

## STATUS OF THE ELDERLY HEALTHCARE COSTS

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### ABSTRACT

One of the most fundamental aspects of healthcare for the elderly is planning to reduce challenges associated with their healthcare costs. The present study aimed to assess the status of the elderly health care costs in North Khorasan Province in 2013. In this descriptive-analytical study, all elderly citizens in North Khorasan Province comprised the study population. Sample size was found 400 people using cluster sampling method. Study tools for collecting data consisted of a questionnaire that was completed through interviews with the elderly or their first degree family members. Data were analyzed with SPSS-16 software using descriptive statistical tests of chi square and Kruskal-Wallis. Of the 400 participating elderly, 50.7% were female and the rest male. Mean total healthcare costs of the elderly were 3,335,200 IRR, with mean outpatient care costs of 2151900 IRR and mean in-patient service costs of 1183290 IRR. Mean costs in urban and rural areas were 2609220 IRR and 4039720 IRR, respectively. There was a significant relationship between variables of gender and the service providing center. Given the results obtained, mean costs incurred for the elderly in the province is high, particularly in the male elderly group. Outpatient costs are higher than the in-patient service costs. Furthermore, compared to the urban areas, costs are higher in rural areas.

**Keywords:** Elderly, Cost of Services, Health, North Khorasan

### 1. INTRODUCTION

Medical advances of the second half of the 20th century and success in providing healthcare services in recent century together with the increased life expectancy have added to the elderly population and naturally, to the number of elderly in need of medical services (Pourkakhki *et al.*, 2009). Aging is a biological and a natural process of life that begins with a living fetus and continues until death (Maghsood-Nia, 2006). According to the World Health Organization, elderly is defined as the age group of over 60 years old. Aging is a part of the biological process that occurs in all living organisms and is a part of life that follows middle-age (Hodaee, 2012).

Aging materializes for all who have survived accidents and events and have left behind youth and middle age years (Alhani *et al.*, 2012; Sepanlou *et al.*, 2010). In fact, aging is a natural process in human life and passage of time, diseases, physical, mental and environmental

conditions, all affect this process (Riahi *et al.*, 2010). Aging involves three interlinked processes. First is physical aging that involves changes that occur to the body over time due to aging. Second comes psychological aging that consists of development of character including emotional and perceived behavioral changes. The third process is the social aging that involves various stages of transition from one social base/status to the next, experienced by the person in childhood. These three processes occur in different amounts and heterogeneously in each person (Dellavar, 2009). Every period in human life has its own particular challenges. In this period, the elderly community and the aged have their own aging problems such as economical, social, cultural, health and treatment. Thus, investigating elderly patients and their very high treatment costs as a pivotal issue is necessary (Fathi, 2009; Sasdeghian *et al.*, 2011).

According to the UN report in 2009, it is estimated that close to two thirds of the 737 million people over 60

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years of age live in the developing countries (UN, 2009). Examining statistical indicators suggest an accelerated growth in the elderly population. Given their young population compared to the developed countries, developing countries like Iran will be more seriously faced with increasing elderly population (Alizadeh *et al.*, 2011; Mould-Quevedo *et al.*, 2009; Nejati, 2009). In demographic studies, aging population means that proportion of elderly people to the total population is rising. More accurately, a population is tending toward aging that consists of 7-14%, 65 years old and over. This proportion in an aging society is 14-20% and in an elderly society, 20% and higher (Fathi, 2009). Given the WHO report (2006), in the near future Iran will be faced with explosion in the elderly population (by 2030) and 25 to 30% of the population will be 50 years of age and older (Joftavi, 2010). This will double by 2050, making up 15.6% of the population. Currently, one out of 10 people is aged 60 or older and by the middle of the century, one out of 5 people will be in that age range (Fathi, 2009; Farzianpour *et al.*, 2012; 2013).

Investigating a number of indicators of aging population in recent years also suggests changing trend in country's population structure. Mean and median of the population age is severely on the increase. Based on the 2006 population census, there has been an increase in the aging population index from 17 persons in 1996 to almost 29. In other words, the country's number of people  $\geq 60$  years old for every 100 people under 15 years of age has increased from 17 in 1996 to 29 in 2006 (Ghavi, 2007). Studies reveal that in the future, aging trend of the population will occur at much higher rates. In a not so distant future, Iran will be faced with the aging population phenomenon and soon after, with old population (Fathi, 2009; Farzianpour *et al.*, 2010; 2012).

What has been expressed as the increasing trend of the elderly population in the world and in Iran is not important per se, but the consequences of this increase in various socioeconomic dimensions including resources in the healthcare sector are highly important and require to be studied seriously. Although no study has yet been conducted in Iran to predict health sector costs, given the growth of the elderly population, even most optimistically, elderly population of 6.7% in 2000 will reach 20% by 2050. Assuming a 5-fold increase in elderly treatment costs, to meet healthcare expenses, a 2.5 times increase per capita in financial resources of the health sector seems necessary (Rasel and Ardalan, 2007). Proportion of the elderly to the general population of the country in the 50 year-interval has increased by 2.7

times. Accordingly, by 2050, the number of the elderly will reach over 26 million and its ratio to total population will reach 26% (Habibi *et al.*, 2009).

Increased number of the elderly necessitates special planning and policies in this area. Thus, to have the right plans and policies in this area, a country ought to be aware of her socioeconomic and population characteristics, as well as trends over the years (Ghavi, 2007). Predicting prospects in terms of necessary resources is the prerequisites for planning and control of the surge in the elderly population that endangers health of the society. Today, investigating causes of imposing costs of elderly health care and also, effective preventative strategies can help promotion of health in this group. Addressing the elderly and health of those who have helped set the wheels of the society in motion and bent over backwards in doing so, has long been the subject of a wide range of studies (Sadiadpour, 2009). Attention to the concepts mentioned, especially in the present century, due to the increase in chronic diseases, longevity and the elderly population in developing countries is of particular importance (Pourkakhki *et al.*, 2009).

Aging in the not-too-distant-future (soon) may become the most important challenge facing the world, including developed and developing countries. Thus, responsible organizations and institutions should focus their efforts to solve problems arising from the imbalance in elderly and young active populations of the country straight away (Khangilani, 2013). Unfortunately, in Iran, many of the elderly are deprived of healthcare services due to the expenses and sometimes due to not being covered by health insurance (especially, comprehensive health insurance), or they partially receive services, which leads to putting this vulnerable group at higher risks. We need to study the costs and design necessary plans in this regard. Today, investigating causes of imposing costs of elderly healthcare and also, effective preventative strategies can help promotion of health in this group. Thus, the present study aimed to determine status of the elderly healthcare costs in North Khorasan Province in 2013 and to provide strategies to reduce current costs and improve financial status of this group by investigating their economical status.

## 2. MATERIALS AND METHODS

This applied descriptive-analytical study was conducted in every town (7 towns) in North Khorasan on 400 elderly subjects in rural and urban areas. Cluster sampling was used to select a sample size of 400 people according to the formula given below:

$$n = \frac{Z_{1-\alpha/2}^2 \times p \times (1-p)}{d^2}$$

$$p = 0.5$$

$$\alpha = 0.05$$

$$d = 0.05$$

$$n = \frac{(1.96)^2 \times 0.5 \times (1-0.5)}{(0.05)^2} = 384$$

First, number of subjects was identified according to the percentage of the elderly population of men and women, in cities and villages. In every township, 50% of urban clusters and 50% of rural clusters, which were covered by an urban or a rural healthcare center were randomly selected. The overall sample size was divided according to the elderly population in each town. By assuming 10 subjects in every cluster, the number of clusters per township was found for each urban and rural area and was announced to the teams. Data collection tool consisted of a standard questionnaire that was completed by interviewing subjects of their first degree relatives at their homes.

Study inclusion criteria were 60 years of age or older and the person's consent to participate in the study. If the person was unable to answer questions, informed relatives were asked and if such a person was not available, the subject was replaced with another from the next household from the right according to existing addresses. Also, if in the chosen household, according to random sampling, the person did not meet study inclusion criteria, another subject was selected from the next household. If there was more than one person in a household that met inclusion criteria, then, one of them was chosen randomly.

If an elderly was not available after three visits in a cluster, the next person was selected to complete the questionnaire. Maximum number of subjects in a household was one man and one woman. If there were more than 2 elderly persons in a household, one was randomly selected. If an elderly home existed in a cluster, it was considered as one family. Selection of clusters in urban areas was carried out according to their postal codes obtained from the post office and in rural areas, using HNIS software.

Data were analyzed with SPSSV.16 software using descriptive tests, chi square and non-parametric Kruskal-Wallis tests.

### 2.1. Ethical Considerations

This study was conducted after approval and obtaining permission of relevant officials in the target

groups. All participants' data were entered into the software anonymously. To complete the questionnaire, consents were obtained from participating elderly.

## 3. RESULTS

In this study, 400 elderly people from North Khorasan Province participated, of whom 203 (50.75%) were women and the rest men. Also, 203 (50.75%) persons were from urban areas and the rest from rural areas, 275 (68.75%) were married, 118 (29.5%) divorced or widowed and 7 (1.75%) had never married. 0.299 (74.75%) were illiterate, 88 (23%) had primary school education, 164 persons (41%) were housewives, 101 (25.25%) were employed, 125 (31.25%) were from 60 to 64 years age group and 122 (30.5%) in 65- to 69-year-old group.

**Table 1** presents related information to outpatient care costs. Mean of the highest costs was associated with those aged 80 years and older, single male, from rural areas with primary school education, with miscellaneous insurance, receiving services from university treatment centers. The lowest costs were incurred by those in 70- to 74-year-old group that were married, had university education and "Aide Committee" insurance. Also, maximum expenses was incurred by married illiterate women living in rural areas with the Armed forces insurance, receiving services from the university centers.

Information of the in-patient care is presented in **Table 2**. Mean highest costs were incurred by married illiterate men aged 70 to 74 years, living in rural areas, with other insurances and receiving services from the university health centers. The lowest costs were found in people aged 80 years and older, without spouse, educated to middle school level, with social welfare insurance. Also, maximum cost was incurred by married illiterate women aged 60 to 64 years, living in rural areas, with welfare insurance and receiving services from the university health center.

Data relating to comparison between outpatient and in-patient costs and total costs are presented in **Table 3**. Data relating to the variable of age were ranked in more than two sample intervals. Thus, non-parametric Kruskal-Wallis test was used for comparison. There was no significant difference between age groups in terms of costs ( $p < 0.05$ ). Cost data were not normally distributed for gender, therefore, non-parametric test was used for comparison. There was a difference in costs between female and male groups ( $p > 0.05$ ). The difference in costs in marital status groups was insignificant ( $P < 0.05$ ). Cost data relating to place of residence were not normally distributed, hence, non-parametric test was used for comparison.

**Table 1.** Health care services costs in terms of the study variables in Tomans

Variable		Mean	Median	Minimum	Maximum	Standard deviation
Age	60-64	193541.20	110000.00	0	1140000	248714.578
	65-69	238425.00	85000.00	0	2206000	396926.559
	70-74	160274.63	72000.00	0	1422000	237489.128
	75-79	250631.82	72500.00	0	2750000	474427.778
	80 and over	262609.57	126500.00	0	2510000	433909.724
Gender	Female	187779.57	60000.00	0	2750000	336875.061
	Male	243436.80	120000.00	0	2510000	357835.671
Marital status	Married	206479.64	85500.00	0	2750000	345663.245
	Widowed/divorced	217486.44	90000.00	0	1422000	288494.760
	Single	518714.29	49000.00	10000	2510000	929889.190
Place of residence	Urban	204250.51	87000.00	0	2510000	335216.026
	Rural	225807.65	88000.00	0	2750000	360553.643
Education	Illiterate	222912.21	90000.00	0	2750000	370901.033
	Primary school 1	205011.64	95000.00	0	990000	258604.456
	Primary school 2	241213.33	49000.00	0	1270000	390834.013
	Middle school	89500.00	69500.00	19000	200000	78877.542
	Diploma	70875.00	68750.00	1000	145000	80480.199
	University	40000.00	25000.00	9000	121000	45749.317
Insurance type	Treatment services	218272.95	85000.00	0	2750000	368912.846
	Social welfare	189367.14	88250.00	0	1138000	267113.718
	Armed forces	289866.67	158000.00	0	840000	295804.923
	Aide committee	148607.14	72500.00	0	869000	223331.435
	Others	295155.56	104000.00	0	1422000	457893.006
Service providing center	University	221106.17	90000.00	0	2750000	351118.176
	Others	6000.00	0.00	0	42000	12489.996
Total outpatient costs		215190.75		0	2750000	348036.822

**Table 2.** In-patients healthcare costs in terms of study variables in IRR

Variable		Mean	Median	Minimum	Maximum	Standard deviation
Age	60-64	153568.00	0.00	0	4452000	712935.801
	65-69	92799.18	0.00	0	4200000	449729.701
	70-74	160704.49	0.00	0	7900000	973671.306
	75-79	75022.73	0.00	0	1095000	192904.421
	80 and over	65383.33	0.00	0	675000	149583.033
Gender	Female	46315.77	0.00	0	2270000	217163.035
	Male	192536.55	0.00	0	7900000	849606.150
Marital status	Married	149368.00	0.00	0	7900000	737075.094
	Widowed/divorced	46132.21	0.00	0	1110001	164428.295
	Single	116000.00	0.00	0	457000	200283.965
Place of residence	Urban	56671.58	0.00	0	1270000	174586.351
	Rural	178165.02	0.00	0	7900000	849265.133
Education	Illiterate	142703.01	0.00	0	7900000	701196.325
	Primary school 1	61117.81	0.00	2270000	2270000	284348.516
	Primary school 2	13466.67	0.00	0	202000	52156.176
	Middle school	0.00	0.00	0	0	0.000
	Diploma	0.00	0.00	0	0	0.000
	University	0.00	0.00	0	0	0.000
Insurance type	Treatment services	136206.51	0.00	0	7900000	710983.718
	Social welfare	52064.29	0.00	0	1114000	197184.897
	Armed forces	128333.33	0.00	0	1270000	336142.331
	Aide committee	52142.86	0.00	0	495000	133614.173
	Other	140000.11	0.00	0	1110001	367117.478
Service providing center	University	121675.58	0.00	0	7900000	627924.643
	Other	0.00	0.00	0	0	0.000
Total in-patient costs		118329.50		0	7900000	619528.980

**Table 3.** Comparison of outpatient, in-patient and total costs in terms of study variables

Variable	Test	Outpatient costs	In-patient costs	Total costs
Age	Chi-Square	3.396	7.717	3.238
	Df	4.000	4.000	4.000
	Asymp. Sig.	0.519	0.103	0.494
Gender	Mann-Whitney U	16889.500	18296.000	16492.000
	Wilcoxon W	37595.500	39002.000	37198.000
	Z	-2.688	-20171.000	-3.302
	Asymp. Sig. (2-tailed)	0.070	0.030	0.020
Marital status	Chi-Square	0.614	0.726	0.960
	Df	2.000	2.000	2.000
	Asymp. Sig.	0.736	0.696	0.619
Place of residence	Man Whitney U	19342.000	19351.000	19282500.000
	Wilcoxon W	38845.000	40057.000	38785500.000
	Z	-665.000	-0.823	-0.617
	Asymp. Sig. (2-tailed)	0.572	-0.410	0.537
Education	Chi-Square	408.200	5.343	4.976
	Df	5.000	5.000	5.000
	Asymp. Sig.	-440.000	0.375	0.419
Type of insurance	Chi-Square	2.388	2.369	2.572
	Df	4.000	4.000	4.000
	Asymp. Sig.	0.632	0.668	0.665
Service providing center	Chi-Square	12.831	19.617	16.982
	Df	5.000	5.000	5.000
	Asymp. Sig.	0.250	0.010	0.050

Costs in urban and rural areas showed an insignificant difference ( $p < 0.05$ ). Cost data were ranked in more than two samples. Therefore, non-parametric Kruskal-Wallis test was used for comparison. In terms of education groups, costs showed no significant differences ( $p < 0.05$ ). This also applied to insurance groups and no significant difference was found in costs ( $p < 0.05$ ). However, in terms of service providing centers, costs showed a significant difference between groups ( $p > 0.05$ ).

#### 4. DISCUSSION

In the present study, the highest mean outpatient healthcare costs related to the over 80-year-old group and the lowest to the 70- to 74-year-old group. The highest mean costs of in-patient services also related to the 70- to 74-year-old group and the lowest to the over-80-year-old group. There was no significant difference in costs among age groups. The main reason for the high costs of outpatient services in the over-80-year-old group can be attributed to factors such as more vulnerability compared to early years of seniority and higher risks of weakness and fatigue in this age group. Moreover, this group normally prefers not to be hospitalized (Babakhani, 2006; Mohagheghi *et al.*, 2008). In studies by Shojaee 2005-2006, the highest healthcare cost was

found in the over 60 years age group (nearly 37% of total costs), which confirms high costs in this age group and mean cost of each time hospitalization in this group was higher than the overall mean, equaling 4634384 IRR (Shojaee *et al.*, 2011). A study in 2007 revealed healthcare costs in the over 65 years age group was 5 times as much as the total healthcare costs in the less than 65 years age group (Jenson, 2007). Results of these two studies are in line with those found in the present study.

In the present study, mean healthcare costs, including outpatient, in-patient and total costs were higher in men than in women and there was a significant difference in costs between the gender groups. A study by Pur Reza *et al.* (2007) on the cost and illness pattern in elderly in-patients covered by healthcare insurance in Damghan city showed mean costs of in-patient cases were 1367687 and 1460426 IRR for every woman and man, respectively.

In the present study, the highest outpatient service cost was in singles and the lowest in married people. The highest mean in-patient costs were in married people and the lowest in widowed/divorced people. Also, the relationship between costs and marital status was insignificant, despite the group that has never been married is more exposed to diseases and resulting costs due to the subsequent stresses of loneliness.

In the present study, mean outpatient, in-patient and total costs was higher in the elderly living in rural areas compared to those in urban areas. However, the difference in costs between rural and urban areas was not significant, which disagrees with results of other studies. 63.6% of the elderly people live in urban areas and 35.4% in rural areas (Asefzadeh *et al.*, 2009). In the study by Pur Reza *et al.* (2007) rural elderly were hospitalized 21% less than those in urban areas. It appears that with the commencement of the rural health insurance plan, people in rural areas have better access to healthcare and consequently, they incur higher costs than the elderly in urban areas.

In the present study, the highest mean elderly outpatient service costs was in those with primary school 2 education level and the lowest in those with university education. The highest mean elderly in-patient costs was in illiterate people and the lowest in those with middle school, high school and university education. There was no significant difference in costs between gender groups.

In this study, the highest mean elderly outpatient service costs were in other insurance category and the lowest was in the Aide Committee insurance. The highest mean elderly in-patient costs were in other insurance category and the lowest in social welfare insurance. Also, no significant difference was found in costs. Zilochi *et al.* (2011) study investigating elderly in-patient pattern of service use in Kashan city in 2010, it was found that in terms of insurance cover, 62% of the elderly were covered by the social welfare organization and 27% were covered by health service insurance. High healthcare costs in the 60-year-olds and older groups will lead to higher expenditure by the insurance organizations. The population's aging trend confirms that insurance organizations must be ready for better management of resources.

The highest mean elderly healthcare costs in this study were associated with outpatient services. This was due to the preference of the elderly to be less hospitalized and receive services as out-patients. Pur Reza *et al.* (2007) study showed the highest costs in elderly subjects were associated with non-surgical services. Compared to other age groups, in terms of the in-patients costs, the elderly are at the top and paid the highest costs for hospital services.

In the present study, the highest mean costs of the elderly outpatient services, in-patient and total costs of services were in centers affiliated to the university and the lowest were in centers affiliated to the government. Given that a high proportion of the rural and urban population refer to governmental hospitals and also due to the lack of private hospitals in this province, the

highest costs are related to the university affiliated government centers.

#### 4.1. Limitations

Our research was a new subject, with limited resources. Considering the lack of research in this area, inadequate cooperation of a number of the elderly was due to amnesia was one of the limitations of the study. The results from our study on Status of the elderly healthcare costs in North Khorasan Province may not be expanded to other Province in Iran. Our study results are generated from on Status of the elderly healthcare costs in North Khorasan; therefore, the generalization of the results to the other Province in Iran should be done cautiously. Similar studies in other parts of the country might improve the generalizability of this study.

### 5. CONCLUSION

Given the results obtained, mean burden of elderly healthcare costs is high in the North Khorasan province, particularly so in the male gender. Outpatient service costs are higher than in-patient costs. Also, the highest elderly healthcare cost is incurred by those with no spouse. These costs are higher in the elderly living in rural areas than those in urban areas. Also, illiterate elderly incur higher mean healthcare costs. There was a significant relationship between gender and service providing center. Considering growth of the elderly population and the financial burden of diseases on them and high costs of healthcare services in this group, it is necessary for the decision makers and policy makers in this area to predict and implement necessary plans in order to minimize future challenges associated with the elderly healthcare and to have a healthy elderly population.

Inadequate cooperation of a number of the elderly was due to amnesia was one of the limitations of the study. This was compensated by using information obtained from their first degree relatives, hospital notes and insurance papers.

Given the increasing elderly population in Iran and also, their high healthcare service costs and vulnerability of this group in the society, the following strategies are recommended:

- Providing grounds for more elderly access to healthcare services in rural and urban areas, especially by activating family physician program
- Providing adequate information for the elderly through mass media, empowering them with respect healthcare plans and encouraging the media for

fuller coverage of the elderly health issues and making the elderly and their family more sensitive to these issues

- Training more specialists in geriatric medicine and expanding health and welfare care of the elderly population.
- Policy makers' planning for and supporting the elderly and up-to-date and continuous revisions of elderly healthcare policies and national and local programs
- Conducting applied research into the costs associated with elderly health
- Implementation of health promotion and prevention of chronic diseases
- Involvement of the elderly in the process of design and development of self-care programs
- Empowering and providing knowledge and skills needed by the elderly for self-care and promoting their own health in the family and society, at an extensive level
- Enhancing capacity and desire of the families to take care of and support the elderly
- Encouraging governmental and non-governmental and volunteer organizations to play their roles in providing health care and social care for the elderly
- Forecasting costs, budgets and necessary infrastructures for caring for the elderly
- Providing encouragement, training and skills for the young and middle-aged to care for themselves when they are old and to prevent risk factors of chronic diseases
- Informing the elderly of factors influencing their health promotion
- Attending to the role of the elderly in benefiting other family members, the society and country
- Supporting research, investigations, studies and skills in various areas of the elderly, family and community health

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