Mortality Levels and Causes of Death in Iran

Hossein Ghodrati [1], Shafieh Ghodrati,[2]

This paper aims at investigating differential mortality between men and women considering mortality levels and causes of death in Iran. For this we used the data of Ministry of Health and Medical Education titled "Registration and Classification of Causes of Death" in 2008. Firstly life tables for men and women were constructed. Decomposition technique was used to define the share of causes of death in life expectancy differences between men and women. Findings show that life expectancy at birth in 2008 is 72.7 for females and 70.7 for males. Examination of age mortality pattern in Iran indicated two major differences with other populations: First, the death rate of young men is very higher than that of women. Second, at 70+ ages death rates of women is higher than men. Decomposition technique showed that 91.4 percent of life expectancy differences belonged to deaths resulted from injuries and were influential on youths. It also revealed that the main cause of higher mortality rates of aged women compared with old men was due to non-communicable diseases. Appearance of some exceptions in the mortality pattern and causes of death in Iran shows that mortality as well as epidemiological transition does not follows a linear and general trend.

Keywords: mortality transition, causes of death, decomposition, Iran

Introduction

The most prominent event of 20th century has been the drastic increase of world population which has occurred under the influence of mortality decline. Continuous decline of mortality has been an important achievement of socio-economic development during two recent centuries. This shift is defined as mortality transition in demographic literature.

Compared with fertility, less attention has been drawn to mortality studies in Iran. The main part of mortality studies just measure and describe mortality levels without any explanation or are limited to local areas and provinces with no attention to national level. Among these studies some are more considerable such as Amani(1996), Sarayi(1997), Mirzayi et al(1998), Zanjani and Nourollahi(2000), Taghavi and Gaafari(2004), and Khosravi et al(2007). However there are dark dimensions of the issue which should be considered like age structure of mortality as well as its causes of death.

This paper investigates the life expectancy differences among men and women and the role of age pattern and causes of death in these differences in Iran. For this we used the data of Ministry of Health and Medical Education titled "Registration and Classification of Cause of Death" In 2008.

[1]- Assistant Professor of Sociology, Research Center of Geography and Social Studies- Hakim Sabzevari University.

[2]- Assistant Professor of Demography, Research Center of Geography and Social Studies- Hakim Sabzevari University.

In 2008 the total number of registered death was 249194 that 6094 cases belong to Tehran province. Because of this province is not covered by the death registration system, this province was not entered in the analysis. Data for population was calculated based on linear interpolation between two censuses of 2006 and 2011.

Regarding of the purposes of the study, first the quality of data was evaluated and level of mortality estimated and then difference of life expectancy between male and female studied using decomposition technique. The evaluation includes examination of under-registration and misreports of age. Brass's growth balance method was used to adjust for undercounting in mortality data for those aged over 5. It is notable that there are various estimating methods for completeness of adult mortality such as General Growth Balance, Simple Growth Balance, Benneth-Houriochi which their assumptions are more adoptable with the studied population, (Hill et al, 2008). However the results of these methods were unexpected and for this reason were not used in the present study.

There are two main approaches in decomposing a difference in life expectancies, a continuous approach and a discrete approach. Although both procedures are formally identical, a discrete approach is easier to apply to traditional life table data (Preston et al, 2005).

Findings

Analysis of age report of mortality shows that there are some problems in ages 80+, which was corrected. Sixty six percent of female death and 81 percent of male death was registered in 2008. This figure is 60 percent for female children and 73 percent for male children. Thus under-registration of female death is higher than that of male and for adults is lower than that of children mortality. After correcting data, life expectancy at birth was 72.7 for female and 70.7 for male.

To investigate the effects of mortality and its age pattern on difference in life expectancy at birth between male and female, decomposition technique was used. Table 1 shows the results of age decomposition of difference in life expectancy between male and female. The column of n∆x indicates the contribution of every age group of the total difference. The sum of values in this column equals life expectancy differences between male and female. The other column shows the percent of contribution of every age group. As the table1 indicates, in the age groups 70 to 74, 75 to 79 and 80+, the total difference in life expectancy at birth is reduced and in other age groups the difference is increased that is due to lower rate of male mortality. Contribution of mortality in ages 20 to 24 has the biggest effect on exceeding females' life expectancy at birth than males' and contribution of mortality difference in age group 1 to 4 is the least. Through calculating the contribution of various causes of death, we can examine more exactly the difference of life expectancy between males and females.

Table1. Age decomposition of difference in life expectancy between male and female, 2008

age group	n∆x	percent
0 - 1	0.17	8.6
1 - 5	0.004	0.2
5 - 10	0.01	0.6
10 - 15	0.03	1.6
15 - 20	0.17	8.5
20 - 25	0.35	17.2
25 - 30	0.34	16.9

30 - 35	0.26	13.0
35 - 40	0.23	11.3
40 - 45	0.24	11.9
45 - 50	0.26	13.0
50 - 55	0.27	13.5
55 - 60	0.25	12.5
60 - 65	0.19	9.3
65 - 70	0.07	3.7
70 - 75	-0.06	-3.2
75 - 80	-0.19	-9.5
80 +	-0.58	-29.2
sum	2.01	100

Table 2 shows the results of causes of death decomposition of difference in life expectancy at birth between male and female. The results are based on percent distribution and sum of all columns are 100. Thus we can show that which age groups by which causes of death have the biggest effect on the difference in life expectancy at birth between males and females. Injuries have the biggest effect on difference in life expectancy at birth and 91.4 percent of total difference is due to these causes of death. The non-communicable diseases have a negative and little impact on the difference. Non-communicable diseases have the highest impact on the age group 80+ so that it explains -28.3 percent of the difference in life expectancy at birth between males and females. In other word the role of non-communicable diseases in age group 80+ leads to decreasing difference in life expectancy at birth between males and females. The highest impact of injuries is on the age groups 20 to 24 and 25 to 29. These two age groups represent 29.3 percent of the difference in life expectancy at birth between males and females.

Table2. Cause of death decomposition of difference in life expectancy at birth between male and female, 2008

Age group	$n\Delta 1x^*$	$n\Delta 2x^{**}$	$n\Delta 3x^{***}$
Under 1	7.4	1.9	-0.9
1 to 4	-0.4	-0.7	1.2
5 to 9	-0.3	-0.4	1.1
10 to 14	-0.1	-0.2	2.2
15 to 19	0.0	-0.1	9.2
20 to 24	-0.2	1.4	15.6
25 to 29	0.1	2.7	13.7
30 to 34	0.4	2.6	10.1
35 to 39	0.4	2.8	8.2
40 to 44	0.7	3.9	7.1
45 to 49	0.4	6.1	6.1
50 to 54	0.5	7.4	5.0
55 to 59	0.5	8.0	3.4
60 to 64	0.3	4.9	3.8
65 to 69	-0.1	1.6	2.2
70 to 74	-0.1	-4.4	1.4
75 to 79	-0.1	-9.8	0.8
80+	-0.3	-28.3	1.2
sum	9.2	-0.6	91.4

* Infectious and parasitic diseases, Maternal/Perinatal causes, Malnutrition
** Non-communicable diseases
*** Injuries

Conclusion

Previous estimations show that in Iran life expectancy at birth reached to 70 during 2001 to 2006(farzadfar et al, 2005 and Agha, 2006). The present study showed that life expectancy at birth of both males and females is beyond 70 in 2008. Thus it can be concluded that Iran is at the final stages of mortality transition.

Results of decomposition indicated that injuries have the highest impact on difference in life expectancy at birth between male and female and mainly effect of injuries are through youths (age group 15 to 35).The next important findings of decomposition of life expectancy difference between men and women indicated that non-communicable diseases in the oldest age groups, resulted in more deaths among women compared with men and it makes a difference in the age pattern of causes of death. Appearance of some exceptions in the mortality pattern and causes of death in Iran shows that health and epidemiological transition does not follows a linear and general trend so that the share of injuries is higher than normal in Iran.

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