

Mortality Statistics in South Karachi

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Abstract

Objective: To create an awareness amongst the medical profession in Pakistan about the importance of mortality statistics in epidemiological research and its correlation with the cause of death statement.

Methods: The original death registration forms and the statistical information, compiled into a database by the District Municipal Corporation, South Karachi, for the years 1995 to 1998 were evaluated.

Results: The total number of deaths reported from the District Municipal Corporation, South Karachi, for the years 1995 to 1998 were 7480. Of these 28% were females and 72% were males. The adult deaths were 99% whereas childhood deaths were 1%. The leading cause of death was cardiovascular disease (33%). However 49% of the deaths were classified as caused by non-specific or ill-defined conditions.

Conclusion: The maintenance of records and compilation of death registry data by the District Municipal Corporation, South Karachi is satisfactory. The coverage of deaths in the years 1995 to 1998 was reasonable. The degree of precision of the age statement was moderately good as the 'National Identity Card' copy accompanied each adult death notification. As the cause of death statement was non-specific in 49% of the deaths, this data will have limited use in research or health planning. It is therefore essential to emphasize the importance of the death certification process to the medical profession (JPMA 51 :446,2001).

Introduction

Demographic estimation techniques suggest that worldwide about 50 million deaths occur each year, of which about 39 million are in the developing countries. In countries with adequate registration of vital statistics, the age at death and the cause can be reliably determined¹. About 80 countries or areas regularly report detailed cause-of-death data to WHO based on the International Statistical Classification of Diseases, Injuries and Causes of Death (ICD)². The statistics from Pakistan are notably absent from all population-based WHO statistics.

The rules for certifying death, followed in most of the world, including Pakistan are those established by the World Health Organization (WHO). The rules are described in the chapter 'Medical Certification and Rules for Classification' of the 9th revision of the International Statistical Classification of Diseases and Cause of Death (WHO, 1977)³ and the 'Instruction Manual', volume 2 of the 10th revision (WHO, 1993a)⁴. Despite this standardization the quality of information on death certificates has long been a subject of critique⁵. Statistics of causes of death remain an important source of epidemiological data for the evaluation of various medical and health problems. The improvement of analytical techniques and, above all, the transformation of demographic and morbid structures of populations have prompted researchers in the field to give more importance to the quality of death certificates.

The death registration data as seen in Karachi South is accurate in all fields except the cause of death statement, which is non-specific in approximately half the deaths. Unfortunately this is the sole responsibility of physicians as medical practitioners sign all the death certificates. This inaccuracy

limits the use of mortality statistics for any epidemiological research or health-care planning. The Karachi Cancer Registry (KCR), to assess completeness and validity of its data uses mortality data as part of an international requirement. The awareness of the inherent problems of death certificates and mortality statistics is therefore considered essential for the proper interpretation of the registry data. The objective of this article is to promote this awareness amongst clinicians, especially those certifying deaths or senior clinicians that are in a position to help bring about a change in the death registration system.

Materials and Methods

The registration area of KCR i.e., Karachi District South has a well-established Death Registry Department, situated at the District Municipal Corporation, South Karachi (DMC South). The district is sub-divided into Lyari, Khori Garden, Saddar and the newly formed Mahmoodabad death registries for easy access and convenience of the resident population. The original death registration forms from all the sub-units are filed at DMC South and the statistical information is compiled into a database. Some of the deaths are also registered with the Cantonment Death Registry Department. The rules for certifying cause of death are those established by WHO³.

The section of the death certificate pertaining to cause of death is certified by medical practitioners who use the international form of medical certificate of cause of death (figure).

The image shows a form titled 'Cause of Death' with a grid layout. The top right corner has a box for 'Applicable (Mental, Behavioral, Abuse, and Disease)'. The main section is divided into several rows for recording causes of death. The first row is for 'Disease or condition directly leading to death' with a sub-note '(a) due to (or as a consequence)'. The second row is for 'Precedent Causes'. The third row is for 'Morbid conditions, if any, giving rise to the above cause, stating the underlying conditions last'. The fourth row is for 'Other significant conditions contributing to the death, but not related to the disease or condition causing it'. At the bottom, there is a note: 'This space has been provided for recording conditions such as diabetes, asthma, etc. if these are diseases, injuries or conditions which caused the death'.

Figure International Death Certificate

The form has 2 parts. In part I, the sequence of events resulting in deaths is recorded, with the underlying cause featuring last in the list. Part II records other significant diseases or conditions that contributed to, but did not cause death⁶. It is clearly stated in the form that the sequence of events does

not mean the mode of dying e.g. heart failure, asthenia etc. It means the disease, injury or complication that caused the death.

The death records also mention the following demographic, medical and health-care information viz. serial number, name of the deceased, name of spouse/father, national identity card number in case of adults, date of death, date of registration of death, age, sex, religion, address, place of death, name and address of clinician certifying death, name and identity of person reporting death, his/her relationship to the dead. Details of burial i.e. time, date and graveyard are also mentioned.

The death registry data were coded at KCR using ICD-107 as trained coding staff was not available at DMC South. The causes of death were sub-classified into groups using ICD codes, infectious diseases (A00-B99), cancer (C00-D48), systemic diseases (D50-G99, J00-K93, N00-N99), cardiovascular diseases (100-199), deaths due to intentional/unintentional injuries (S00-T98, W00-Y98) and death due to non-specific causes (R95-99) viz. cardiorespiratory failure, natural causes, sudden death, found dead etc. The four year (1995-98), official mortality statistics for the registration area, (Karachi, District South) and the individual death certificates were used for the interpretation of accuracy of the cancer registry data.

Results

The total number of deaths reported from DMC South, for the years 1995 to 1998 were 7480. Of these 28% were females and 72% were males. The adult deaths were 99% whereas childhood deaths were 1%. The maintenance of records and compilation of death registry data by DMC South was satisfactory. The coverage of deaths in the years 1995 to 1998 was reasonable. The degree of precision of age statements year-wise was moderately good as all adult deaths reported were accompanied by the national identity card numbers and copies of the same. The birth dates were not however reported precisely. The official mortality statistics for the years had an under-reporting of childhood and female deaths. Inaccuracies due to coding were not seen as trained KCR staff coded the causes of death. The specificity of cause of death statement in the Khori Garden and the Saddar registries, with large hospitals was 40.7% and 25.5% respectively. The Lyari Death Registry had a specificity of 88.0%. Here the area GPs, who had known the dead persons during their life and were aware of the underlying cause of death, certified the deaths. The cause of death statement though completed by medical practitioners was vague and non-specific attributing 49.0% of the deaths to non-specific or ill-defined conditions (R95-99). Despite the high percentage of non-specificity, the leading causes of death were cardiovascular diseases (100-199) 35.6%, systemic diseases other than cardiac diseases (D50-G99, J00-K93, N00-N99) 6.0%, deaths due to intentional and unintentional injuries (S00-T98, W00-Y98) 5.1%, infectious diseases (A00-B99) 2.3% and cancer (COOD48) 2.0% (table 1).

Table 1. WHO health report for 1997, published in 1999.

Diseases	Developed world %	Developing countries %	Karachi South %
Infection and Parasitic Diseases	1.0	43.0	2.3
Perinatal and Maternal Causes	1.0	10.0	1.0
Respiratory System	8.0	5.0	2.5
Circulatory System	46.0	24.0	35.6
Cancer	21.0	9.0	2.0
Other and Unknown	23.0	9.0	5.1 and 49.0

Deaths of known cancer cases in our study had been wrongly classified as deaths due to 'cardio-respiratory failure' in 50% of the cases. Whilst the diagnosis of cancer (when specified) on the death certificate was accurate, the primary site was not mentioned in 77%.

Discussion

The WHO health report⁸, for 1997, published in 1999, classified the causes of death into infectious and parasitic diseases (A00-B99), perinatal and maternal causes (O00-P96), cancers (C00-D48), diseases of the circulatory system (I00-199), diseases of the respiratory system (J00-99) and other and unknown causes (D50-G99, K00-K93, N00-N99, R00-Y99). The representative percentages vary in the developing world and the developed countries (table 2).

Table 2. Death registry data 1995-1998.

Diseases	Khorri Garden Death Registry		Saddar Death Registry		Lyari Death Registry		Total	
	No.	%	No.	%	No.	%	No.	%
Infectious Diseases	25	0.8	9	0.5	139	5.0	173	2.3
Systemic Diseases								
Liver	21	0.7	9	0.5	13	0.5	43	0.6
Lung	53	1.8	35	2.0	96	3.5	184	2.5
Kidney	42	1.4	18	1.0	30	1.1	90	1.2
CVS	704	23.6	285	16.4	1675	60.6	2664	35.6
CNS	25	0.8	12	0.7	56	2.0	93	1.2
Endocrine	5	0.2	2	0.1	30	1.1	37	0.5
Cancer	33	1.1	24	1.4	95	3.4	152	2.0
Miscellaneous	308	10.3	48	2.8	23	0.8	379	5.1
NOS	1766	59.3	1292	74.5	607	22.0	3665	49.0
Total	2982		1734		2764		7480	

The causes of death in Karachi South when similarly classified showed that 49.0% of the deaths were attributed to non-specific causes. Ironically medical practitioners who are given instructions for proper completion of the cause-of-death section of the death certificate had certified all deaths. In Lagos City and amongst the South African blacks, with one of lowest specificity of death registry data, only 17.3% and 20% of the deaths were due to ill-defined conditions^{9,10}. Only 29.9% of ill-defined deaths were certified by a medical practitioner¹¹. As no autopsies were performed in Karachi, confirmation of initial cause of death as mentioned on the death certificates is not possible and the provisional cause of death has to be accepted. To some extent the error in the cause of death as mentioned on the official form may be due to the certificate being filled out by medical doctors unfamiliar to the dead person, on the other hand there is also an indifference to the importance of this variable. The DMC South staff is adequately maintaining the death registry data.

As there is no distinction between the underlying and direct cause of death, compilation of mortality statistics as a true reflection of the disease patterns in our population is not possible. Thus the planning of public health intervention is based on arbitrary statistics and figures which may be a far cry from reality. Unless the importance of the death certification process is emphasized to clinicians, medical students and junior doctors, no improvement can be expected in the future.

The accuracy of diagnosis on the death certificate is important considering the use of mortality data for research and planning. Cancer registries use death certificates to evaluate the completeness of the database on incident cancers¹². A high number of 'Death Certified Only' cases (DCOs) are an indicator of incident cancer cases missed in life, provided the cases reported on the death certificate are accurate. The KCR has low DCO cases, which is a direct indicator of good quality data however with a 49.0% non-specificity of cause of death statement, this criterion cannot be accepted as a quality control measure. This would be a drawback for all demographic research in the country, not just for cancer research.

The accuracy of death certificates is generally evaluated by their sensitivity (detection rate) and by the confirmation rate (positive predictive value of a death certificate diagnosis)⁶ It is unfortunately not possible to calculate either in Karachi, at this stage.

Most developed countries in the world publish a vital statistics report on death annually. A comparison of each year's deaths with the deaths of previous years gives the overall improvement or deterioration in general mortality and life expectancy, the trend in mortality and the infant mortality. On the basis of this report the health-care planning of the country for the subsequent year is planned.

The 1996's and 1997¹⁴ annual report for United States, stated that the age-adjusted death rate per 100,000 standard population was 491.6 and 479.1. Life expectancy at birth was 76.1 and 76.5 years respectively. The Infant mortality rate per 1,000 fell to 7.3 infant deaths in 1996. The 15 leading causes of death in USA (1996, 1997) remained the same as in 1995. Mortality declined for all age groups, including persons aged 85 and over. The largest decline in age-adjusted death rates among the leading causes of death was for Human Immunodeficiency Virus infection, which dropped 28.8 percent in 1996, to the 8th leading cause of death and subsequently to the 14th leading cause in 1997, showing a success in the preventive measures established over the past few years.

It is at this stage not possible for us in Karachi to establish precisely the leading causes of death considering the quality of the death registry data. As infant deaths are hardly ever reported, the infant mortality rates cannot be established accurately, on a population-based parameter. Monitoring of preventive programs and screening programs is not possible nor is it possible to have targeted preventive measures in the country, resulting in wastage of the health budget on fanciful schemes. The maintenance of records and compilation of death registry data by the DMC South is satisfactory, despite this there is apathy amongst clinicians, as regards filling of the death registry forms. Unless the importance of the death certification process is emphasized to them neither improvement in

demographic research is possible, nor can health-care be monitored.

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