

Original Article

Relationship Between Life Satisfaction and Cognitive Impairment Among the Elderly: A Cross-sectional Study

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Abstract

Introduction: Cognitive impairment (CI) is one of the serious changes that happens with aging. CI and depression are the most common disabilities and causes of decreased life satisfaction in the elderly. Therefore, the aim of this study was to investigate the relationship between life satisfaction and CI in the elderly.

Methods: This cross-sectional study was performed on 270 elderly people aged ≥ 65 years covered by community health centers in Qaimshahr, Mazandaran province. The sampling method was a two-stage cluster classification. Three validated questionnaires, including demographic information, CI, and the life satisfaction scales, were used for data collection. The collected data were analyzed using descriptive statistical tests, one-way ANOVA test, *t* test, and linear regression.

Results: The mean (standard deviation) of the age of the female and male was 74.93 (7.44) and 77.87 (8.42) years, respectively. About 60% of participants were female, 70% lived in the city, 71.90% were illiterate, and 64.10% were married. In general, 58.1% ($n=157$), 29.6% ($n=80$), and 12.2% ($n=33$) of the elderly had no/mild, moderate, and severe CI, respectively. In addition, there was a statistically significant association between age, gender, education level, marital status, place of residence, and life satisfaction and CI ($P<0.05$).

Conclusion: Our findings demonstrated that high levels of CI are associated with low levels of life satisfaction in the elderly. Therefore, identifying risk factors related to CI in this population group and providing solutions such as increasing the level of social and family support for these people can increase their level of life satisfaction.

Keywords: Life satisfaction, Cognitive impairment, Elderly



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Introduction

The trend of fast aging in communities is a considerable universal subject that poses subsequent health challenges globally (1). In 2020, there were 1 billion people aged 60 and older worldwide. It is expected that this number will reach 1.4 billion by 2030 and 2.1 billion by 2050. In addition, it is estimated that the number of people aged 80 or older will triple between 2020 and 2050 to reach 426 million people (2). Nevertheless, both developed and developing countries will face an expected rise in healthcare demand and the associated socioeconomic burden (3).

Older adults undergo both cognitive and physical changes as they get older, which can profoundly affect their quality of life. Generally, with ascending age, the incidence of chronic conditions rises, and there is a

straight association between aging and decreased ability and health (4). Cognitive impairment (CI) is one of the serious changes that occurs with aging (5). CI is a neurodegenerative disease described by a gentle but incremental absence of the ability to learn, think, and remember (6). Symptoms of CI involve sluggish problem-solving, a decline in numerical ability, and modifications in verbal ability (7). CI is now one of the main causes of dependency and disability and the seventh leading cause of death among all diseases among the world's elderly (8). It is expected that more than 100 million people will be identified with CI by 2050 (9).

The prevalence of mild CI in people over 65 years old has been reported to be between 10% and 20% (10). In 2020, more than 68 million elderly Chinese had mild CI,



dementia, or Alzheimer's (11). According to the studies, about 5%, 47.5%, and 30% of the elderly had severe, moderate, and mild CI, respectively. According to the results of this research, only 17.5% of the elderly did not have CI (12).

Factors that are related to the CI include intelligence status, education level, employment status, and socioeconomic position (13,14). Some studies have represented a higher prevalence of dementia, or CI, in male participants and residents of rural areas, whereas other studies depicted a higher prevalence in women as compared to men (7,15,16). Similar to hypertension and diabetes, non-communicable diseases enlarge the risk of CI (13). Significant differences in CI were noticed by education level, age, smoking, and risk of cardiovascular disease. In some studies, obesity has been presented to be associated with cognitive decline (17). Moreover, stroke, a history of myocardial infarction, and depression have all been found to be independently related to a higher CI prevalence (18,19). CI increases the dependence rate in people and affects their quality of life (7). Disorders such as CI and depression are the most common disabilities and causes of reduced life satisfaction in older adults (20). Life satisfaction, as a cognitive constituent of mental well-being, reverberates the equilibrium between a person's desires and her current position (21). In a study performed by Kim et al (22), participants in the high-risk dementia group demonstrated significantly more negative consequences in terms of activities of daily living, loneliness, social support, depression, and life satisfaction compared to participants who fell in the low-risk group. Studies on the elderly without dementia or CI have shown that low life satisfaction is correlated with the occurrence of dementia or CI (23,24).

As the population ages, recognizing elements that amplify health and well-being is urgent for stopping the rising surge of chronic diseases and climbing healthcare tariffs (25,26). High levels of life satisfaction are correlated with preferable health effects, including less risk of chronic disease and reduced mortality (27-29). Given the high global prevalence of CI and its serious outcomes for individuals, their families, the healthcare system, and the economy, and considering that early recognition could accumulate the public health system a calculated 7 trillion dollars in paying out on long-term medical care (30), this study aimed to evaluate the relationship between life satisfaction and CI in the elderly.

Materials and Methods

This cross-sectional study was conducted on 270 elderly people aged ≥ 65 years covered by community health centers in Qaimshahr, Mazandaran province. In this study, two-stage cluster classification was used as the sampling method. First, the research community was divided into city and village classes, and then cluster sampling was performed within each class. To cover the entire city, based on the geographical map, the city was

divided into four regions, and the urban, rural, and base health centers of each region were identified and coded. From each region, an urban center or health center and a rural center were randomly selected as the target cluster. According to the weight distribution of the population, 40% of the sample was from the rural area and 60% from the urban area. Therefore, the sample size of the urban area was 164 elderly people, and that of the rural area was 106 elderly people. In this way, the share of each selected urban center or base was 41 elderly people, and that of each selected rural center was 27 elderly people. First, the researchers referred to the selected centers in order to determine the first sample (the cluster head). Then, the first head of the cluster was determined based on the household number and address of the last vaccinated child on that day. The samples were selected from the right side of the specified address by referring to the houses in the case of healthy residents aged 65 and older who also met the condition of entering the study. The inclusion criteria were giving consent to participate in the study, being at least 65 years old, and receiving primary care at a health center in Qaimshahr. The information was obtained through questionnaires. The questionnaire was completed in the form of a face-to-face interview. Before conducting the interview, informed consent was obtained from the participants before they entered the study.

Demographic information, CI, and life satisfaction scales were used for data collection. The demographic information was composed of 5 items, including age, gender, marital status, education, and place of residence. CI was determined using the Mini-Mental State Examination (MMSE) questionnaire, which includes 10 questions. The MMSE is a well-known test of global cognitive functioning that assesses various cognitive functions, including memory, repetition, attention, short-term recall, and language (31). It consists of the date, name of the day of the week, current address of residence, name of the province of residence, place of birth, mother's name, name of the current president, previous president, the result of subtracting number three from number twenty, and the result of subtracting number three from the number obtained, respectively, toward the number zero. MMSE scoring was demonstrated by code 1 if there was a disorder and code 0 if there was no disorder. Scores 0-1, 2-5, and 6-10 indicated no CI or mild CI, moderately CI, and severe CI categories, respectively. The validity and reliability of the MMSE among Iranian older adults were perused, and the findings demonstrated good reliability ($\alpha = 0.78$) of this scale (32, 33).

The life satisfaction scale was based on the Chicago Attitude Inventory, designed by Cavan in 1994. It was used in the study after changes and corrections suggested by expert professors in this field. The questionnaire determined the satisfaction of the elderly in nine dimensions of life (health, family, friends, leisure time, job, security, religion, usefulness, and happiness). Each dimension of the questionnaire consisted of 10 questions

(N=90 questions) and was identified by answers “yes” and “no” and codes 0 and 1. Scores 0-4, 5-8, and 9-10 in each dimension indicated dissatisfaction, relative satisfaction, and high satisfaction, respectively. In the total of nine dimensions, scores 0-44, 45-65, and >65 represented dissatisfaction, relative satisfaction, and high satisfaction categories, respectively. The test-retest method was utilized to measure the reliability of this questionnaire. The questionnaire was completed by 15 elderly people in the form of a face-to-face interview. Then, after two weeks of completing the questionnaire, the same people were interviewed again. Using Cronbach’s alpha method, the correlation coefficient of the Chicago Attitude Inventory was found to be 0.82.

The collected data were analyzed using descriptive statistical tests, t-test (CI with participant’s gender and place of residence), one-way ANOVA (CI with education level, marital status, and the association between CI and life satisfaction in older adults), and linear regression (the association between CI and older adults’ age). All statistical analyses were conducted using SPSS V26 software, and a significance level of $P < 0.05$ was adopted.

Results

This study was conducted on 270 older adults aged 65 and over. The mean (SD) of the ages of the females and males was 74.93 (7.44) and 77.87 (8.42) years, respectively. Approximately 60% of the participants were female, 64.10% were married, 70% lived in the city, and 71.90% were illiterate. Other demographic characteristics of the participants are listed in Table 1. The mean (SD) score of CI in females and males was 2.59 (2.33) and 2.30 (1.44), respectively, showing moderate CI among participants. In general, 58.1% ($n=157$), 29.6% ($n=80$), and 12.2%

($n=33$) of the elderly had no/mild, moderately, and severe CI, respectively.

Regarding the relationship between CI and the participant’s gender, the findings of the t-test revealed that CI had a significant relationship with gender ($P=0.003$). In this way, the average CI of elderly females was higher than that of elderly males. Moreover, the t-test results showed that CI had a significant relationship with the place of residence ($P=0.01$), so that CI was more noticeable in the elderly living in the village. The results of the one-way ANOVA test confirmed that CI had a statistically significant relationship with the education level of the older adults ($P < 0.001$). Using the post hoc test, this difference was related to the elderly with elementary literacy levels and the elderly with different education levels. Additionally, based on the one-way ANOVA test results, a significant relationship was found between the CI of the elderly and marital status ($P=0.03$, Table 1).

Regarding the association between CI and elderly age (Table 2), the age variable of the elderly could significantly predict CI ($P < 0.001$). In the interpretation of this finding, it is suggested that with an increase of 1 SD in the age score, the CI score will increase by 0.27 SDs.

Table 3 presents the frequency distribution of elderly satisfaction in the nine dimensions of life. According to the findings, 75.2% and 73% of the elderly were highly satisfied with the religion and family dimensions, respectively. Around 84.4%, 50%, 48.9%, and 48.3% of the elderly were relatively satisfied with the friends, security, usefulness, and happiness dimensions, respectively. In addition, 60.4%, 54.8%, and 50.7% of the elderly were dissatisfied with the job, leisure time, and health dimensions, respectively.

According to the obtained results, the level of life

Table 1. Differences in CI Score by Socio-demographic Variables

Variables	Categories	CI			
		N (%)	Mean (SD)	P Value	F
Gender	Female	108 (40)	2.3 (1.44)	0.003*	5.44
	Male	162 (60)	2.9 (2.33)		
Location of residence	Urban areas	164 (60.7)	2.37 (1.67)	0.01*	4.07
	Rural areas	106 (39.3)	2.65 (2.44)		
Education	Illiterate	194 (71.9)	2.58 (2.46)	<0.001**	5.48
	Reading and writing	35 (13.0)	2.44 (1.31)		
	Primary school	26 (9.6)	0.72 (0.26)		
	Secondary school	8 (3.0)	0.70 (0.25)		
	High school	3 (1.1)	0.60 (0.15)		
	Diploma	2 (0.7)	0.58 (0.10)		
	College	2 (0.7)	0.58 (0.10)		
Marital status	Married	173 (64.1)	1.68 (2.40)	0.03**	3.00
	Single	2 (0.7)	1.50 (0.70)		
	Widowed/ Widower	79 (29.3)	2.68 (2.63)		
	Others	16 (5.9)	1.75 (2.72)		

Note. SD: Standard deviation; ANOVA: Analysis of variance; CI: Cognitive impairment; LSD: Fisher’s least significant difference. * P values reported from the t-test, ** P values reported from one-way ANOVA. A significant difference was obtained by the LSD post-hoc test.

Table 2. Linear Regression Analysis for the Association Between Age Variable With CI* in Older Adults

	B**	SE	Beta	95.0% CI	P Value
Age	0.089	0.020	0.279	0.05: 0.13	<0.001

Note. SE: Standard error; CI: Confidence interval. *Dependent Variable: Cognitive impairment, **Unstandardized Coefficients

satisfaction of 60.6% (n=164) and 22.7% (n=61) of the elderly was moderate and poor, respectively. Only 16.7% of the elderly (n=45) had good life satisfaction.

The results of one-way ANOVA (Table 4) showed that there was a significant association between CI and life satisfaction in the elderly ($P<0.001$). Based on the results of LSD's post hoc test, CI in people with poor life satisfaction was more considerable than in people with moderate and good levels of life satisfaction. Further, CI was more common in people with average life satisfaction than in people with good life satisfaction.

Discussion

The results of the present study indicated that most of the elderly had a normal cognitive state and an average level of satisfaction with their lives. Furthermore, the amount of CI in people with poor satisfaction was higher than in people with moderate and good satisfaction. On the other hand, the amount of CI was significantly related to the variables of increasing age, female gender, people with dead spouses, village residency, and illiteracy.

In the present study, most of the elderly were in the no/mild CI category. Similarly, the results of some domestic and foreign studies revealed that most of the elderly have a normal cognitive state (34–39). For example, in the study of Saw et al, only 29.9% of the elderly had cognitive dysfunction (40). Contrary to our findings, in the study of Sohrabi et al, most of the elderly residents of Shahrood nursing home had a moderate CI (41). The reason for this discrepancy may be the fact that most of the elderly in our study lived with their families.

The results of the present study demonstrated that the average CI increased significantly with age. The results of some internal and external studies also confirmed the possibility of CI with increasing age (36,38–40, 42,43). Normal cognitive status is dependent on the full functioning of different brain systems, and increasing age and progressive analytical and functional changes cause disturbances in brain function and cause cognitive problems in a person.

Based on the findings, the average CI in elderly women was significantly higher than that of elderly men. In line with our results, in the study by Rezaei Jamaloei, CI was significantly higher in elderly women in Hamedan than in men (43). Likewise, Jia et al stated that the female gender is independently associated with a higher probability of mild CI (38). In their results, Arguvanli et al mentioned female gender as one of the risk factors determining CI in the elderly in Turkey (44). Contrary to our findings, in the study conducted by Shahbazi et al, cognitive deficits were

Table 3. Frequency Distribution of the Nine Dimensions of Life Satisfaction of the Participants

Dimensions of Life Satisfaction	The Level of Life Satisfaction			
	Very Satisfied	Relatively Satisfied	Dissatisfaction	Total
	No. (%)	No. (%)	No. (%)	No. (%)
Religion	203 (75.2)	66 (24.4)	1 (0.4)	270 (100.0)
Family	197 (73.0)	61 (22.6)	12 (4.4)	270 (100.0)
Usefulness	89 (33.0)	132 (48.9)	49 (18.1)	270 (100.0)
Security	33 (12.2)	135 (50.0)	102 (38.7)	270 (100.0)
Friends	28 (10.4)	228 (84.4)	14 (5.2)	270 (100.0)
Health	24 (8.9)	109 (40.5)	137 (50.7)	270 (100.0)
Leisure time	19 (7.0)	103 (38.2)	148 (54.8)	270 (100.0)
Happiness	15 (5.2)	130 (48.3)	125 (46.5)	270 (100.0)
Job	10 (3.7)	97 (35.9)	163 (60.4)	270 (100.0)

significantly higher in the elderly men of Kahrizak nursing home in Alborz province (45). It seems that the cause of our finding is the longer life span of women, followed by the higher incidence of CI with age.

According to the findings, the average CI in widows/widowers was significantly higher than in married people. Contrary to our results, Masoumi et al mentioned the relationship between CI and marital status, emphasizing that it is more significant in married people (34). In addition, Faramarzi et al and Arguvanli et al found that living alone and being single are significantly associated with an increased risk of CI (35,44). In explaining the reason for this finding in our study, it seems that the elderly living with their family, especially their spouses, is related to the decrease in the occurrence of CI due to the increase in personal and social support.

CI had a statistically significant relationship with the place of residence, and CI was more common among the elderly living in the village. Similarly, Kounnavong et al reported that living in a rural area was significantly associated with CI (42). However, in the study by Jia et al, living in the city and suburbs was associated with a higher probability of mild CI (38). The reasons for this finding of our study can be the elderly being left alone after their children migrate to cities due to unemployment, the lack of medical facilities in the villages, and the lack of access to urban medical centers due to old age.

The results of the present study indicated that the average CI was significantly higher in illiterate and literate people who could only read and write at other educational levels. In line with our findings, some domestic and foreign studies also mentioned illiteracy and low education levels with an increased risk of CI (34–36,40,42,44). Likewise, Jiang et al studied the urban elderly in China and concluded that the risk of CI was higher among participants with primary education levels than those with university education (39). It is true that the dimensions of cognitive status, including information recording, attention, calculation, memory, and language skills, are strengthened with the increase in education, leading to a more favorable cognitive status.

Table 4. Association Between CI and Life Satisfaction in Older Adults

	Categories	Cognitive Impairment	P Value	F	Post Hoc
		Mean (SD)			
Life satisfaction	Poor	3.75 (2.98)	<0.001	25.73	Good life satisfaction < moderate life satisfaction < poor life satisfaction
	Moderate	1.63 (2.21)			
	Good	0.77 (1.49)			

Note. ANOVA: Analysis of variance; CI: Cognitive impairments; SD: Standard deviation; LSD: Fisher's least significant difference. *P*-values were reported from one-way ANOVA. A significant difference was obtained by the LSD post-hoc test. The mean difference is significant at the 0.05 level.

According to the findings of this study, most of the elderly had an average level of satisfaction with their lives. The highest level of satisfaction was related to the religion and family dimensions, respectively, and the lowest level was attributed to satisfaction with the job, leisure time, and health dimensions, respectively. Similarly, in the study of Sadegh Moghadam et al, the life satisfaction of nearly two-thirds of the elderly was at the average level (46). However, Siahjani et al reported the high and low levels of life satisfaction in the test and control groups of the elderly in Tehran (47). The reason for this conflict with the results of the study by Siahjani et al is psychological interventions for 20 sessions in the test group and elderly people living in nursing homes in the control group.

Based on the results of the present study, a statistically significant difference was found between CI and the levels of life satisfaction in the elderly, so that the amount of CI in people with poor satisfaction was higher than in people with moderate and good life satisfaction. In line with our findings, Katayama et al associated mild CI with low levels of life satisfaction in the elderly (48). Gotanda et al also mentioned the condition of dementia with lower life satisfaction due to restrictions in the daily activities of the elderly (49). However, in the study of Kim et al, life satisfaction was not related to specific health conditions such as CI (29).

One of the strengths of the study was the selection of almost equal proportions of the urban and rural elderly population compared to other domestic studies conducted in this field. In addition, the use of standard MMSE and life satisfaction questionnaires was another strength of this research. On the other hand, one of the limitations of the present study was the completion of questionnaires in the form of self-reporting, which can be a factor of distortion and provide incorrect information. Another limitation of this study was that it was performed only in one city. Therefore, it is recommended that similar studies in different parts of Iran and cohort studies be conducted to detect the risk factors of CI in the elderly.

Conclusion

The results of the present study revealed that high levels of CI are associated with low levels of life satisfaction in the elderly. Therefore, identifying risk factors related to CI in this demographic group and providing solutions, such as increasing the level of social and family support for these people, can increase their level of life satisfaction.

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Authors' Contribution

Conceptualization: Fereshteh Khatti Dizabadi.

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Competing Interests

This article has no conflict of interests.

Ethical Approval

This study was approved by the Research Ethics Committee of Mazandaran University of Medical Sciences with the ethics code: IR.MAZUMS.REC.94-515.

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