



Structural Model of Social, Physical and Mental Health and Physical Image Evaluation with Quality of Life: The Mediating Role of Limitations due to Chronic Pain of Elderly

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Abstract

Background: Chronic pain in the elderly leads to spending plenty of time and money, using health services, negative emotions, as well as reducing the quality of life and malfunctioning in the family. This study aimed to design a model of social, physical, and mental health and physical image evaluation with quality of life: the mediating role of limitations due to chronic pain of elderly in Tehran.

Methods: This was a descriptive, analytical, retrospective study with a structural modeling approach that was performed on 270 elderly people (138 females and 132 males) between 60 and 70 years old living in Tehran. The sampling method was cluster random and convenience. To collect the data used Keyes social health questionnaire, Ware & Sherbourne health assessment questionnaire 36- SF, body image evaluation of Godoosi, Manouchehri chronic pain limitation, and WHO elderly quality of life scales. Data analysis was performed using SPSS₂₂ and Amos software through structural modeling using path analysis and confirmatory factor analysis.

Results: The restriction variable due to chronic pain showed a negative relationship with physical and mental health ($Pvalue < 0.01$, $\beta = -0.734$), evaluation of body image ($Pvalue < 0.01$, $\beta = -0.676$), and social health ($Pvalue < 0.01$, $\beta = -0.691$) in the quality of life of the elderly. A strong positive correlation (0.694 to 0.764) was obtained between the predictor variables (physical-mental health surveying, body image valuation, and social health) at a significance level of less than 0.01.

Conclusions: The quality of life of the elderly was moderate and low; findings showed limitations caused by chronic pain are moderate the relationship of the quality of life in elderly with social, physical, mental health, and physical image evaluation.

Keywords: Social health, Physical-mental health, Body image evaluation, Limitation due to chronic pain, Quality of life.

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Introduction

Aging is a global health challenge. Given growing aging, it is estimated age above 65 will be double in the next 40 years.¹ According to the 2016 census in Iran, by 1400, ten percent of the country's population will be elderly (about ten million).^{1,2} Kaye et al. noted that today the elderly have the fastest population growth in the world.² Van Lerberghe reported the elderly population would be two billion by 2050. According to the previous studies, aging is a critical period in the life of each person affected by various variables.³

Quality of life is a broad and deep concept in old age and includes social, environmental, economic, health satisfaction, and each person's perception of his or her situation and the degree of satisfaction with this situation.⁴ Mooney believes that quality of life is dependent on mental health, physical health, and their interaction;⁵ Choo, Burke, Pyo Hong called this concept the functional ability and outcomes on the patient's perception of the physical, psychological, and social aspects of personal life.⁶

The evaluation of body image is one of the factors affecting the quality of life in old ages. Fitzsimmons-Craft considers body valuation as a person's perception of his or her body, which includes appearance, emotional reactions, and body-related situations.⁷ Negative evaluation can lead to dissatisfaction with the body and feeling unattractive and ultimately mental preoccupation with the body and frustration in the person.⁸

Hernandez & Sachs-Ericsson attributed aging to retirement and reduced social and communication roles and argued that this change was of great concern to the elderly at the economic, social, and physical levels. It is associated with psychology, culture, and communication.⁹ According to the world health organization (2014), in recent decades there have been two approaches to the concept of health, a medical approach based on technology and health interventions, and an approach that considers health as a social phenomenon. The second approach states health is a "perception is "personal" and changes under the influence of physical, psychological, economical, and social factors.¹⁰ Health is a state of complete physical, mental, and social well-being¹¹ and the absence of illness and disability is not a complete criterion of health. According to the world health organization, social health is also one of the levels of the overall health of the individual. Larsen defines social health as an assessment of a person's quality of relationships with family, others, and social groups, and believes that this phenomenon measures a portion of a person's health, which indicates his or her satisfaction or dissatisfaction with a social life to meet their needs. It is the mental dimensions of the person (feeling, thinking, and behavior).¹² Physical health means the appropriate function, which includes health, nutrition, and housing.¹³ Mental health is the interpersonal emotion of ensuring self-efficacy, self-reliance, competitive capacity, and adaptation to the environment.¹⁴

Findings show that low quality of life, psychological well-being, happiness, social functioning, and negative perception of identity, and low self-esteem can be due to chronic pain,¹⁵ which is one of the most serious problems that affect the quality of life of the elderly.¹⁶ Chronic pain in the elderly means an unpleasant emotional feeling and experience that may be associated with illness or some non-specific conditions.¹⁷ If chronic pain is not properly controlled and treated, it causes suffering and frustration in the elderly, increases the use of health care services, and imposes enormous costs on the individual, family, and community.¹⁸ In addition, chronic pain can lead to dysfunction and reduced quality of life in the elderly.¹⁹ Lee et al. showed that lack of social support is associated with low scores of physical and mental health, prolonged illness, and high mortality. Deprivation and low scores of social support reduce the quality of life.²⁰ Heesch et al. also find out a routine physical activity such as walking inversely is associated with a reduction in depression, physical pain, and psychological problems in older women with a history of depression.²¹

Studies show that aging is a phenomenon that needs more attention in psychological and physical conditions.²² Chronic pain as an unpleasant emotional experience¹⁷ is associated with physical and psychological trauma, reduced quality of life, and heavy costs among the elderly, there is no doubt that the evaluation of factors affecting the quality of life among these vulnerable groups, is necessary. Therefore, the present study aimed to investigate the pattern of social, physical, mental health, and body image evaluation with quality of life of the elderly considering mediating role of chronic pain limitations.

Materials and Methods

The present study was a retrospective, applicable-descriptive study conducted through the structural equations method. The statistical population included all the elderly over 60 years old living in Tehran during 2018. The sample size was 270 people (138 females and 132 males) 60-70 years old, calculated by Tabaking Fidel method.²³ The study sample was selected through cluster random sampling from five regions of Tehran city. The inclusion criteria were age 60-75 years old, absence of physical, mental disabilities, and psychiatric disorders. The purpose of the study was explained to the elderly and the package (a folder, questionnaires, a blue pen, and a desktop calendar was given as a gift to the elderly (Note: Study conducted before covid-19 global pandemic). If each person had a question in reading or understanding the questionnaire items, the researcher was available for help.

The following scales (Keyes social health questionnaire, Ware & Sherbourne health assessment questionnaire 36- SF, body image evaluation of Godoosi, Manouchehri chronic pain limitation, and WHO elderly quality of life scales) were used for measurement of the participants.

Keyes social health questionnaire: The Standard social health questionnaire was developed by Keys and Shapiro (2004) includes 20 items with five subscales of social prosperity, social solidarity, social cohesion, social acceptance, and social participation in the five-choice Likert scale 1 very low to 5 very high.²⁴ The final score of this scale is between 20

and 100 points, which is reported in three situations of weak (20-46), medium (47-74), and good (75-100). Joshan Lou et al. (1998) standardized the validity and factor structure of the Keys social health scale using exploratory and confirmatory factor analysis, and the Cronbach's alpha value for its subscales was 0.59-0.76.²⁵

Ware & Sherbourne health assessment questionnaire 36- SF (short form physical-mental health): Ware & Sherbourne (1992) developed a questionnaire with 36 items and 8 scales of physical function (ten items), social function (two items), physical role (four items), emotional role (three items), mental health (five items), vitality (four items), physical pain (two items), and general health (five items).²⁶ The scores were between 0-100, and a higher score indicates higher health. The validity and reliability of this questionnaire have been confirmed in the Iranian population of Asghari Moghaddam and Faqihi (2003) and the internal consistency coefficients of its 8 subscales are between 0.70 and 0.85 and their retest coefficients with a time interval of one week between 43 0 to 0.79 has been reported.²⁷

Body image evaluation questionnaire: This questionnaire was developed by Ghodoosi et al. (2014) with 13 items and four scales of physical attractiveness, feeling comfortable with body, comparing body with a healthy body, and sexual attractiveness. These items were scored with a five Likert scale from strongly agree (1) to strongly disagree (5). Scores ranged from 13-65, and higher scores, indicate higher body acceptance. The reliability of this instrument was obtained by measuring the internal reliability by using Cronbach's alpha coefficient of 0.080.^{8,28}

Restriction questionnaire for chronic pain in the elderly: This questionnaire was developed by Manouchehri et al., in 2014 with 21 items and three scales of limitations in daily work inside the house (items 1-7), outside the house (8-15 items), and medical restrictions (1-21 items). The scoring of the questionnaire based on the five-point Likert scale is never (zero) to always (4) and the scores are in the range of 0-84. To determine the psychometric properties of this questionnaire content and construct validity (exploratory factor analysis) were reported by Bartlett test as 30, 18, 58, and 93% KMO and content validity of the questionnaire was 92%. The reliability of the questionnaire was reported to be 0.89 using Cronbach's alpha coefficient. Cronbach's alpha of three scales, respectively, limitations in daily work at home 0.75, limitation in daily work outside the home 0.88 and treatment limitations were 0.89.²⁹

This questionnaire was created by the world health organization (1996) with 26 items and four subscales of physical health (7 items), mental health (6 items), environmental health (8 items) and social relations (3 items), scored in five options of never (0) to always (4). Scores are between 0-100, and higher scores indicate a better quality of life for the elderly. Nejat et al. validated its Persian version, which obtained a Cronbach's alpha coefficient above 0.7 in all domains.³⁰

The collected data were analyzed using SPSS20 and AMOS software. Quantitative variables were reported as mean

and standard deviation and qualitative data as frequency (percentage) and structural modeling conducted through path analysis technique and confirmatory factor analysis.

Results

Out of 270 elderly participants in the study, 132 (48.9%) was male and 138 (51.1%) were female. The mean age of men and women were 65.54 ± 3.01 and 65.44 ± 2.83 respectively. Elderly people with literacy were 106 (39.3%), undergraduates and graduates 56 (20.7%), postgraduates and bachelors 64 (23.7%), masters 30 (11.1%), and doctorate 14 cases (5.2 %).

Table 1 shows descriptive statistics of research variables. To evaluate the normality distribution of data, the kurtosis and skewness of each variable were examined. The results showed that the elongation and skew values of none of the variables were out of the range ± 3 . This indicates that the distribution of data variables does not deviate from the normality of univariate.

Table 2 examines the correlation matrix between the research variables and the results showed a positive and significant relationship of quality of life with physical and mental health (0.866), social health (0.827) and body image valuation (0.80), and negative and significant relationship with the limitation caused by chronic pain (-0.859) (Pvalue<0.01). The limitation caused by chronic pain had a significant negative relationship with physical and mental health (-0.734), social health (-0.691), body image valuation (-0.676) (Pvalue<0.01). On the other hand, a positive and significant correlation (0.694 to 0.764) was obtained between the predictor variables (physical-mental health, body image valuation, and social health) (Pvalue<0.01).

Table 3 showed that the values of the tolerance coefficient are less than 0.1 and the values of variance inflation factor for each of the predictor variables are not higher than 10, which means that the assumptions criteria have been met.

Table 4 shows according to the acceptable cut-off points, the fit indexes for quality of life, social health, body image valuation, physical-mental health, and limitation due to pain were at a desired level.

Table 5 shows that the standard factor loads of all indicators are higher than 0.3. According to Pallant (1999),³¹ factor loads below 0.3 are considered weak and do not have the necessary power to measure their latent variable. As table 5 shows the markers have the necessary ability to measure their latent variables and indicate that the structure is desirable.

The structural model of the research was tested using the structural equation modeling method according to figure 1 (it should be noted that indirect relationships with the Bootstrap test were analyzed). In this model, it was hypothesized that physical-mental health, social health, and body image valuation were related to the quality of life of the elderly limitations due to chronic pain. Examination of fit indices obtained from testing the structural model of the research showed the chi-square ($P < 0.01$, $N = 25.217$ ($N = 270$)) and ($P\text{value} = 0.033$) χ^2/df , CFI=0.993, GFI=0.976, AGFI=0.922, RFI=0.969, TLI=0.982, NFI=0.988 and RMSEA=0.07 indicates an acceptable fit of the model with the data.

1) Indirect path coefficient between the field of mental and social health ($P\text{value} < 0.01$, $\beta = 0.149$) and quality of life in the elderly at the P level of less than 0.01 is significant. Thus, physical and mental health is related to the mediation of chronic pain limitations in the quality of life of the elderly; In other words, physical and mental health affects the quality of life of the elderly through the limitations of chronic pain.

2) Indirect path coefficient between body image valuation ($P\text{value} < 0.01$, $\beta = 0.07$) and quality of life in the elderly is significant at the level of $P\text{value} < 0.01$. Thus, body image valuation is related to the mediation of chronic pain limitations in the quality of life of the elderly; In other words, valuing body image through the limitations of chronic pain affects the quality of life of the elderly.

3) Indirect path coefficient between social health ($P\text{value} < 0.01$, $\beta = 0.079$) and quality of life in the elderly is significant at the level of $P\text{value} < 0.01$. Thus, social health is related to the mediation of the limitations caused by chronic pain with the quality of life of the elderly; In other words, social health affects the quality of life of the elderly through the limitations of chronic pain. (Table 6).

Table 1. Descriptive indexes of variables

Variables	Mean	Median	Mode	SD	Skewness	Kurtosis
Mental-physical health	112.84	114	1110	12.22	-0.45	-0.24
Quality of life	97.66	97	97	13.18	0.12	-1.17
Body image evaluation	36.07	36	36	6.69	-0.15	-0.22
Social health	35.6	35	31	7.66	0.19	-0.65
Limitation due to chronic pain	69.77	71	76	9.84	-1.56	2.10

Table 2. The correlation coefficient between variables

Variable	1	2	3	4	5
1-Quality of life (main dependent)	1	-0.89*	0.86*	0.80*	0.82*
2-Limitation due to pain (dependent moderation)		1	-0.74*	-0.67*	-0.69*
Predictive variables					
3-Mental-physical health			1	0.69*	0.71*
4-Body image evaluation				1	0.76*
5-Social health					1

*Pvalue<0.01

Table 3. Inflation variance factor and tolerance coefficient

Variable	Tolerance coefficient	Inflation variance
Social health	0.28	2.53
Mental and physical health	0.22	3.57
Body image evaluation	0.32	3.07
Limitation due to chronic pain	0.38	2.60

Table 4. Model fit indices (confirmatory factor analysis)

Model fit indices		χ^2	df / χ^2	CFI	GFI	AGFI	RMSEA
Quality of life	Primary	14.42*	7.213	0.983	0.947	0.87	0.1
	Secondary	4.272**	4.373	0.995	0.992	0.92	0.1
Social health		12.254**	2.451	0.984	0.983	0.95	0.073
Body image evaluation		7.501*	3.751	0.985	0.987	0.936	0.1
Physical mental health		88.189**	4.409	0.959	0.944	0.9	0.095
Limitation due to chronic pain		453.942**	2.441	0.9	0.09	0.81	0.073
Acceptable cut points		<0.05	<5	=>0.90	=>0.90	=>0.8	=>0.1

Pvalue<0.05*, Pvalue<0.01**

Table 5. Parameters of the measurement model of each research questionnaire in confirmatory factor analysis

Mental and physical health back ground									
	B	β	SE	C.R		B	β	SE	C.R
Physical function	1	0.798			Mental health	0.609	0.812	0.035	17.529*
Social function	0.248	0.647	0.019	13.213*	Vitality	0.495	0.808	0.028	17.409*
Physical role	0.413	0.668	0.03	13.719*	Pain	0.303	0.677	0.022	13.935*
Emotional role	0.39	0.77	0.024	16.372*	General health	0.413	0.77	0.025	16.351*
Body image evaluation					Quality of life				
Physical attractive	1	0.605			Mental health	1	0.791		
Cofirtability with body	1.769	0.821	0.186	9.497*	Physical health	1.167	0.85	0.075	15.496*
Body comparing	2.839	0.794	0.302	9.39*	Envirioment health	1.735	0.935	0.098	17.699*
Sexual attractiveness	1.953	0.679	0.228	8.573*	Social relationship	0.785	0.814	0.054	14.617
					Social health				
Social actualisation	1.082	0.741	0.103	10.485*	social solidarity	1	0.709		
Social association	0.898	0.651	0.096	9.385*	Social acceptance	1.152	0.689	0.117	9.87*
Social cordination	1.024	0.739	0.098	10.46*					
Limitation due to chronic pain									
Question1	1	0.636			Question12	1.378	0.59	0.211	6.52*
Question2	1.163	0.61	0.135	8.60*	Question13	1.11	0.619	0.166	6.678*
Question3	1.666	0.605	0.136	8.554*	Question14	1.331	0.588	0.204	6.516*
Question4	1.353	0.605	0.136	8.554*	Question15	1.257	0.676	0.181	6.945*
Question5	1.118	0.471	0.162	6.885*	Question16	1	0.517		
Question6	1.24	0.57	0.152	8.136*	Question17	1.142	0.613	0.153	7.483*
Question7	0.414	0.619	0.162	8.718*	Question18	0.621	0.333	0.13	4.793*
Question8	1	0.451			Question19	0.855	0.554	0.122	7.029*
Question9	1.209	0.651	0.177	6.833*	Question20	1.041	0.616	0.139	7.503*
Question10	1.412	0.589	0.215	6.565*	Question21	1.051	0.622	0.139	7.55*
Question11	1.373	0.723	0.192	7.137*					

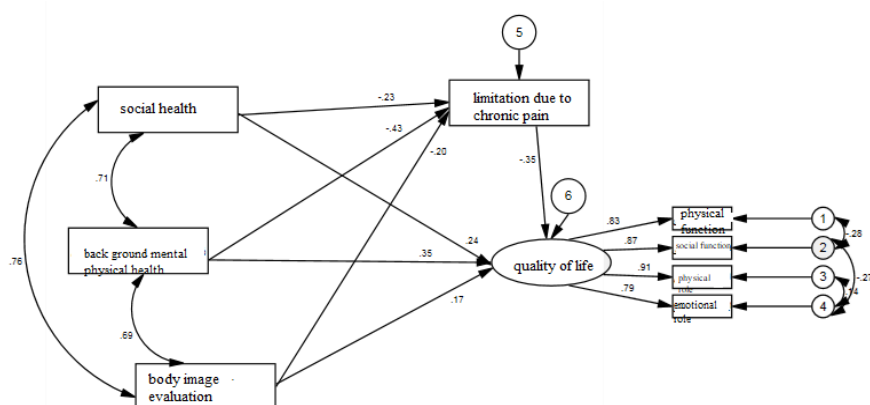
**Figure 1. Structure model diagram and its parameters using standard data (β)**

Table 6. Total, direct, and indirect path coefficients between predictor variables, pain-induced constraints, and quality of life of in the structural model

PATH	Variable	B	S.E	β	Pvalue
Total	Mental-physical health-> Limitation due to chronic pain	0.116	0.035	0.498	0.001
	Mental-physical health-> Quality of life	-0.298	0.063	-0.20	0.001
	Body image evaluation-> Limitation due to chronic pain	0.103	0.029	0.243	0.001
	Body image evaluation-> Quality of life	-0.295	0.064	-0.229	0.001
	Social health-> Limitation due to chronic pain	0.119	0.04	0.22	0.001
	Social health-> Quality of life	-0.1	0.022	-0.226	0.001
	Limitation due to chronic pain-> Quality of life	-0.246	0.056	-0.43	0.001
	Mental-physical health-> Limitation due to chronic pain	-0.346	0.056	-0.43	0.001
	Mental-physical health-> Quality of life	-0.298	0.063	-0.202	0.002
	Body image evaluation-> Limitation due to chronic pain	0.103	0.029	0.243	0.001
Direcct path	Body image evaluation-> Quality of life	-0.295	0.064	-0.229	0.001
	Social health-> Limitation due to chronic pain	0.119	0.04	0.32	0.001
	Social health-> Quality of life	-0.1	0.032	-0.246	0.001
	Limitation due to chronic pain-> Quality of life	-0.346	0.056	-0.43	0.001
	Mental-physical health-> Limitation due to chronic pain	0.081	0.032	0.173	0.001
	Mental-physical health-> Quality of life	-0.298	0.063	-0.202	0.002
Indirecct path	Body image evaluation-> Limitation due to chronic pain	0.089	0.035	0.024	0.001
	Body image evaluation-> Quality of life	-0.1	0.024	-0.246	0.001
	Social health-> Limitation due to chronic pain	0.035	0.034	0.149	0.001
	Social health-> Quality of life	0.03	0.023	0.07	0.002
	Limitation due to chronic pain-> Quality of life	0.029	0.024	0.079	0.001

Discussion

This study aimed to design a structural model for the variables of social health, physical-mental health, and body image valuation in relationship with the quality of life of the elderly mediated by the limitation of chronic pain. The results showed that the mediating variable of chronic pain limitation affects negatively physical-mental health, social health, and evaluation of body image and the quality of life scores of the elderly. Therefore, there is an inverse and strong relationship between the variables, which means the presence of the mediating variable of limitation due to chronic pain reduces physical-mental health, social health, physical image valuation which impact negatively the quality of life in old age. These findings were confirmed in the previous studies.

Thielmann & Hilbig et al. Reported that chronic pain was negatively related to daily activities, interpersonal and family relationships, quality of life, and high rates of depression.³²⁻³³ In Iran Mohammadi, et al with Anbari, Staji and Rostaghi is in line with the results of the present study.^{30,34}

In explaining the present result, we can refer to the view of Sarafino and Smith, who consider pain as unpleasant sensory and emotional experiences related to real or potential damage to body tissue that has the potential to reduce the quality of life of the elderly.³⁵ Sanderson described chronic pain as the pain that persists daily for at least three months, or even returns if interrupted for a short time; it is incurable, progresses slowly, and has a direct and strong relationship with psychological factors.³⁶

In the present study, there was a strong inverse relationship between chronic pain limitation as a mediating variable with body image valuation and quality of life in the elderly; it implies that high scores due to chronic pain limitation reduced body image valuation and the quality of life scores. In the other words, in presence of the limitation due to chronic pain, self-esteem, and quality of life will be decreased. Fitzsimmons-Craft described the valuation of the body as a person's perception of his body, which includes appearance, emotional

reactions, and situations related to the body. Negative evaluation can lead to dissatisfaction with the body and feeling unattractive and ultimately mental preoccupation with the condition of a part of the body and frustration in the person.⁷ Azimi Khatibani and Akbari showed that body image and satisfaction with appearance have a significant positive and strong relationship with quality of life and an inverse relationship with obsessive behaviors.³⁷ Pinto and Trunzo believed that in people, especially the sick and the elderly, body valuation is influenced by many factors such as aging, having chronic pain, disease, and lifestyle. As people want an ideal appearance in old age. Old age, pain, and illness will negatively affect their physical and sexual attractiveness, and low self-esteem can reduce a person's control over their body and leads to a sense of worthlessness, hopelessness.³⁸

In addition, the results of the present study showed that there was a strong inverse relationship between the limitation caused by chronic pain as a mediating variable with social health and quality of life in the elderly. It implies that as long as our mediating variable is chronic pain and the limitation due to chronic pain, social health cannot increase the quality of life scores in the elderly. In line with this result, the researches of Saeed et al., point to a strong and direct relationship between social relations, social health, communication with family and friends with the quality of life in the elderly.³⁹ Conaghan et al., and Shirazi et al., referred to dysfunction in the elderly due to chronic pain and decreased quality of life.^{19,40} In general, chronic pain is an obvious medical, personal, social, psychological problem and a threat to a person's physical and mental health, and is one of the most common physical diseases that cause many physical, psychological, economic, and social problems for its sufferers; Chronic pain reduces the quality of life in the elderly.⁴¹

The limitations of the present study were as the following: The results of the study are related to a limited and specific number of elderly people in Tehran, which requires more caution in generalizing results to the elderly in other cities and provinces. The age range of the elderly is between 60 and 70 years old in Tehran (in the research, according to Farrell et al.,

We considered primary aging, not secondary aging, which is between 84-75 years old). Given that currently science and health literacy has come up with newer definitions of age periods and periods, especially in the definitions of middle age and old age which have a positive and direct relationship with increasing health literacy and changing people's life patterns, so its generalization to older ages should be careful. The last point was that the final process of executive work and data collection simultaneously with the outbreak of covid- 19 in Iran, which brought a lot of concerns for researchers and the elderly, and perhaps one of the strongest limitations of field research.

It is recommended for the health care provider to use the results and output of current data, develop appropriate planning to increase the level of quality, social health, physical-mental health, physical image of the elderly, and consider the necessary considerations in the future to the enhancement of the quality life for the elderly.

Quality of life in geriatrics is considered as life satisfaction, which is the initial result of successful aging and functional ability. In some contexts, quality of life is considered as happiness, no pain, energy level, personal control, and self-esteem. Some also believe that successful aging or quality of life in old age includes favorable conditions in physical, psychological, socio-economic, and religious dimensions. According to the present research including the elderly population of Tehran city evaluating their quality of life in relationship with social health, physical and mental health, and evaluation of body image by mediating role of limitation caused by pain. The results showed that the constraint caused by pain can reduce the quality of life scores of the present sample according to the variables of physical-mental health, social health, and body image evaluation in the elderly. There is a need to pay more attention to the significant, growing, and vulnerable group of the elderly. The implementation of strategies to improve the quality of life and increase social, physical, and mental health, value body image, and gain a good feeling are important in this age.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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