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# *A Comparative Study on Life-Style of Elders Affected and Not Affected by Intestinal Parasitic Infections in Guilan, Iran*

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## Abstract

***Background:*** Life-style is one of the most important factors affecting health, which can counteract with various pathogenic risk factors through identification and management of it.
***Objectives:*** This study aimed to compare life-style of elders affected and not affected by intestinal parasitic infections (IPIs).
***Methods:*** This case-control study was conducted on 190 elders aged ≥60 years old (30 individuals: affected, 160 individuals were non-affected by IPI) who referred to health centers in Gilan province (2017-2018). Sampling was random and the samples were transferred from the health centers to the laboratory of the medical school in east of Guilan. Using direct wet smear (microscopic examination), formalin-ethyl acetate concentration techniques and Ziehl Neelson's stain, stool samples were examined for IPIs. Data were collected using Babak's healthy life-style questionnaire for the elderly and analysed in SPSS v.21 software.
***Results*:** The majority of the participants were in the age range of 60-69 years (63.2%) and illiterate (55.8%). Most of the elders had moderate life-style (62.1%). In the significant dimensions (exercise, prevention, nutrition, stress management and total), mean and median score of life-style in elders non-affected by IPI were higher than affected ones (P<0.05). In addition to IPI, age, presence of chronic disease, living with spouse, BMI and educational level are among the factors related to life-style in the elderly (P<0.05).
***Conclusion:*** Identifying factors related to healthy life-style has important role in change and promotion of elders' life-style. Performing interventions in order to enhance elders' awareness to modify and improve life-style is essential.

***Keywords: elder; lifestyle; intestinal parasitic infection***

## Introduction

World Health organziation (WHO) named individuals aged ≥60 years old as elderly and reported that the number of elders is considerably increasing in last years [1] This indicates that elder care at 21 centuries is a growing issue [2]. According to demographic predictions, the number of elders aged more than 65 years old in Iran will increase to 18 million individuals up to year 2051 and the population fraction of them increased to 20%. Population fraction of elders in Guilan was 8.9% according to reports at 2016 [3]. As individuals' life span increases, the importance of health promoting behaviors is more highlighted due to maintenance of performance and independency of the individuals and increase in life quality [4]

The study by Heshmati et al showed that the status of health promoting behaviors in elders is not desirable, and due to increase in number of elders, this condition will be more undesirable and its related problems will increase [5]. Therefore, health promoting behaviors in this period, due to prevention of disability, maintenance of performance and independency of individuals and increase in their life quality are highlighted, which healthy lifestyle can be a key approach to maintain health and promote life expectancy along with elders' health [6].

Healthy lifestyle refers to all the behaviors which lead to prevention of the disease and injury, maintenance of health and its promotion, including appropriate diet, exercise, stress management, desirable pleasure time, avoidance of high-risk behaviors such as tobacco consumption [7,8]. Old ages considerably increase the probability of incidence of mental and physical chronic illnesses. So, 80% of old citizens are affected by at least one chronic disease (41.6% of the elders were with one of the chronic diseases), and 40% of them suffer from limitations caused by chronic diseases [9].

IPIs are among the public health problems in developing countries [10,11] Based on annual international reports, more than 3.5 billion of the people on earth are infected with one type of intestinal parasites, which 4.5 million of the cases lead to appearance of clinical symptoms [12,13] The prevalence of parasitic diseases is directly associated with health level and economic and social status of each region [14,15]. Factors such as age, gender, educational level and job type, and more importantly, consumption of raw and/or unwashed fruits and vegetables, especially in the northern provinces of Iran have high have important effect on severity of infection type [15,16].

Iran is also an appropriate environment for activities of various parasites due to geographical region, climate, vast area, cultural and social characteristics [17] Limited studies conducted in recent years in several areas in country, not only showed considerable reduction in prevalence of these infections in Iran, but also indicated transformation in types of pandemic parasites [18].

The patients with immunity deficiency, children and elders are the victims of these parasitic infections. These infections specifically are common amongst elders who are cared in crowded nursing houses with low hygiene [19].

Although, studies related to IPIs amongst elders are limited due to low correlation of this issue in elders, it is obvious that IPIs impair the nutritional status of these individuals through intestinal obstruction, malnutrition, anemia, diarrhea and malabsorption, and lead to impairment of performance capacity, independency and decline in life quality in this age group [20].

Guilan province is always an appropriate environment for growth and establishment of these parasites due to suitable climate, high humidity and raining, population densities, high water level, wide agricultural activity, tourism, abandoned livestock around human settlements [21] More importantly, consumption of insufficient disinfected raw vegetables which grown in the organic soil and unwashed fruits played a critical role in prevalence of IPIs [16] Therefore, due to increase in elders in the country and specifically in Guilan and the importance of intestinal parasites in personal and social hygiene and lack of such type of studies in the province in recent years, this study aimed to compare lifestyle of elders affected and not affected byIPIs, in order to in case of need, along with development in knowledge in this context, based on obtained results, with the aim of achieving healthy life-style, programming and presenting healthy policy to more control intestinal parasitic diseases and promote health level in elders.

## Methods

This is a descriptive-analytical case-control study performed at 2017-2018 (in spring and summer) in East, west and center of province Guilan, Iran. The study population was all the elders aged ≥ 60 years old referred to therapeutic health centers in Guilan, Iran.190 elders (which selected based on stool sampling result; thus, 30 individuals selected with IPI, Blastocystis hominis and Giardia and 160 individuals selected without IPI), who met inclusion criteria were enrolled in the study. The characteristics of the participants in the study included age 60 years and older, no dementia (according to the patient's condition during the interview to complete the questionnaire), no disability, awareness of time, place and people no

blindness - deafness according to the elderly, and willingness to participate in the study.

Stool sampling was done randomly throughout the year. For each person with a parasite- test result, 5 people with a negative test were selected from the same laboratory and information was obtained. Each group needed 30 people. Due to the availability of non-infected people, this group was considered up to 5 times the affected group and considering the drop, 10 people were added.

Data gathering tool was two-part elder healthy life-style questionnaire. The questionnaire used in the present study was made by Dr. Babak et al. In 2007-2008, whose face and content validity were confirmed [7], and its reliability was recalculated with Cronbach's alpha coefficient of 0.76, and permission to use it was obtained from the author (obtained score was identical).

The mentioned questionnaire has a demographic part and a main part consist of 46 questions as follow: 15 questions in prevention dimension; 5 questions in physical activity, exercise and entertainment dimension; 14 questions in healthy nutrition dimension; 5 questions in stress management dimension; and 7 questions in dimension of social and inter-personal communication. Responding scale of this questionnaire consists of repetition scale and multiple choices scales (single-response and multiple-response). Measuring scale of the questionnaire was 5-part- Likert. For each question, the score of 1 allocated to the option that represents the most undesirable level of lifestyle, and the scores of 2, 3, 4, and 5 are allocated to other options according to increase in desire level of lifestyle. In regard with questions number 20-23 which have triple scale of "low, moderate and high", in order to establish coordination in description of these quantities, one sheet containing information on description of each food portion and the prescribed daily amount has been attached to questionnaire. In four questions of 34, 44, 45, and 46 for the cases who are single, no scores are allocated that means its score is zero. In illiterate people, either the questions were read by the researcher, or if someone was with the patient, the question was asked from him (her).

By the way, the least obtainable score is 42 and the highest score is 210. Questionnaires were provided to elders after obtaining orally informed consent, and finally, the lifestyle score was classified into three levels; the score was calculated as undesirable (42-98), moderate (99-155) and desirable (more than 156). (the author (obtained score was identical) [8].

Required laboratory samples after collecting positive or suspected faeces samples for intestinal parasites of elders referred to treatment health centers in eastern, western and center regions of province were transformed to laboratory of medicine or School of Nursing, Midwifery and Paramedical Sciences at east of Guilan, and the confirmation of laboratory tests and samples was done using formalin ether test by Professor of parasitology of University.

Collected data after coding were analyzed in SPSS version 21 software. Chi-square test was used to check the frequency distribution of participants in two affected and non-affected groups according to the variables of education level, residence, age, gender, life with spouse, and presence of chronic diseases. Kruskal-Wallis and Mann-Whitney test were used to compare the lifestyle score according to the variables of age, life with spouse, education level, and BMI. Mann-Whitney test was used to compare the mean score of lifestyle and its dimensions in two affected and non-affected groups. For the normality of quantitative variables, K-S test were used and the significance level of the test was $\alpha<0.05$. In the multiple analysis, in order to relate the lifestyle with intestinal parasitic disease in the elderly, with the control of individual and social variables, the logistic regression model was used using the backward method. In the initial model, all the variables that had a significance level of less than 0.1($p<0.1$) in the univariate analysis were entered into the model.

## Results

In this study, 190 elders with mean (SD) age of 69.1 (7.9) years old were enrolled. The majority of the elderly were female (55.3 %), illiterates (55.8 %), in the age range of 60-69 years (63.2 %), and most of them lived with their spouses (74.7 %). There was no statistically significant difference between the affected and non-affected groups in terms of education level ($p=0.481$), residence ($p=0.6$), age ($p=0.09$), gender ($p=0.333$), living with spouse ($p=0.701$), and presence of chronic diseases ($p=0.308$) (Table 1).

*Table 1: Age, Sex, Living with Spouse, Educational Level and Residence of Elders in the Study*

| | | Non-affected by intestinal parasitic infection | | Affected by intestinal parasitic infection | | Total | | P* |
|---|---|---|---|---|---|---|---|---|
| | | Frequency | Percentage | Frequency | Percentage | Frequency | Percentage | |
| Educational level | Illiterate | 86 | 53.8 | 20 | 66.7 | 106 | 55.8 | 0.481 |
| | Lower than diploma | 52 | 32.5 | 9 | 30.0 | 61 | 32.1 | |
| | diploma | 14 | 8.8 | 1 | 3.3 | 15 | 7.9 | |
| | University degree | 8 | 5.0 | 0 | 0.0 | 8 | 4.2 | |
| Residence | City | 77 | 48.1 | 16 | 53.3 | 93 | 48.9 | 0.600 |
| | Village | 83 | 51.9 | 14 | 46.7 | 97 | 51.1 | |
| Age | 60-69 | 105 | 65.6 | 15 | 50.0 | 120 | 63.2 | 0.09 |
| | 70-79 | 30 | 18.8 | 11 | 36.7 | 41 | 21.6 | |
| | ≥80 | 25 | 15.6 | 4 | 13.3 | 29 | 15.3 | |
| Gender | Male | 74 | 46.3 | 11 | 36.7 | 85 | 44.7 | 0.333 |
| | Female | 86 | 53.8 | 19 | 63.3 | 105 | 55.3 | |
| Living with spouse | Yes | 119 | 74.4 | 23 | 76.7 | 142 | 74.7 | 0.701 |
| | No | 41 | 25.6 | 7 | 23.3 | 48 | 25.3 | |
| Presence of chronic diseases | Yes | 64 | 40 | 15 | 50 | 79 | 41.6 | 0.308 |
| | No | 96 | 60 | 15 | 50 | 111 | 58.4 | |

**Chi Square Test. Fisher exact test*

Comparison of the mean (SD) of the lifestyle score according to age groups, life with spouse, education level, and BMI showed a statistically significant difference ($p<0.05$) (Table 2). According to the findings of Table 2, the mean lifestyle score decreases in older age groups.

*Table 2: Comparison of Lifestyle Score According to the Variables Age, Living with Spouse, Educational Level*

| | | Lifestyle score | | | P |
|---|---|---|---|---|---|
| | | Count | Mean (SD) | Median | |
| Age | 60-69 | 120 | 159.65 (20.36) | 156 | 0.001** |
| | 70-79 | 41 | 145.39 (12.72) | 142 | |
| | ≥80 | 29 | 137.31 (15.32) | 133 | |
| Living with spouse | Yes | 142 | 157.02 (19.80) | 153 | 0.001* |
| | No | 48 | 141.75 (16.97) | 137 | |
| Educational level | Illiterate | 106 | 144.92 (14.85) | 143/50 | 0.001** |
| | Lower than diploma | 61 | 161.51 (22.25) | 185 | |
| | Diploma | 15 | 169.80 (19.93) | 169 | |
| | University degree | 8 | 167.63 (14.55) | 165 | |
| BMI | 20<BMI | 7 | 152.43 (10/89) | 154 | 0.005** |
| | 20<= BMI<=25 | 44 | 144.43 (17.24) | 141.50 | |
| | 25<= BMI<=30 | 105 | 153.71 (17.86) | 150 | |
| | BMI>30 | 34 | 162.91 (26.91) | 159 | |
| Chronic disease | Yes | 79 | 146.56 (15.16) | 145 | 0.001** |
| | No | 111 | 157.86 (22.02) | 154 | |

***Mann Whitney test -**Kruskal-Wallis test**

Comparison of the mean (SD) of the lifestyle score in the dimensions of exercise, prevention, nutrition, stress management, and the total score in the two groups of affected and non-affected by IPIs showed a statistically significant difference ($p<0.05$). This difference was not significant in

the dimension of social communication (p=0.061) (Table 3).

***Table 3: Comparison of Lifestyle Score in Study Dimensions and Total Score in two Groups of Elders with and Without Intestinal Parasitic Infection***

| | Non-affected by intestinal parasitic infection Mean (SD) | Affected by intestinal parasitic infection Mean (SD) | P* |
|---|---|---|---|
| **Life-style score in exercise** | 14.44 (3.65) | 12.93 (2.39) | 0.045 |
| **Life-style score in prevention** | 58.32 (6.67) | 53.63 (6.34) | 0.001 |
| **Life-style score in nutrition** | 43.99 (6.31) | 40.17 (4.40) | 0.001 |
| **Life-style score in stress management** | 16.39 (3.11) | 14.93 (1.66) | 0.031 |
| **Life-style score in social communication** | 22.18 (6.04) | 20.00 (4.84) | 0.061 |
| **Life-style score** | 155.32 (20.58) | 141.67 (13.33) | >0.001 |

***Mann Whitney test**

Percentage of desirable lifestyle (score more than 156) in elders non-affected by IPIs was (41.9%). But this percentage in elders affected by IPIs was 46.7%. According to the Chi-square test, there was a statistically significant difference between the two groups in terms of lifestyle status (Table 4).

***Table 4: Frequency Distribution of Lifestyle Status in two Groups of Elderly with and Without Intestinal Parasitic Infection***

| Lifestyle status | Non-affected by intestinal parasitic infection N (%) | Affected by intestinal parasitic infection N (%) | Total N (%) | P* |
|---|---|---|---|---|
| **Moderate lifestyle** | 93 (58.1) | 25 (83.3) | 118 (62.1) | 0.009 |
| **Desirable lifestyle** | 67 (41.9) | 5 (46.7) | 72 (37.9) | |
| **Total** | 160 (100) | 30 (100) | 190 (100) | |

***Chi Square Test**

41.6% of the elders were with one of the chronic diseases. According to chi-square test and Fisher exact test, percentage of chronic diseases in two groups were not significantly different (p=0.308) (Chart 1).

After adjustment of personal and social variables and the effect of chronic disease, the association of IPIs in the elderly with desirable lifestyle remained significant (p=0.047).

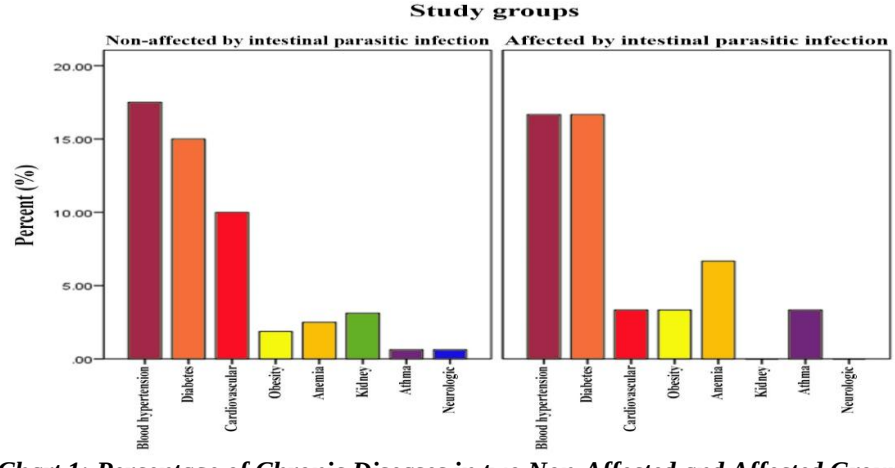


***Chart 1: Percentage of Chronic Diseases in two Non-Affected and Affected Groups***

**Discussion**

In this study, Majority of elders had in general moderate lifestyle and a small percentage had desirable lifestyle and there was no undesirable lifestyle. This finding was in line with the study by Babak [7], Khalili et al. [22] and Movahedi et al. [23] This issue is hopeful and shows that with more training the lifestyle of elders can be improved. The study conducted by Borne et al. [6], reported low performance of elders in regard with lifestyle which was inconsistent with the current study. In this regard, difference between elders' groups based on disease and also the applied tools in the study might have an important role in this inconsistency.

Along with aging, lifestyle score reduces in both elder elder groups affected and non-affected byIPIs. The study by Ataei et al. [24] also shows that age significantly related to lifestyle score of elders. But in the study by Rashedi and Bahrami [25], no significant association was observed between health promoting behaviors and age. It seems that along with increase in age due to muscular dystrophy and disability, lifestyle status becomes worse, by the way, if in ages before old ages, behavior modification is performed in order to increase physical activity, improvement in nutritional status, stress management, improvement in social communications and in general lifestyle, disability caused by elderly reduces.

Several studies showed the associations between IPIs in elders and socio-economic factors including age [16,26] marital status, educational level [16], and income and health status (daily life activities) [27]. However, in the study by Santos et al. [19], no association between these groups of variables, cigarette and alcohol use and infection by IPI was observed.

Living conditions of elders (living alone, living with family and spouse) is one of the other factors related to elder's lifestyle, and this might be due to that elders with spouses preserve higher levels of activity and social communications. In this study, elders who live with their spouse had a higher lifestyle score. The study by Heshmati et al. [5] in elders in Kashmar showed a significant association between lifestyle and living with spouse. The study by Santos et al. [19]. a significant association was observed between infection by intestinal parasites and living with spouse, so that IPI was higher in old men who lived alone.

In the study, according to the study population, people with overweight body mass index and more than 30 had the highest lifestyle score in terms of mean and median.

After management of the effects of personal and social variables and underlying diseases, the association between IPIs in elders with desirable lifestyle remained significant.

The results of the present study showed that there is a significant relationship between lifestyle score and BMI in the elderly.

In the study by Najimi et al. [28] BMI and elder lifestyle score in dimension of physical activity and entertainment are in significant adverse association. The study by Shahnazi et al. [13] observed no significant association between lifestyle score and BMI, which is inconsistent with the current study, and this inconsistency can be due to difference in study populations based on presence or no of disease.

Educational level is among the factors that can associated with elder lifestyle. In the current study, a significant association is observed between educational level and lifestyle, In findings by Babak et al. [7] and Heshmati et al. [5] that education was related to the type of lifestyle.

According to results of the current study, half of the elderly with IPIs were suffering from chronic diseases compared to the non-infected elderly elders with chronic disease had lower lifestyle scores, which is in line with the studies by Babak et al. [7] and Seifzadeh [29].

The findings of the study by Shamsedini et al. [30] in nursing home of Shiraz showed no significant association between chronic disease and elder's lifestyle, which was inconsistent with the current study. This inconsistency might be due to higher prevalence of chronic disease in our population.

The non-affected group had a better lifestyle in terms of exercise, nutrition, and stress management than the affected group, which in this regard, the results of the study by Shahnazi et al. [13] Mahmoudi [31], Babak [7], and Najimi [28] were in line with the current study.

The lack of ability of some elderly people to answer the questions due to not having enough literacy, hearing or vision problems to read the questions, the number of questions in the questionnaire which sometimes made the elderly people tired or impatient were some of the limitations of the research.

One of the strengths of this study is carry of the first comparative study life-style of elders affected and not affected by IPIs in Guilan, North of Iran.

## Conclusion

In the present study, lifestyle scores in the field of exercise, prevention, nutrition and stress management in the two groups of the elderly affected by intestinal parasitic infections and non-affected intestinal parasitic infections are statistically significant. It is recommended to conduct studies in each of the mentioned areas and obtain more accurate and detailed results.

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## Conflict of interest

The authors have no conflict of interest to declare.

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## Authors' contributions

Gholizadeh, Pourghane and Mahmoudi, contributed to the conception and design of the study. Gholizadeh collected the data. Atrkar-Roushan performed data analysis. Gholizadeh, Pourghane and Mahmoudi performed data interpretation. Pourghane evaluated and edited the manuscript.

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