



# Relationship between Social Determinants of Health and General Health Status of the Elderly in Alborz Province: Path Analysis

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## Abstract

The purpose of this study was to examine the relationship between social determinants of health (SDH), quality of life, lifestyle, and general health of the aging people in Alborz province. A descriptive cross-sectional study conducted in 2000 aging people. A two-stage cluster sampling was applied to select participants. We used a four-section questionnaire. The statistical analysis was performed with AMOS 22. We used path analysis to examine whether SDH, QOL and lifestyle would directly or indirectly affect general health and whether the pathway model was acceptable. The general health status of the most of participants was low. The results of path analysis show that general health is affected by the SDH, lifestyle and quality of life. Our pathway model was an acceptable model. Variables such as marital status, educational level, job, income, number of family members, QOL, and lifestyle can be considered as predictors of general health status in the aging people. It can be concluded that it is necessary to provide appropriate strategies to promote general health of the elder person.

**Keywords** QOL · Lifestyle · Elder · Pathway model · General health · Mental health

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## Introduction

The number of aged people in both developing and developed countries is increasing. WHO predicted that until 2025, the population of individuals aged 60 years and older will be more than double in the world (“World Health Organization. World health statistics 2010. Geneva,” , 2010). Presumably, as the elderly population increases, the health problems, especially mental health problems become more serious. Depression, anxiety and dementia are also common mental problems in this age group (Fries 2002). During the past decades, the public health community has been paid attention to the social determinants of health (SDH) increasingly. The SDH are daily life conditions in which people are born, grow, work, live, and age, socio-economic policies and systems, that can influence health-related behaviors (WHO 2012).

Mental health is defined by World Health Organization as a state of well-being in which every person perceives his own potential, can manage the normal stresses of life, can work effectively, and can contribute to his community. The positive dimension of mental health is emphasized in the definition of the health by WHO, as stated in the constitution: “Health is a state of complete physical, mental and social, and not just the absence of illness or disability.” It highlights the significance of mental health and disorders (“World Health Organization 2018).

The psychological, hormonal, physical and social changes caused by old age may reduce the quality of life (QOL) of the elderly, which may cause health problems (Hameed et al. 2014).

Several studies suggested that there is a reverse correlation between QOL with depression (Brett et al. 2012) and frailty (Gobbens et al. 2013), stated as factors of vulnerability. However, there is a positive correlation between QOL with social relationships (De Belvis et al. 2008), social support (Bryła et al. 2013) and physical activity (Miranda et al. 2016; Van Dyck et al. 2015).

Healthy lifestyle has a major impact on the physical and mental health of the individual and society and improves the quality of life (Tran and Hanh 2017). As revealed in a study the causes of death are mainly rooted in lifestyle (Iseki et al. 2017). Additionally, inappropriate lifestyle is one of the causes of chronic diseases, including high blood pressure, cancer, AIDS, and stomach ulcer (Hedayatinejad et al. 2016).

Estimates by UN and the WHO suggest that by 2030 the world’s aging population will increase from 9% to 16%, from 5.6% to 17.5 (Legido-Quigley and Asgari-Jirhandeh 2018).

In Iran, the number of elderly people was less than 1.2 million in 1956, which reached 7.4 million in 1980, meaning that the aging population has grown more than 6 times during this period (Beladi-Mousavi 2018).

In general, improving the health of the elderly leads to improving the general health in the community. Given the population trends, Iran will have a large number of elderly men and women in the near future, many of whom will have serious health problems (Afzali et al. 2007).

Accordingly, the purpose of this study was to examine the relationship between social determinants of health (SDH), quality of life, lifestyle and general health of the elderly in Alborz province by using the General Health Questionnaire (GHQ28) for screening general health and mental disorders. Furthermore, Short-Form Health Survey questionnaire (SF-36) was administered

to measure quality of life (QOL) and lifestyle questionnaire (LSQ) to measure lifestyle.

We formed a pathway model consisting of GHQ28, SF-36 and LSQ questionnaire items and SDH. We hypothesized that SDH, QOL and lifestyle would directly or indirectly affect general health. We examined fitness of the model and its effective power of SDH, QOL and lifestyle on general health using path analyses.

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## Methods and Methods

This was a descriptive study conducted on elderly people of more than 60 years of age in Karj province in Iran in 2018. A two-stage random sampling was applied to select participants. First, we classified the health centers of Alborz province into 5 groups (southeast, southwest, central, northwest, and northeast) based on a map. Then a health center was randomly selected from each cluster. All participants were randomly selected from the senior population covered by the city's health centers. The study inclusion criteria consisted of age (more than 60), being a resident of Alborz province based on selected health care center, not having dementia, and having consent to participate in the study.

We used a four-section questionnaire. The first section of the questionnaire consisted of 10 items to measure social determinants of health in participants, individual factors (marital status and education levels) and socioeconomic factors (job, income, number of family members).

The second section was General Health Questionnaire (GHQ-28) to measure mental health. The GHQ-28 had 28 items in 4 subscales of somatic symptoms (7 items), anxiety and insomnia (7 items), social dysfunction (7 items), and depression (7 items). The scores of the general mental health assessment were divided into 3 levels: 28–66 points as low level; 66–103 points as middle level; and 104–140 points as high-level mental health. The scores on the mental health subscales assessment were divided into 3 levels: 7–16 points as low level; 17–26 points as middle level; and 27–35 points as high-level mental health (Nazifi et al. 2014).

The third section was Short-Form Health Survey questionnaire (SF-36) to measure quality of life. The SF-36 had 36 items in 8 subscales: physical functioning (10 items), role limitations due to physical problems (4 items), bodily pain (2 items), general health (5 items), vitality (4 items), social functioning (2 items), and role limitations due to emotional problems (3 items) (Nedjat et al. 2008).

The fourth section was lifestyle questionnaire (LSQ) to measure lifestyle. The LSQ had 54 items in 10 subscales: physical health (8 items), exercise and fitness (7 items), weight control and nutrition (7 items), illness prevention (7 items), psychological health (7 items), spiritual health (6 items), social health (7 items), drug and alcohol avoidance (7 items), accident prevention (7 items), and environmental health (6 items) (Lali et al. 2012). Each item was measured based on a five-point Likert scale (none, little, middle, much, and very much).

Informed consent was obtained from all the participants. The statistical analysis was performed with AMOS 22. We used path analysis to examine whether SDH, QOL and lifestyle would directly or indirectly affect general health and whether the pathway model was acceptable. We calculated Goodness of Fit Indexes containing Chi-Square, Root Mean Square Error of Approximation (RMSE) and Comparative Fit Index (CFI), Incremental Fit Index (IFI) and Tucker-Lewis Index (TLI) were employed to evaluate the fitness of the model.

## Results

Two thousand participants were recruited into the study, and 1682 participants completed the questionnaire. The mean  $\pm$  SD age of the participants was  $66.82 \pm 6.59$ . The majority of the participants were female (60%, 1124), married (73.4%, 1363), illiterate (44.4%, 764), unemployed (57.2%, 1012), with less than ten million Rials as monthly income (61.4%, 1044), with two bedrooms in the house (48.1%, 901), and with a two-member household (31.9%, 557).

We assessed general health status of the elderly in Alborz province. The general health status of the most of participants was low (93.9%) especially in the subscales such as in somatic symptoms (84%), anxiety and insomnia (81.6%), social dysfunction (73.5%), and depression (94.4%).

Table 1 shows the mean scores of general health and its subscales as well as the correlations between general health and its subscales. Three subscales of somatic symptoms, anxiety and insomnia, and depression had a strong correlation with the general health score (Pearson correlation of more than 0.7) and the subscale of social dysfunction had a moderate relation to the general health score.

Figure 1 shows hypothesized model of influencing factors on general health among Iranian aging people and fig. 2 shows the Path diagram with standardized estimation of the Final model in Amos Graph. The correlation appears as a two-directional arrow, and standardized path coefficients appear as one-directional arrows. The results of path analysis show that general health is affected by the socioeconomic factors, lifestyle, and quality of life. Also, socioeconomic factors affect lifestyle, and individual factors affect quality of life.

**Table 1** The mean scores of general health and its subscales, the correlations between general health and its subscales

	Mean	Std. Deviation	GHQ.Total	
			Pearson Correlation	Sig. (2-tailed)
Somatic symptoms	13.3757	3.46731	.771**	.000
Anxiety and insomnia	12.8858	4.44887	.840**	.000
Social dysfunction	15.1552	3.92931	.350**	.000
Depression	9.3429	3.67405	.710**	.000
General health	50.7449	10.40116		

\*\*  $P < 0.01$

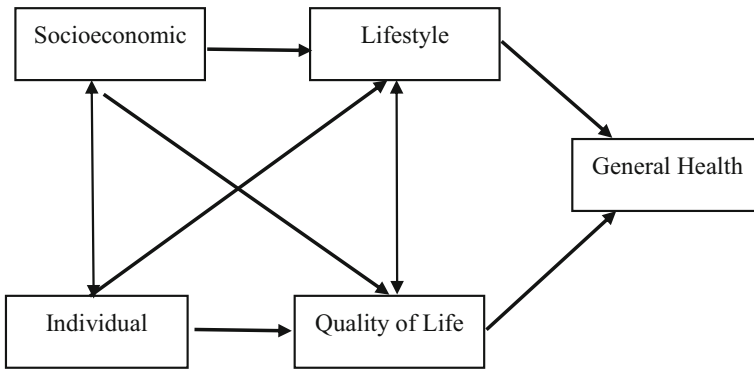


Fig. 1 A hypothesized model of influencing factors on general health among Iranian elderly

To assess acceptability of our path model we use different range of criteria such as Chi-Square/df ratio, Root Mean Square Error of Approximation (RMSEA) Index, Comparative Fit Index (CFI), Tucker-Lewis Index (TLI) and Bollen’s Incremental Fit Index (IFI).

The  $\chi^2/df$  indicates acceptable value when it produces a value of less than 3 (Schermelleh-Engel et al. 2003) and the significant of Root Mean Square Error of Approximation (RMSEA) criteria, values equal to or less than 0.05 indicate a good fit, and values up to 0.08 are acceptable (Marsh et al. 1988) also for acceptable model, CFI, TLI, IFI should be higher than 0.9 (Hooper et al. 2008). The result of this criteria has shown in Table 2. As can be seen in this table, the  $\chi^2/df=2.73$  the significant of RMSEA = 0.043 also the CFI = 0.98, TLI = 0.97 and IFI = 0.98. In addition, all of the path coefficients were significant. So, we can conclude that data has shown acceptable fitting with the conceptual model.

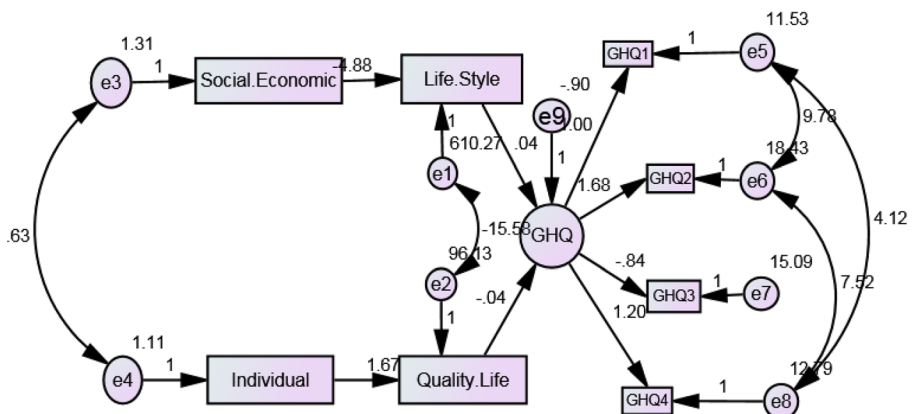


Fig. 2 Path diagram with standardized estimation of the Final model in Amos Graph

**Table 2** Goodness of Fit Indexes

Indexes		Mean
Chi-Square	.000	
CMIN/df	2.73	Less than 3 is an acceptable model
RMSER	.043	The range between approximately 0 and 0.1 is an acceptable model.
CFI	.983	Larger than .90 is an acceptable model.
IFI	.983	Larger than .90 is an acceptable model.
TLI	.97	Larger than .90 is an acceptable model.

## Discussion

In this study, our pathway model was an acceptable model (CFI = 0.983, IFI = 0.983, and TLI = 0.97). As we hypothesized, SDH, QOL and lifestyle affected general health. This influence was classified into direct and indirect.

In our model, individual factors indirectly affect general health by influencing QOL, for instance more educated or married people had a higher level of general health than others. One possible explanation is that higher education and living with the spouse result in better social and physical functioning, which improves QOL. It was consistent with a study by Mirowsky & Ross that suggested the level of education has a significant impact on the health of individuals, in other words, education enables people to change their behaviors, it is an important factor of health. High level of education lead to a better earning and household income, full time employment, and lower economic hardship. Also, education develops positive habits and attitudes (Mirowsky and Ross 2015). For example, lack of awareness about a healthy diet can lead to choosing an unhealthy one. (Karimi et al. 2018). Another study indicated that individuals with lower education have more criteria for the diagnosis of depression (Strine et al. 2004). Also being single is one of the reasons for mental health problems (Rao et al. 2014). Several studies found that factors such as low level of education, being single or divorced. In elderly, living alone or with one's children (after the death of the spouse) were highly associated with depression. (Gobbens et al. 2013; Rakhshani et al. 2014; Thilak et al. 2017).

According to the results of our study, socioeconomic factors indirectly affected general health by influencing lifestyle, since low income results in inadequate access to healthy nutrition, housing, social participation, leisure activities, and health care. Also, education is a significant socioeconomic factor of health. As mentioned above education develops positive habits and attitudes. The greatest risk factors for mental health problems are chronic diseases and the socioeconomic differences (Rodrigues et al. 2015; Strine et al. 2004). Several studies showed that a good financial status was a predictor for a healthy lifestyle among older people (Datta et al. 2015a, Datta et al. 2015b; Hanklang et al. 2018; Steiber 2014; Worach-Kardas and Kostrzewski 2014). In addition, established social relationships plays an important role in the quality of life and lifestyle (Worach-Kardas and Kostrzewski 2014). A study showed that the prevalence of mental disorders and medical problems in older people who lived in aging care homes were higher than those who lived with a family member since they had

more psychological stress as a result of a poor family support and financial limitations (Rao et al. 2014).

In present study, QOL and lifestyle directly affected general health. The most probable explanation for this is that life satisfaction and quality of life are the general health predictors. Also, it was found that QOL had a strong correlation with general health. Which has also been observed in the Previous studies (Aghaei et al. 2013; Datta et al. 2015a, Datta et al. 2015b). A study showed that there is a direct relation between mental health and lifestyle (Yang et al. 2017). A good QOL and a healthy lifestyle guarantee the physical and mental health of individuals. A study showed that physical activity has significant effects on the mental health of aging people (Mortazavi et al. 2012). Also, a study indicated that mental health disorders lead to obesity, smoking, chronic diseases and musculoskeletal disorders (Nasiry Zarrin Ghabaee et al. 2016).

In our model, QOL and lifestyle had a two-directional relationship and there was a strong correlation between QOL and lifestyle. Our results support a study that indicated there was a positive relationship between physical activity and QOL (Miranda et al. 2016). Vagetti et al., studied the association between physical activity and QOL in the aging people confirming that physical activity plays an important role in the quality of life and general health in the aging people, and people with a higher physical activity will have a healthier life in their old ages and will have a lower risk of cardiovascular diseases (Vagetti et al. 2014).

## Conclusions

Variables such as marital status, educational level, job, income, number of family members, QOL, and lifestyle can be considered as predictors of general health status in the elderly. It can be concluded that it is necessary to provide appropriate strategies to promote general health of the elder persons. Therefore, promoting a healthy lifestyle and good QOL is of prime importance.

## Limitations

The main limitation of this study was that the uneducated aging people did not fill the questionnaires by themselves, but we assured them that their information would be kept confidential.

Considering the self-report of the scales and this fact that the samples were selected through convenience sampling procedure, the generalizability of the results faced with limitation.

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**Authors' Contributions** ✓ All authors contributed to the study conception and design.

✓ Material preparation, data collection and analysis were performed by [Tayebeh Fasihi Harandi], [Mitra Rahimzadeh] and [Nooshin Ghavidel].

- ✓ The first draft of the manuscript was written by [Azam Mohamadloo] and all authors commented on previous versions of the manuscript.
- ✓ All authors read and approved the final manuscript.

## Compliance with Ethical Standards

Corresponding Author (Azam Mohamadloo) on Behalf of all the Authors (Tayebeh Fasihi Harandi, Mitra Rahimzadeh, Nooshin Ghavidel) Declare that:

- ✓ The manuscript has not been previously published in any language anywhere
- ✓ The manuscript is not under simultaneous consideration by another journal.
- ✓ The manuscript is an original work of authorship. All data, tables, figures, etc. are used in the manuscript are prepared originally by authors, otherwise the sources are cited and reprint permission is attached.
- ✓ All listed authors have approved the manuscript before submission, including the names and order of authors;
- ✓ All communication between the Journal and all co-authors, before and after publication were managed
- ✓ The manuscript are included disclosures, declarations and transparency on data statements from all authors

**Conflict of Interests** All the authors declare no conflict of interests.

**Informed Consent** None.

**Ethical Treatment of Experimental Subjects (Animals and Humans)** No experimental treatment was conducted on either human or animal subjects in this study.

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