Faris Dababneh et al.

Improving mortality data in Jordan: a 10 year review

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(Submitted: 11 February 2014 – Revised version received: 2 March 2015 – Accepted: 17 March 2015 – Published online: 14 August 2015)

Abstract

Problem Before 2003, there was substantial underreporting of deaths in Jordan. The death notification form did not comply with World Health Organization (WHO) guidelines and information on the cause of death was often missing, incomplete or inaccurate.

Approach A new mortality surveillance system to determine the causes of death was implemented in 2003 and a unit for coding causes of death was established at the Ministry of Health.

Local setting Jordan is a middle-income country with a population of 6.4 million people. Approximately 20,000 deaths were registered per year between 2005 and 2011.

Relevant changes In 2001, the Ministry of Health organized the first meeting on Jordan’s mortality system, which yielded a five-point plan to improve mortality statistics. Using the recommendations produced from this meeting, in 2003 the Ministry of Health initiated a mortality statistics improvement project in collaboration with international partners. Jordan has continued to improve their mortality reporting system, with annual reporting since 2004. Reports are based on more than 70% of reported deaths. The quality of cause of death information has improved, with only about 6% of deaths allocated to symptoms and ill-defined conditions – a substantial decrease from the percentage before 2001 (40%). Mortality information is now submitted to WHO following international standards.

Lessons learnt After 10 years of mortality surveillance in Jordan, the reporting has improved and the information has been used by various health programmes throughout Jordan.
Problem

As in many other middle-income countries, Jordanian law mandates that all deaths be registered. However, registration was not universal and cause of death certification was often inaccurate. A survey conducted in 1995–1996 used verbal autopsy to estimate mortality indicators and determine causes of death.¹ The death notification form did not comply with World Health Organization (WHO) recommendations² for mortality reporting and data were inconsistent and not comparable within Jordan or with other countries.

Assessing death notification forms from 1996 to 2000, the disease control directorate of the Ministry of Health found underreporting of deaths, particularly infant deaths, missing information on cause of death and incomplete and inaccurate reporting of the cause of death. The crude death rate based on registered deaths was about half that estimated by the Department of Statistics (2.4–2.8 versus 5.0 per 1000 population). Over 12% of reports were missing direct cause of death, and 40% of all death notifications contained uninformative causes of death, including symptoms or ill-defined conditions. Before 2003, no cause of death coding was completed, inhibiting production of useful mortality statistics. Lack of coding also meant that underlying cause of death information could not be provided to WHO in the requested format.

Approach

The improvement of mortality data in Jordan was initiated by an inter-agency collaboration and led by a mortality surveillance unit. In March 2001, Jordan enacted a new law requiring deaths to be reported and a burial permit sought within 10 days of death. In December 2001, the Ministry of Health organized the first national meeting on the Jordanian mortality system with WHO, the United States Centers for Disease Control and Prevention (CDC), and the United States Agency for International Development (USAID). Approximately 40 people attended, including health sector officials, medical and paramedical syndicates, deans of medical schools, mortality statistics experts, staff from the Department of Statistics and the Civil Status and Passports Department (which is directly responsible for death notification in Jordan). The multi-agency task force proposed a five-point plan to improve mortality statistics in Jordan: (i) establishment of a cause of death coding unit at the Ministry of Health, Directorate of Information and Research; (ii) modification of death notification form; (iii) training on use of the WHO International Classification of Diseases and Related Health
Problems (ICD) for cause of death certification and coding; (iv) appointment of focal points for supervision and quality control; and (v) tabulation and reporting.

Following these recommendations, the Ministry of Health initiated a project in 2003 to improve mortality statistics in collaboration with WHO, CDC and USAID. The project included a new mortality surveillance system to monitor causes of death and a unit for coding causes of death.

**Modified notification form**

The death notification form was modified to comply with WHO recommendations. The modified form now includes a two part medical certification section, four lines for recording cause of death and space for recording the period between onset of cause and death. These changes facilitate accurate cause of death certification and the application of WHO recommendations² for selecting the underlying cause of death. The attending physician completes the notification in duplicate, with the original sent to the Civil Status and Passports Department and the duplicate copy sent to the Ministry of Health. The modified form was distributed throughout Jordan in the last six months of 2003.

**Certification and coding**

The Ministry of Health developed and distributed to all physicians and hospitals a one-page guideline on completing the modified death notification form. A telephone service was established during working hours for inquiries. Workshops were held in the largest Ministry of Health hospitals, and orientation workshops were held for new employees. In 2003 the Ministry of Health sent 10 staff physicians to training for mortality coders offered by the Australian National Centre for Classification in Health. The training covered all chapters of the ICD (10th revision) manual coding procedures including four-digit coding and medical terminology. Two physicians were assigned to the mortality coding group in the Ministry of Health coding unit and Jordan began officially using the ICD system for mortality coding for 2004 data. With support from WHO, the coding unit conducts a workshop on how to use ICD-10 every two years.

**Supervision and quality control**

Training as focal points for completing the death notification form was provided for 50 staff from 20 health directorates and 30 public hospitals, five forensic medicine staff and one staff member from each of the Royal Medical Services, Jordan University Hospital and Jordan
University for Science and Technology. The focal points were appointed in their respective organizations to train colleagues, review forms for accuracy and enforce the reporting system.

Tabulation and reporting
Focal points gather the duplicate and forward it to the coding unit. Causes of death are manually coded and underlying cause is selected using ICD-10 rules. Staff key the data into an electronic database (Oracle, Reedwood Shores, United States of America) developed in 2003 to facilitate storage, retrieval and analysis of mortality data. The database system includes basic logic checks and is linked to the national identification system at the Civil Status and Passports Department. The percentage of ill-defined conditions and unsuitable underlying causes are monitored to check quality and completeness. Additional training for coders and physicians is conducted on a regular basis. Data are organized by ICD chapter and three-digit ICD codes. The database system generates a publicly-available annual mortality statistics report.

Relevant changes
The first data collected by the new mortality surveillance system (July to December 2003) showed consistency in the distribution of deaths by major cause as compared with the benchmark verbal autopsy study in 1995–1996. The Ministry of Health produced the first annual mortality statistics report in 2007, based on 2004 data. The report provided mortality statistics based on 71.9% of the death notification forms, a figure that increased to 77.7% by 2011 (Fig. 1). WHO recommends that less than 10% of deaths should be classified as caused by ill-defined conditions. By 2011, ill-defined conditions accounted for only 2.9% of deaths, similar to the USA (1.9%).

A mortality statistics publication, tabulated by the ICD-10 classification, has been released annually since 2007, maintaining an interval approximately three years from the close of the data year to publication. Since 2008, mortality information has been submitted to WHO with four-digit coding, following the prescribed data template. In 2011, diseases of the circulatory system (ICD codes: I00-I99) remained the leading cause: 37.7% of deaths, compared to 31.1% in the USA (Shehab F and Walke H. Analysis of registered deaths in Jordan 1996–2000, unpublished observations, 2002).

A rapid assessment of the Jordanian civil registration and vital statistics system conducted in November 2012 documented improvement of the mortality surveillance system. Using a standard tool, Jordan scored in the highest category (87%, satisfactory), indicating
that minor adjustments may be required in an otherwise well-functioning system (Table 1). Compliance with ICD practices, certification and coding methods were highlighted as strengths. Practices affecting the quality of cause of death data; coder qualification and training; quality of coding and data quality and plausibility checks were suggested as areas needing further improvement.

Lessons learnt
The coverage, completeness, timeliness and validity of the aggregated results of the Jordanian mortality surveillance system have greatly improved as a result of the project, but further improvements are possible. Implementation of the Iris system for automated coding is currently being considered to improve timeliness and quality. Continued improvement efforts would benefit from a formal assessment using an existing framework. The project has improved appreciation of the value of vital statistics. Data and reports from the mortality surveillance system are publicly available and are disseminated to all health directorates and other health agencies for planning purposes. This information has generated commitment from the government to achieve health-related Millennium Development Goals. Objectives in the Ministry of Health’s strategic plan are now informed by mortality data and various programmes have used the data to plan and measure improvement. The increased value placed on information from the mortality surveillance system has generated continued internal and external support for the system (Box 1).

Jordan, like other middle-income countries, is witnessing an epidemiological transition characterized by an increase in noncommunicable diseases. Mortality statistics are the principal means for assessing population health status, identifying health problems, tracking progress, and comparing health status between countries. The ongoing effort to improve the mortality statistics in Jordan provides an example for other countries facing similar needs.

Acknowledgements
We thank Henry Walke, Harry Rosenberg, Karen Wilkens, Bassam Jarrar, Russell Gerber, Fawwasz Shehab (deceased), Tala Fakhouri and Arialdi Minino.

Funding:
Jordan Ministry of Health, WHO, CDC and USAID.

Competing interests:
None declared.
References


**Box 1. Summary of main lessons learnt**

- An inter-agency collaboration, led by a mortality surveillance unit, was essential.
- The project did result in more complete and accurate death notification.
- The mortality reports generated have been useful for planning purposes.

**Table 1. Assessment of the civil registration and vital statistics system, Jordan, 2012**

<table>
<thead>
<tr>
<th>Function</th>
<th>Score (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legal framework for civil registration and vital statistics</td>
<td>67</td>
</tr>
<tr>
<td>Registration infrastructure and resources</td>
<td>100</td>
</tr>
<tr>
<td>Organization and functioning of the vital statistics system</td>
<td>100</td>
</tr>
<tr>
<td>Completeness of registration of births and death</td>
<td>83</td>
</tr>
<tr>
<td>Data storage and transmission</td>
<td>100</td>
</tr>
<tr>
<td>ICD-compliant practices and certification within and outside hospitals</td>
<td>100</td>
</tr>
<tr>
<td>Practices affecting the quality of cause of death data</td>
<td>67</td>
</tr>
<tr>
<td>ICD coding practices</td>
<td>100</td>
</tr>
<tr>
<td>Coder qualification and training, and quality of coding</td>
<td>50</td>
</tr>
<tr>
<td>Data quality and plausibility checks</td>
<td>50</td>
</tr>
<tr>
<td>Data access, dissemination and use</td>
<td>92</td>
</tr>
<tr>
<td>Overall</td>
<td>87</td>
</tr>
</tbody>
</table>

ICD: International Classification of Diseases and Related Health Problems.

Note: The assessment was done using the Rapid assessment of national civil registration and vital statistics systems.
Fig. 1. Death notifications, Jordan, 2004–2011

CSP: Civil Status and Passports Department; MoH: Ministry of Health.