Response to: Population and mortality profile in the Islamic Republic of Iran, 2006–2035

Aghamohamadi S; Hajinabi K; Jahangiri K; Masoudi Asl I; Dehnavieh R. Population and mortality profile in the Islamic Republic of Iran, 2006–2035. East Mediterr Health J. 2018;24(5):469-476. https://doi.org/10.26719/2018.24.5.469

Methodological issue on population and mortality profile in the Islamic Republic of Iran

Mehdi Naderi,¹ Amin Ataey ² and Elnaz Jafarvand ³

¹Department of Operating Room, School of Paramedical Sciences, Kermanshah University of Medical Sciences, Islamic Republic of Iran. ²Meshkinshahr Health Center, Ardabil University of Medical Sciences, Ardabil, Islamic Republic of Iran. ³Department of Community Nutrition, School of Nutritional Sciences and Dietetics, Tehran University of Medical Sciences, Tehran, Islamic Republic of Iran. (Correspondence to: Amin Ataey: amin5143@yahoo.com).

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Sir,

We were interested to read the paper by Aghamohamadi et al. published in the July 2018 issue of the Eastern Mediterranean Health Journal (1). Their purpose was to calculate the population and mortality in the Islamic Republic of Iran from 2006 to 2035 in two phases: first, the age and sex structure of the population was predicted in three steps. Second, the value of the general groups for cause of death in the country was assessed and predicted during the indicated years. The crude and causal death rates were calculated and their 20 year trend was predicted using the Lee-Carter model. Authors reported that in 2035, the age group 60 years and over will reach 17.6% of the total population. Endocrine, nutritional and metabolic diseases will be the biggest causes of an increase in the rate of death in the general population; also the largest decline in cause of death is for unintentional injuries (1).

It should be noted that the Lee-Carter method expresses the death report in age groups of 5 years. It also expresses only the prediction of death in the form of a time series and is not able to predict the causes of death; this process not mentioned in this article (2). Another point is that this method is not able to predict death for a group under the age of 5 years, and more precise methods are available (2). In addition, in terms of the number of deaths expected by 2035, the debate on the progress of science and technology has not been considered, and is one of the weaknesses of the Lee–Carter method. Also, regarding the coding of the causes of death in the Islamic Republic of Iran – despite significant progress – it is incorrect to use the codes of Group I, which is also mentioned in Khosravi's study (3). The Ministry of Health is faced with a low estimate of the number of deaths recorded, especially for females, which is also evident in this article. The article states that deaths from cardiovascular disease, especially in women, and deaths due to unintentional incidents, are declining; however, according to the World Health Organization report, since 2006 these rates have been rising (4), which indicates the inability of this method to predict the cause of death.

Authors concluded that noncommunicable diseases will increase as the aging population grows. Identification of their primary causal and risk factors can, therefore, contribute to prevention and control.

Methods to predict the causes of death and the expected number of deaths, such as the Murray method that can predict the causes and number of deaths expected for each community based on hospital deaths (5). However, the use of this method as expressed in this article can be somewhat misleading, especially if the results are taken into account in health decisions.

References

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Response by Dr Hajinabi:

In this study after calculating the amount of crude and cause-specific deaths in 5-year age groups, the 20-year trend was predicted using the Lee-Carter model. It should be noted that using this model for predicting the causes' trend, a value must exist for all 5-year age groups, and forecasts in main groups of cause of death was based on the International Classification of Diseases. Of the total 21 primary disease groups in this classification, the diseases that cannot be considered as the causes of death - as well as the diseases of the skin and subcutaneous tissue, diseases of the musculoskeletal system and connective tissue, pregnancy, childbirth and puerperium and conditions originating in the perinatal period with negligible or zero value in age and gender groups - were excluded from the study because their trend was not predictable by this model. Finally, forecast for 13 major groups of causes of death was performed. Also in this study we calculated 5-year age groups but not all data was specifically mentioned in the article.

In this paper, Lee–Carter's method is used since it is a combination of a sophisticated demographic model (with least parameters) and time series methods. It also predicts the age group under 5 years old and a large portion of changes in the mortality rates are covered by this model (1,2). The causes of death are also mortality rates that can be calculated with this model.

The Lee-Carter model calculates the death rate and not the number. Although in this method, similar to other methods of extrapolation, information about the effects of medical, social and behavioural advances is not exerted on the mortality rate, but its usage is superior to other methods of extrapolation for the following reasons: first, a large proportion of changes in the mortality rate of the total population in developed countries is covered by this model; second, the parameters of this model can be easily interpreted; and third, this method in addition to predicting mortality rates in a specific period of time, is able to provide the corresponding confidence interval as well. In the demographic texts, this method is regarded as an "outstanding statistical model to predict long-term mortality rate of the total population (2).

The Coding of causes of death in the Islamic Republic of Iran over the past 10 years has improved significantly, which has been confirmed by the World Health Organization (3).

In this study, the data were also amended in terms of low registration. Low registrations were amended by scaling up of causes of death. For this purpose, the number of deaths reported (current registration) by the organization for civil registration (4) in each of the years 2006 to 2015 was considered as the basis for incremental coefficient of that year and the multiplier of all deaths in certain age groups and gender, as well as the number of deaths caused by various diseases with respect to the multiplier and were re-calculated.

It should be noted that some of the above sections were omitted from the article because of the article word limit in accordance with the EMHJ submission guidelines.

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