Predicting the Aging Trend of Ilam Population and the Necessity for Implementing Health Services for the Elderly Until 2050

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Received: 17/08/2020 revised: 25/10/2020 accepted: 23/11/2020

Abstract

Introduction: The process of demographic transition has led to a change in the age of populations. Almost all countries around the globe have passed or are passing through the reproductive phase, which naturally contributes to the rising elderly populations. The present study was conducted to predict future trends of the elderly population in Ilam city.
Materials and Methods: The secondary analysis method, population forecasting model, and scenario producing approach were used to assess demographic changes. Data analysis and the prediction of population features were performed using Spectrum and Mortpak software.
Results: Among the important findings of this study was that the elderly population is rising in Ilam. Currently, the elderly population comprises 5% of the total population of Ilam, which will increase to more than 20% in 2050.
Conclusion: Policy makers and managers should consider implementing social welfare and health care services for the elderly in the future.

Keywords: Population change, Futures studies, Ilam, Population projection, Aging

Introduction

In today's modern and advanced world, socio-economic development has contributed to a decrease in population growth and an increase in life expectancy across the world. In this regard, the process of demographic transition has led to a change in the age of populations (i.e., age transition), so it is expected that the population weight will be transferred from the young to the elderly. In the past, few people would reach old age, but in today's world, technological and health care advances have caused people to live longer, resulting in a rise in the ratio of the elderly people. On the other hand, almost all countries around the globe have passed or are passing through the reproductive phase, which naturally contributes to the rising elderly populations.

Along with aging, physical dysfunction increases, resulting in various health problems and diseases among old people. In the United States, cardiovascular diseases, malignancies, and central nervous system (CNS) diseases are the leading causes of death in the elderly (1). The study of Heydari *et al.* showed that cardiovascular problems, hypertension, as well as musculoskeletal and auditory-vision problems are among the most common diseases in the elderly (2). On the one hand, elders lose their capability to maintain independence due to health problems and diseases, and on the other hand, these problems impose a great financial burden

on families and the health care system. Because of this, elders' issues are among concerning problems and health priorities in most societies, and coping with these problems requires implementing precise and intact policies and programs. Certainly, countries without a comprehensive program in this area will face many problems. Planning for financial, physical, and human resources is one of the basic principles of health care management. These items should also be considered for the elderly taking into account demographic and epidemiological changes, as well as technological advancements (3, 4). Since the population is the most important factor and the cornerstone for health policy-making, policymakers should pay special attention to the interrelationships between the factors affecting the socioeconomic developments in populations. Therefore, without gathering comprehensive demographic information, it is almost impossible to plan neither for development nor for other areas such as health care, etc.

The population surveys conducted by the United Nation show that the world's population is heading towards aging, and this trend will even accelerate in the future. The proportion of the world's elderly population (65 years and older) is currently 9.3% (2020). Considering that the fertility rate remains stable at its current level, the average ratio of the elderly population will be doubled (i.e., 22.8 %) by 2050. In 2020, the ratio of the elderly proportion (65 years and older) has been estimated as 17.6% in developed countries and 6.3% in other countries. It has been predicted that by 2050, 15.6% of the world's population will be 65 years and older (33.4% in developed countries, 19.5% in developing countries, and 9.5% in less-developed countries). Interestingly, based on predictions by the UN, the ratio of the population over the age of 60 years in 42 countries will exceed the current ratio in Japan (as the country with the oldest population globally) by 2050. In 2020, the ratio of 60-year-old or older people in Japan has been estimated to be 34.3% (5). A comprehensive list of the studies assessing different aspects of the elderly population, their health problems, and required health care planning has been noted in Table 1.

Studies show that in parallel with global trends, Iran is experiencing population aging as well. The country has passed through the primary population transition phase, and general censuses show that the number of elders in Iran has been increasing in recent decades. Considering regional differences among Iranian populations, it is necessary to assess population aging trends in different regions of the country. Ilam city, which has been subjected to this population survey, harbors a population of 199,000 according to the latest census conducted in 2016. Of this population, 5% or about 10,000 people are elders (18). It is necessary to predict the ratio of the elderly in 5-year intervals to avoid the health care system facing challenges regarding elders' problems in the future. Because planning for the future requires knowledge about demographic characteristics and trends of a population, this research aimed to predict the elderly population of Ilam city up to the 2050 horizon. We here tried to scrutinize possible scenarios and their outcomes as well.

Materials and Methods

In this study, we used the secondary analysis method (or secondary data analysis), in which research dimensions and objectives are explored and scrutinized based on the data previously gathered by statistical centers (such as the Statistics Center of Iran). The main data resources used in this study were those of the national censuses conducted in Iran from 1977 to 2016, as well as the demographic statistics provided by the National Organization for Civil Registration of Iran.

Table 1. Studies projecting predictions on the elderly population, their health problems, and planning strategies.

Author	Type of study	Location of study	Publication year	Population under study	Important findings
Ahmadi et al. (6)	Cross-sectional	Tehran-Iran	2007	Over 60 years old people	Providing educational programs to the elderly and physicians improved the culture of consuming and prescribing medicines.
Dadkhah (7)	Review	Iran	2007	Over 60 years old people	It is necessary to provide special services to the elderly using the experiences of successful countries.
Mirzaei (8)	Review	Iran	2007	Over 60 years old people	Population aging is becoming an important challenge in Iran.
Mohammadi et al. (9)	Cross-sectional	Iran	2016	The elderly population	Sistan-Baluchestan and Guilan provinces have the lowest and highest aging rates in Iran.
Safdari et al. (10)	Review	Iran	2016	Scientific data sources	The measures taken for the elderly in Iran are inadequate and disproportionate to their needs.
Yahyavi et al. (11)	Cross-sectional	Iran	2018	Households' income and costs	Aging imposes a high financial burden on households.
Afshar et al. (12)	Cross-sectional	Golestan-Iran	2010	Rural population over 60 years of age.	It is necessary to implement interventions, especially educational interventions, to promote older people's health.
Riahi et al. (13)	Comparative	Iran	2007	Documented sources of Iran and the US	Considering population aging, there is an urgent need to develop a comprehensive program to provide the necessary facilities to the elderly.
Farzin pour et al. (14)	Cross-sectional	Iran	2007	Pensioner elders	The most important health problems of the elderly include cardiovascular, musculoskeletal, auditory, and vision diseases.
Warner (15)	Review	The US	2001	Elderly population in the US.	It is important to give priority to basic gerontology research.
Lee et al. (16)	Cross-sectional	Seoul-South Korea	2005	Over 60 years old people.	Boosting health-promoting behaviors improves elders' quality of lives.
Buckinx et al. (17)	Review	Global	2015	Scientific databases	Screening and prevention programs reduce the burden of diseases and health care costs of the elderly.

This study was conducted in Ilam urban areas in 2018. In order to predict and analyze the transition trends of the Ilam population in future, we employed the combined population prediction method. Regarding the current structure and composition of the city's population in 2016 and by presenting a series of hypotheses and scenarios, we projected predictions on the population status in 2050. The data was analyzed using descriptive indicators and demographic models. The indicators were predicted utilizing demographic software including

Spectrum, Mortpak, and Microsoft Excel. Based on a combination of hypotheses, experts' experiences in predicting the country's population trends, the population predictions presented by the UN, the current trends, international experiences, and most importantly, changes in the country's fertility rate in the last decade (including provincial subdivisions and urban and rural areas), predictions on fertility changes in the country (and in the population of Ilam) in the future can be presented within four following categories:
1- Upper-limit scenario: An increase in the total fertility rate with a steep slope, reaching about 2.5 children per family by 2050 (the optimistic assumption).
2- Average-limit scenario: An increase in the total fertility rate with a gentle slope, reaching about 2.1 children per family by 2050.
3- Fixed-limit scenario: The total fertility rate remains constant (1.8 children per family) from 2016 to 2050.
4- Lower-limit scenario: A reduction in the total fertility rate to 1.5 children per family by 2050 (the pessimistic assumption).
This study was approved by Ilam University of Medical Sciences. All ethical standards were followed according to the Declaration of Helsinki on ethical principles for medical research.

Results

As depicted in Table 2, the ratio of the elderly population to the total population of Ilam from 1977 to 2016. As shown in this table, elders comprised only 3.5% of the total population of Ilam in 1977. However, the ratio of the elderly to the total population of the city increased to 5% in 2016, indicating an ascending trend of 1.5% during four decades.
Table 3 shows the predictions on the ratio of the elderly population in Ilam city in five-year intervals based on the four mentioned scenarios from 2016 to 2050. Considering the upper-limit scenario (the fertility rate of 2.5 children per family), the elderly population of Ilam will reach 20% of the total population by 2050.

Table 2. The ratio (%) of the elderly population to the total population of Ilam from 1977 to 2016.

Year	The ratio (%) of the elderly population (≥ 65 years old) to the total population
1977	3.5
1987	3.4
1997	3.6
2007	4.1
2012	4.3
2016	5

According to the average-limit scenario (the fertility rate of 2.1 children per family), the ratio of the elderly population in Ilam will also be 20% by 2050. Based on the fixed-limit scenario (the fertility rate of 1.8 children per family), the percentage of the elderly population of Ilam will rise to 21% in 2050. Finally, based on the lower-limit scenario (the fertility rate of 1.5 children), the ratio of the elderly population in Ilam in 2050 will be 22%. So, according to these scenarios, the ratio of the elderly population in Ilam will range from approximately 20 to 22% by 2050, indicating a ratio of higher than 20% either way. According to the definition of the elderly population index (i.e., the population of 60 to 65 years old and over comprising more than 15% of the total population), Ilam city will certainly have an elderly population by 2050. Another important indicator related to population aging is the aging index (or the ratio of the elderly to children), which is calculated by dividing the proportion of people older than 64 years by the ratio of people under the age of 15 years, multiplied by 100. An index of 100 (i.e., equal numbers of the elderly and children) indicates an aged population. Figure 1 shows the predicted aging index of Ilam city during 2016-2050 based on four fertility assumption scenarios. The results show that by even assuming a fertility rate of 2.5 (i.e., the upper-limit scenario, the yellow line), the aging index of the city will reach 100 in 2050. Considering other fertility assumption scenarios, this index will reach "100" five to 10 years earlier.

Table 3. Predicting the ratio of the elderly population (65 years old and over) in Ilam within five-year intervals up to the 2050 horizon based on four fertility assumption scenarios

Scenarios	Increased fertility with a steep slope (up to 2.5 children)	Increased fertility to the replacement level (2.1 children)	Constant fertility rate (1.8 children)	Decreased fertility rate (1.5 children)
2016	0.05	0.05	0.05	0.05
2021	0.06	0.06	0.06	0.06
2026	0.07	0.07	0.07	0.07
2031	0.08	0.08	0.08	0.08
2036	0.11	0.11	0.11	0.11
2041	0.13	0.13	0.14	0.14
2046	0.16	0.16	0.17	0.17
2050	0.20	0.20	0.21	0.22

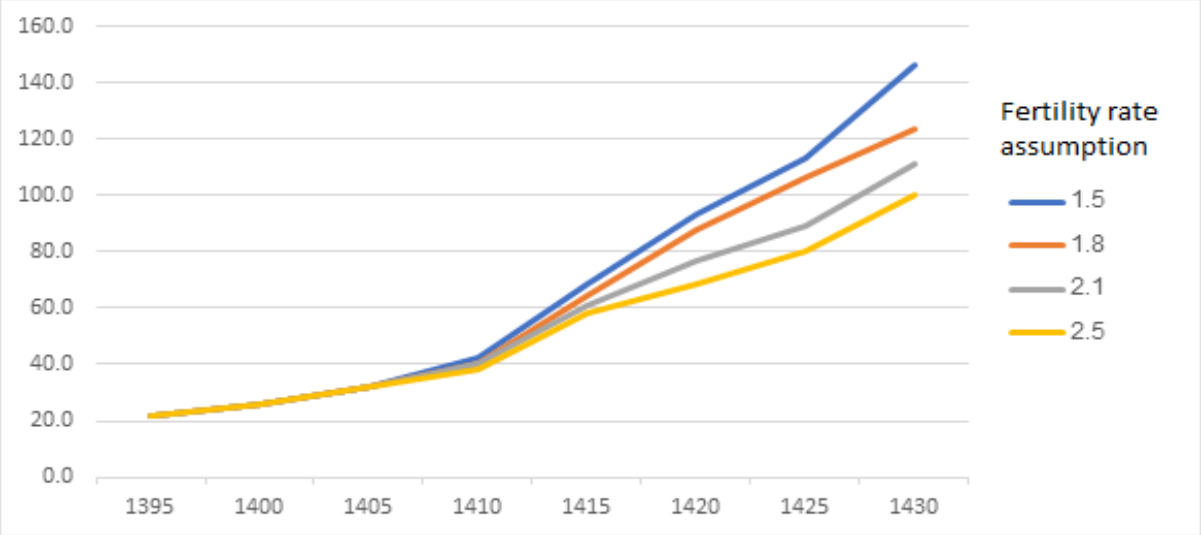

Figure 1. Prediction of the aging index in Ilam city considering four fertility assumption scenarios within five-year intervals up to 2050.

Discussion

Based on the predictions of all four fertility assumption scenarios and considering the aging index of Ilam, as well as the current ratio of the population over 65 years respective to the total population, it can be said confidently that Ilam will have an elderly population by 2050 even by having an optimistic view on the fertility rate (i.e., 2.5 children per family). Either way, the population of Ilam will be aged within the next 30 to 35 years, and the share of the elderly population will rise to more than 20% of the total population of the city.

Elders are among the most vulnerable groups of societies (19). After years of work, endeavors, and gathering experiences, elders finally embark in a phase in their lives during which they will require more attention and calm (20). In fact, elder people need to be present in interactive and participatory environments. So, it is necessary to design elderly care programs according to their health requirements (8, 12). It is clear that there is a necessity for the municipal officials of Ilam city to pay more attention to the elderly population in future large-scale and long-term planning and policies. Furthermore, policymakers and planners should consider arrangements for warranting social welfare and health care for the elderly and provide them with adequate urban infrastructure, including parks, nursing homes, pedestrian crossings, and special health care facilities (21).

Conclusion

Making predictions about the future in terms of the resources required for

populations is a necessity for controlling the rising wave of population aging, a situation that endangers public health. Finding a suitable solution to population aging requires an objective, quantitative, and scientific understanding of the problems of old people. Despite special attention to elders' health requirements during recent decades, national elderly health programs in Iran lack strategic orientations and inter-organizational communications. Regarding the urgency of the issue, policies should be implemented to ensure the health of the elderly and improve their livelihood. The number of elders in a society indicates the number of required hospital beds, geriatricians, health care facilities, and nursing homes in the future. We should acknowledge that population aging creates considerable health care challenges that need relevant structural modifications.

Acknowledgments

The demographic data required for the predictions were obtained from the Planning and Management Organization of Ilam city to which we offer our appreciation.

Conflict of Interest

There is no conflict of interest.

References

1. Anderson LA, Goodman RA, Holtzman D, Posner SF, Northridge ME. Aging in the United States: opportunities and challenges for public health. Am J Public Health. 2012;102(3):393-5. doi: 10.2105/AJPH.2011.300617.
2. Heidari S, Mohammad Gholizadeh L, Asadolahi F, Abedini Z. Evaluation of health status of elderly in Qom city, 2011, Iran. Qom UMSJ. 2013;7(4):71-80.
3. Arab-Zozani M, Mostafazadeh N, Arab-Zozani Z, Ghoddoosi-Nejad D, Hassanipour S, Soares JJ. The prevalence of elder abuse and neglect in Iran: A systematic review and meta-analysis. J Elder Abuse Negl. 2018;30(5):408-23. doi: 10.1080/08946566.2018.1523765.
4. Maghsoudi A, Dindarloo S, Jamali T, Ghaed S, Rastgoo Z, Hassanipour Azgomi S. Comparison of sleep quality and general health in elderly individuals living in their houses and nursing homes. Sadra Med J. 2016;4(3):161-72.
5. Bloom DE, Boersch-Supan A, McGee P, Seike A. Population aging: facts, challenges, and responses. Ben. Compen Int. 2011;41(1):22.
6. Ahmadi B, Alimohamadian M, Mahmoodi M. Polypharmacy among older adults in Tehran. Tehran Univ Med J. 2006;64(9):65-71.
7. Dadkhah A. Review of aged rendered services in USA and Japan and Guidelines for Iran aging strategic plan. 2007.
8. Mirzaie M. Factors affecting the elderly self-perceived health status. Iran J Age. 2008;3(2):539-46.
9. Mohammadi S, Yazdani Charati J, Mousavinasab N. Factors Affecting Iran's Population Aging, 2016. J Mazandaran Univ Med Sci. 2017;27(155):71-8.
10. Safdari R, Sadeghi F, Mohammadiazar M. Aged Care and Services Programs in Iran: Looking at the Performance of Relevant Organizations. Payavard. 2016; 10 (2) :155-66.
11. Yahyavi Dizaj J, Emamgholipour S, Pourreza A, Nommani F, Molemi S. Effect of aging on catastrophic health expenditure in iran during the period 2007-2016. J Public Health Res. 2018;16(3):216-27.
12. Afshar PF, Asgari P, Shiri M, Bahramnezhad F. A review of the Iran's

elderly status according to the census records. Galle Med J. 2016;5(1):1-6.
13. Riahi ME. A comparative study on the status of elderly in the traditional and modern societies. Iran J Age. 2008;3(3):10-21.
14. Farzianpour F, Foroushani AR, Badakhshan A, Gholipour M, Hosseini M. Evaluation of quality of life and safety of seniors in Golestan Province, Iran. Gerontol Geriatr Med. 2015;1. doi: 10.1177/2333721415599702.
15. Warner H. Support for basic gerontological research in the USA. Exp Gerontol. 2001;36(3):403-12. doi: 10.1016/S0531-5565(00)00261-8.
16. Lee TW, Ko IS, Lee KJ. Health promotion behaviors and quality of life among community-dwelling elderly in Korea: A cross-sectional survey. Int J Nurs Stud. 2006;43(3):293-300. doi: 10.1016/j.ijnurstu.2005.06.009.
17. Buckinx F, Rolland Y, Reginster J-Y, Ricour C, Petermans J, Bruyère O. Burden of frailty in the elderly population: perspectives for a public health challenge. Arch Public Health. 2015;73(1):1-7. doi: 10.1186/s13690-015-0068-x.
18. Mehri N, Messkoub M, Kunkel S. Trends, determinants and the implications of population aging in Iran. Age Int. 2020;45(4):327-43. doi: 10.1007/s12126-020-09364-z.
19. Mehri N, Messkoub M, Kunkel S. Trends, determinants and the implications of population aging in Iran. Age Int. 2020;45(4):327-43. doi: 10.1007/s12126-020-09364-z.
20. Gu D, Dupre ME. Encyclopedia of Gerontology and Population Aging: Springer, Cham; 2019. doi: 10.1007/978-3-030-22009-9_300106.
21. Ogura S, Jakovljevic MM. Global population aging-health care, social and economic consequences. Front Public Health. 2018; 6:335. doi: 10.3389/fpubh.2018.00335.