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Healthy aging and the University of the Third Age – Health behavior and subjective health outcomes in older adults

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ABSTRACT

Introduction: By participating in the University of the Third Age (U3A), retirees are offered the opportunity for activation and development in the later years of life. However, little is known how certain aspects of healthy aging, such as health-related behavior and subjective health outcomes, differ between U3A students and other older adults not taking part in any form of education. To address this, the aim of the present study was to compare selected aspects of healthy aging in a group of U3A members with older adults not taking part in any form of lifelong learning. The study also establishes relationships between the tested variables and predictors of health behavior.

Materials and methods: 277 older adults (130 U3A members and 147 non-members) aged 60–92 (M = 68.84, SD = 5.32) completed measures of health behavior, self-rated physical health, self-rated sense of own health responsibility and satisfaction with life.

Results: The U3A attendees presented significantly higher scores for general health behavior and some of its components, and declared higher self-rated health than their peers not affiliated to any educational organization. Self-rated health, responsibility for health and satisfaction with life were positively correlated with general health behavior and most of their categories. but the correlation coefficients differed between both groups. A hierarchical regression model demonstrated the predictive roles of attendance in U3A, sociodemographic and subjective factors in health behavior undertaking.

Conclusions: The study results may help to identify older adults who should be targeted in interventions aimed at supporting healthy aging.

1. Introduction

Together with current demographic trends characterized by longer life expectancy and increasing societal aging, research interest in the period of late adulthood has grown considerably. Although many studies to date have identified risk factors for late-age disability, morbidity and premature mortality, recent years have seen increasing attention being paid to the search for factors that ensure *healthy aging*. Identifying this goal requires the research focus to shift to identifying people who are "aging well". Such attempts to define and describe the nature of such process have been made since the 1960s, and have resulted in diverse searches for *successful*, *productive*, *active* or *resilient* aging (Kusumastuti et al., 2016; Martin et al., 2015).

The most realistic definition of healthy aging appears to be that given by the WHO, which is based on trajectories of health across the course of life, rather than chronological age *per se* (Michel & Sadana, 2017). The World Health Organization describes healthy aging as a "process of developing and maintaining the functional ability that enables well-being in older age" (WHO, 2015). The term *functional ability* comprises the health-related attributes that enable people to be, and do, what they have reason to value: the *intrinsic capacity* of the individual, the characteristics of the environment and the interactions between them. Of these, *intrinsic capacity* refers to the genotype, health and personal characteristics of the individual, with *health characteristics* in turn referring to health-related behaviors, traits and skills, physiological changes and risk factors, diseases and changes in homeostasis, and *personal characteristics* to sociodemographic traits such as ethnicity, educational attainment, gender and wealth. Positive relationships between those factors will enhance the individual level of functional ability, thus providing greater wellbeing, happiness and high quality of life during later stages.

The abovementioned *health characteristics* can be assessed in different ways. One simple marker of health status is self-rated health (Fiacco, Mernone, & Ehlert, 2020). It can serve as a global measure of health status and is widely used in practice; it appears to be consistent with the state of objective health and have similar predictive value

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(Pinquart, 2001; Wu et al., 2013; Wuorela et al., 2020) A large number of empirical studies have demonstrated that that self-appraisal of health by older adults is a powerful predictor of future morbidity and mortality (Lyyra, Leskinen, Jylhä, & Heikkinen, 2009; Schnittker & Bacak, 2014; Wuorela et al., 2020). Other healthy aging concepts include metal health aspects such as psychological well-being or satisfaction with life, which can be also associated with self-rated health in older adults (Fiacco et al., 2020; Siahpush, Spittal, & Singh, 2008).

The core element of the healthy aging concept comprises a number of health behaviors; these include smoking status, physical activity level, diet and alcohol use, as well as various health practices, i.e. modifiable behavioral factors directly associated with the maintenance of good health in older adults (Burke et al., 2001; Peel, McClure, & Bartlett, 2005). However, it is important to examine healthy aging through the prism of the late-life period, because the specific nature of developmental tasks, loss of physical strength and deteriorating health significantly affect health behavior during this time (Zadworna-Cieślak & Ogińska-Bulik, 2018; Zadworna-Cieślak, 2017). Therefore, any reliable examination of health behavior in older adults requires tools adjusted to the late life period.

However, intentional health behavior activities require health consciousness at all ages. One of the components of health consciousness is personal health responsibility: Individuals who are health conscious are more likely to take responsibility for managing their own health and engage in health-promoting behavior (Dutta-Bergman, 2004; Gould, 1990; Hong, 2009; Kraft & Goodell, 1993). Therefore, health responsibility could be an important element of health promotion and healthy aging (Brown, Maslen, & Savulescu, 2019; Resnik, 2014), and enhancing individual health responsibility may improve health-promoting behavior and prevent various lifestyle diseases (Ried et al., 2010).

A number of sociodemographic traits serve as *personal characteristics*, one of which is educational attainment (WHO, 2015). There is a growing body of evidence suggesting that education can lead to more positive health behavior, better health outcomes (such as reduced disease, better mental health, lower level of stress), longer lifespan, higher quality of life and lower health costs due to less hospitalization and more effective use of health services (Baker, Leon, Smith Greenaway, Collins, & Movit, 2011; Cutler & Lleras-Muney, 2006; Hammond, 2002; Lewis, 2014).

Education attainment can be continued in late adulthood through different forms of lifelong learning (Merriam & Kee, 2014). One international initiative of lifelong learning for older adults that has been adopted in several countries worldwide, including Poland, is the University of the Third Age (U3A), the purpose of which is to organize and conduct lectures, seminars and regular classes, such as workshops, courses and interest circles, and to provide cultural and artistic input, with their main aim being to increase the quality of life through educational, social and sporting activities. Its growth has substantially contributed to the implementation of the model of “healthy aging” among older adults (Formosa, 2014; Zajac-Gawlak et al., 2016; Zielińska-Wieczkowska, Muszalik, & Kedziora-Kornatowska, 2012). In 2018, 640 U3A centers were operating in Poland (Statistics Poland, 2019).

However, there remains relatively little research on older adults who participate in U3A. The assumption that participation in lifelong education will be a healthy aging factor results from one of the most famous adaptations to old age theory: the theory of activity, as well as some more contemporary approaches to active aging (Boudiny, 2013; Havighurst, 1961). The theory of activity assumes that the natural aging process allows individuals to maintain their current life commitment. Optimally aging people are those who remain active, who take part in social life, who find replacement for gainful employment, and who also establish new relationships with others. When transitioning into late adulthood, individuals need to be able to manage their own health and understand health conditions, diseases and disabilities. Such understanding requires knowledge, skills and behaviors developed not just through initial education and learning, but throughout the lifespan.

According to active aging theories, studies indicate that participation in educational activities has positive effects on physical and psychological well-being in the period of late life (Narushima, Liu, & Diestelkamp, 2018; Sloane-Seale & Kops, 2013). Participation in universities of the third age (U3A) allows all members to age in a more active and healthier way, by realizing self-fulfillment and sustaining active citizenship without keeping away from social life (Günder, 2014).

A number of Polish studies have been performed on U3A students. Their findings indicate that older adults attending lifelong-learning courses at U3A are the highest functioning group of elderly, and that they tend to demonstrate a positive aging direction and higher level of healthy lifestyle than other groups (Cybulski, Cybulski, Krajewska-Kulak, & Cwalina, 2017; Cybulski, Krajewska-Kulak, & Jamiolkowski, 2015; Kostka & Jachimowicz, 2010; Kozieł, Kaczmarczyk, Naszydłowska, & Gałuszka, 2008; Zajac-Gawlak et al., 2016; Zasadzka, Trzmiel, Pochylska, Kropińska, & Pawlaczyk, 2017; Zielińska-Wieczkowska et al., 2012).

Further research on the determinants of healthy aging are needed to achieve the priorities outlined by the United Nations Research Agenda on Aging for the 21 st Century (United Nations Programme on Ageing & International Association of Gerontology & Geriatrics, 2007). In particular, a greater understanding is needed of the complex interrelations between different healthy aging aspects: health characteristics such as health behavior, health status and health consciousness, and personal characteristics such as sociodemographic factors and lifelong education attainment.

The comparison of U3A students with their community-living peers not taking part in any lifelong learning courses offers a new, unobvious, perspective on the issue of healthy aging. In particular, it offers an insight into the role played by U3A attendance with regard to different lifestyle patterns and personal attributes.

The aim of the present study was to compare selected aspects of healthy aging, viz. health behavior, self-rated physical health, self-rated sense of own health responsibility and satisfaction with life, in a group of U3A members with older adults not taking part in any forms of lifelong learning. The study also establishes relationships between the tested variables and predictors of health behavior in the entire group of older people.

The hypothesis of the study was that older adults from U3A will present a higher level of healthy aging aspects than their peers not taking part in any institutional forms of education. The two groups may also differ with regard to the nature of their relationships between health behavior and other healthy aging aspects. Finally, variables associated with three blocks, viz. sociodemographic factors (gender, age, education, marital and financial status), attendance/non-attendance at U3A and subjective health outcomes (self-rated health, heath responsibility, satisfaction with life) may have predictive roles for health behavior among the whole group of older adults.

2. Materials and methods

2.1. Participants and data collection

The study was conducted in central Poland from May 2017 to February 2019. Participants were recruited through convenience sampling. U3A attendees were recruited during three U3A classes, and those not attending U3A were recruited using the snowball method. The following main inclusion criteria were employed: being a member of U3A or not taking part in any organized life-long learning courses, and an age over 60 years. The exclusion criterion comprised serious disabilities enabling the understanding and filling of the questionnaires, or lack of informed consent. Each resident who met the eligibility criteria was asked to complete a set of paper versions of self-assessment

questionnaires. The comparability criteria for the two groups included the assumption that the participants were all at a similar phase of adulthood age (late adulthood - 60 and over) with the main difference being their participation in formal lifelong learning: one group attending U3A classes and the other not attending any forms of institutional learning courses. Participation in the study was voluntary and anonymous, with the possibility to withdraw at any time without penalty. The overall response rate from the initial pool was 87 %. Permission was awarded for the study to be conducted by the Ethics Committee of the University of Lodz.

The study group comprised 277 participants aged 60–92 (M = 68.8, SD = 5.3). Of these, 130 were attending U3A and 147 were not participating in lifelong learning (non-U3A). In total, the group consisted of 77 men (27.8 %) and 200 women (72.2 %): in addition, due to the fact that few men are generally enrolled at U3A, men were underrepresented in the U3A group (16 men versus 114 women, aged 60–84). However, these groups were nevertheless representative of the subpopulation taking part in activities such as U3A in Poland (Statistics Poland, 2019).

2.2. Study tools

Health behavior was measured using the Health-Related Behavior Questionnaire for Seniors (Zadworna-Cieślak, 2017). This 24-item tool measures the health behaviors of people aged 60 and above according to one overall score for health behavior, together with separate scores for five behavioral categories:

(1) Positive attitude towards life – activities strengthening mental health and positive emotionality, such as calmly expressing emotions, or avoiding stressful situations (e.g., I try to think positively about life).
(2) Behavior associated with physical health – behaviors related to the somatic aspect of health, such as maintaining a proper diet, avoiding spending excessive time in front of the television and computer, avoiding being surrounded by smokers (e.g., I make efforts to maintain a normal body weight).
(3) Attention to mental health – behavior aimed at improving intellectual functioning, such as reading books, broadening knowledge, or acquiring new skills (e.g., I pursue my interests).
(4) Behavior related to prevention and treatment – treatment-related behaviors and illness avoidance, such as following medical recommendations, reporting symptoms to a doctor and health information retrieval (e.g., I report for periodic medical examinations).
(5) Environmental behavior – behavior relating to the domain of public health, including environmental protection, such as conserving water and electricity for the sake of the environment and considering the impact of the products purchased on the environment, (e.g., I segregate my rubbish, disposing of it in appropriate containers).

Answers are given on a 5-point Likert scale. A higher score indicates a higher level of behavior beneficial to health. The development and construction of the tool is described in a previous validation study (Zadworna-Cieślak, 2017). The questionnaire has satisfactory psychometric properties with regard to validity (relationships with scores obtained in an instruments testing similar behaviors), internal consistency (Cronbach's α was 0.87 for the whole test and ranged from 0.63 to 0.79 for its subscales) and absolute stability (determined by test-retest was .88.). In the present sample, the respective Cronbach's alpha coefficients for the five abovementioned components were .83; .82; .74; .78 and .68, with the value for the overall score being .87.

Satisfaction with life was assessed by means of the Satisfaction With Life Scale (SWLS) (Diener, Emmons, Larsen, & Griffin, 1985). The scale consists of five items (e.g., "I am satisfied with my life") rated on a Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). A higher score indicates greater satisfaction with life. The SWLS has been shown to have good test–retest reliability (.82) and validity. Internal consistency was strong (α = .81) for the Polish version of the SLWS (Juczyński, 2009) and in the current study (α = .85).

Self-rated health was assessed by a numerical scale ranging from 1 to 10 designed by the author. Respondents were asked to circle the point corresponding to their current state of physical health, according to their own assessment; the score ranged from 1 - very bad, to 10 - very good. This simple measure is widely used in health surveys and reflects health status in the elderly in a reliable way (Meng, Xie, & Zhang, 2014; Wuorela et al., 2020). Although different options of the measure exist (e.g. different amount of response options, specified response options only at the ends of the scale or specified statements for each option), they all represent similar assessments of subjective health (Eriksson, Undén, & Elofsson, 2001).

Self-rated health responsibility was measured by a similar scale. The respondents were asked to mark the point reflecting their sense of responsibility for their own health, from 1 - I feel very little responsibility for my health, to 10 - I feel great responsibility for my health. This can be considered a key element of health consciousness in existing validated and reliable tools (Gould, 1990; Michaelidou & Hassan, 2008). However, personal health responsibility can also be measured by simple single-item measures (Traina, Martinussen, & Feiring, 2019). In order to simplify the examination of older people, the present study uses the single-item version.

Sociodemographic status was assessed by a questionnaire, developed for the purpose of the current study, which collected information about the participants' sex (coded as 1-men, 2 woman), age (number of years), education level (coded as 1 – primary; 2 – basic vocational; 3 – secondary; 4 – higher), marital status (coded as 1 – bachelor/maiden; 2 – married; 3 – widow/widower; 4 – divorced). An additional question concerned subjectively perceived financial status ("Your financial status in your opinion is: 5-very good, 4- good, 3-average, 2-bad, 1- very bad"). It also included questions about attending any organized forms of education.

2.3. Statistical analysis

The results were analyzed with SPSS Version 25.0. Demographic characteristics were compared using Chi-square tests, and differences between the two groups in health behavior, satisfaction with life, self-rated health and responsibility for health level were evaluated using t-tests. Pearson's correlations between variables in the U3A and non-U3A groups were also established.

To analyze the relative influence of U3A attendance, sociodemographic status and subjective factors (self-rated health, responsibility for health, satisfaction with life) on health behavior, a hierarchical three-step multiple linear regression model was developed. Block One included objective factors: several sociodemographic variables (sex, age, education, marital and financial status). Block Two included whether or not a participant attended U3A. Block Three included subjective health outcomes: self-rated health, sense of responsibility for health and satisfaction with life. The significance of each block was tested to identify which groups of variables were most relevant to predicting the general health behavior of older people.

In order to determine the sample size for all analysis, a power analysis was conducted using G*Power 3.1. software (Faul, Erdfelder, Lang, & Buchner, 2007). With a medium effect size of .15 (alpha of .05, a standard power level of .80,) a minimum sample size for all types of conducted analyses was required (Cohen, 1992). The statistical significance level was set at $p < .05$.

3. Results

Table 1 shows the baseline demographic participant characteristics

Table 1
Comparison of the demographic characteristics of U3A and non-U3A participants.

Variable	Category	U3A N = 130 n (%)	Non-U3A N = 147 n %	*p*
Sex				
	Male	16 (12,3%)	61 (41,5%)	.000
	Female	114 (87,7%)	86 (58,5%)	
Age in years	< 69	59 (45,4%)	61 (41,5%)	.515
	≥69	71 (54,5%)	86 (58,5%)	
Education				
	Primary education	0 (0,0%)	15 (10,2%)	.000
	Secondary vocational education	6 (4,7%)	30 (20,4%)	
	High school education	73 (56,6%)	80 (54,4%)	
	Higher education	50 (38,8%)	22 (15%)	
Marital status				
	Single	17 (13,2%)	15 (10,4%)	.011
	Married	58 (43%)	92 (63,9%)	
	Widowed	50 (38,8%)	32 (22,2%)	
	Divorced	5 (3,1%)	4 (3,5%)	
Financial status	Good / very good	30 (37%)	45(30,6%)	..614
	Average	47 (50%)	94 (63,9%)	
	Bad / very bad	4 (4,9%)	8 (5,4%)	
Place of living				
	Village	6 (4.6%)	11 (7.6%)	.191
	Small town	39 (30%)	31 (21,4%)	
	Big city	85 (65,4%)	103 (71%)	

of the two study groups. The two groups were virtually identical in terms of age, and no significant differences were observed between groups with regard to their financial status or place of residence: most participants from both groups lived in a large city (more than 50,000 citizens) and reported their financial status to be average. However, U3A students were better educated, more likely to be widowed and more likely to be female. This is the typical demographic structure of U3A students in Poland (Statistics Poland, 2019).

Table 2 shows the health behavior and subjective health outcomes scores in both groups. U3A students demonstrated significantly higher results for health behavior, both overall and with regard to their components, i.e. *behavior associated with physical health* and *attention to mental health* and *environmental behavior*. No significant statistical differences were found between groups in with regard to *positive attitude towards life* or *behavior related to prevention and treatment*. The satisfaction with life and self-rated health responsibility scores were also similar in the two groups; however, the U3A participants declared significantly higher self-rated health scores.

In both groups, general health behavior was most strongly correlated with self-rated responsibility for health (Table 3). The degree of responsibility for the health of the participant was positively correlated with the level of health-promoting behavior undertaken. Responsibility for health was also related to every category of health behavior; however, only the groups of U3A members demonstrated a relationship with *attention to mental health*.

A higher score for self-rated health was associated with a higher level of health behavior; however, the correlation coefficient for *attention for mental health* was significant in the U3A group, and b*ehavior associated with physical health* and e*nvironmental behavior* were significant in the non-U3A group. A correlation was observed between both groups for p*ositive attitude to life*, while no significant correlation was found for *behavior related to prevention and treatment*.

Satisfaction with life was positively correlated with general health behavior in both groups. However, correlation coefficients for factors of health behavior, such as b*ehavior associated with physical health, behavior related to prevention and treatment* and e*nvironmental behavior* were significant only for non-U3A participants. The other domains of health behavior were correlated with wellbeing in both groups.

The final step of the analysis was a three-step multiple linear hierarchical regression. In order to clarify the results, marital status was recoded as dummy: 1 – singles (single men / women, divorcees, widows / widowers) and 2 – married. The first step introduced sociodemographic variables, the second introduced UTA attendance (coded as 1 – attending, 2 – not attending), and the third included subjective health outcomes such as self-rated heath, self-rated health responsibility and satisfaction with life. The results are presented in Table 4.

Sociodemographic factors introduced in the first step of regression analyses predicted 12 % of general health behavior variability, with the significant predictors being sex (female), financial status and education (higher education and financial status were associated with higher levels of undertaken health behavior).

In the second step, financial status remained significant, even after the introduction of attendance at U3A as a new variable; however, neither sex nor education were significant predictors at this stage. U3A attendance was a significant predictor of health behavior. The negative beta coefficient indicates that attendance at UTA promotes health behavior. The addition of this variable improved the model significantly, but very slightly, adding only 2% to the general variance of health behavior explanation.

In the third step, subjective factors were added to the model. Responsibility for health and satisfaction with life appeared to be significant predictors of health behavior. UTA attendance remained as a significant predictor at this step, while financial status was no longer significant. Sex also was found to be a significant predictor at this stage. Participants who demonstrated greater responsibility for their own health and who were more satisfied with life displayed greater health-

Table 2
Comparison of health behavior and subjective health outcomes of U3A and non-U3A groups.

Variable	U3A N = 130			Non-U3A N = 147			*p*
	M (SD)	*Min*	*Max*	*M (SD)*	*Min*	*Max*	
Health behavior -overall	97.1 (12.0)	55	120	90.1 (16.2)	36	148	.000
Positive attitude towards life	24.1 (3.8)	12	30	23.1 (4.4)	10	30	.063
Behavior associated with physical health	23.2 (4.6)	11	30	20.8 (5.5)	6	30	.000
Attention to mental health	17.4 (2.5)	9	20	15.2 (5.0)	4	20	.000
Behavior related to prevention and treatment	16.4 (2.5)	9	20	16.0 (3.7)	4	20	.203
Environmental behavior	16.1 (2.6)	8	20	15.0 (3.4)	4	20	.002
Satisfaction with life	20.7 (5.2)	8	32	21.7 (5.0)	5	35	.114
Self-rated health	6.5 (1.7)	3	10	6.1 (1.8)	2	10	.042
Self-rated health responsibility	7.3 (2.0)	1	10	6.9 (2.2)	1	10	.107

Note: M – mean; SD – standard deviation. Min – minimum value; Max – maximum value; p – significance level.

Table 3
Correlations between variables in the group of U3A and non-U3A.

Variable	Self-rated health			Self-rated responsibility for health			Satisfaction with life		
	Total	U3A	Non- U3A	Total	U3A	Non-U3A	Total	U3A	Non-U3A
Health behavior- overall	.30**	.28**	.29**	.40**	.42**	.37**	.30**	.27**	.37**
Positive attitude towards life	.36**	.34**	.36**	.36**	.41**	.32**	.41**	.42**	.43**
Behavior associated with physical health	.29**	.17	.34**	.38**	.33**	.40**	.17**	.12	.25**
Attention to mental health	.18**	.34**	.08	.13*	.28**	.04	.14*	.18*	.18*
Behavior related to prevention and treatment	−.01	.03	−.04	.25**	.26**	.25**	.23**	.15	.30**
Environmental behavior	.23**	.14	.27**	.35**	.24**	.40**	.15*	.09	.22**

Note: **p < .01; *p < .05.

promoting behavior. Adding those variables in the last step significantly improved the prediction of the variability of the dependent variable, i.e. by 16 %. The final model predicted 30 % of general health behavior variability.

4. Discussion

The aim of the present study was to compare selected aspects of healthy aging among older adults attending U3A and those not attending any such educational organization. The findings indicate that the U3A participants are generally engaged in more health-promoting behavior. This has been confirmed by previous studies suggesting that people attending lifelong-learning courses at U3A tend to demonstrate a positive aging direction (Cybulski et al., 2017; Kozieł et al., 2008; Zajac-Gawlak et al., 2016; Zasadzka et al., 2017; Zielińska-Wieczkowska et al., 2012).

There is also empirical evidence that U3A members demonstrate significantly higher levels of general health behavior than older nursing home residents, particularly with regard to correct dietary habits and preventive behavior; however, the reverse relationship was observed in the case of positive mental attitudes and health practices (Cybulski et al., 2015). Health behaviors have a multidimensional structure, which can be predicted by various psychosocial factors, and are strictly connected to the period of development time (Zadworna-Cieślak & Ogińska-Bulik, 2018; Zadworna-Cieślak, 2017). The present study results are consistent with previous findings indicating that U3A students display greater overall health-promoting behavior than those who do not attend (Kozieł et al., 2008). However, the two groups demonstrate similar results with regard to positive attitude towards life and behavior related to prevention and treatment. It is possible that the differences between the studied groups are due to the sociodemographic and contextual aspects: the U3A attendants tended to be better educated, female and widows. While this is the typical of the demographic structure of U3A students in Poland (Statistics Poland, 2019), it is likely that specific persons decide to attend U3A. The particular structure of the non-formal activities engaged in by the second group also merits further examination in future studies.

The present findings also indicate that students who attend U3A rate their health significantly more highly than their peers who do not. However, the two groups demonstrate similar levels of self-rated health responsibility and satisfaction with life. Previous studies suggest that being an active older person is not synonymous with being more satisfied with one's own life compared to non-active or institutionalized elderly (Kostka & Jachimowicz, 2010; Świerżewska, 2010). Wellbeing in late life seem to be dependent on various personal resources and the attainment of certain developmental tasks (Zadworna-Cieślak & Ogińska-Bulik, 2019). Research indicate that the relationships formed between satisfaction with life, lifestyle and personal resources are of a complex nature. In the case of self-rated health, it appears that U3A participants attending physical activity classes declared better health status and functional ability than those who are not active (Zasadzka et al., 2017), and that highly-active U3A students are more likely to declare a high quality of life in the psychological and social domains than other respondents (Krzepota, Biernat, & Florkiewicz, 2015). It may be the case that the specificity of U3A classes may play an important role in strengthening particular mental, social and physical attributes in the individual.

The aim of the present study was to identify relationships between health behavior and subjective health outcomes. The study findings indicated that, generally, variables like self-rated health, responsibility for health and satisfaction with life were positively correlated with health behavior and most of its categories. In addition, the correlation

Table 4
Summary of the multiple hierarchical regression analysis for variables predicting general health behavior.

Variable	Model 1			Model 2			Model 3		
	B	SE B	β	B	SE B	β	B	SE B	β
Sociodemographic factors									
Sex	5.31	2.28	.16*	3.99	2.35	.12	4.92	2.14	.15*
Age	.12	.18	.04	.09	.18	.03	.21	.17	.08
Education	3.20	1.25	.17*	2.30	1.32	.12	2.15	1.20	.11
Marital status	−.58	2.13	−.02	−1.10	2.13	−.04	.17	1.98	.01
Financial status	5.10	1.60	.21*	5.03	1.59	.21*	.90	1.58	.04
U3A attendance				−4.83	2.31	−.15*	−4.17	2.12	−.13*
Subjective health outcomes									
Self-rated health							.65	.59	.08
Self-rated responsibility for health							2.08	.48	.29**
Satisfaction with life							.70	.19	.25**
R^2	.12			.13			.30		
R^2 change	.12			.02			.16		
F for change in R^2	5.79**			4.37*			16.65**		

Note: B – non-standardized regression coefficients; SE B – non-standardized regression coefficients error; β – standardized regression coefficient; R^2 – determination coefficient; F - value of F-statistic; **p < .01; *p < .05.

coefficients of these variables differed between the U3A and non-U3A groups, suggesting that health behaviors are complex phenomena, internally differentiated into specific categories and related in varying ways to other factors and health states. Among active older adults, the self-rated state of health and degree of health responsibility were particularly associated with caring for intellectual performance; this may be due to the fact that this sphere is the most developed at U3A, and as such is rated most highly among U3A students. In contrast, care for physical and ecological health is associated with self-rated health only in non-U3A participants, possibly because these categories of health behavior may be the most important indicators of good health in typical, less active older adults. While both groups associated overall life satisfaction with other categories of heath behavior, the non-U3A group related satisfaction with life with behaviors concerning the physical and ecological spheres. Many studies indicate that relationships between health behaviors, health outcomes, psychological characteristics and quality of life, may be different between various groups of elderly (Brudek, Krok, & Telka, 2017; Zajac-Gawlak et al., 2016). It is possible that determinants of healthy aging may differ between high-functioning U3A students, who are healthier and more focused on their health, and less active groups. In various groups of older adults, different corelates of heathy aging and health-related quality of life can be observed (Burke et al., 2001; Cohrdes, Mensink, & Hölling, 2018; Peel et al., 2005).

Finally, hierarchical regression analysis revealed the significance of different variables in predicting general health behavior – the core element of healthy aging concept. Demographic factors predicted general health behavior variability in 12 %, with the most important factor being financial status and education, whose scores were positively related with better health behavior, and sex (female). Previous studies have identified various sociodemographic factors that appear to be related to health behavior. Women who have received a higher level of education and are satisfied with their economic status are more inclined to take care of their health (Cohrdes et al., 2018; Kostka & Jachimowicz, 2010). However, health behavior is not a homogeneous construct, and as such, diverse sociodemographic differences can also exist between specific spheres of activity (Cohrdes et al., 2018; Juczyński, 2009; Kostka & Jachimowicz, 2010; Shi, 1998).

The second step in the regression analysis examined the particular role played by another variable: U3A attendance. The results suggest that it may be a health-promoting element of lifestyle; however, its independent impact seems not to be as essential as expected. Adding this variable to the model improved the overall R^2 to a small degree. This may suggest that this particular factor is not related to heath behavior in a simple, direct way. The effect could be also covered by sociodemographic variables, while the U3A group has a specific structure, i.e. mostly more educated women. Possible indirect effects can occur in relationships between variables. Moreover, lifelong learning can be linked with other sociodemographic and subjective factors, and serve as an element of general lifestyle. Perhaps it is not only the mere fact of attendance that can play a significant role for healthy aging, but also the quality of participation, engagement, type of classes and social relations. Moreover, the duration of attendance can be crucial to achieve the heathy effects of lifelong learning. As Narushima et. al. reports, older adults who remained on a single course or pursued the same subject for longer tended to report better psychological wellbeing (Narushima et al., 2018).

The University of the Third Age (U3A) is a highly-successful adult education movement that provides opportunities for older adults to enjoy a range of activities associated with quality of life during the later period of life. Although several lifestyle factors offer the potential to promote health-related quality of life across adulthood (Cohrdes et al., 2018), the current study findings indicate that the most significant role seems to be played by subjective health outcomes: self-rated health, responsibility for health and wellbeing. While sociodemographic factors, such as gender, financial status and education, as well as attendance at U3A, are important ones, personal attributes also play a major role in a healthy lifestyle. This result is consistent with those of previous studies: people more satisfied with their lives are more likely to engage in healthier behaviors (Diener, Pressman, Hunter, & Delgadillo-Chase, 2017), satisfaction with life can also play a mediating role in the relationship between individual resources and health behavior in older adults (Zadworna-Cieślak, 2020) and individual responsibility for health is also a predictor of health behavior undertaken (2014, Minkler, 1999; Resnik, 2007). Self-rated health did not appear to play a predictive role, which is inconsistent with previous studies (Zadworna-Cieślak & Ogińska-Bulik, 2013). Health behavior undertaken by individuals in poor health can differ from that taken by those in good health. However, the examined elderly were generally in good health: they demonstrated full functional ability and were not hospitalized. Therefore, any effect of health status was likely insignificant Nevertheless, the correlations identified in the current study, and previous ones (Abuladze, Kunder, Lang, & Vaask, 2017; Wilson et al., 2019) indicate that self-rated health and health behaviors are related.

Although the abovementioned findings do not identify the causal effects of the variables, they nevertheless suggest that participants of U3A live in a more healthy way than their peers who do not take part in lifelong learning. Lifelong learning courses can be engaged in healthy lifestyle promotion. Although participation in such learning programs can be associated with the subjective wellbeing of older adults, such results depend on the type of classes or courses undertaken (Jenkins, 2011). Major benefits of lifelong learning can be identified. Enduring interests, classroom-based informal social support networks and raised awareness of the right to learn are all potential mediators for promoting psychosocial health among older adults (Narushima, 2008). These learning effects are closely interrelated, working as a synergetic health-enhancing mechanism. Attendance in U3A can be far more than a strategy for filling time in retirement or coping with widowhood, as is so often presumed. It can be a chance for self-realization and achieving goals that could not have been previously achieved due to lack of time or money.

The mechanisms through which lifelong learning affects health have been extensively examined. A substantial body of evidence suggests that positive relationships exist between education and physical and mental health: lifelong learning plays a fundamental role in generating health-enhancing behaviors, skills and personal attributes (Hammond, 2002, 2005, 2003; Iñiguez-Berrozpe, Elboj-Saso, Flecha, & Marcaletti, 2020; Narushima et al., 2018).

Older adults have become the focus of attention for makers of national policy and local agendas in Poland (Samolinski et al., 2015). The final declaration of the members of the Universities of the Third Age ("The Pact for Seniors") outlines the principles and directions of nation policy for older adults. Such lifelong learning provided for the elderly should be considered a legitimate part of the national education system and the focus of gerontological prophylaxis. Such activity would enable older people to maintain a high quality of life during this period, as well as a feeling of social integration and intergeneration solidarity. The pact recommends the development of a public-private partnership for creating a hospitable public space for older adults and proposes supporting the rise of senior social capital in Poland, particularly by creating conditions for lifelong learning.

The study findings offer a new perspective in understanding aspects of healthy aging and offer new opportunities for designing prevention programs. Nevertheless, the study has some limitations: the small size of the research group and the cross-sectional character of the study. The main hypotheses were supported; however, the significance of attendance in U3A for predicting health behavior was not as strong as expected. More detailed information about the forms, level of engagement, social participation and duration of attendance in education should be carefully examined in the future. Moreover, the second group, which declared non-attendance at any formal learning course, should be more carefully examined, particularly with regard to the

forms of social participation or informal activity undertaken, such as activities at home, in the garden or among local social circles. In addition, as individual health behavior and awareness are largely shaped by social activities and media exposure, these aspects should be also examined more closely in the future. Health behavior and subjective health outcomes measures may act also both as dependent and independent variables. The results pertain to volunteers with an adequate level of physical and cognitive functioning and who are able and willing to participate in multiple tests. Future investigations are needed to establish the role of different types of activity and various forms of lifelong learning in healthy aging. Future studies should also try and identify the structure of the relationship between variables, by using techniques such as structural equation modelling and causal pathways.

There is strong scientific evidence that prevention programs promoting greater involvement in a range of health behaviors, such as consumption of a balanced diet and involvement in the recreational, intellectual and social activities, may provide substantial health benefits extending over the lifespan (Eaglehouse et al., 2016; Kanning & Schlicht, 2008; Martinson et al., 2010; Opdenacker, Boen, Coorevits, & Delecluse, 2008). Local agendas should also enhance social participation by the elderly, with an emphasis on community-based activities as important determinants of healthy aging (Aroogh & Shahboulaghi, 2020; Dahan-Oliel, Gélinas, & Mazer, 2008).

5. Conclusions

The study presents an interesting new perspective into various aspects of healthy aging in two typical communities in Poland: highly-active U3A attendees and community-living retirees spending time in less active ways. The study results may help identify older adults who should be targeted in interventions aimed at supporting healthy aging. Such healthy lifestyle interventions should be targeted mainly towards men who are inactive, with lower educational levels and lower well-being, who do not attend any educational initiatives, or who may be less satisfied with their income or demonstrate poor health responsibility. The study findings also highlight the need to sustain and develop affordable and accessible public continuing education programs in local communities as an important social determinant of healthy aging in an aging society. They also highlight the need for further research identifying factors promoting healthy aging.

Author statement

I am the sole author of the manuscript “Healthy Aging and the University of the Third Age - Health Behavior and Subjective Health Outcomes in Older Adults”. I am responsible for the content, including the concept, design, analysis, writing and editing of the manuscript. The manuscript is original and no part of the manuscript has been published before.

Declaration of Competing Interest

The author declares that there is no conflict of interest.

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