
PUBLIC HEALTH RESEARCH

Burden of Premature Mortality in Malaysia

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ABSTRACT

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Introduction	Mortality estimates are important parameters for health monitoring and are routinely used as evidence for health policy and planning. This study aimed to estimate the mortality component of Burden of Disease in Malaysia in 2008.
Methods	The 2008 mortality data from the Statistics Department were used to estimate cause-specific mortality (by age and sex) in Malaysia. Data were coded using the ICD10 (International Classification of Disease) coding. Calculation of mortality component of Burden of Disease (ie: Years of Life Lost (YLL) was done using the standard Global Burden of Disease Methodology.
Results	The total estimated deaths in Malaysia in 2008 were 124,857, of which 72,202 (57.8%) were males. The total years of life lost (YLL) for the Malaysian population in 2008 was 1.51 million in which 0.92 million (60.7%) was among males. Almost three quarter (68%) of the burden of premature deaths resulted from non-communicable diseases, followed by communicable diseases (20%) and injury (12%). Among the top three leading causes of YLL were ischaemic heart disease (17.1%), stroke (9.6%) and road traffic injuries (8.3%).
Conclusions	In Malaysia, premature mortality mainly contributed by non-communicable diseases followed by communicable diseases and injury. A multi-agency collaboration is needed to prevent premature death and to improve quality of life.
Keywords	Mortality - Cause of Death - Years Life Lost (YLL) - Burden of Disease.

INTRODUCTION

Measuring the health status of the population is central to form public policy for health care. Mortality estimates are important parameters for monitoring health and are routinely used as evidence for health policy and planning¹. Numbers of death and mortality rates are among the simplest indicators for presenting mortality and are highly influenced by health problems of the elderly more advanced group since majority of deaths occurred among them. However, these measures do not fully account for the burden of premature mortality.

Premature mortality entails estimating the average time a person would have lived had he or she not died prematurely². In the Global Burden of Disease study a standardized form of years of life lost for measuring the burden of disease due to premature mortality was promoted. This uses the expectation of life at each age x based in some ideal standard to estimate the loss of years of life associated with a death. As a measure of the burden of premature mortality, SEYLL has several advantages: a) deaths at all ages contribute to the calculation of the burden of disease and b) deaths at the same age contribute equally to the burden of disease³.

The “gold standard” data source for estimating premature mortality is a national vital registration system, only about a third of all countries in the world have vital registration systems that produce complete, valid and timely statistics of this nature⁴. Malaysia is one of few Asian countries with long standing and functional vital registration systems. Registration of births and deaths is a legal requirement in Malaysia, operated by the Ministry of Home Affairs. Under this system, a burial permit is issued on death registration, which is mandatory before corpse disposal in all locations across the country. The Department of Statistics compiles data from civil registration obtained from the Ministry of Home Affairs, and these are commonly referred to as vital registration (VR) statistics⁵.

Despite having a functional system for the reporting the death events, there are problems with ascertainment of the cause for each death. Deaths in health facilities were certified as to cause by attending physicians and the National Statistics Department uses the International Classification Diseases and Health Related Problems to classify and tabulate medically certified deaths by age, sex and cause⁶. Deaths outside hospitals are reported to the local police station by relatives of the deceased, who also provide a ‘lay’ opinion of the cause, which is recorded at death registration. The National Statistical Department has its own classification for these lay causes for non-medically certified deaths. The dual-system had limited the direct use of available mortality data for measuring the premature mortality in Malaysia.

Therefore, this study was conducted to estimate the premature mortality of Malaysian population for 2008 using the Burden of Disease principle and methodology.

METHODS

Age and sex specific number of deaths

Mortality data for the year 2008 from the Statistics Department were used to the number of deaths (by age and sex) in Malaysia.

Cause-specific mortality estimates

All death in National Vital Registration were coded either using ICD-10 classification (for medically certified death) or Malaysia Statistic Department codes (for non-medically certified death). All data were examined for quality on causes of death using specific criteria⁷.

Data of medically certified death were cleaned through three steps. First step was assessment of the accuracy of ICD-10 coding done by original coders (Department of Statistic) on cause of death. Second, coding of the death data were conducted by independent certified coders on the original data, based on cause of death. Finally, findings (codes) of the death were compared between coding by original coders and independent certified coders. Cases with similar codes between two coders will be accepted whereby any discrepancy will be reviewed by a group of independent certified coders who will assign the final ICD-10 code.

For the death which was non-medically certified it is coded using guideline produced by Department of Statistic Malaysia. Based on the given codes, all cases of non-medically certified death will be coded into ICD 10 classification by an expert certified coders and physician which referred to the available information including age, sex and cause of death.

All deaths were then combined and taken as the cause of death structure. Deaths coded to garbage categories (ill-defined cause of death) were redistributed, separately for each age and sex stratum, based on guideline for Global Burden of Disease 2005 Study⁸ and some modification.

Overall mortality in this study region was divided into three broad groups of cause: Group I, communicable, maternal, prenatal and nutritional deficiencies; Group II, non-communicable diseases; and Group III, all injuries. These groups were then further subdivided into 114 specific causes of death⁸.

Life Expectancy

Age-sex specific deaths structure was used to create abridged life table.

Years of Life lost (YLL)

Premature mortality was estimated in terms of Years of Life lost (YLL). YLL was calculated using the procedures utilized in the Global Burden of Disease (GBD) study⁸. YLL is calculated as a simple sum of deaths at each age from a given cause, multiplied by the life expectancy at that age.

$YLL = N \times L$

Where:

- N = number of deaths
- L = standard life expectancy at age of death in years

RESULTS

The total number of deaths estimated in Malaysia for the year 2008 was 124,857 with 72,202 (57.8%) occurring in males and 52,655 (42.2%) in females. Based on death registered in 2008, the estimated life expectancy at birth for the Malaysian males is 70.2 years and 74.8 years for females.

Years of Life Lost (YLL)

The total number of YLL in Malaysia for the year of 2008 was 1.5 million. Almost 60.7% of the YLL was contributed by male. Majority of YLL occurred in the age group of 45-59 (26%), followed by 60-69 (18%) and 30-44 (16%) (Figure 1).

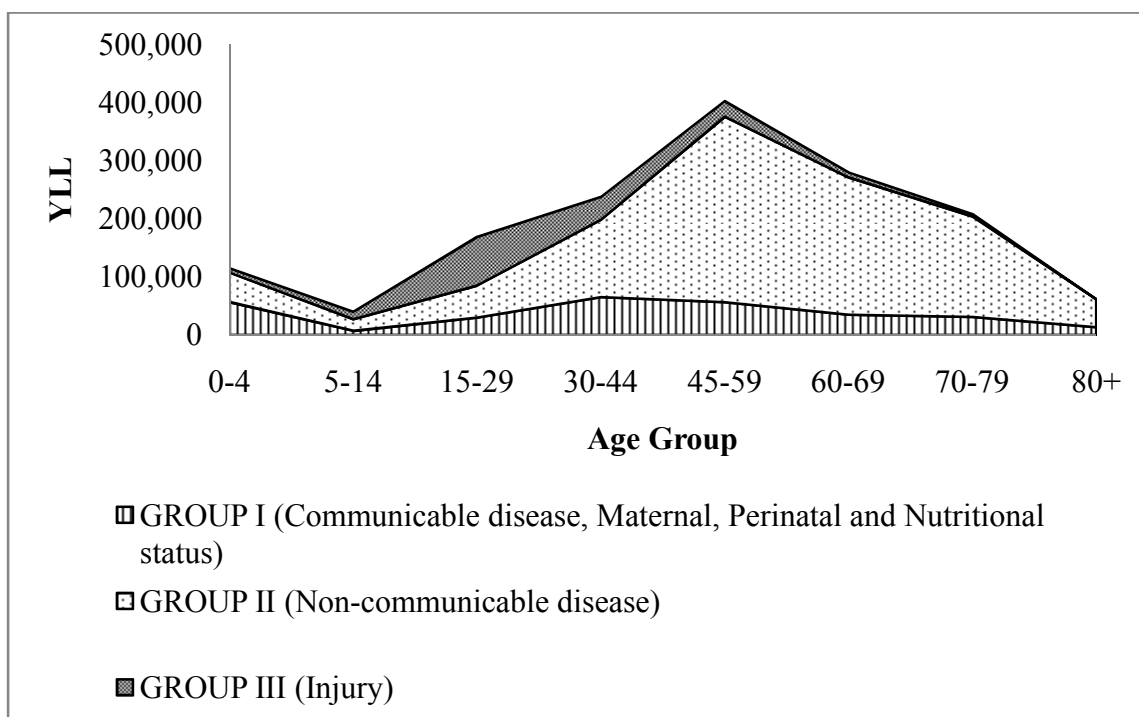


Figure 1 Percentages of YLL by age group

Almost three quarter of YLL was due to non-communicable diseases (68%) followed by communicable disease (20%) and injury (12%). Overall, the leading causes of YLL were ischaemic heart disease (17.1%), stroke (9.6%), road traffic injuries (8.3%) and lower respiratory infections (4.2%) (Table 1). For men, other major contributors of YLL were HIV; trachea, bronchus and lung cancers; nephritis and nephrosis and chronic obstructive lung diseases. For women, road traffic injuries at the fifth rank followed by nephritis and nephrosis, trachea, bronchus and lung cancers and diabetes mellitus.

Looking at the age group (Figure 1), majority of YLL in age group 0-4 was contributed by Group I (Communicable disease, Maternal, Perinatal and Nutritional status), meanwhile for age group 15-29, was due to Group III (Injury) and among 30 years and above, majority of YLL was contributed by Group II (Non-Communicable disease).

By the disease category, the leading cause of YLL in Malaysia is caused by cardiovascular and circulatory diseases (35%), followed by malignant neoplasm (20%), infectious disease (15%), unintentional diseases (14%) and respiratory diseases (6%) (Figure 2).

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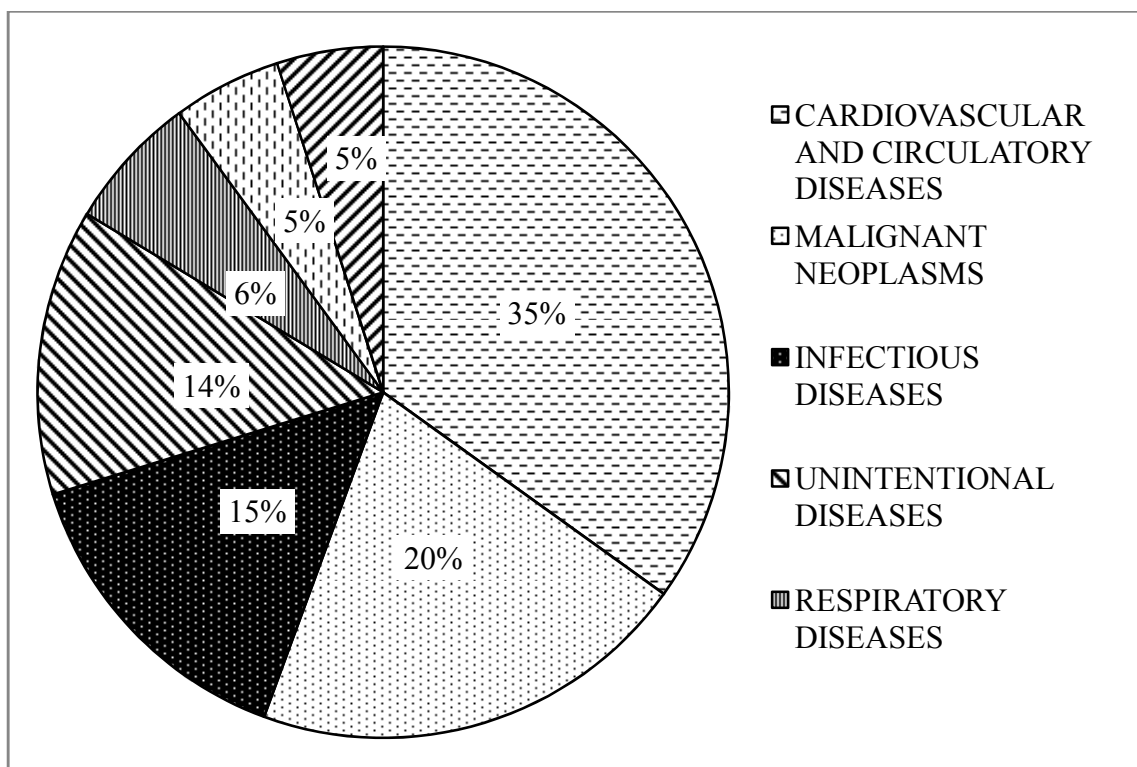


Figure 2 Percentages of YLL by major disease category

Table 1 Top 10 causes of YLL, by overall and Sex

Rank	Overall			Males			Females		
	Disease category		%	Disease category		%	Disease category		%
1	Ischaemic heart disease	17.1	Ischaemic heart disease	18.9	Ischaemic heart disease	14.3			
2	Cerebrovascular diseases (Stroke)	9.6	Road traffic injuries	11.4	Cerebrovascular diseases (Stroke)	11.7			
3	Road traffic injuries	8.3	Cerebrovascular diseases (Stroke)	8.3	Breast cancer	5.6			
4	Lower respiratory infections	4.2	Lower respiratory infections	4.1	Lower respiratory infections	4.3			
5	Trachea, bronchus and lung cancers	3.0	HIV	3.3	Road traffic injuries	3.5			

6	Nephritis and Nephrosis	2.7	Trachea, bronchus and lung cancers	3.1	Nephritis and Nephrosis	3.2
7	HIV	2.2	Nephritis and Nephrosis	2.4	Trachea, bronchus and lung cancers	2.8
8	Breast cancer	2.2	Chronic Obstructive Pulmonary	1.9	Diabetes Mellitus	2.6
9	Diabetes Mellitus	2.0	Tuberculosis	1.8	Colon and rectum cancers	2.0
10	Colon and rectum cancers	1.6	Liver cancers	1.6	Leukaemia	1.5

DISCUSSION

Results from the analysis of the leading causes of death and premature death are important evidence-based information as a guide to the health decision strategies. The rank order and magnitude of diseases and injuries in population will serve better information to the health programme and policies for decision making. The life expectancy at birth in 2008 showed females live longer than males, similarly result was found by other studies^{9,10}.

By age group (Figure 1), majority of YLL in age group 0-4 was contributed by Group I. This was similar with global burden of disease study, that 85% of deaths in children under five years old worldwide were contributed by communicable diseases¹¹. For age group 15-29, the majority of YLL was due to Group III. The Global Burden of Disease report found that, about 5 million people died of injuries and most of these deaths were heavily concentrated among young adults. Specifically, among 15-44 year olds, road traffic accidents were found to be the leading cause of death for men and the fifth most important for women¹².

Among age group 30 years and above, majority of YLL was contributed by Group II. This showed that ageing population in low and middle income countries resulted in significant increase of total deaths due to non-communicable disease¹¹. Our findings showed that almost three quarters (71%) of this burden of premature deaths among this age group were from non-communicable diseases, followed by communicable diseases (20%) and injury (12%). This was supported by a study done in Brazil, which showed that the burden of non-communicable diseases falls mainly in low-income and middle-income countries¹³. Similarly, the finding was consistent with another

study done in China¹⁴. To compare with the previous Burden of Disease study done in year 2000, there was increasing trend both in non-communicable disease and injury (4%) while there is a decrease in number of communicable disease (4%)¹⁵.

Our finding revealed that the epidemiology of diseases in Malaysia was resembled the pattern of developing countries, as reported in international comparative assessments¹⁶. It showed that mortality due to non-communicable disease mainly contributed by cardiovascular and circulatory disease. Ischemic heart disease was the leading cause of death in both sexes followed by cerebrovascular disease which is in third rank in male and second rank in female. The same finding reported by the Burden of Study & Injury Study in Australia¹⁷. Malaysia Health Facts 2008 and 2009 showed, the first principle causes of deaths in Ministry of Health Hospital was due to heart diseases and diseases of pulmonary circulation^{18,19}. Interestingly, to compare with Malaysia Health Facts 2010 and 2012, the trend were similar but it has been reclassified and further divided into two groups in which disease of the circulatory system was the top rank followed by disease of the respiratory system^{20,21}. Moreover, ischemic heart disease was the leading cause of death worldwide^{11, 22}. A report produced by WHO on Burden of Disease in 2004 also projected that globally in 2030, ischemic heart disease and cerebrovascular disease will be the top two leading cause of death. Thus, more aggressive effort should be made in order to raise the awareness among the public community about the danger of non-communicable disease¹². Ministry of Health Malaysia has published the National Strategic Plan for Non-Communicable Diseases (NSP-NCD) 2011-2015 on 17 December 2010²³.

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This plan outline the necessary framework for actions needed to reduce the prevalence of NCD using diabetes as the entry-point in Malaysia. However, the major challenge faced by the MOH was in operationalizing the strategies contained in the NSP-NCD.

Road traffic injuries are important causes of YLL as it is the top three ranking of YLL in Malaysia. According to Ministry of Health Malaysia, accident was the third principle cause of hospitalization in hospitals and accident was the fourth principle cause of mortality²⁴. Our result showed that the death due to road traffic injuries was more common in males compare to female. In most developed countries such as in Sweden and Spain it exhibited a decreasing trend, but in developing countries such as Thailand and China, there has been increasing trend¹⁴. Increased number of vehicles, speed, drunk driver and a mixture of road users are known risk factors for road traffic injuries in developing countries¹⁴. Therefore, more effort should be made by the government to reduce the incident of road traffic injuries nationally. A study conducted in China revealed that, approximately 70% of road traffic accidents are related to bicycle, and pre hospital emergency treatment is an effective method to reduce death from road traffic accidents¹⁴. Another study in Thailand which assessed revealed the road traffic injuries occur mostly in teenagers which later cause longer period of productivity loss²⁵.

The result obtained by this study can be used by the health policy maker to plan the strategies in combating the non-communicable diseases (NCD) as well as the communicable diseases and injuries. The program planned need to be more specific and focus especially towards the target group. For example, as for those aged 30 years above, more programs on preventing NCD should be done towards this age group.

This study has limitation in which we assumed the registration of mortality was complete based on the report by the Department of Statistic because there was no other source of mortality data for us to make formal checks. Disaggregated data were evaluated for quality in terms of proportion of deaths and the data were used to construct abridged life tables. In addition, there was no standardization cause of death for not medically certified and it reflected the underestimating cause of death in Malaysia. As we started this research in 2010, yet we used the 2008 data, in which is relatively backward, but this was due to the constraints to obtain data that has been verified in recent years.

Thus it is important to have a scheme for medical certification of cause of death for Malaysia so as to have the best estimates of cause specific mortality for health development. A multi-agency collaboration between Ministry of Health, Statistics Department, Registration Department, Police and other related agencies is needed to enable Malaysia to have a better

quality on the causes of death in the population. A complete review of the medical certification should be considered as a priority by relevant authorities and ministries of the government of Malaysia, in conjunction with studies to validate medically certified causes of death in hospitals^{26,27}. Improvement in medically certified death could be initiated with improved training programs for physicians in cause of death certification procedures and ICD-10 coding. Also, like other Asian countries, Malaysia should undertake pilot projects to improve cause of death attribution for deaths occurring outside health facilities, using verbal autopsy methods^{9,28,29}.

Publication of this article is important as this article can give clear information about disease mortality trends in Malaysia. Researcher will gain knowledge about the burden of disease in Malaysia as well as morbidity and mortality trend, thus can create opportunity for further study.

CONCLUSIONS

In Malaysia, premature mortality was essentially due to non-communicable diseases followed by communicable diseases and injury. Estimating mortality component is very crucial as it gives comprehensive information on the total burden of disease in the country. The information will enable the authorities to develop activities and programs to prevent and reduce the mortality. Data provided in this study are relevant for a more balanced health agenda aimed at reducing the burden of premature mortality. This study also represents a first step in estimating the overall burden of disease in terms of premature death and disability.

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