



Connection between Lifestyle and Life Satisfaction of Older Adults in Relation to the Living Environment

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Abstract

Edited by: Sasho Stoleski
Citation: Kaučič BM, Štemberger Kolnik T, Filej B. Connection between Lifestyle and Life Satisfaction of Older Adults in Relation to the Living Environment. Open-Access Maced J Med Sci. 2022 Feb 05; 10(E):790-797. https://doi.org/10.3889/oamjms.2022.8973
Keywords: Older adults; Home environment; Institutional environment; Lifestyle; Life satisfaction
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Received: 12-Feb-2022
Revised: 03-May-2022
Accepted: 06-May-2022
Copyright: © 2022 Boris Miha Kaučič, Tamara Štemberger Kolnik, Bojana Filej
Funding: This research did not receive any financial support
Competing Interests: The authors have declared that no competing interests exist
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BACKGROUND: Physical activity, healthy diet and avoiding risk factors are essential for a healthy lifestyle of older adults and for their life satisfaction.

AIM: The aim of the research was to determine the connection between lifestyle and life satisfaction of older adults in relation to the living environment (home environment, institutional environment).

METHODS: The research was based on a non-experimental quantitative research approach. We used the Oldwellactive standardised questionnaire to obtain lifestyle data and the SWLS scale to determine life satisfaction. The study included 656 older adults with an average age of 78.2 years who lived in a domestic (n = 380) and institutional environment (276).

RESULTS: Older adults living in the home environment rate their lifestyle higher (AV = 2.38, SD = 0.77) than those in the institutional environment (AV = 2.31, SD = 0.88), the difference is not statistically significant (p = 0.304). Eating habits with regard to the location of residence showed statistically significant differences in the consumption of meat, fish and fish products and milk and dairy products (p < 0.001). In the institutional environment, older adults are more likely to perform balance-enhancing exercises, while they consume more alcohol in the home environment. By assessing conditional associations, we establish a positive association between life satisfaction and lifestyle (estimated value = 21,600, p = 0,000). Older adults living in the institutional environment are more satisfied with life ($\bar{X}_v = 23,097$) than those living in the home environment ($\bar{X}_N = 21.774$).

CONCLUSION: The satisfaction of older adults with their life increases if an individual's lifestyle improves. Older adults living in the institutional environment are more satisfied with life than those living in the home environment. In the future, it will be necessary to pay more attention to the study of living in a home environment, in accordance with the strategy of long-term care for the older adults.

Introduction

The basic feature of the demographic future of European society is aging. Every person experiences aging and old age differently. Everyone has their own characteristics and their own lifestyle, everyone also has their own needs. Every older adult can make an important contribution to maintaining and enhancing their health.

Lifestyle characterizes an individual's characteristic way of life, which is determined by a group of distinct behaviors that occur consistently over a period of time. A healthy lifestyle is the basis for health and includes a healthy diet and physical activity and abandons unhealthy lifestyle habits [1]. It is one of the domains of human life satisfaction, which is important for maintaining well-being [2].

The terms healthy aging and successful aging denote a positive attitude toward aging. The terms are synonymous with the satisfaction of older adults with their lives, which is an important driver of life and

an important factor in human personality stability [3]. Life satisfaction depends on experiencing oneself, meeting set goals, ability to cope with daily activities, interpersonal relationships, coexistence, as well as mood and health [4].

Older adults are happy if they maintain their health, which means that they adjust their lifestyle accordingly.

Numerous scientific studies show that older adults aged 65 and over who are physically active have a lower rate of developing many diseases and a lower rate of developing chronic non-communicable diseases than those who are physically inactive [5], [6]. Physical activity has a positive effect on the health of older adults [7], [8], [9], [10], has a beneficial effect on cardiovascular function in people with heart failure [9], improves cognitive function, attention, and memory [7], [8], [9], [10], and has a positive effect on physical and mental health [11].

The Resolution on the National Program on Nutrition and Physical Activity for Health 2015–2025 [12]

states that two-thirds of older adults in Slovenia are not physically active, and the proportion of physically inactive people is the highest among those with the lowest level of education. The proportion of sufficiently physically active people is increasing in Slovenia, but the changes are related to socioeconomic factors. Kaučič and Vidnar [13] found that most older adults perform physical activity independently, one-third perform physical activity with a friend or partner, and less often while socializing with neighbors. Older adults are most often involved in Nordic walking and walking, less often in swimming.

Older adults can improve balance by walking [14], as well as by practicing Pilates and Tai Chi [15], [16], which also prevents osteoporosis and osteoporotic fractures [17]. Otherwise, older adults should be as physically active as their health allows them to be [18].

The nutritional status of older adults is also important for maintaining good health [19]. The diet of an older adult is no different from the diet of the past, but attention should be paid to daily intake and weight management. The latter should be reduced to the recommended amount, in accordance with gender, due to altered metabolism [20].

Nutrition is one of the factors that can endanger the health of older adults as a risk factor, but, on the other hand, it can act as a protective factor that strengthens health and improves the quality of life [21]. Nutrition is, therefore, the basis of preventive medicine and a powerful tool in treatment and the responsibility of us all [22].

Unhealthy eating in old age is an important risk factor for developing chronic non-communicable diseases. Even in old age, healthy eating guidelines should be followed such as five daily meals, which should be properly distributed throughout the day, and not forgetting plenty of fluid intake [20]. Long-lasting malnutrition leads to loss of body strength and weight, weakens the body's immune system, a person becomes confused, disoriented, memory function deteriorates, and the risk of falls increases. Kimura *et al.* [23] found that older adults who ate alone did not have a varied diet, while Nykä *et al.* [24] suggested that older adults in the local community are at a greater risk of malnutrition.

Factors that negatively affect the health of older adults are excessive alcohol consumption and smoking. There are several causes for excessive drinking in old age. One is certainly related to the loss of a partner or the deterioration of the socioeconomic situation. Changing the environment, migration from the home environment to the institutional environment, has also proven to be a trigger for harmful alcohol consumption in later years. To prevent this, proper education is required and a social network in which drinking alcohol is not a habit. Chronic health problems have also been shown to be a factor in protecting against excessive drinking in old age [25].

Those who also drink mostly tend to smoke [26]. Cigarette smoke is just as harmful to health as alcohol, but there is a significant difference between them. Alcohol only harms the user's on the health of the user, while tobacco smoke also has a negative effect on non-smokers in the environment [27]. Koprivnikar [28] states that it is predominantly men who smoke and that the proportion of smokers decreases with age and that the lowest proportion of smokers is aged 61 and over.

The aim of our research was to determine the connection between lifestyle and life satisfaction of older adults in the home and in the institutional environment. Based on the definition of the research problem, we formulated a research question: What is the relationship between lifestyle and life satisfaction of older adults, considering their living environment?

Methods

Research method

We used a quantitative research approach, a method of description, compilation, and a causal non-experimental research method.

Measuring instrument

To obtain lifestyle data, we used a standardized questionnaire, "A self-rated wellness profile for the assessment of wellbeing and wellness activity in older people" (Oldwellactive) by Koistinen *et al.* [29] which include a set of questions on the lifestyle of older adults. The questionnaire consisted of 12 questions and one statement. The questions were closed and structured, which means that the respondents were also able to provide the numerical answer that applies to them. Respondents rated the claim on a 5-point scale (1 – very good, 2 – fairly good, 3 – neither good nor bad, 4 – bad, and 5 – very bad). Oldwellactive was translated into Slovenian and validated. We followed the double translation process.

We used the Satisfaction with Life Scale (SWLS) [30], which comprises five claims, to assess satisfaction with life. Respondents agreement with the statements was assessed on a 7-point scale (1 – strongly disagree, 2 – disagree, 3 – partly disagree, 4 – neither agree nor disagree, 5 – partly agree, 6 – agree, and 7 – strongly agree). Respondents who completed the scale were able to score 5–35 points, with a range of points representing very high life satisfaction (30–35 points), high life satisfaction (25–29 points), average life satisfaction 20–24 points), below-average life satisfaction (15–19 points), dissatisfied (10–14 points), and very dissatisfied (5–9 points). The SWLS scale was translated into Slovenian and validated. We followed the double translation process.

We previously obtained the permission of the authors to use both questionnaires. We added questions about the demographic data of older adults to the combined questionnaire.

Smoking and alcohol drinking are risk factors within the lifestyle. The scale of issues related to smoking and drinking alcohol was reversed so that those who smoke and consume alcohol were assigned lower values than those who do not. Based on the literature review, we proceeded from the thesis that older adults who do not smoke or drink have a healthier lifestyle.

Sample and demographics

We used a simple random sample and decided on stratified sampling by region. In accordance with the size of the population 65 years and older, we selected proportional stratification by statistical regions (sample sizes in strata are proportional to stratum sizes). Creative Research Systems, Sample Size Calculator [31] was used to calculate the sample.

The study included 1064 older adults, taking into account, the following inclusion criteria were as follows: Age 65+, male and female, region of residence, location of residence (home environment and institutional environment), without dementia and other mental disorders, ability to communicate, and reading literacy.

The survey involved 656 respondents with an average age of 78.2 years, mostly widowed persons, of which 33.9% had a high school education. The demographic characteristics of the surveyed older adults are shown in Table 1.

Table 1: Demographic characteristics of respondents by gender, marital status, education, and age

Demographic factor	n = 656	%
Sex		
Men	186	28.4
Female	470	71.6
Marital status		
Married	246	37.5
Single	48	7.3
Widowed	302	46.0
Separated, alienated	43	6.6
Non-marital partnerships	17	2.6
Education		
Primary school	132	20.1
Professional	146	22.3
Secondary	229	33.9
Higher, higher education	97	14.8
University and more	52	7.9
	AV ± SD	Range
Age (in years)	78.2 ± 8.0	65–98
Location of residence		
Home environment	380	57.9
Institutional environment	276	42.1

Data collection process

The research was conducted in 21 social welfare institutions (institutional environment), in 10 statistical regions and in the home environment of older adults. Respondents were randomly selected and met the inclusion criteria. We distributed 532 survey questionnaires in each environment, which accumulated

to a total of 1064. There were 656 correctly completed questionnaires, which mean that sample realization was 61.6%, and it was 57.9% in the home environment, which indicates a better health status of older adults.

Forty-three interviewers participated in the data collection. Respondents needed an average of 45 min to complete the questionnaire in their home environment and up to 120 min in social welfare institutions. Correctly completed questionnaires were encrypted (ID determined) and the data were entered into the data entry matrix (Excel).

Data analysis process

The data were analyzed using descriptive and inferential statistics methods. First, we calculated mean values (arithmetic mean) and variability measures (standard deviation) for the variables. Sets of individual variables were combined into new variables. When inferring from the sample to the population (inference), we performed statistical tests, such as the t-test (to compare the averages of two independent groups), the ANOVA test (to compare the averages of several groups), and the Chi-square test (to test the independence of nominal variables). The analysis was performed with the SPSS 22.0 software. The conditional association assessment complements the t-test results in the analysis. We first used the t-test to check whether there was a statistically significant difference between the two groups. Then, we used a simple linear regression to assess the association between individual index and life satisfaction. To be able to show the desired effects or connections, we used advanced statistical methods to analyze causal effects and conditional associations, the so-called propensity score methods [32]. Propensity methods are designed to analyze associations or causal effects on balanced study designs that allow for the comparison of two statistically comparable groups.

Ethical aspect of research

Before the research, we obtained the consent for exogenous research from the Commission for Scientific Research, which assessed that the research and the measuring instrument take into account all ethical aspects of research and are appropriate for conducting research among older adults.

Results

Below, we will present the results of indices that affect the lifestyle of older adults in relation to the living environment and thus their satisfaction with life.

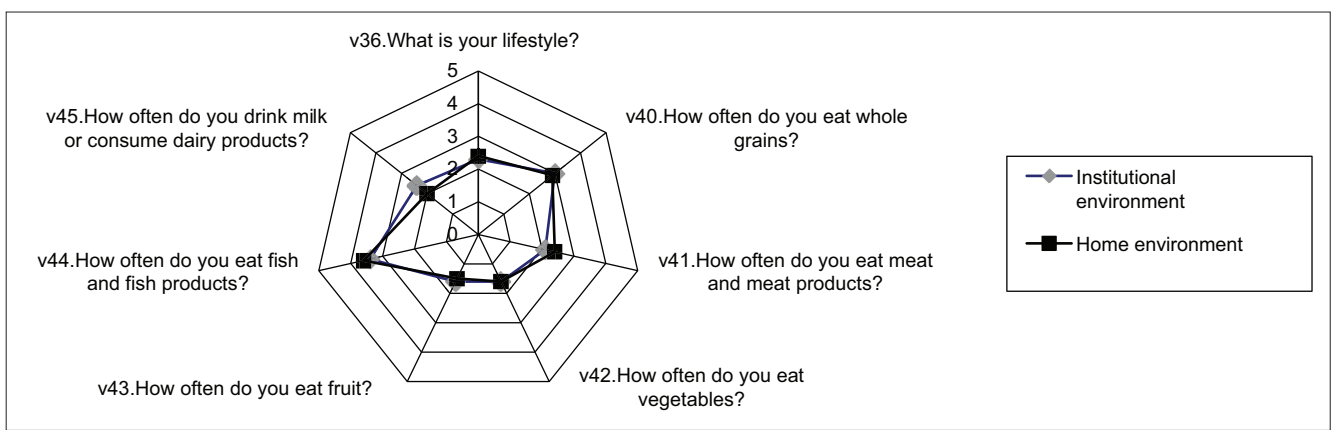


Figure 1: The lifestyle of older adults according to Oldwellactive in regard to the living environment. 1: Very good; 2: Fairly good; 3: Neither good nor bad; 4: Poor; 5: Very poor (v36: lifestyle of older adults), 1: Daily; 2: Almost daily; 3: At least once a week; 4: Rarely; 5: Never (for v40-v45: eating habits of older adults)

Figure 1 shows that older adults living in an institutional environment rate lifestyle with AV = 2.31 (SD = 0.88) and those living at home with AV = 2.38 (SD = 0.77). The analysis of the data did not show statistically significant differences in lifestyle in accordance with the location of residence (p = 0.304).

On average, older adults consume whole grain products at least once a week and there is no major difference depending on their location. There is a statistically significant difference in the consumption of meat and meat products. Specifically, older adults in the institutional environment eat meat and meat products more often than older adults in the domestic environment (p < 0.001). There is no statistically significant difference in the consumption of vegetables and fruits, as older adults eat fruits and vegetables almost daily regardless of the living environment. Older adults enjoy fish and fish products at least once a week in an institutional setting. A comparison between the average values in accordance with the living environment shows a statistically significant difference (p < 0.001) in the frequency of consumption of fish and fish products. Older adults consume less of these products in the home environment (AV = 3.63). There is also a statistically significant difference in the consumption of milk and dairy products; older adults consume the latter daily in the home environment and slightly less in the institutional environment (Table 2).

Table 3 shows that 38 (5.8%) older adults smoke daily and 21 (3.2%) occasionally. A total of 594 (91%) older adults in the sample never smoke.

A total of 110 (16.8%) older adults consume alcohol daily. More than half of older adults consume

alcohol infrequently or never. Pertaining to the living environment, Table 4 shows that older adults consume more alcohol in the home environment (p = 0.001).

Table 5 shows that balance-enhancing exercises are more frequent in the institutional environment (p = 0.001). A total of 284 (43.7%) older adults perform balance-enhancing exercises daily and 112 (17.2%) perform them on a weekly basis.

After the alignment process was completed, it could be determined that there were differences in life satisfaction between those with a high level of the index (\bar{x}_v) and those with a low index level (\bar{x}_n) were assessed on matched data. Welch's t-test was used to compare the harmonized sample between individuals with a high and a low lifestyle index and indicated that there is a statistically significant difference between the groups (Table 6). Results shown in the table lead to the conclusion that those who have a high lifestyle index are more satisfied with life ($\bar{x}_v = 24,280$) than those with a low lifestyle index ($\bar{x}_n = 21,190$). Despite the statistically significant difference, the average values of life satisfaction of both groups fall into the same Diener category of life satisfaction, which is the average value of life satisfaction (20–24 points). However, it is also true that the group with a higher level of lifestyle is on the verge of the next Diener's category, high value of life satisfaction, while the group with low lifestyle value only slightly crossed the threshold between the category of below average and average life satisfaction in old age.

The effective sample used in the analysis of this index was 422 (64.33%). Based on the calculation of the confidence interval, it can be seen that there is a

Table 2: Eating habits of older adults, depending on the location of residence

Question	Institutional environment, n = 276		Home environment, n = 380		t	p
	AV	SD	AV	SD		
v40 – How often do you eat whole grains?	2.99	1.28	2.90	1.22	0.966	0.335
v41 – How often do you eat meat and meat products?	2.07	0.93	2.39	0.74	-4.848	<0.001
v42 – How often do you eat vegetables?	1.57	0.74	1.60	0.72	-0.455	0.649
v43 – How often do you eat fruit?	1.58	0.85	1.54	0.83	0.574	0.566
v44 – How often do you eat fish and fish products?	3.42	0.82	3.63	0.71	-3.503	<0.001
v45 – How often do you drink milk or consume dairy products?	2.44	1.44	2.01	1.17	4.120	<0.001

AV: Average value, SD: Standard deviation, t: Test for independent samples, p: Statistical probability.

95% chance that the difference between the groups will be in the interval [2.001, 4.179], as shown in Table 6.

Based on the results of conditional association assessments, we find a positive association between life satisfaction and lifestyle (Table 7). When an individual's lifestyle improves while all other factors remain unchanged, the individual's satisfaction with life increases.

Table 3: Frequency of smoking among older adults

Reply	Total
Never	
n	594
%	91.0
Occasionally	
n	21
%	3.2
I smoke on a daily basis	
n	38
%	5.8
Total	
n	653
%	100.0

χ^2 : Xi square; p: Statistical probability; n: Number; % share, $\chi^2 = 4.183$; p = 0.123

Discussion

The research found that lifestyle is assessed higher by older adults living at home, but otherwise there is no statistically significant difference in lifestyle depending on the location of residence. There are statistically significant differences in the eating habits of older adults with regard to the location of residence. Specifically, older adults in the institutional environment eat more meat and meat products, they eat more fish and fish products, while they eat milk and dairy products more often in the home environment. We also find that most older adults do not smoke and that they consume more alcohol in the home environment, and that older adults in the institutional environment perform exercises to strengthen balance more often. Our research also confirmed that life satisfaction increases if an individual's lifestyle improves and that older adults who live in an institutional environment are more satisfied with life.

Similarly, other researchers have studied the association between lifestyle and life satisfaction of older adults. Those who are more physically active, eat more fruits and vegetables, do not smoke or drink alcohol, and consume less fat are more satisfied with life [2]. Those who are more physically active are also more satisfied with life [33].

Life satisfaction is strongly associated with present health problems, which may be the result of an inappropriate lifestyle [34], [35]. With a changed lifestyle,

Table 6: Welch t-test lifestyle index

Lifestyle	\bar{X}_V	\bar{X}_N	95% confidence interval difference between \bar{X}_V and \bar{X}_N	p-value	Preserved n (effective n)
Welch t-test of comparison of two samples	24.280	21.190	[2.001, 4.179]	0.000	64.33% n = 422

\bar{X}_V : High level of index; \bar{X}_N : Low level of index.

Table 4: Frequency of alcohol consumption among older adults in accordance with the living environment

Frequency	Living environment		Total
	Institutional environment	Home environment	
Daily			
n	27	83	110
%	9.8	21.8	16.8
Weekly			
n	49	49	98
%	17.8	12.9	15.0
Monthly			
n	8	23	31
%	2.9	6.1	4.7
Rarely			
n	81	145	226
%	29.5	38.2	34.5
Never			
n	110	80	190
%	40.0	21.1	29.0
Total			
n	275	380	655
%	100.0	100.0	100.0

χ^2 : Xi square; p: Statistical probability; n: number; % share, $\chi^2 = 42.898$; p = 0.001.

including healthy diet and physical activity, we can influence the promotion of healthy aging and improve the quality of life of older adults [36], and improve life satisfaction in old age. A healthy, balanced diet, regular and moderate physical activity, connection with the environment, less stress, and maintaining mental health are the keys to a healthy and active old age [37].

Table 5: Frequency of balance exercises among older adults

Frequency	Environment		Total
	Institutional environment	Home environment	
Daily			
n	147	137	284
%	53.6	36.4	43.7
Weekly			
n	47	65	112
%	17.2	17.3	17.2
Monthly			
n	1	5	6
%	0.4	1.3	0.9
Rarely			
n	47	91	138
%	17.2	24.2	21.2
Never			
n	32	78	110
%	11.7	20.7	16.9
Total			
n	274	376	650
%	100.0	100.0	100.0

χ^2 : Xi square; p: Statistical probability; n: Number; % share, $\chi^2 = 23.756$; p = 0.001.

Hughes *et al.* [38] stated that physical activity has a positive effect on the health of older adults, specifically affecting functional ability, thus reducing the risk factors for disability. The positive effect was observed after five and then after 10 months. The positive effects of physical activity were also found by Carnivet *et al.* [7] and Gajewski and Falkenstein [8] to be that regular physical activity improves cognitive function by improving attention and memory. Tai Chi also positively influences the cognitive system [39], [40]. Kaučič [20] notes that older adults more often perform exercises to strengthen balance in an institutional environment, where there are organized exercise sessions and professionally trained staff, which further encourages older adults to engage in physical

Table 7: Assessment of the conditional association (connection) between lifestyle and life satisfaction of older adults

	Estimated value	Standard error	p-value	Preserved n (effective n)
Lifestyle	21.600	3.095	0.000	64.33% n = 422

activity and raises their awareness of the importance of physical activity to prevent falls, which negatively affect life satisfaction.

Diet also has a positive effect on the health of older adults and thus on their life satisfaction. Tourlouki *et al.* [41] found that longevity is positively influenced by the Mediterranean diet, midday sleep, and non-smoking. The positive impact of the Mediterranean diet on health has also been noted by Elhayany *et al.* [42]. They have shown that lower carbohydrate intake has the effect of lowering cholesterol, thus reducing the risk of cardiovascular disease. Djoussé *et al.* [43] studied the impact of a diet containing three fatty acids and found a lower mortality rate in patients with heart failure.

Physical activity, diet, alcohol consumption and smoking, or the lifestyle of older adults affect the quality of life and their satisfaction with life in old age. Daily physical activity and a balanced diet provide well-being and maintain and strengthen health in old age [44].

Physical activity and eating habits are key factors in healthy aging, enabling older adults to maintain physical and mental health and protecting them from chronic diseases [11]. All of this contribute to the quality of life in old age, as confirmed by the resolution on the National Nutrition and Physical Activity Program 2015–2025 [12], which states that healthy eating and regular physical activity are key factors in protecting and promoting health, a better quality of life, and the sustainability of health systems. On the one hand, there is the problem of overweight and obesity due to an unhealthy diet, insufficient physical activity, and occupancy, and on the other hand, frequent malnutrition and fragility among older adults. Older adults who have a good lifestyle are more satisfied with life in old age. Based on the results of conditional association assessments, we find a positive association between life satisfaction and the lifestyle of older adults.

Quality of life is determined by economic and social factors, as well as by the biological and individual characteristics of the older adult. Our research has shown that living conditions have a significant impact on quality of life and are related to life satisfaction.

Limitation of research

The conducted research has its main limitations in the chosen methodology, as we did not use triangulation, which would allow the study of the research problem from different angles. The measurement instrument was very extensive and relatively complex to fulfill in the institutional environment, resulting in a lower realization of the sample in this environment.

The response of the stratified sample (61.6%) is also a limitation, as we cannot know whether the sample we analyzed is the same as the total sample selected. Despite the fact that the sample is not representative, based on the analysis, the results can be extrapolated to the general population of older adults, as the analysis was made on the basis of balanced data.

Conclusion

Satisfaction with the lives of older adults is conditioned by physical, mental, and cognitive functions. A healthy diet and regular, moderate physical activity affect healthy and active aging in the absence of risk factors, which contributes to the greater sustainability of the health system. A healthy balanced diet is an important element of a healthy lifestyle that has a significant impact on the prevention of chronic non-communicable diseases and risk factors. Regular physical activity also enables older adults to socialize, which means that their social isolation and loneliness in old age are prevented. We, therefore, find that older adults with a healthy diet who avoid risk factors and engage in physical activity maintain greater functional capacity, which allows them greater autonomy and greater satisfaction with life.

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