# Investigating the status of successful aging based on selection, optimization and compensation model and its relationship with some demographic variables in elderly population of Shiraz, southwest of Iran, 2018



***Investigación del estado del envejecimiento exitoso basado en el modelo de selección, optimización y compensación y su relación con algunas variables demográficas en la población anciana de Shiraz, suroeste de Irán, 2018***

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**Abstract**

**Introduction and Objectives**: Increasing growth of the elderly population in many developed countries has drawn attention of researchers to this age group. Thus, one of the goals of community-based health studies has always been maintaining high quality of life at old age and helping the elderly people to have a successful aging, and this will not be possible without a proper understanding of the status of the elderly people in community. The objective of this study was to investigate the status of successful aging based on Selection, Optimization and Compensation Model and its relationship with some demographic variables in the elderly population in Shiraz-Iran.

**Materials and Methods**: In a cross-sectional study, 197 eligible elderly people were selected by multistage cluster sampling from four districts of Shiraz in 2018. To collect the data, the short version (12 items) of the HYPERLINK "https://www.frontiersin.org/articles/10.3389/fpsyg.2018.00410/full" \l "B4" Baltes & Baltes (1999) Selection, Optimization and Compensation Questionnaire (SOC) and Demographic Questionnaire were used. Data were analyzed through SPSS 16 software and Spearman, Mann-Whitney, and Kruskal-Wallis tests.

**Results**: a total of 99 males (55.3%) and 80 females (44.7%) aged 60 to 97 years with a mean age of 72.4 ± 8.70 years participated in this study. Mean and standard deviation of successful aging score was 6.58 ± 3.42 [Min = 0 and Max = 12]. Based on the results, gender had no significant correlation with the mean score of successful aging and its dimensions (P value >0.05).

**Discussion**: However, the age variable was inversely correlated with the compensation strategy (P value = 0.048). Level of education showed a direct and significant correlation with the mean scores of all three dimensions of successful aging (selection, optimization and compensation strategies) (P value = 0.0001). Based on the results, there was an inverse and significant correlation between marital status and mean score of optimization and compensation (P value = 0.008). The number of children was also significantly correlated with change-based selection and overall successful aging (P value = 0.007 and P value = 0.043; respectively).

**Conclusion**: Based on the results, the studied elderly people accounted for more than half of the score of successful aging. Successful aging scores were significantly correlated with variables such as age, level of education, marital status, and number of children. Hence, it is recommended to pay more attention to these variables in future research and planning.

**Keywords**: Old age, Successful Aging, Selection, Optimization, and Compensation

## Resumen

**Introducción y objetivos**: el crecimiento creciente de la población de edad avanzada en muchos países desarrollados ha llamado la atención de los investigadores sobre este grupo de edad. Por lo tanto, uno de los objetivos de los estudios de salud basados en la comunidad siempre ha sido mantener una alta calidad de vida en la vejez y ayudar a las personas mayores a tener un envejecimiento exitoso, y esto no será posible sin una comprensión adecuada del estado de las personas mayores personas en comunidad. El objetivo de este estudio fue investigar el estado del envejecimiento exitoso basado en el Modelo de Selección, Optimización y Compensación y su relación con algunas variables demográficas en la población de ancianos en Shiraz-Irán.

**Materiales y métodos**: en un estudio transversal, se seleccionaron 197 personas mayores elegibles mediante muestreo por conglomerados en varias etapas de cuatro distritos de Shiraz en 2018. Para recopilar los datos, la versión corta (12 artículos) de la Selección Baltes & Baltes (1999), Se utilizaron el cuestionario de optimización y compensación (SOC) y el cuestionario demográfico. Los datos se analizaron mediante el software SPSS 16 y las pruebas de Spearman, Mann-Whitney y Kruskal-Wallis.

**Resultados**: un total de 99 hombres (55,3%) y 80 mujeres (44,7%) de 60 a 97 años con una edad media de 72,4±8,70 años participaron en este estudio. La media y la desviación estándar del puntaje de envejecimiento exitoso fue de 6.58±3.42 [Min=0 y Max=12]. Según los resultados, el género no tuvo una correlación significativa con la puntuación media del envejecimiento exitoso y sus dimensiones (valor de P>0.05).

**Discusión**: Sin embargo, la variable edad se correlacionó inversamente con la estrategia de compensación (valor P=0.048). El nivel de educación mostró una correlación directa y significativa con las puntuaciones medias de las tres dimensiones del envejecimiento exitoso (estrategias de selección, optimización y compensación) (valor de p=0,0001). Según los resultados, hubo una correlación inversa y significativa entre el estado civil y la puntuación media de optimización y compensación (valor de p=0,008). El número de niños también se correlacionó significativamente con la selección basada en el cambio y el envejecimiento general exitoso (valor de P=0.007 y valor de P=0.043; respectivamente).

**Conclusión**: Según los resultados, las personas mayores estudiadas representaron más de la mitad del puntaje de envejecimiento exitoso. Las puntuaciones de envejecimiento exitosas se correlacionaron significativamente con variables como la edad, el nivel de educación, el estado civil y el número de hijos. Por lo tanto, se recomienda prestar más atención a estas variables en futuras investigaciones y planificación.


**Palabras clave**: Vejez, Envejecimiento exitoso, Selección, Optimización y Compensación.

## Introduction

According to the 2016 census in Iran, the number of people aged 60 years and over was 7414091 (9.28% of the Iranian population)[1]. It is estimated this figure to double by 2030. It means that as the population of Iran doubles over an 11-year period, the number of elderly populations aged over 65 years will increase 6 times[2]. The impact of this large group of elderly people on the Iranian health system deserves careful analysis. One of the major challenges of aging studies is to maintain the quality of life despite the aging-related deficiencies[3]. The dominant attitude toward aging is focused on the deficiencies, reduced performance, and the disabilities associated with aging. However, an ideal successful aging has psychosocial dimensions that are not associated much with physical condition and they are learned and acquired. The focus of this view is on the strengths of the elderly people, enhancing their self-efficacy, and promoting their quality of aging[4]. Based on the results of some studies, demographic characteristics such as age are associated with some indicators of successful aging such as well-being and health-related quality of life[5,6]. Level of education, marital status, and number of children are factors influencing the quality of life and well-being at old age, but there are contradictions on this relationship[7-9].



### Successful aging

Despite rich literature on the concept of successful aging and its dimensions, there is no consensus on a comprehensive definition of successful aging[5-7]. Havighurst (1963) introduced the concept of “successful aging” for the first time[10], and then, Rowe and Kahn (1997) and Baltes and Baltes (1990) expanded this concept[11,12]. To show how elderly people succeed in adapting to aging, Paul Baltes and Margret Baltes (1990) proposed a successful aging model or selection, optimization and compensation model[12]. They believe that successful aging is an individual evolution with three main strategies of selection, optimization and compensation. These three key processes are essential for the evolution of successful aging. Successful aging involves selecting the functional areas based on one’s available resources, optimizing evolutionary potential (maximizing profit) and compensating the losses[11-14]. In other words, by using the strategies of selection, optimization, and compensation model, maintaining performance and minimizing of loss during aging are guaranteed. The underlying assumption of this model is that people are exposed to a number of specific opportunities (such as education) and certain limitations in resources and capabilities (such as illness) during their life that they can cope with and overcome them through three strategies of selection, optimization, and compensation[15]. The successful aging model of Baltes and Baltes (1990) considers successful aging process as an appropriate, creative and individual

combination of selection, optimization and compensation strategies[16]. The reason for choosing this model is that it considers successful aging as an evolutionary nature and deals with the psychological aspects of successful aging. Successful aging enhances the quality of life in elderly people. A review of existing studies revealed that there is no accurate information on the status of successful aging in Iran. Hence, the present study was conducted to investigate the status of successful aging in Iran and its relationship with some demographic characteristics.

## Materials and methods

The present study was a descriptive-analytical study. The study population included elderly people aged over 60 years living in Shiraz. In this study, 179 elderly people aged 60-97 years were studied. Due to the lack of a similar study, 153 samples were first collected as pilot. Considering the accuracy of 0.5 and the significance level of 0.05, standard deviation of the pilot sample was obtained at 3.41 and the final sample size was estimated at 179 people using the following formula:

**Sample size determination formula**

Sampling was performed through random multistage cluster sampling. Accordingly, Shiraz was divided into 4 districts and each district was subdivided into 4 regions. One park and one clinic were randomly selected from each region. The reason for the selection of parks and clinics was the results of a field study that showed that elderly people spend most of their time in parks and clinics. The researcher referred to each of the mentioned locations in morning and evening. Sampling was performed in parks and clinics using a convenience sampling method. Before starting the study, the objective of the study was explained for the subjects. Participation in the study was also voluntary. The participants were ensured that their information would remain completely anonymous and confidential. Then, their informed consent was obtained. The research inclusion criteria were: 1- Age above 60 years, 2- Willingness to participate in the study, 3- Having the skill of reading and writing in Persian. The research exclusion criterion also included any of mental and cognitive disabilities.

Data collection tools included Demographic Information Questionnaire and short form of Selection, Optimization and Compensation Questionnaire. First, demographic information questionnaire including demographic information of gender, age, marital status, level of education, and number of children were completed by researcher assistant. The short form of Selection, Optimization and Compensation Questionnaire was used to measure the mean score of successful aging. The selection component is divided into two sub-components of preference-based selection and change-based selection. The short form of Selection, Optimization and Compensation Questionnaire developed by Baltes and Baltes (1999) was used to measure the mean score of successful aging. It has 12 items, 3 items of which are related to preference-based selection, 3 are related to change-based selection, 3 are related to optimization and 3 are related compensation[17].

Each item consists of two propositions. The first proposition is behavioral proposition that represents selection, optimization, or compensation strategies and other proposition is unrelated to these strategies. The related proposition receives a score of 1 and the irrelevant proposition receives a score of zero. The range of scores in each component is from 0 to 3 and the total score for whole questionnaire is between 0 and 12. Higher scores indicate higher levels of selection, optimization and compensation. The face, content, construct validities and the reliability coefficients of the questionnaire have been examined in Iran by Agilar Vafaei et al (2016)[18]. The face and content validities of this questionnaire were measured and evaluated at appropriate level. Cronbach's alpha was obtained at 0.64 for the whole scale and 0.63, 0.68, and 0.69, respectively, for the selection, optimization and compensation components[17]. The construct validity of this questionnaire was also measured by confirmatory factor analysis and its four-factor structure was confirmed. The test retest reliability with a four-week interval for this questionnaire was obtained at acceptable level (r=0.74-0.82)[19]. Internal reliability coefficients (Cronbach's alpha) for selection, optimization, and compensation were obtained at 0.60, 0.61, and 0.65, respectively[17]. The questions were read orally by the tester and the elderly people's responses were written accurately and completely.

**Statistical Analysis**

The Kolmogorov-Smirnov test did not show normal distribution data. Therefore, nonparametric tests such as Spearman, Mann-Whitney and Kruskal-Wallis tests were used for data analysis. Data were analyzed through SPSS version 16 software and the significance level was considered at the level of 0.05.

## Results

A total of 179 participants (99 males and 80 females) aged 60-97 years with a mean age of 72.46 years participated in the first stage of the study. More than 55% of the participants were male. 60.4% of the participants were married and 70.4% had high school diploma and lower level of education. The number of children varied from 0 to 11. (Table 1) illustrates the demographic information of the participants (age, gender, level of education and marital status).

The mean and standard deviation of selection, optimization and compensation components are presented in (Table 2).

(Table 3) presents the relationship between some demographic characteristics including age, gender, level of education, marital status and number of children and selection, and compensation components.

According to the results, gender had no significant correlation with mean score of selection, optimization and compensation (P -value >0.05). However, the age variable had a significant and inverse correlation with the compensation strategy. It means that the mean score of compensation decreases significantly with increasing age (P- value=0.048).

Level of education had a direct and significant correlation with the mean scores of all three strategies: selection, optimization, and compensation strategies (P-value= 0.0001) (Table 3). (Table 4) presents the mean score of selection, optimization and compensation based on the level of education. According to the results, the mean score of selection (preference-selection and change-based selection) and optimization was significantly higher in elderly people with an academic level of education compared to illiterate elderly people.

Based on the results, there was an inverse and significant relationship between marital status and mean score of optimization and compensation (P-value=0.008) (Table 3). Single elderly people had the highest mean score and widowed elderly people had the lowest mean score in selection, optimization, and compensation strategies and overall aging score. The mean score of successful aging and the mean score of optimization in the widowed elderly people were significantly different from those of the other elderly people (Table 5).



**Table 1. Demographic information of the studied elderly population in the first quantitative stage**

| Variable | SD ±(Median) Mean | N (%) |
|---|---|---|
| Age (year) | 70.8±46.72 | |
| Gender | Male | (3.55) 99 |
| | Female | (7.44) 80 |
| Marital status | Single | (1.6) 11 |
| | Married | (4.60) 108 |
| | Widowed | (5.33) 60 |
| Level of education | Illiterate | (4.13) 24 |
| | High school diploma and lower | (4.70) 126 |
| | Academic | (2.16) 29 |
| Number of children | 47.2±5 | |

**Table 2. Mean and standard deviation of selection, optimization and compensation strategies in the studied elderly population**

| Components | Minimum score | Maximum score | Mean | SD |
|---|---|---|---|---|
| Preferences-based selection | 0 | 3 | 1.67 | 1.17 |
| Change-based selection | 0 | 3 | 1.64 | 1.04 |
| Optimization | 0 | 3 | 1.63 | 1.23 |
| Compensation | 0 | 3 | 1.64 | 1.09 |
| Total score | 0 | 12 | 6.58 | 3.42 |

**Table 3. Relationship between demographic characteristics and mean score of selection, optimization, and compensation in the studied elderly population**

| | Preference-based selection | Change-based selection | Optimization | Compensation | Total successful aging score |
|---|---|---|---|---|---|
| Age | 136.0- | 145.0- | 108.0- | *148.0- | *168.0- |
| Gender | 006.0 | 040.0- | 020.0 | 008.0- | 002.0- |
| Level of education | **253.0 | **250.0 | **280.0 | *210.0 | **333.0 |
| Marital status | 105.0- | 119.0- | **236.0- | *155.0- | **197.0- |
| Number of children | 102.0- | **200.0- | 058.0- | 080.0- | *151.0- |

** Significant at the level of 0.01 (bidirectional). * Significant at the level of 0.05 level (bidirectional)

**Table 4. Mean score of selection, optimization, and compensation based on level of education in the studied elderly people**

| | Illiterate | Diploma and lower | Academic | Chi-square | p-value |
|---|---|---|---|---|---|
| preference-selection | 72.15 | 78.74 | 100.86 | 14.10 | *0.001 |
| change-based selection | 62.78 | 78.17 | 90.09 | 11.49 | *0.005 |
| optimization | 60.73 | 78.58 | 93.59 | 19.56 | *0.000 |
| compensation | 64.90 | 77.1 | 90.82 | 7.94 | *0.013 |
| Total successful aging score | 69.04 | 90.77 | 119.79 | 30.287 | *0.000 |

* Significance at the level of 0.5

**Table 5. Mean score of selection, optimization and, compensation based on marital status of the studied elderly population**

| | Single | Married | Widowed | Chi-square | p-value |
|---|---|---|---|---|---|
| preference-selection | 112.14 | 90.75 | 86.60 | 2.892 | 235.0 |
| change-based selection | 96.64 | 94.07 | 81.46 | 2.667 | 264.0 |
| optimization | 116.64 | 95.65 | 74.95 | 10.068 | 007.0* |
| compensation | 93.82 | 96.16 | 78.22 | 5.017 | 081.0 |
| Total successful aging score | 112.45 | 95.00 | 76.89 | 6.975 | 031.0* |
| * Significance at the level of 0.5 | | | | | |

The objective of this study was to investigate the status of successful aging and its relationship with some demographic characteristics in the elderly population of Shiraz. There are different models and theories about successful aging. The well-known model of Rowe and Kahn defines successful aging as avoiding illness and disability, maintaining the highest level of physical and cognitive function, and active involvement in life events[20]. However, there are very few successful elderly people based on high functional criteria of this model[13]. According to Strabridge et al, 50.3% of elderly people 65 to 99 years old in the United States believed that they are successful, while only 18.8% of them considered themselves successful according to Rowe and Kahn model criteria[21]. Modern theories, such as Baltes and Baltes, consider successful aging as an individual evolution with three main components of selection, optimization, and compensation.

Accordingly, successful aging involves selecting the functional areas according to one's available resources, optimizing evolutionary potential (maximizing profit), and compensating of losses. According to this model, the definition of successful aging should include objective and subjective criteria and recognize cultural areas[13]. The status of successful aging in Iran was not clear due to the lack of necessary findings. Hence, the comparison of successful aging in Iran with other developed countries should be performed with caution. The results revealed that preference-based selection had the highest mean score among the studied elderly people and they obtained more than half of the mean score of successful aging. Based on the results of the study conducted by Freund and Baltes (2002), preference-based selection was the only component that increased in the elderly people compared to the middle-aged people[19]. The results revealed that age was a determining factor for successful aging, meaning that within the population bracket studied older people use less compensatory strategies than younger ones to cope with the deficiencies of aging. Compensation strategy generally reflects the ability to access and use various resources to compensate a reduction in performance due to aging. This ability decreases with increasing age. Previous studies have confirmed this issue. According to the study conducted by Freund and Baltes (1999), the use of compensation strategies decreases with increasing age[22]. Review of existing studies showed that the elderly people had the lowest quality of life in social-related factors[5,8].

Age has also been identified as an influencing factor in health and well-being[6]. It seems that with increasing age, in addition to a reduction in physical efficiency, the cognitive status of the elderly people also decreases. Reduced cognitive status is an important factor with regard to the level of independence in decision-making and quality of life in elderly people. Lack of physical and mental ability reduces the chances of compensations in the elderly people. The results revealed that the mean score of compensation and the total score of the successful aging were significantly lower in the elderly people compared to younger ones. Gender did not show a significant relationship with successful aging and its dimensions. Review of existing studies showed that health-related quality of life was not significantly associated with gender of the elderly people[8]. Level of education was significantly correlated with the mean score of successful aging in all four components and total score of successful aging. Existing studies show that well-being in elderly people with a higher level of education is significantly higher than that of elderly people with a lower level of education[7,8]. Education increases the opportunities for selecting the options available. On the other hand, more educated elderly people are better able to optimize their existing opportunities or, if necessary, adapt to existing conditions. Elderly people with higher level of education are able to compensate their disabilities more successfully than illiterate ones. Thus, it seems that education to be a determinant of successful aging in the elderly people. Marital status was found to be inversely correlated with successful aging, meaning that single elderly people had significantly higher scores in optimization and compensation components and overall successful aging score than married ones. This result is inconsistent with that of the study conducted by Arias-Merino et al (2012). In the above-mentioned study, married elderly people achieved a higher score of successful aging than single ones[23]. These differences might be attributed to differences in sample size, sampling method, and cultural and ethnic differences. The present study was conducted on elderly people in one city, while Arias-Merino examined elderly people in two cities in western Mexico with

a larger sample size. Based on Iranian-Islamic culture and beliefs, married men and women, despite having marital problems, are obliged to continue living and this issue can reduce marital satisfaction in some couples.

Existing studies emphasize the relationship between marital satisfaction and well-being and health outcomes at high ages. Accordingly, marital problems are one of the most important predictors in reducing health outcomes in the elderly people[24]. In another study, despite the importance of marital life satisfaction on the health and well-being of the elderly people, psychological and social factors had a determining role in marital satisfaction, emotional loneliness and helplessness in the elderly people. The researchers concluded that health and well-being in the elderly people are more influenced by psychological resilience and marital problems[25]. Also, the results of a longitudinal study revealed that poor marital quality of life has exacerbated feeling of loneliness over the next two years[26]. In contrast, results of other study revealed that married elderly people achieved higher scores in the aging criteria, while marital status in middle-aged people was associated with more stresses[27]. The results of Hazrati et al.'s (2017) study showed that 68.9% of couples are emotionally abused in their marital relationship[28]. It may be concluded that the quality of marital life and satisfactory relationship with spouse have a more important role in the successful aging and health of the elderly people. Further studies are required in this regard.

## Conclusions

Studies show that having a contact with adult children increases life satisfaction at old age[27]. In the present study, the number of children was significantly correlated with the total score of successful aging and change-based selection strategy, meaning that with increasing the number of children, the overall score of successful aging increased. Previous studies conducted on different cultures have reported conflicting information about the relationship between number of children and marital satisfaction[28,29].

The cause of these inconsistent results might be attributed to cultural differences of different communities[30]. The results of the present study also showed that higher number of children is associated limited use of change-based selection strategies. A change-based selection strategy indicates the ability to adjust existing needs based on resources and facilities. In fact, this strategy indicates the ability to allocate scarce energy to the most important goals and needs, which is one of the important criteria for successful aging[14]. Having more children seems to take more energy from parents due to their involvement in the children affairs and reduce their concentration and organizing power to meet their basic needs.

Limitations and Recommendations: One of the limitations of this study was relying on the memory of the studied elderly people to complete a demographic questionnaire, which increases the probability of bias and reduces the accuracy of the study, due to reduction in normal function of memory resulting from aging in some elderly people. To address this threat, it was attempted to devote more time to remembering older people's memories. Longitudinal studies with larger sample size are needed on discovering the relationship of demographic factors with successful aging and predictors of successful aging in different cultures, especially Iran.

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