

# Mortality rates by specific age group and gender in Malaysia: Trend of 16 years, 1995 – 2010

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**Abstract.** Mortality trends discussed widely in most countries were on infants and age under five. This paper presented trend of mortality rates in six important age groups (infants, under 5, adolescents, adults, middle age and elderly), using national deaths records for a 16-year period (1995 – 2010). We found decreasing trend in all age groups except for infants and age under 5. Although the mortality rates for both groups are slowly increasing, the rates are satisfactory and better compared to that in most developing countries. Mortality rate among male is high in all age groups. The highest difference is among the adult groups, in which, the average ratio in 16 years between male and female is 2.75, followed by adolescent group, 2.12 and middle age group, 1.65. This trend can become a reference for comparing that from other developed and developing countries. It can also become an indicator for a country's health status and population growth. Due to the decreasing trend of mortality rates, the government needs to plan for health program to support more elderly people in the coming years.

**Keywords.** Mortality; specific age group; death trend; death certification; Malaysia.

## Introduction

Malaysia is one of the developing countries whose population had reached almost 28 million people in the year 2010<sup>1</sup>. Malays formed the majority (50.1%), followed by Chinese (22.6%) and Indian (6.7%). Although the people are of different religions, languages and races, they enjoy better life as compared to their neighbours in terms of wealth, health status, less conflict and free from natural disaster such as tsunami, earthquake, tornado and other natural disaster. The Gross Domestic Product (GDP) per capita for Malaysia in 2010 was USD15, 300 and ranked at 57<sup>th</sup><sup>2</sup>. Besides that, it has also gained international recognition from the Global Peace Index 2011, ranking Malaysia at the 19<sup>th</sup> in its list of 153 countries, up from the 26<sup>th</sup> position in 2009<sup>3</sup>.

Based on year 2007 data<sup>4</sup>, World Health Organization (WHO) ranked Malaysia at 49<sup>th</sup> in terms of health status among 190 countries. Malaysia's population life expectancy in 2010 is 73.6, much higher compared to only 70.3 in the last 20 years. With the death rate (per thousand) ranked at 167<sup>th</sup> and healthy life expectancy ranked at 82, Malaysia can claim as a safe country. This paper discusses the trend of specific mortality rates by distinct age groups for a period of 16 years from 1995 to 2010. Those were mortality rates for infants, under 5, adolescents, adults, middle age and elderly. The findings could become a reference to compare with that from other-developed and developing countries.

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In this paper, we propose that, the trend of mortality rates be evaluated by various age groups since each age group has its significant characteristics such as lifestyle, dependency and activities. The focus recently is towards infant and under 5 mortality. For the Millennium Development Goal, for example, the United Nation had set a target of a two thirds reduction in under-five mortality rates from the year 1990 to 2015<sup>5</sup>. This is of concern due to the serious increase of mortality rates among age under 5 in most developing countries. However it is worth to see the trend of mortality rates among these groups and these findings are significant to indicate not only health status as a whole but also the future pattern of the population.

## 1. Methods

This is a population based study using data of death records from the National Registration Department (NRD), Malaysia from 1995 to 2010. Age groups were divided into six categories based on WHO recommendations and previous studies<sup>6, 7, 8, 9</sup>; infant (below 1 year), under 5 (below 5 years), adolescent (5 to 19 years), adults (20 to 39 years), middle age (40 to 64 years) and elderly (more than 65 years). Results are presented in mortality rates and figures are illustrated by using line plot for the trends in 16 years. Population estimates that were retrieved from Department of Statistics Malaysia were used as denominator except for infants and under 5 where live birth statistics were used instead. No inferential analysis was done for this paper.

## 2. Results

### 2.1 *Mortality rates (per thousand) between gender*

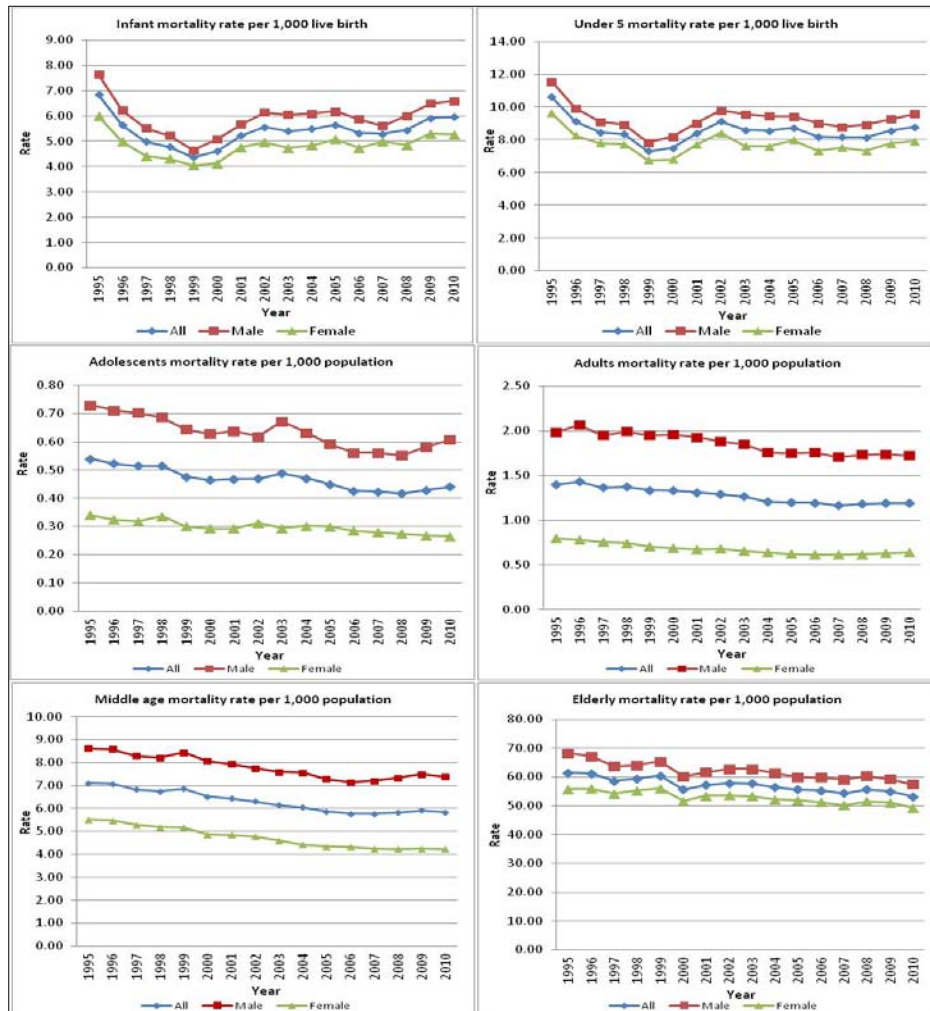
Mortality rate among male is consistently higher in all age groups throughout the whole study period. The highest difference is among the adults group where the mean (SD) of male:female ratio in these 16 years is 2.75 (0.11), followed by the adolescent group, 2.12 (0.11) and the middle age group, 1.65 (0.06) (Table 1).

### 2.2 *Mortality rates (per thousand) among all age groups*

Trend of mortality rates among the infant group started to decrease since 1995, from 6.9 to 4.4 in the year 1999. However, the rates started to rise again since 2000 with minimum fluctuation. The rates since 2000 until 2010 were between 4.6 and 6.0. A similar trend was observed among the under 5 age group and the rates were between 7.3 and 10.6 where 1995 was the highest. Decreasing trends were observed from 1995 to 2010 with few fluctuations in adolescent group. The rates were low which were between 0.4 and 0.6. Similar trends were found in adults, middle age and elderly groups in comparison with that of adolescent group, and their rates were between 1.2 to 1.4, 5.8 to 7.1 and 53.2 to 61.5 respectively (Table 1 and Figure 1)

**Table 1:** Mortality rates and ratio between gender in Malaysia (1995 – 2010)

Category	Rates(Min, Max)			Ratio Male:Female	
	Male	Female	All	Mean (SD)	(Min , Max)
Infant	4.66,7.65	4.05, 5.99	4.37, 6.85	1.23(0.04)	1.12,1.28
Under 5	7.83,11.55	6.74, 9.62	7.31, 10.61	1.19 (0.03)	1.15,1.25
Adolescent	0.55,0.73	0.27, .034	0.42, 0.54	2.12 (0.11)	1.97,2.29
Adults	1.72,2.06	0.61, 0.80	1.16, 1.43	2.75 (0.11)	2.48,2.88
Middle age	7.20,8.62	4.23, 5.52	5.77, 7.10	1.65 (0.06)	1.56,1.77
Elderly	57.51, 68.21	49.36, 56.09	53.21, 61.53	1.17 (0.02)	1.15,1.22



**Figure 1:**

### 2.3 *Ranking of mortality rates among all age groups*

The highest mortality rates among age groups were among elderly followed by middle age, infant, under 5, adults and adolescents group (Table 1).

## 3. Discussion

We divided the discussion into four sections. First is concern on the increase of mortality rates among infant and under 5 age groups. Second is with regard to the decreasing mortality rates among adolescents, adults and middle age groups. Third is the implication caused by the decreasing rates of mortality in the elderly group and finally is regarding the gender difference in mortality.

### 3.1 *Concern on the increase of mortality rates among infant and under 5 group in Malaysia*

The proportion of under-five deaths that occur within the first month of life (the neonatal period) has increased about 10% since 1990 to more than 40%<sup>10</sup>. The rates of infant mortality throughout the world ranged from 2 to 136 per thousand populations. The lowest rate was reported in Singapore, and one of the highest was reported in Afghanistan<sup>11</sup>. One study participated by 108 countries reported that the median infant mortality rate was 33 per 1000 population<sup>12</sup>. Therefore, infant mortality rates in Malaysia can be considered as one of the lowest among developing countries. Although the trend is slowly increasing, but at current rate, it remains as an indicator to show good infant survival. This pattern would also support population growth in the country<sup>13</sup>. Between gender, mortality rate among females was lower than that for males. However, study by Krzysztof mentioned that this difference loses its statistical significance in later childhood (after the first birthday), and it could be attributed to the socio-cultural and physiological mechanisms<sup>14</sup>.

In Malaysia, infant and child deaths are rare, relative to adult deaths. However, in a developing country like Kenya, child mortality in 2002 is at 112 per thousand births<sup>15</sup>. United Nation had set a target called as the Millennium Development Goal targeted of a two thirds reduction in under-five mortality from 1990 to 2015<sup>5</sup>. Therefore, this target requires that under 5 mortality rates to decline on average by 4.4% per annum. Based on under 5 mortality in Malaysia, there was a decline phase from 1995 to 1999, in average of 8.8% per annum, which was better than the target. This was followed by increment phase with the average increase of 1.8% per annum from 1999 to 2010.

Strategies to improve the mortality rate for under 5 needs to be re looked. Previous study found that mother's educational level has influences her child's health where children's chances of surviving usually improve as their mothers' education increases<sup>16</sup>. Positive trend is expected to be seen since the percentage of females getting tertiary level education in Malaysia is increasing<sup>17</sup>. Mother and child health education also needs to be emphasized.

### 3.2 *Trend of mortality rates among adolescents, adults and middle age in Malaysia*

Mortality rates among adolescents, adults and middle age in Malaysia were satisfactory, and it showed a declining trend for the past 15 years. Similar trend was found in China, South Korea and Taiwan<sup>18</sup>. Mortality rates among the groups were between 0.5 and 1.0, 1.0 and 1.5, and 6.0 and 7.0 respectively. The issue might be the gender difference in mortality rates as discussed in the section below.

These three age groups can be considered as the productive age where most adults and middle age groups are actual drivers of and serve the country. Although lesser numbers are dying, the morbidity and quality of life are not ascertained and is beyond the scope of this paper. The health conditions among these groups are in fact an important matter in order for them to be more productive. Adult mortality has been relatively less emphasized as compared to child mortality. Surprisingly, in developed country like United States, mortality rates among adults have increased significantly. Based on study by Julie et al.<sup>19</sup> in 1990, the United States ranked 34th in the world for female mortality and 41<sup>st</sup> for male mortality, but the ranking had dropped to 49<sup>th</sup> for women and 45<sup>th</sup> for men in 2010. This puts United States behind all of Western Europe and also in lower-income countries such as Albania, Chile and Tunisia.

Knowing that infant, children and elderly are the vulnerable groups who are dependants of the adult group, increase in mortality rates among adults then becomes a concern. Therefore, the major causes of death among these groups need to be further investigated to plan for premature death prevention especially due to unnatural causes. According to World Health Report 2008, physical violence such as homicide, suicide, and acts of war is one of the major contributors for death among adults. It had caused an estimated of 2 million deaths worldwide in 1990 where homicide, suicide, and acts of war accounted for 20 percent to 40 percent of the deaths of men ages 15 to 34<sup>20</sup>.

### 3.3 *Impact of the decreasing rates of mortality in the elderly group in Malaysia*

Populations are growing older in countries especially in more developed countries including in the Asian region, and this trend began recently in most less developed countries<sup>21, 22</sup>. This will give impact to government policy especially to support insurance and medical care for the elderly group. In United States, although government programs such as Social Security, Medicare, and Medic-aid improve the health of the elderly group, current forecasts showed that they would not be sustainable for long time<sup>23</sup>. It is anticipated that, with limited resources, government of developing countries would face more challenge in supporting the elderly group. For example, Sri Lanka by 2020 will experience South Asia's most rapid population ageing. This trend will demand larger proportion of financial resources be allocated for health care services in the future<sup>24</sup>.

In Malaysia, mortality rates among the elderly group are on the decrease, which means there will be more elderly group in the coming decades. This shows a positive trend of health status in Malaysia as a result of the government's emphasizing on people's health care development and improvement. In Malaysia budget 2011, the government had provided 5% of the government social sector development budget into public health care which showed an increase of more than 47% over the previous figure. In line with the rising of the aging population, the Government is keen to improve health in many areas including upgrading of

existing hospitals, building and equipping new hospitals, expansion of the number of polyclinics, improvements in training and expand the health care service in rural areas<sup>25</sup>.

With concern on research by Linda et al.<sup>23</sup>, developed country such as United State may be facing difficulties in supporting health care services in the long run. Malaysia as a developing country, on the other hand, needs to think of policies to provide the health care services among the elderly group within the existing constraint. Therefore, mortality among elderly is already becoming a concern. In addition, the quality of life among elderly group also needs to be taken into consideration. Study by Christopher et al based on Australian elderly population showed that more than two-thirds of the increase in female life expectancy over the decade 1988–1998 is spent in the disabled state, and the situation is worse for elderly men<sup>26</sup>. Therefore, the policy should not only focus on reducing or retain the mortality rate among elderly but prior to that, increasing their quality of life.

### 3.4 *Mortality rates by gender in Malaysia*

In most countries, life expectancy among female is better than that of male. In the United States, female's life expectancy is better compared to males' by about 2 years in 1900 and by 5.4 years in 2000<sup>27</sup>. This finding was also supported by the trend in East Asian region where females had faster mortality decline than males' in all age groups<sup>12</sup>. The gap appeared to be particularly bigger for age groups between 20-24 and 40-44 in all countries. Likewise this was also the trend found in the Malaysian population. The differences in mortality rates were obvious in all age groups, with an average difference of between 0.5% and 3.0%. The highest difference is among adult groups where the average of the ratio in 16 years between male and female is 2.75. This indicated that, mortality rate among male is almost three times higher than in female. According to Laura, old-age female life expectancy continued to rise in a more or less undisturbed manner through the second half of the 20<sup>th</sup> century<sup>28</sup>. This pattern suggested that gender difference need to be taken into account for any social and health planning. This was supported by Reto et al in their study where they suggested public health campaigns must take gender differences into account, and may have to address men and women separately<sup>29</sup>. Therefore, before good policy can be designed, inequalities need to be properly measured.

## 4. Suggestion and summary

The trend of mortality rates among the six age groups that were presented here will be meaningful if this parameter can be compared with that of various countries including developed and developing country. And the predicting factor for the increase and the decrease of the rates can be investigated using important parameter such as GDP, Global Peace Index, disability-adjusted life year (DALY) and other parameter which are relevant. Knowing that in our country where government plays a very important role in sustaining the health care service in Malaysia, we can hope that health programme stability and stable funding can result in further improvement of trend for the next decade ahead. Ellen et al noted in their study that changes in medical care for the past 20 years have had an impact towards the people in Europe<sup>30</sup>.

For summary, there is variability in mortality and disability among and within countries. In Malaysia, the mortality rates were satisfactory overall and by six important age groups. This was in line with study by Scott et al where they mentioned that less developed countries enjoyed dramatic and improvements in living standards and declines in mortality<sup>31</sup>. We believed these were due to many factors such as the physical environment, political stability, education, health system, the Nation's wealth, health policy and the community itself<sup>31</sup>. However, the trend of the aging population hopefully will capture the interest for the government to provide better health strategy considering the limited resources.

For future studies, we propose categorization for cause of death also to be presented by six age groups as showed in this paper. However, this needs quality data especially for the cause of death. Concerning on developing country particularly Malaysia, where medically certified death were only 45% to 57% from 1995 to 2010, may lead to poor data collection especially for cause of death<sup>32</sup>. Meanwhile, projection also can be done for mortality rates by the six age groups when long series of data had been captured. Such simple time – series model can be applied to do forecasting. Mohamad et al did the prediction number of death by occurrence using simple model and found it almost accurate for short-term forecast<sup>33</sup>.

## **5. Conclusion**

This paper found that, as compared to other developing countries, the mortality rates in Malaysia were satisfactory; overall and by six important age groups. For most age group it is a stable trend. However we are concerned over the two vulnerable groups; infants and under 5 as their rates are slowly increasing. Since lesser elderly are dying, more services need to be in place to cater for their needs.

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