


# A Model of Aging Perception in Iranian Elders With Effects of Hope, Life Satisfaction, and Socioeconomic Status: A Path Analysis

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## Abstract

**BACKGROUND:** Aging perception plays a central role in the experience of healthy aging by older people. Research identified that factors such as hope, life satisfaction, and socioeconomic status influence the perception of aging in older populations. **OBJECTIVE:** This study sought to test a hypothetical model to quantitatively evaluate the relationship between hope, life satisfaction, and socioeconomic status with aging perception. **DESIGN:** A cross-sectional design was used with 504 older aged participants who live in Qazvin, Iran. Data were collected using the Barker's Aging Perception Questionnaire, Life Satisfaction Index-Z, and Herth Hope Index. **RESULTS:** The results of path analysis showed that hope was the most important factor affecting aging perception. Results drawn from correlation analysis indicated that there was a positive significant correlation ( $r = .383, p < .001$ ) between hope and aging perception. Further analysis found that hope had the strongest impact on aging perception compared with the other variables analyzed (e.g., life satisfaction and socioeconomic status). **CONCLUSIONS:** A model of aging perception in Iranian elders is presented. The findings suggested that hope had a significant and positive impact on aging perception. Implications for clinical practice and research are discussed.

## Keywords

aging perception, hope, life satisfaction, socioeconomic status, elder, path analysis

## Introduction

The World Health Organization (2015) projects that the world's population of adults above the age of 65 years is estimated to grow from 524 million in 2010 to 2 billion in 2050. In fact, this older population is expected to nearly double from 12% to 22%. In Iran, it is estimated that the number of elders over the age of 60 years is currently 5.1 million, which comprises 7.3% of the whole population. This number is also expected to increase (Jadidi, Farahaninia, Janmohammadi, & Haghani, 2011). According to the United Nations, an aging population is defined as a population with more than 7% of people over the age of 60 years. Thus, it seems detrimental and necessary to prospectively plan for an aging population in Iran in order to best meet the unique needs of this target population (Fernández-Ballesteros et al., 2013).

Aging is an inevitable process for all human beings. Individuals' perception of aging (physiological, mental, and social) have been found to be influenced by various

variables including gender, cultural context, quality of life, existential experiences, and socioeconomic. Aging Perception (AP) is a subjective, biological phenomenon that involves complex dynamic processes that influence an individual's physiological and psychological reality

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(Ifitkhar & Mohyuddin, 2014). Two distinct dimensions of AP have been discussed in the literature—positive perceptions (e.g., where individuals consider aging to be a time of ongoing personal growth and development) and negative perceptions of aging (e.g., where individuals consider aging to be a time of physical decline) as illustrated by Sexton, King-Kallimanis, Morgan, and McGee (2014).

Relationships between positive self-perceptions of aging and psychological health consequences like life satisfaction have been widely reported and recognized in the literature (Barker, O'Hanlon, McGee, Hickey, & Conroy, 2007). Positive AP has been found to positively influence life satisfaction as well as an individual's ability to cope with the many and varied challenges that present with older age (Sadegh Moghadam et al., 2016; Yaghoobzadeh et al., 2017). A positive perception of aging has been associated with improved mental health, decreased mortality rates, and increased general well-being. People who report positive AP are also more likely to report a better quality of life.

The concept of healthy aging, and what influences this construct, has been a focus in academic fields interested in *gerontology* (e.g., nursing, psychology, medicine, social work) (Officer et al., 2016). Given that AP plays a fundamental role in healthy aging (Zanjari, Sharifian Sani, Hosseini Chavoshi, Rafiey, & Mohammadi Shahboulaghi, 2016), understanding the factors that affect it has important implications for professionals that work with older populations (Sadegh Moghadam et al., 2016). The field of gerontological nursing in particular has emphasized the importance of positive AP for healthy aging (Buys, Aird, & Miller, 2012). Studies that have been conducted in this area have identified a broad range of factors affecting AP, which include hearing (Gygi & Shafiro, 2013; Musaiger, D'Souza, & Al-Roomi, 2013), the use of religion as a coping strategy (Heydari-Fard, Bagheri-Nesami, Shirvani, & Mohammadpour, 2014), sociability (Buys et al., 2012; Heydari-Fard et al., 2014), perceived aging discrimination (Han & Richardson, 2015), the presence of physical pain (Buys et al., 2012), gender (Musaiger et al., 2013), and the ability to pursue lifelong learning (Fernández-Ballesteros et al., 2013).

Among the factors found to affect AP, an individual's hopefulness is argued to be the most influential (Bergin & Walsh, 2005). Erikson's theory of development suggests that hope develops in infancy provided that sufficient care and nurturing is provided by caregivers (Erikson, Erikson, & Kivnick, 1994). Bergin and Walsh (2005) suggest that hope is defined by dichotomous conceptualizations that include adaptive hope (e.g., hope as a productive coping skill) and maladaptive hope (e.g., hope as a non-productive coping skill).

Recently, researchers have been interested in the concept of hope among elderly populations (Gunzelmann, Beutel, Kliem, & Brahler, 2016; Haugan, Utvaer, & Moksnes, 2013). The nurse-patient interaction, in particular, has been found to influence hope in patients who have unimpaired cognitive functioning (Haugan, Moksnes, & Espnes, 2013). This positive nurse-patient relationship has been found to enhance the self-worth of elders, which has been associated with increased life satisfaction (Haugan, 2014). Hope has been identified as an important factor that may inspire the elderly to maintain their overall health, especially those who are searching for new love (Warren-Jeanpiere, Dillaway, Hamilton, Young, & Goparaju, 2014).

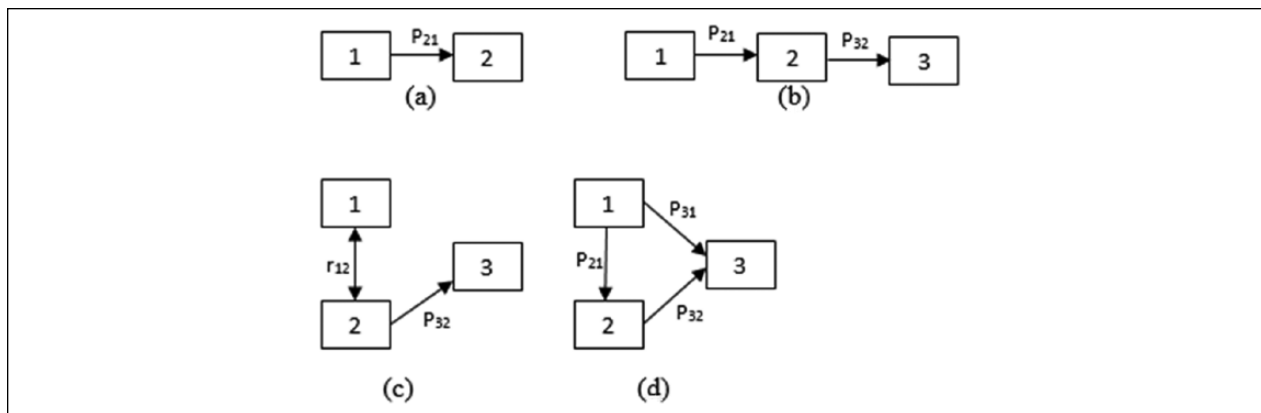
A substantial portion of the peer-reviewed literature also describes the influence of life satisfaction and socioeconomic status on AP (Kalfoss, 2017; Kunna, San Sebastian, & Williams, 2017; Park, Kim, & Park, 2014). Such findings suggest that the level of life satisfaction diminishes in the elderly if they are facing economic hardship. An outcome of this interaction is that AP is also reduced (Kolosnitsyna, Khorkina, & Dorzhiev, 2017). More research is needed to investigate how life satisfaction and socioeconomic status affect AP directly (Sadegh Moghadam et al., 2016).

AP is affected by multiple variables; however, hope, life satisfaction, and socioeconomic status have had a particularly strong focus in the literature (Nilsson, Sarvimaki, & Ekman, 2000; Sadegh Moghadam et al., 2016). Understanding and identifying the relationship between these three factors will help nurses and other health care providers to facilitate essential care to elders for their physical and mental well-being (Sadegh Moghadam et al., 2016). The purpose of the present study is to design and test a hypothetical model to evaluate the possible direct and indirect relationships between hope, life satisfaction, and socioeconomic status with aging perception.

## Method

### Data Source

In this cross-sectional study, 504 older aged participants who lived in Qazvin province were recruited from 23 health centers and clinics through a convenience sampling method between December 2015 and April 2016. The inclusion criteria for participation in the study included the following: (1) a willingness to participate in the research, (2) aged 60 years and over, (3) awareness of time and place, (4) ability to communicate, and (5) ability to respond to the questionnaire. Participants who experienced extreme stress in the past month were excluded.



**Figure 1.** (A) Direct effect. (B) Indirect effect. (C) Unanalyzed effect. (D) Spurious effect.

## Measures

The questionnaire consisted of four parts: (1) questions eliciting demographic information, (2) the Barker's Aging Perception Questionnaire, (3) Life Satisfaction Index Z, and (4) Herth Hope Index (HHI). The content validity and face validity were assessed using these questionnaires confirming validity.

*The Aging Perceptions Questionnaire (APQ)* is a multidimensional assessment questionnaire with seven dimensions, each comprising three to five items. These subscales are timeline chronic (Items 1-5), timeline cyclical (Items 27, 28, 30, 31, 32), consequences positive (Items 6, 7, 8), consequences negative (Items 16-20), control positive (Items 10, 11, 12, 14, 15), control negative (Items 21-24), and emotional representations (Items 9, 13, 25, 26, 29). An identity subscale was also included (Id1-Id17). These dimensions formed a self-evaluation scale of 32 items scored on a 5-point Likert-type scale ranging from "strongly disagree" to "strongly agree." With the exception of control negative, subscales were scored from 1 to 5. The mean score for each subscale was calculated. Higher scores were indicative of greater endorsement of a specific perception. The identity subscale examined the experience of health-related changes and consisted of 17 possible health-related changes. Participants were first asked to indicate whether they have experienced these changes over the past 10 years (1 = *Yes*, 0 = *No*). When the response was affirmative, participants were then asked whether they attribute these changes to getting older (1 = *Yes*, 0 = *No*). Scores on these subscales range from 0 to 17. The percentage of health-related changes attributed to aging was then tabulated as a proportion of the number of health-related changes experienced, which yields an identity score. Scores for identity range from 0 to 100 (Barker et al., 2007). The internal consistency reliability, using Cronbach's alpha, was .79 for the present study.

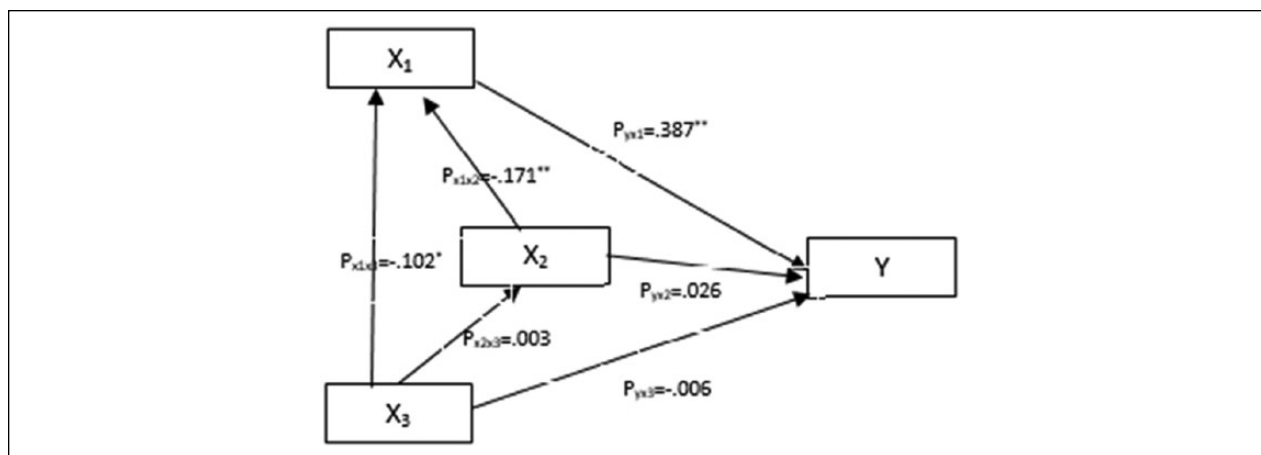
*Life Satisfaction Index Z* is a shortened version of the Life Satisfaction Index A (Neugarten, Havighurst, &

Tobin, 1961) including 13 items. The total score ranges from 0 to 26, with a higher score indicating higher overall life satisfaction (Wood, Wylie, & Sheafor, 1969). Cronbach's alpha was .78 in the present study.

The HHI is a 12-item abbreviated version of the Herth Hope Scale measuring multidimensional aspects of hope based on Dufault and Martocchio's (1985) conceptual framework of hope. It uses a 4-point Likert-type scale to access a participant's level of hope. Total HHI score range from 12 to 48 with higher scores corresponding to higher levels of hope (Herth, 1992). The HHI has been used in studies worldwide with individuals experiencing varied health conditions in both hospital and community settings. The reliability of HHI, using Cronbach's alpha, was .80 for the current study.

## Design

Path analysis was used for the present study to measure the direct influence of hope, life satisfaction, and socio-economic status on AP and to find the degree to which these variables affect AP (Wright, 1921). The most important part of path analysis is creation of the path diagram, which determines the direction of the relationship between variables. The four different effects of path analysis for the current study are Direct Effect (DE), Indirect Effect (IE), Unanalyzed Effect (UE), and Spurious effect (SE). Every correlation between variables can be identified by one of these effects. The DE of a variable is the effect that is not mediated by an intervening variable ( $r_{12} = DE = p_{21}$ ; Figure 1a) and is also equal to the correlation coefficient between two variables. The IE is the sequence of path through one or more intermediate variable ( $r_{13} = IE = p_{21} * p_{32}$ ; Figure 1b), while the UE is due to correlated causes—correlation of variables with cause of second ( $r_{13} = UE = r_{12} * p_{32}$ ; Figure 1c). An SE is the path connecting two variables but affected by two causes ( $r_{23} = DE + SE = p_{32} + p_{21} * p_{31}$ ; Figure 1d (Gorgulu, 2011)). This study used



**Figure 2.** Path diagram of model of aging perception.

DE, IE, and SE to determine the relationship between variables (Figure 2) based on the calculation of path effects provided by Şahİnler and Görgülü (2000).

Statistical Package for Social Sciences, version 21.0, for Windows (IBM SPSS Statistics for Windows, Version 21.0; IBM Corp., Armonk, NY) was used for the analyses in the study.

**Ethical Considerations**

The study was approved by Mazandaran University’s Medical Sciences Ethics Committee (IR.MAZUMS.REC.1396.10368). Participants were informed about study aims and procedures (e.g., that participation was voluntary and would not affect medical care) before signing an informed consent document. Participant confidentiality was assured by completing all study procedures in a quiet treatment area. All personal data were de-identified by assigning codes to the participants.

**Results**

Table 1 presents the demographic characteristics of participants in the study. AP for men was 155.44 (*SD* = 0.96; 95% confidence interval [CI95] = 153.53 to 157.35) compared with women, 154.20 (*SD* = 0.77; CI95 = 152.68 to 155.72). The mean age for men in the study was 69.50 (*SD* = 0.50; CI95 = 68.51 to 70.50) and for women it was 66.24 (*SD* = 0.37; CI95 = 65.51 to 66.97). Most of the participants were women (57.5%). Among the participants, 386 (76.6%) were married and 300 (59.5%) had a guidance school education level. Other descriptive statistics are presented in Table 1.

Table 2 presents the correlation matrix between variables. According to the correlation findings, the relationship between aging perception (*Y*) and hope (*X*<sub>1</sub>) was found to be statistically significant (*r* = .383, *p* < .001).

**Table 1.** Demographic Profiles of Respondents.

Variables	N (%) or Mean (SD)
Sex	
Male	214 (42.5%)
Female	290 (57.5%)
Age	66.20 (5.76)
Marital status	
Single	27 (5.4%)
Married	386 (76.6%)
Widow/divorced	91 (18.1%)
Educational status	
Illiterate	119 (23.6%)
Guidance	300 (59.5%)
Diploma	26 (8.7%)
Collegiate	29 (5.8%)
Present living place	
Personal	463 (91.9%)
Children	41 (8.1%)
Present socioeconomic status	
Poor	85 (16.9%)
Average	334 (66.3%)
Good	85 (16.9%)
Main income resources	
Personal	170 (33.7%)
Family	77 (15.3%)
Pension	257 (51%)
Relative visiting	
Sometimes	253 (50.2%)
Often	157 (31.2%)
Very much	94 (18.7%)
Emotional support	
Family	475 (94.2%)
Friends and colleagues	29 (5.8%)

There was a negative significant relationship between hope (*X*<sub>1</sub>) and satisfaction (*X*<sub>2</sub>; *r* = -.171, *p* < .001).

**Table 2.** Correlation Coefficient Table Between Factors Affecting Aging Perception.

	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	Y
Hope (X <sub>1</sub> )	1			
Life satisfaction (X <sub>2</sub> )	-0.171**	1		
Socioeconomic status (X <sub>3</sub> )	-0.102*	0.003	1	
Aging perception (Y)	0.383**	-0.040	-0.046	1

\* $p < .05$ . \*\* $p < .001$ .

In addition, there was a negative correlation between hope and socioeconomic status (X<sub>3</sub>;  $r = -.102$ ,  $p < .05$ ). There was no significant correlation between life satisfaction (X<sub>2</sub>) and socioeconomic status (X<sub>3</sub>;  $r = .003$ ,  $p > .05$ ). The correlation between socioeconomic status (X<sub>3</sub>) and aging perception (Y) was also not statistically significant ( $r = -.046$ ,  $p > .05$ ).

The pathways through which the three variables (X<sub>1</sub>, X<sub>2</sub>, and X<sub>3</sub>) operate to produce their relationships with aging perception (Y) reveal direct, indirect, and S effect.

Considering Figure 2, the effects between aging perception and independent variables could be divided into the following path equations:

$$r_{x_1y} = DE + SE = P_{yx1} + P_{x_1x_2} \cdot P_{yx2} + P_{x_1x_3} \cdot P_{yx3}$$

$$r_{x_2y} = DE + SE + SE = P_{yx1} + P_{x_1x_2} \cdot P_{yx2} + P_{x_1x_3} \cdot P_{yx3}$$

$$r_{x_3y} = DE + IE + SE = P_{yx2} + P_{x_1x_1} \cdot P_{yx1} + P_{x_2x_3} \cdot P_{yx3}$$

$$r_{x_3y} = DE + IE + IE = P_{yx3} + P_{x_2x_3} \cdot P_{yx2} + P_{x_1x_3} \cdot P_{yx1}$$

Path analysis showed that hope (X<sub>1</sub>) influences aging perception (Y) in three different pathways as direct effect, S effect arising from life satisfaction (X<sub>2</sub>), and S effect arising from socioeconomic status (X<sub>3</sub>). Direct effect hope (X<sub>1</sub>) on aging perception (Y) had the highest significant positive effect ( $p < .001$ ). The other effects were low and insignificant (Table 2).

The results of the study also found that the effect of life satisfaction (X<sub>2</sub>) on the hope (X<sub>1</sub>) is negative and significant ( $p < .001$ ; Table 3). The effect of socioeconomic status (X<sub>3</sub>) on hope (X<sub>1</sub>) is negative and significant ( $p < .05$ ). While direct effects of life satisfaction (X<sub>2</sub>) and socioeconomic status (X<sub>3</sub>) on the aging perception (Y) is significant, other effects are not significant. So there were effects of life satisfaction (X<sub>2</sub>) and socioeconomic status (X<sub>3</sub>) on hope (X<sub>1</sub>) and life satisfaction (X<sub>2</sub>) and no effect of X<sub>3</sub> on Y. Only hope (X<sub>1</sub>) has an effect on the aging perception (Y).

## Discussion

The aim of the current study was to investigate the relationship between hope, life satisfaction,

and socioeconomic status with AP. Path analysis was conducted to generate an accurate illustration about how these variables correlate with each other. The results revealed that among the three variables, hope had the highest direct effect toward AP and was statistically the most significant factor affecting AP. The study also revealed that even though life satisfaction and socioeconomic status had no significant direct effect on AP, these variables were significantly correlated to hope indirectly. This discussion will focus on (1) the influential role of hope in AP and (2) how life satisfaction and socioeconomic status contribute toward AP.

### Hope and Aging Perception

The role of hope for positive AP in older people is a major finding of the current study. It may be that hope, from an older person's perspective, helps influence a more positive mindset. For example, despite a decrease in physical ability, hope may assist an individual to believe they are still able to engage in a meaningful life. Hope may also assist with other feelings reported to be associated with growing older, such as loss, grief, loneliness, and social transformation (Danely, 2016).

Positive perceptions in the elderly seem to have a positive effect on psychological integrity (Banks, Breeze, Lessof, & Nazroo, 2006; Demakakos, Hacker, & Gjonca, 2006). Research has found that those participants who report aging as a negative experience generally report worse self-perceived health than those who report aging as a positive experience. Thus, increasing positive AP could be considered to help improve the mental and physical health behaviors of older people. Therefore, interventions aimed at increasing hopefulness in the elderly could be a mechanism by which increased positive AP and consequently better perceived health could be achieved (Camboim et al., 2017; Wolff, Warner, Ziegelmann, & Wurm, 2014).

The findings of the present study have direct and meaningful therapeutic implications for the nurse-patient relationship (Haugan, Moksnes, et al., 2013). For nurses and other health care professionals, it may be essential to identify a patient's experiences of hopefulness to either aim to increase or maintain it. The accurate identification of the presence of hope in patients may serve as a basis for future care plans and intervention (Olsman, Leget, Onwuteaka-Philipsen, & Willems, 2014). While hope can be the result of an interplay of aspects within a person's life such as family, peers, spirituality, culture, and others (Danely, 2016), health care professionals should still be encouraged to understand the importance of hope in patient care (Haugan, 2014).

One example of an existing intervention designed to increase or maintain hope is described in the nursing

**Table 3.** Path Effects Between Factors Affecting Aging Perception.

Pathways	Effect value
<i>The relations of Hope (X<sub>1</sub>) and Aging Perception (Y)</i>	
Direct effect	0.387**
S effect arising from Life Satisfaction (X <sub>2</sub> )	-0.00445
S effect arising from Socioeconomic Status (X <sub>3</sub> )	0.000612
Error	-0.00016
Total correlation	0.383**
<i>The relations of Life Satisfaction (X<sub>2</sub>) and Aging perception (Y)</i>	
Direct effect	0.026
Indirect effect over Hope (X <sub>1</sub> )	-0.06618
S effect arising from Socioeconomic status	-0.00014
Error	0.000198
Total correlation	-0.040
<i>The relations of Socioeconomic Status (X<sub>3</sub>) and Aging Perception (Y)</i>	
Direct effect	-0.006
Indirect effect over Life Satisfaction (X <sub>2</sub> )	0.000078
Indirect effect over Hope (X <sub>1</sub> )	-0.03947
Error	-0.0006
Total correlation	-0.046

\*\*p < .01.

interventions classification (NIC) as *hope inspiration*. Hope inspiration is an intervention to enhance the belief in one's ability to initiate and sustain future change (Butcher, Bulechek, Dochterman, & Wagner, 2013). Hope inspiration involves strategies such as taking time to listen to patients with interest and recognizing and empowering individual patient strengths and abilities (Haugan, Utvaer, et al., 2013). Given the findings of the present study, it is important for health care professionals to be aware of such interventions and strategies so that they may increase and maintain hope in their therapeutic practices with patients.

### *The Influence of Life Satisfaction and Socioeconomic Status*

In this study, life satisfaction and socioeconomic status were found to have a very weak and nonsignificant positive effect on AP. However, there are significant negative indirect effects of these two variables on AP through hope. Accordingly, it is worth noticing that these two factors should receive more attention from nurses and other health care professionals who provide services to the elderly.

To date, in the literature, life satisfaction has been widely used as an indicator of successful aging (Gutierrez, Tomas, Galiana, Sancho, & Cebria, 2013). It is generally agreed that a positive relationship exists between life satisfaction and adaptive coping mechanisms, such as social support and an ability to seek professional help (Gow, Pattie, Whiteman, Whalley, & Deary, 2007; Okabayashi, Liang, Krause, Akiyama, & Sugisawa, 2004). Such coping strategies have been found to be frequently adopted by the elderly to overcome difficulties associated with aging and achieve a healthy transition during this life stage (Pinto & Neri, 2013). In the present study, the results indicated that those participants with low hope, for which particular active coping strategies were present, also reported increased life satisfaction. Therefore, it could be possible that these participants were engaging in coping strategies such as seeking social support and help from others without needing to necessarily rely on hope to cope. In other words, individuals who experienced low hope may be able to resolve challenges and difficulties by drawing on their social resources and the expertise of professionals. An implication of this finding is that it suggests that for older people, gaining a supportive social network may be chiefly important for individuals with low hope (Danoff-Burg, Prelow, & Swenson, 2004).

Past studies have supported the direct effect of socioeconomic status on AP (Jackson, Antonucci, & Gibson, 1990; Sadeh Moghadam et al., 2016); however, the present study found a very weak correlation between these two variables. Elders may feel like an economic burden to their families and caregivers (Butler, Turner, Kaye, Ruffin, & Downey, 2005; Gupta, 2000). Adult children, living expenses, and costs (e.g., children's education, treating chronic diseases associated with aging) can contribute to the financial distress of older people (Saberian, Hajiaghajani, & Gorbani, 2003). Despite the weak correlation of the present findings, evidence from the broader literature supports the notion that family members who provide emotional support and financial support to their older relatives can have a positive impact on AP in the elderly (Yaghoobzadeh et al., 2017). Future research using a larger sample size may produce a stronger correlation between financial support and AP as found in other studies with much larger participant groups. Another explanation for the present findings may be that financial issues were not a pressing concern for the elders sampled in the current study. Given that they were drawn from a hospital setting, it may be that their current health issues were more of a concern than their socioeconomic status.

The present results also showed that hope mediated the relationship between socioeconomic status and AP. This may be because individuals who are more hopeful may be more inspired to make financial-based plans and

take actions to attain their personal economic goals. Hope, given its role in the literature as an adaptive coping strategy, may also provide the psychological motivation and resilience to face financial adversity (Hong, Hodge, & Choi, 2015). Without sufficient levels of hope, older individuals who have low incomes may become overwhelmed by the associated financial challenges of growing older (e.g., paying rent or bills on limited income, or paying medical expenses). Thus, in the case of older people in care, hope may play a role in managing the negative feelings associated with medical expenses and health care costs.

### Limitations and Future Directions

This study had several limitations. First, data collection tools may have presented some challenges for the older aged participants recruited in the study. It is uncertain whether they answered truthfully or whether they had a good overall understanding of the items of the questionnaires. Future researchers should be encouraged to qualitative data to assess AP, hope, life satisfaction, and socioeconomic status to compliment the quantitative research in the field. Further studies may also consider a case study approach to shed light on perceptions of AP among the elderly.

Another limitation of the present findings is that the participant group was drawn from inhabitants of the same city; therefore, the present results cannot be generalized to a broader older adult population in Iran. Despite these shortcomings, this study provides useful information regarding the perception of aging in Iranian society, especially with a severe shortage of studies on this topic. An important finding from the study pertains to the role of hope for AP in elders, which holds merit for clinical implications for nurses and health care professionals. Future research may therefore focus on how hope can be used as an intervention to increase AP in older people and investigate how this may affect their overall physical and mental well-being.

### Conclusions

The present study aimed to evaluate a model of AP in Iranian elders. The findings supported past research and confirmed that hope had a positive and significant relationship with AP. Moreover, it was found that an individual's reported hopefulness had a direct effect on AP. Therefore, in summary, the findings of the current study have important clinical implications for patient care. It is vital that clinicians understand the key role that hope may play for an individual's perception of aging. Further research is required to evaluate the impact of hope on AP and how clinicians may work toward employing

strategies and interventions that can increase hopefulness in their patients.

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### Author Roles

AY and HSN conceived and designed the evaluation and helped draft the manuscript. AY collected the clinical data. HSN reevaluated and interpreted the clinical data. OG and SPS performed the statistical analysis. BLY, AHW, SPS, AY, and KAA revised the manuscript. All authors read and approved the final manuscript.

### Declaration of Conflicting Interests

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