicians.

**Data collection tools**

An English-language, self-administered questionnaire was used in this study. The questions were based on previous studies and the death certification training pack, and the questionnaire was pretested on 20 physicians before the study commenced. These 20 physicians were excluded from the sampling frame before sample selection. The questionnaire included items on physicians’ knowledge and practice of death certification, and consisted of (mainly) closed- and open-ended questions, and case scenarios (see Appendix 2).

Statistical Package for the Social Sciences Version 17 (SPSS Inc., Chicago, IL, USA) was used for data entry and analysis.

**Results**

The overall response rate was 317/370 (85.6%). The median age of participants was 35 years, 206 were male (65%), the majority (84.5%) were non-Qatari, and two-thirds (61.5%) had worked in Qatar for five years or less. Almost half (51.4%) of participants worked in the department of internal medicine. Residents comprised the highest proportion of participants (55.8%) (Table 1).

Only 72 (22.7%) participants reported that they had received formal training in death certification, and 49 (68%) of these participants had received their training more than three years previously. Most (60%) participants had been trained by HMC, and the others had been trained at medical school or elsewhere. Interestingly, 230 (72.6%) participants reported that they did not need training.

**Knowledge assessment questions**

Only 117 (37%) participants gave a correct response to the question about referral to a forensic physician. However, more than 60% of participants knew which healthcare professionals were entitled to complete the cause of death section on the death certification form.

When assessing knowledge about the difference between underlying cause of death and mechanism of death, 80.4% and 79.5% of participants identified lung cancer and stroke as possible underlying causes of death, respectively. In contrast, 63.4% of participants thought that asphyxia was an appropriate option for underlying cause of death, when in fact it is a mechanism of death. Similarly, 33.1% of participants incorrectly identified cardiorespiratory arrest as an underlying cause of death (Fig. 1). Almost 80% of participants misinterpreted the terminology (mechanism of death and underlying cause of death) (Fig. 2).

**Practice assessment questions**

In total, 207 (65.3%) participants reported that they knew how to complete a death certification form. However, 124 (39.1%) participants had never done so. Two hundred and thirty-eight (75.1%) participants knew that the deceased’s ID and/or health card was required for completion of a death certification form.

The most common difficulty facing physicians during death certification was dealing with complicated cases (47.3%), followed by lack of training (43.5%) and not understanding the terms used in the death certification form (39.6%).

<table>
<thead>
<tr>
<th>Table 1 – Characteristics of participants (n = 317).</th>
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<tbody>
<tr>
<td>Characteristic</td>
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<tr>
<td>Gender</td>
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<tr>
<td>Male</td>
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<tr>
<td>Female</td>
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<tr>
<td>Age (years)</td>
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<tr>
<td>&lt;35</td>
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<tr>
<td>36–45</td>
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<tr>
<td>≥46</td>
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<tr>
<td>Missing data</td>
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<tr>
<td>Median age 35 years/range 24–67 years</td>
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<tr>
<td>Nationality</td>
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<tr>
<td>Qatari</td>
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<tr>
<td>Non-Qatari</td>
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<tr>
<td>Department</td>
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<tr>
<td>Medicine</td>
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<tr>
<td>Surgery</td>
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<tr>
<td>Paediatrics</td>
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<tr>
<td>Obstetric and Gynecology</td>
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<tr>
<td>Position in Hamad Medical Corporation</td>
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<tr>
<td>Consultant</td>
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<tr>
<td>Specialist</td>
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<tr>
<td>Resident</td>
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<tr>
<td>Time working in Qatar (years)</td>
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<tr>
<td>≤5</td>
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<tr>
<td>&gt;5</td>
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</table>
Scenario assessment

An 88-year-old man suffered sudden loss of the use of his right arm and leg. Following a neurological examination by you (as the attending doctor), a clinical diagnosis of stroke was made. He was subsequently confined to bed for seven days, and showed few signs of improvement. He began to cough, became feverish, and additional sounds could be heard on chest auscultation indicating that he had developed pneumonia. He died 48 h later. His medical history showed that he also suffered from benign prostatic hyperplasia.

*Correct completion of the case scenario would be: Part I, Line a, Aspiration pneumonia; Line B, Stroke; Part II, None.

For definitions of the types of errors and examples of possible ways of completing the case scenario, see Appendix 3.

The immediate cause of death was identified correctly by 70.7% of participants, and the fact there was no comorbid cause was identified correctly by 36.9%. Sixty-eight (21.5%) participants identified all causes of death in the scenario correctly (Table 2).

Regarding the frequency of errors in the case scenario, a high proportion (77.6%) of participants made at least one error, and 38.5% made both major and minor errors (Fig. 3).

On assessing the different types of errors, the most common major error was listing an incorrect underlying cause of death (42%). In contrast, listing an incorrect mechanism of death was the least common major error (22.4%). The most common minor error was illegible handwriting (53.6%).

The frequency of errors was studied in relation to the characteristics of the physicians. The frequency of reporting errors was higher among younger physicians (age ≤35 years); this was true for almost all types of errors, minor and major errors specifically, underlying cause of death and multiple causes of death errors ($\chi^2 = 6.306, df = 2, P = 0.043; \chi^2 = 11.794, df = 2, P = 0.003$). Similarly, physicians in training (residents) were more likely to make errors than specialists or consultants; in particular, residents were significantly more likely to make errors in the underlying cause of death and multiple causes of death ($\chi^2 = 6.859, df = 2, P = 0.032; \chi^2 = 10.112, df = 2, P = 0.006$).

Physicians who had been working in Qatar for less than five years (42.6%), were significantly more likely to make errors when reporting multiple causes of death compared with those who had worked in Qatar for more than five years (31.4%) ($\chi^2 = 3.935, df = 1, P = 0.047$). Additionally, it was found that physicians who had received training answered the case scenario better than those who had not received training; this difference was statistically significant, particularly for errors in the underlying cause of death ($\chi^2 = 7.690, df = 1, P = 0.006$) (Table 3).

Discussion

The majority of participants were non-Qataris (84.5%), which is consistent with the demographics of the workforce in Qatar. More than half (61.5%) of the participants had been working in Qatar for five years or less, which may be due to the fact that more than half (55.8%) of the participants were residents. This may also be attributed to the expansion of services in Qatar, which necessitates frequent recruitment of new physicians.

Training of physicians is one of the most important determinants of accuracy of death certification data, as reported by others.6–10 In the present study, only 22.7% of participants reported that they had received training; this is consistent

![Fig. 1 – Physicians’ understanding of terms used in the death certification form (underlying cause of death and mechanism of death).](image1)

![Fig. 2 – Difficulties related to completion of death certification forms by physicians.](image2)

![Table 2 – Frequency of correct answers concerning causes of death in the case scenario.](table2)

<table>
<thead>
<tr>
<th>Causes of death</th>
<th>Frequency (%)</th>
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<tbody>
<tr>
<td>Immediate cause of death</td>
<td>224 (70.7%)</td>
</tr>
<tr>
<td>Underlying cause of death</td>
<td>184 (58%)</td>
</tr>
<tr>
<td>*Comorbid cause</td>
<td>117 (36.9%)</td>
</tr>
<tr>
<td>All causes identified correctly</td>
<td>68 (21.5%)</td>
</tr>
</tbody>
</table>

* The correct answer for the comorbid cause of death in the case scenario was to leave it blank.
with studies conducted in the US teaching hospitals in 2004 \(^7\) and 2007, \(^1\) where the proportion of trained physicians ranged between 14% and 23%. Among the participants who reported that they had received training, this had been provided by HMC in 59.7% of cases.

Surprisingly, 72.6% of participants reported that they did not need training in the completion of death certification forms. This is in contrast to a study in Kansas City, \(^7\) where 80.5% of participants reported that they needed further training. Explanations could be that the participants in the present study believe that their practices for completion of death certification forms are appropriate, or they may not fully appreciate the importance of death certificates.

Nationally, there are guidelines for referring deaths to a forensic medicine physician; however, only 37% of participants answered the relevant question correctly. This indicates that the majority of participants were not aware of such guidelines, and this could contribute to the physicians making other types of errors. The study in Kansas City \(^7\) assessed participants’ awareness of guidelines in relation to the number of years since graduation; awareness was found to range between 22% and 42%, and increased with the number of years of training. A study in Nigeria \(^6\) found that only 2.6% of participants were able to list up to seven cases that should be referred to coroners or forensic medicine physicians, indicating that most physicians were not aware of the referral guidelines. Possible explanations may include the lack of such referral guidelines, non-communication of referral guidelines to physicians, and failure to include these guidelines as part of death certification training. Inadequate communication of updated guidelines may also contribute to this lack of awareness.

In a study in Khartoum, \(^1\) 94.9% of participants agreed that physicians are responsible for completing the cause of death section on death certification forms. This is very similar to the findings of the present study (98.7%). However, 39.4% and 27.1% of participants indicated that a senior nurse or a death registrar can complete the cause of death section, respectively. This may reflect the practice of some physicians, who ask other healthcare workers, such as nurses, to complete death certification forms for them before they sign. It may also indicate the lack of clear guidelines that delineate the person responsible for completing each section of the form.

The participants reported that complicated cases were the most common difficulty they faced when completing a death certification form (47.3%); this was also reported in a study that evaluated the methodologies of studies investigating the accuracy of death certificates. \(^1\) Possible reasons why complicated cases were the most common difficulty include the co-occurrence of complicated consequences of these cases, and poor documentation practice among practitioners. As such, complicated case scenarios should be a crucial aspect of death certification training.

Lack of training was the second most common difficulty reported by the participants (43.5%). This is in agreement with a study \(^1\) in the UK and USA, which found that 50% of general practitioners had received insufficient training in death certification. Similarly, a Nigerian study \(^6\) reported that 71% of participants had no formal training on completion of death certification forms. These findings indicate that lack of training may be a universal issue that is contributing to the inaccuracies observed in the reported mortality data. This underlines the importance of initiating standardized training in the completion of death certification forms for all physicians.

The lack of training may lead to difficulty in understanding the terms used in death certification forms. However, this finding was in contrast to the study in Khartoum, \(^1\) which found that 90% of doctors considered the terms used on death certification forms to be clear. The concept of the underlying cause of death is often a source of confusion for certifying physicians. \(^1\) As such, there is a need for regular review and improvement of the death certification form in Qatar.

When considering individual errors observed in the case scenario, this study found that 22.4% of participants reported the mechanism of death correctly, which is lower than reported by other studies. For example, in the pretraining assessment in a study in Canada, \(^6\) 32.9% of physicians were found to list the mechanism of death correctly, and another study \(^1\) reported that 34% listed the mechanism of death correctly. In the study in Khartoum, \(^1\) the mechanism of death
was listed correctly in 47% of cases, which is higher than found in the present study.

In the case scenario of the present study, underlying cause of death was identified correctly by 58% of participants. This is comparable to an English study which assessed physicians using two scenarios, and found that approximately one-third of each group (general practitioners and house officers) identified the underlying cause of death correctly in the first case, and approximately two-thirds of each group did so in the second case. Abbreviations were used by 28.4% of participants in the present study, while 26.5% of house officers and 35.5% of general practitioners used abbreviations in the English study.

Inadequate death certification has been attributed to inexperience, insufficient practice, incorrect completion of Parts I and II, insufficient time, and ill consideration of coding or accuracy. Younger physicians in training (residents) were more likely to make almost all types of errors, particularly in underlying cause of death and multiple causes of death. This finding is in agreement with other studies which suggested that medical students, house staff and junior physicians frequently make mistakes when completing death certification forms. In this study, female physicians were more likely to make all types of errors, and this finding may be explained by the fact that female physicians were generally younger than their male counterparts ($\chi^2 = 25.175, \text{df} = 2, \text{P} = 0.000$). Training in death certification is highly recommended for resident doctors.

Physicians who had previous experience of completing death certification forms exhibited better practice than those with no experience. This is in agreement with reports from Kansas City and Taiwan. However, other studies have reported that experience did not appear to improve the completion of forms.

This study had various limitations. First, the optimal method to assess physicians’ practice is by reviewing actual death certification forms that they have completed. This was not feasible in this study, but the authors tried to overcome this issue by including a case scenario as a model of death certification practice. Second, the use of a self-administered questionnaire, and the introduction session that was offered immediately before answering the questionnaire, may have allowed physicians to review the topic to provide ‘ideal’ answers, thus overestimating their performance. Third, it was not possible to compare the demographic data of the sample with that of the whole physician population as such data are confidential. However, while responder bias is possible, the high response rate (85.6%) is reassuring.

## Conclusion

A knowledge gap was found between physicians’ responses to the questionnaire and their actual practices in terms of completing death certification forms. Complicated cases, lack of training and failure to understand the terms used on the death certification form were the most common factors contributing to malpractice. Physicians’ experience, age and position were found to be associated with death certification practices. There is a need to raise awareness of the importance of death certification forms and the implications of inaccuracies among physicians as this data is a key public health surveillance tool used to inform health improvement and health service activity. In response, the authors have developed a manual on completion of the death certification form with clear instructions and guidelines.

## Acknowledgements

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## Ethical approval

Ethical approval was obtained from the Research Committee at HMC.

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## Competing interests

None declared.

## Appendix A. Supplementary material

Supplementary data related to this article can be found online at [http://dx.doi.org/10.1016/j.puhe.2012.12.016](http://dx.doi.org/10.1016/j.puhe.2012.12.016).

## REFERENCES