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Health locus of control and sociodemographic factors in older adults: Insights from exercise programs – Cross-sectional study

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ABSTRACT

Introduction: Aging is an inherent and progressive process affecting all living organisms, characterized by physical, mental, and psychological changes. With the societal changes that involve rapid information exchange, there is also a change in the behavior of older individuals. The aim of this study is to analyze the level of health locus of control in older adults participating in exercise programs and its association with certain sociodemographic factors.

Methods: This cross-sectional study was conducted from November 2018 to March 2019. A total of 200 individuals aged 65 and older, who were participating in free exercise programs, were included. Among them, 190 were female, and only 10 were male. For the purposes of this study, the Health Locus of Control Scale (Croatian- ZLK-90) and a general questionnaire on demographic characteristics were used. The questionnaire was completed in a traditional pen-and-paper format.

Results: The results of the Health Locus of Control Scale revealed that, among the respondents, the Eo scale (Circumstances) component had the highest median score of 21.00, while the Evd scale (Important Others) showed the lowest median at 18.00. Furthermore, the findings indicated statistically significant differences in certain subscales of the Health locus of control scale. Specifically, there was a significant difference in the Eo scale (Circumstances) associated with the respondents' level of education, with the highest ranks found among individuals with the lowest education level. A statistically significant difference was also observed in the factor related to respondents' living arrangements, demonstrating a significant variation in the I scale (Internal Locus) for those who live alone.

Conclusion: This study unveiled the health-related locus of control level and its correlation with demographic characteristics in older adults engaged in exercise programs. The findings provide valuable insights into the relationship between the health locus of control and specific traits of the active older population.

Keywords: Older adults; exercise; health locus of control

INTRODUCTION

Aging is an inherent and progressive process affecting all living organisms, characterized by physical, mental, and psychological changes. The global population is rapidly aging, with a significant increase in those aged 85 and older, creating a need to focus on healthy aging (1-4). Contemporary demographic data indicate a remarkable trend – the fastest-growing segment of the global population consists of individuals aged 85 and older, with an anticipated twelvefold increase by 2025. The number of centenarians (individuals aged 100 and older) is projected to grow by a factor of fifteen, surging from the present 210,000 to 3.2 million (2,3).

As a consequence of these demographic shifts, it is estimated that by 2030, one in six individuals will be aged 60 or older (4). While older adults face higher rates of chronic diseases, advancements in medicine enable them to maintain independence. However, the quality of life in old age depends on health and functional abilities (1,5-7). Prolonged life is a welcome outcome, but if it does not correspond with good health it can place a significant burden on the elderly themselves, their families, and society as a whole (8). Achieving successful aging is not only a matter of health but also a critical social and socioeconomic priority. Physical activity offers numerous health benefits for older individuals, but participation in exercise programs remains low. Despite the known advantages, many older adults are not engaging in regular exercise, impacting their health and quality of life (9-21).

Locus of control, a concept introduced by Rotter, plays a role in health behaviors. It distinguishes between internal

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and external locus of control, which can influence health outcomes (22-24). With the societal changes that involve rapid information exchange, there is also a change in the behavior of older individuals. The goal of this study is to assess the health locus of control in older adults engaged in exercise programs and to investigate its relationship with specific sociodemographic factors. This will be achieved through the use of the Health Locus of Control Questionnaire and a general demographic questionnaire.

METHODS

Data collection took place at locations where free exercise programs for older adults were offered in Novi Zagreb. The study included 200 participants involved in exercise programs. The questionnaire was accompanied by a statement guaranteeing the anonymity of the shared information. Participation was voluntary. The study was approved by the Ethics and Research Committee of the Institute of Public Health "Andrija Štampar" in Zagreb. A general demographic questionnaire was utilized to gather information about age, education, participant's financial status, and living arrangements. The Health Locus of Control Questionnaire (Croatian - ZLK-90) was also employed. The HLCQ-90 is intended to examine beliefs about personal health, that is, the perceived source of health control, and the factors that influence it, for the purpose of predicting health behavior. The questionnaire has been adapted to our population and consists of four scales. Three scales explore an individual's beliefs about external factors that affect health, namely: (1) the influence of significant others on the individual (Evd scale); (2) the influence of chance, fate, and God (Es scale); and 3) the influence of circumstances (Eo scale). The fourth scale examines beliefs about personal (internal) factors on which an individual's health depends (I scale). The questionnaire comprises 32 questions (eight questions for each scale). Four answers are provided for each question, indicating different degrees of belief. The response "I do not believe at all" carries 1 point, "I mostly do not believe" 2 points, "I mostly believe" 3 points, while the response "I believe completely" carries 4 points. Each scale is scored separately, and the final result is interpreted accordingly, reflecting the expression of internal factors (I scale) and external factors (Evd Scale, Eo Scale, Es Scale). The assessment of responses is objective and quantitative (25).

Descriptive parameters were calculated for all quantitative variables: mean, standard deviation, median, and interquartile range. The normality of the distribution was tested using the Kolmogorov-Smirnov test. Non-parametric procedures were conducted for categorical variables such as gender, education, and marital status. To examine the relationships between the observed factors, we conducted the Spearman correlation coefficient. The significance limit was set at $p < 0.05$.

RESULTS

The study included 200 participants aged between 65 and 86 years. When divided by gender, 95.0% (n = 190) of the participants were female, and 5.0% (n = 10) were male, with no gender-specific analysis conducted in this work.

Regarding the age distribution of the participants, the youngest participants were 65 years old, and the oldest were 86 years old. The largest group, comprising 34.0% (n = 68) of participants, were aged 65–69 years, 26.5% (n = 53) were aged 70–74 years, 25.5% (n = 51) were aged 75–79 years, and the smallest group, accounting for 14.0% (n = 14) of participants, were in the oldest age group, aged 80 years and above.

Regarding the educational level of the participants, only 9.0% (n = 18) had completed elementary school, 50.5% (n = 101), had completed a high school, and 40.5% (n = 81) had a College/MSc or PhD degree. In response to the question, "How do you assess your financial status?'" 21.5% (n = 43) reported it as worse than average, the majority of participants, 57.5% (n = 115), reported it as average, while 21.0% (n = 42) reported it as better than average. In response to the question about who they live with within their household, the majority of participants, 45.5% (n = 91), reported living alone, 36.0% (n = 72) reported living with a partner, and the smallest number of participants, 18.5% (n = 37), reported living with their extended family (Table 1).

Regarding the Health Locus of Control, the highest mean values of respondents' answers were recorded for the following questions: *Do you believe that the damaged environment (polluted air, water, food) continuously harms your health*? Here, the mean of respondents' answers is 3.36, with a standard deviation of 0.63. *Do you believe that the results of treating any illness depend at least as much on you as on the doctor or therapy?* The mean of respondents' answers is 3.22, with a standard deviation of 0.57. *Do you believe that you will maintain your health by paying attention to what and how much you eat?* The mean of respondents' answers is 3.11, with a standard deviation of 0.63.

The lowest mean values of respondents' answers were recorded for the following questions: *Do you believe that your hygiene habits can protect you from most diseases?* Here, the mean of respondents' answers is 1.76, with a standard

TABLE 1. Respondent's characteristics

Variable	Number of respondents	% (n=200)
Gender		
Male	10	5.0
Female	190	95.0
Age		
65–69	68	34.0
70–74	53	26.5
75–79	51	25.5
80 +	28	14.0
Education		
Elementary school	18	9.0
High school	101	50.5
College/MSc or PhD	81	40.5
Perceived financial status		
Worse than average	43	21.5
Average	115	57.5
Better than average	42	21.0
Living arrangements		
Alone	91	45.5
With a partner	72	36.0
With extended family	37	18.5

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deviation of 0.69. *Do you believe that most of the diseases you can contract are best treated by herbalists?* The mean of respondents' answers is 1.79, with a standard deviation of 0.72. *Do you believe that most diseases are best treated by bioenergy therapists?* The mean of respondents' answers is 1.81, with a standard deviation of 0.68. *Do you believe that you will maintain your health if you pay attention to what you do and how you live?* The mean of respondents' answers is 1.84, with a standard deviation of 0.60. *Do you believe that it would be much better for your health if your workplace (school, college) organized regular check-ups?* Here, the mean of respondents' answers is also 1.84, with a standard deviation of 0.60 (Table 2).

Through an analysis of medians and interquartile range of the components of the Health Locus of Control questionnaire in the total sample, the Eo scale (Circumstances) had the highest median of 21.00. Following that, the Es scale (Chance/Fate) had a median of 20, and the I scale (Internal Locus of Control) had a median of 19. The lowest median in the total sample was observed for the Evd scale (Significant Others), which was 18 (Table 3).

In the obtained results, when looking at the significance level of the Kruskal-Wallis test for education in the Eo scale (Circumstances), it can be observed that the test's significance is <5%. In other words, there is a statistically significant difference with respect to the respondents' level of education. The rank values were significantly higher for respondents with a low level of education, as seen during the testing of medians and interquartile range. Furthermore, when examining the significance level of the Kruskal–Wallis test with respect to the age of the respondents, it can be noted that there is no statistically significant difference in the assessed Health locus of control scales based on the age of the respondents. Also, when considering the significance level of the Kruskal–Wallis test with respect to the financial status of the respondents, it can also be observed that there is no statistically significant difference in the assessed Health locus of control scales based on the financial status of the respondents. However, when looking at the significance level of the Kruskal–Wallis test with respect to the household composition of the respondents, it can be noticed that for the I scale (Internal Locus of Control), the test's significance is <5%. In other words, there is a statistically significant difference with respect to the composition of the household. The rank values were significantly higher (the indicator value was the highest) for respondents who live alone (Table 4).

DISCUSSION

The global population of elderly individuals in developed countries is steadily increasing, with a particular surge in

TABLE 2. Respondent's average Health locus of control score

Health locus of control questions	$\bar{x}$	SD
Do you believe that doctors can cure most diseases you can get?	2.91	0.51
Do you believe that you don't need to take special care of your health because what is destined to happen to you will happen anyway?	2.92	0.91
Do you believe that you can preserve your health by paying attention to what and how much you eat?	3.11	0.63
Do you believe that a damaged environment (polluted air, water, food) continuously harms your health?	3.36	0.63
Do you believe that you can find the most useful health advice and guidance in various magazines and newspapers?	2.98	0.67
Do you believe that your health is in God's hands?	2.54	0.99
Do you believe that you can preserve your health by being mindful of what you do and how you live?	1.84	0.60
Do you believe that daily difficulties you face (at work or in your family) endanger your health?	2.21	0.81
Do you believe that, regardless of what you get sick with, your family's advice is extremely important for your recovery?	2.78	0.73
Do you believe that you don't need to worry about your health because good and bad health depends on genetics?	2.03	0.85
Do you believe that you can protect yourself from various diseases by knowing more about their causes?	2.25	0.85
Do you believe that having more free time would make your health less vulnerable?	2.90	0.86
Do you believe that most diseases are most successfully treated by bioenergetics?	1.81	0.68
Do you believe that your health is purely a matter of luck?	2.85	0.91
Do you believe that the results of treating any illness depend at least as much on you as on the doctor or therapy?	3.22	0.57
Do you believe that every social change (e.g., political upheaval) negatively affects your health?	2.55	0.96
Do you believe that when you're sick, you should seek advice from friends, colleagues, acquaintances, or neighbors?	2.19	0.90
Do you believe that with God's help, you can recover from any illness?	2.37	1.02
Do you believe that your hygiene habits can protect you from most diseases?	1.76	0.69
Do you believe that people who irritate you are harmful to your health?	2.04	0.83
Do you believe that most diseases you can get are most successfully treated by herbalists?	1.79	0.72
Do you believe that almost all the illnesses you've had are the result of chance?	2.72	0.89
Do you believe that, regardless of what you get sick with, how quickly you recover depends on you?	2.04	0.69
Do you believe that every change in weather endangers your health?	2.47	0.85
Do you believe that health-care professionals know best what's good for your health?	2.08	0.52
Do you believe that you always find yourself in a place where there are people who are cold or sick?	2.07	0.91
Do you believe that you can best preserve your health by regularly going for check-up examinations?	2.91	0.51
Do you believe that you can't preserve your health if you have to wait for a doctor's appointment for 2–3 h?	2.97	0.17
Do you believe that it would be much better for your health if your workplace (school, college) organized regular check-up examinations?	1.84	0.60
Do you believe that unpleasant news in newspapers, on the radio, or television harms your health?	2.55	0.99
Do you believe that your hygiene habits can protect you from most diseases?	2.15	0.91
Do you believe that people who irritate you are harmful to your health?	2.44	0.96

$\bar{x}$- Arithmetic mean, SD: Standard deviation

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TABLE 3. Display of medians and interquartile range for health locus of control in the total sample

Variable	Median (interquartile range)		
I scale (internal locus of control)	19.00	18.00	20.00
Evd scale (significant others)	18.00	17.00	20.00
Es scale (chance/fate)	20.00	18.00	22.00
Eo scale (circumstances)	21.00	20.00	22.00

TABLE 4. Test statistics for observed factors: Education, age, financial status of respondents, and household composition of respondents

Variable	Kruskal–Wallis H	df	Asymp. Sig.
Education			
I scale (internal locus of control)	1.055	2	0.590
Evd scale (significant others)	4.432	2	0.109
Es scale (chance/fate)	1.631	2	0.443
Eo scale (circumstances)	11.236	2	0.004
Age			
I scale (internal locus of control)	0.863	3	0.834
Evd scale (significant others)	5.243	3	0.155
Es scale (chance/fate)	5.384	3	0.146
Eo scale (circumstances)	4.072	3	0.254
Financial status			
I scale (internal locus of control)	0.018	2	0.991
Evd scale (significant others)	0.220	2	0.896
Es scale (chance/fate)	0.208	2	0.901
Eo scale (circumstances)	0.410	2	0.815
Household composition			
I scale (internal locus of control)	11.282	2	0.004
Evd scale (significant others)	3.550	2	0.169
Es scale (chance/fate)	1.636	2	0.441
Eo scale (circumstances)	5.068	2	0.079

a. Kruskal–Wallis Test; b. Grouping variable: Education; c. Grouping variable: Age; d. Grouping Variable: Financial status of respondents; e. Grouping Variable: Household composition of respondents

the number of those who remain functionally active and independent well into their 80s and beyond (2). To cater to the needs of this growing demographic, there is a demand for services that allow older individuals to maintain their activity and independence for as long as possible. The objective of this research was to investigate psychosocial factors and their potential connection to the health locus of control in older individuals who are engaged in exercise programs.

The research took place in the Novi Zagreb area, where a significant portion of the current retirees had migrated as a working population. Many had not spent their childhood in Novi Zagreb, which until about two decades ago, was primarily considered a "bedroom community." Back then, people would return home to Novi Zagreb after working on the other side of the Sava River. Despite its size and population, the area lacked cultural and entertainment amenities, with not a single cinema to its name. These unique aspects of the area make it an intriguing location for studying the connection between psychosocial factors and health perceptions in older individuals participating in exercise programs (26,27).

The research involved 200 retirees from the Novi Zagreb area. All the respondents lived independently outside of retirement homes and took part in exercise programs,

which were part of the extramural care offered by the City of Zagreb. Notably, the majority of participants were women, comprising 95% (n = 190), with only 10 men (5%). Therefore, a gender-based analysis was not conducted in the study, and the term "retirees" is used to encompass both genders. Although cultural studies from around the world have produced mixed results regarding the participation of individuals in physical activities based on gender, it's evident that this region displays a notable gender disparity in exercise program participation (28-32).

One of the key findings was the correlation between education levels and exercise program participation. The results indicated that the majority of participants had a high school educational background, making up 50.5% (n = 101) of the sample, followed by individuals with higher and advanced educational qualifications at 40.5% (n = 81). The smallest group included those who had not completed high school, making up just 9.0% (n = 18). These findings were in line with research showing that individuals with higher levels of education are more likely to engage in exercise programs (29-32). In terms of age distribution, most participants were in the 65–69 age group, accounting for 34.0% (n = 68), while the smallest cohort was aged 80 and older, representing 14.0% (n = 28). This broad age range allowed for insights into various generational perspectives on health.

The obtained results of the average scores for Health Locus of Control items, collected from the 200 participants, were revealing. Notably, participants attributed the most significant influence on their health to external factors, such as environmental conditions, with a score of 3.36 (Eo scale). Similarly, they believed that their active role in treatment had a considerable impact on their health, with a score of 3.22 (I scale). However, when it came to their hygiene habits protecting them from diseases, participants scored relatively lower at 1.76 (I scale). Moreover, participants had less trust in traditional healing methods, with scores of 1.79 for herbalists and 1.81 for bioenergetic therapists (Evd scale).

The results reflected the findings of previous studies, with distinctions in the health locus of control beliefs of participants. Some studies found that individuals generally believed in external factors having the most influence on their health, with the equal importance of luck/fate and personal strengths, while they assigned less significance to the role of other people (33). However, other studies demonstrated differences, indicating that participants primarily attributed their health to their personal strengths, followed by the influence of other people, with external circumstances playing a less influential role (34,35). These varying results underline the importance of cultural and regional differences in understanding the health locus of control.

Furthermore, educational levels played a significant role in shaping participants' health beliefs. Participants with lower educational backgrounds appeared to lean more toward external influences having a greater impact on their health. Conversely, individuals with higher educational qualifications exhibited a more internal locus of control, believing their personal strengths played a more critical role in maintaining their health. These findings matched those of Petriček and colleagues, who noted similar patterns among patients with ischemic heart disease (33).

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Interestingly, the study did not establish a significant connection between age and health locus of control. This contrasted with some previous research that indicated a positive correlation between older age and an internal locus of control (36). The results emphasize the multifaceted nature of health beliefs and the need for further investigation into this intricate relationship. The impact of health locus of control on health is a topic of growing interest. Studies have shown a significant association between a high level of reliance on external factors, such as luck or fate, and inadequate health behavior (37). Moreover, individuals with lower socioeconomic status and financial means tend to adopt a more sedentary lifestyle, negatively affecting their health (38,39).

Conversely, those with a more internal locus of control and higher socioeconomic status tend to enjoy better health, even when facing chronic illnesses and stress (40,38). To further understand these relationships, exploring the influence of health beliefs on different segments of the population is crucial.

In this context, the composition of households was another factor of interest. The participants were divided into three categories based on their living arrangements: those who lived alone 45.5% (n = 91), those living with a partner 36.0% (n = 72), and those living with their extended family 18.5% (n = 37). The research results revealed a statistically significant difference in the I scale based on household composition, with notably higher rank values for participants living alone. This categorization provided valuable insights into the potential impact of one's living situation on their health beliefs. Remarkably, these findings are consistent with a 2000 study (39) that identified similar living arrangements among retirees in the region, and they align with other relevant studies (41-44).

The study specifically explored the connection between health locus of control and living arrangements, with a particular focus on those living alone. The findings indicated a significant difference in health beliefs among these groups, with individuals living alone scoring higher in health locus of control. This observation suggests that living alone may encourage a more internal locus of control, emphasizing the significance of personal strengths and behaviors in shaping health outcomes. These results provide valuable insights into the factors influencing health beliefs, highlighting the intricate interplay between living arrangements and individual health perceptions.

CONCLUSION

This study has provided valuable insights into the intricate relationship between psychosocial factors and the health locus of control among older individuals participating in exercise programs. The findings have underscored the significance of educational background and living arrangements in shaping health beliefs. A comprehensive understanding of these factors and their implications is crucial for promoting healthy behaviors and enhancing the well-being of older individuals. Further research encompassing diverse regions and demographic groups will offer a more complete comprehension of these relationships. These findings endorse the implementation of exercise programs targeting

socioeconomically disadvantaged groups as a preventive measure against the adverse effects of lower socioeconomic status on health. It is evident that there are variations in health locus of control beliefs among different populations and health conditions. To develop programs that will engage a larger number of older adults, a thorough understanding of various psychosocial factors, including age, gender, health status, self-efficacy, and motivation, which influence the willingness of older individuals to participate, is essential. Research on the correlation between health locus of control and participation in exercise programs among older individuals in urban settings adds valuable insights. This understanding can inform the planning of public health interventions aimed at involving a greater number of older adults in exercise programs.

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Authors declare no conflict of interests.

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