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THE MEASUREMENT OF HEALTH-RELATED BEHAVIOR
IN LATE ADULTHOOD:
THE HEALTH-RELATED BEHAVIOR QUESTIONNAIRE
FOR SENIORS

The current demographic processes invite an analysis of the lifestyle of people in late adulthood and its determinants. A thorough diagnosis of senior health is also needed, not only for the purposes of description and explanation, but also – above all – for the creation of health programs. The present study analyses the specificity of health behavior of people of senior age. It describes the Health-Related Behavior Questionnaire for Seniors (KZZ-S), a tool used to measure the health behaviors of seniors (i.e., people aged 60 and above), and presents its theoretical basis. The questionnaire has a five-factor structure, as revealed by exploratory and confirmatory factor analysis. It consists of 24 items and allows the calculation of the overall rate of such health behaviors and behavioral categories as positive attitude to life, behavior related to physical health, attention to mental condition, behavior associated with prevention and treatment, and environmental behavior. A higher score indicates a higher level of behavior beneficial to health. In total, the participants in the study were 522 people diverse in terms of activity and life situation, and the aim was to determine the psychometric properties of the KZZ-S. The KZZ-S is a reliable and valid measure with satisfactory psychometric properties (Cronbach's α was .87 for the whole test and ranged from .63 to .79 for its subscales; absolute stability determined by test-retest was .88).

Keywords: health behavior; measurement; late adulthood; seniors.

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Health-related behavior in late adulthood

The average human lifespan has continued to grow over the last few years, and in Poland it has recently reached 73.8 years for men and 81.6 years for women: an increase by 7.6 years for men and by 6.4 years for women compared to 1990. The proportion of seniors in the Polish population has also grown: it currently stands at 18.4% of the total population, and forecasts suggest that it may exceed 30% by 2050 (GUS, *Life expectancy...*, 2014; GUS, *Population forecast...*, 2015). This prolongation of human life also requires efforts to maintain the dignity and quality of seniors' life. The aging of the population is believed to be one of the most important contemporary health and socioeconomic challenges. It is important to help seniors in active and successful aging, defined by the WHO as the process of creating optimal opportunities for health, participation in social life, and security, and to improve the quality of life in old age. Active aging allows those in their late adult years to use their potential, so that they feel well: physically, mentally, and socially (WHO, *Active Ageing*, 2002). An important condition for successful aging is to maintain a healthy lifestyle that enhances the individual's biopsychosocial well-being, delays the occurrence of diseases, and supports their treatment (cf. Peel, McClure, & Bartlett, 2005; Franklin & Tate, 2009; Zadworna-Cieślak & Finogenow, 2012).

Late adulthood is the final phase of human life, whose starting point is widely considered to be 60-65 years of age (cf. Olejnik, 2015; Straś-Romanowska, 2015). It is a period marked by uneven development, with a pace of aging that varies across individuals, and by a reduction in physical stamina and increased susceptibility to disease. As regards the biological aspect, catabolic processes prevail over anabolic processes. The period of late adulthood abounds in so-called critical events, which include the loss of health, a deterioration in physical condition and attractiveness, the loss of loved ones, the approaching prospect of death, retirement, the loss of social and economic status, the loss of a sense of usefulness and social prestige, and the need to move residence, for example, to stay with adult children or in a nursing home (Finogenow & Zadworna-Cieślak, 2013). During this period, the individual faces specific challenges associated with the need to adjust to the decline in physical strength, retirement, reduced income and changing social roles, the need to come to terms with the death of a spouse, the need to maintain social relations with people of the same age, and the devices used to ensure comfortable physical conditions (Havighurst, 1981).

The individual also experiences deteriorating health with the appearance of chronic and fatal diseases, the most common ones in Poland being cardiovascular

diseases and cancer (GUS, *Life expectancy...*, 2014). The subjective assessment of health status is much worse in the case of the elderly living in Poland than in the case of their peers living in other European countries. Of a list of 32 countries, Poland has recently been ranked fourth from the bottom in terms of self-assessment of health among elderly people (GUS, *Demographic situation...*, 2014). However, the population of efficient, active seniors, whom the Universities of the Third Age (UTA) and senior clubs are targeted at, can be seen to be growing.

While aging is an inevitable process, daily engagement in health-promoting forms of behavior can facilitate successful aging by maintaining the psychological and physical fitness of seniors for as long as possible, allowing them to remain in their own home environment and maintain independence. Health behavior in old age is an important predictor of health status and life expectancy (Davis et al., 1994; Ford, Spallek, & Dobson, 2008; Swindell et al., 2010; Selivanova & Cramm, 2014). Research into the lifestyles of older people, such as the PolSenior study conducted on more than 5,500 elderly people, provides a picture of the lifestyles of seniors and highlights a number of shortcomings associated with physical inactivity, irregularity of meals, and the nonsystematic use of medicines (cf. Mossakowska, Więcek, & Błędowski, 2012). As health behaviors are strongly influenced by the developmental context of a particular period of life, seniors appear to demonstrate a higher level of health activity than other age groups and are qualitatively different from groups in their early and middle adulthood in their outlook on health. In addition, the specificity of the health activities engaged in by the elderly also stems from the changing contexts in which they were shaped during the development of older generations: the state of knowledge concerning health, socially dominant health beliefs, and preferred habits are used to be different than they are at present.

The measurement of the health behavior in people at senior age

Research shows that people over the age of 60 show different levels of health practices and perceptions of disease compared to those of other ages. There is age-related variability in these factors, revealed by the comparison of groups of young (20–39), middle-aged (40–59) and older (60–89) adults (Prohaska, Leventhal, Leventhal, & Keller, 1985). Seniors have been found to have very different lifestyle patterns than people in early and middle adulthood, for example as regards behaviors related to nutrition and coping with stress, and their general level

of health-promoting behaviors is higher than it is in young adults (Walker, Volkan, Sechrist, & Pender, 1988).

Usually, however, conclusions derived from empirical data obtained for younger age groups are applied directly to seniors, which is clearly unjustified given the specificity of the over-60 age group. Dissimilarities between seniors and other groups regarding health practices may stem mainly from the constraints associated with deteriorating health and the specific tasks facing the individual during old age. In particular, the significance of health activities for maintaining well-being increases during this period of life, and health promotion challenges are different in this age group (Albert & Freedman, 2010).

No existing technique for measuring health behaviors is tailored to the developmental specificity of late adulthood. Despite this, the subject of the health behavior engaged in by the elderly has enjoyed tremendous popularity in Polish studies in recent years (e.g., Koziół, Kaczmarczyk, Naszydłowska, & Gałuszka, 2008; Smoleń, Gazdowicz, & Żyłka-Rent, 2011; Szczerbińska, Piórecka, & Malinowska-Cieślik, 2011; Muszaliak & Zielińska-Więczkowska, 2013; Sygit-Kowalkowska, 2013; Zadworna-Cieślak & Ogińska-Bulik, 2013; Bartoszewicz, Gandziarski, Lewandowska, & Szymańska 2014; Ogińska-Bulik & Zadworna-Cieślak, 2014; Dziedzic, Zając, Wiśniewski, & Sienkiewicz, 2015; Młynarska et al., 2015; Kupcewicz, Gontarz, Wilk, & Kuśmierczyk, 2016). However, these studies were conducted using measurement tools that failed take into account the specificity of senior health, and the authors of the existing measures did not include people over 60 in normalization samples.

Interest in the style of life of seniors can be expected to grow, driven by demographic processes and the related challenges regarding prevention and health promotion. The specificity of health activities engaged in by seniors has prompted a more intensive search for measurement tools designed specifically for older people.

THE HEALTH-RELATED BEHAVIOR QUESTIONNAIRE FOR SENIORS: THEORETICAL BASIS AND DESCRIPTION

The point of departure for the design of the Health-Related Behavior Questionnaire for Seniors was the measures of health activity in adults that had been used in Poland and worldwide, such as the Health Behavior Inventory (IZZ) by Juczyński (2001), the Health-Related Behavior Inventory by Dolińska-Zygmunt

(2000), the Health-Related Behavior Questionnaire by Ziarko (2007), and the Reported Health Behavior Checklist (Prohaska et al., 1985).

The construction of the questionnaire was guided by the health dimensions relating to human behaviors (WHO, 1984; Ewles & Simnett, 1992): physical, mental, emotional, social, spiritual, and public. I adopted the definition of health-related behaviors proposed by Gochman (1988), according to which they include beliefs, expectations and predictions, themes, thinking, personality traits, and internal behavior patterns associated with the maintenance, improvement, and restoration of health.

In the initial stage, a pool of items describing health behaviors was created based on a pilot study conducted on a group of 40 people aged over 60. The participants were asked to name the activities conducive to health that they engaged in. Based on their responses and those given in the relevant literature, a list of health-related activities typical for seniors was drawn up. This resulted in a pool of 60 items, which were then grouped into categories corresponding to types of behavior associated with various health dimensions. The pool contained items related to all the dimensions given above. Those regarding behavior connected with somatic health concerned maintaining proper diet and exercise or implementing the doctor's recommendations. Behavior relating to the mental domain focused on care for the emotional sphere, such as the appropriate expression of emotion or coping with stress, and on the intellectual aspect, which was often mentioned by seniors – for instance, solving crossword puzzles, reading, or developing a passion. The next set of items concerned behaviors associated with social health (e.g., paying attention to good interpersonal relationships), the spiritual domain (e.g., searching for the meaning of life and contact with the higher power), and the public domain (e.g., caring for the environment, waste segregation).

The psychometric properties of the Health-Related Behavior Questionnaire for Seniors (KZZ-S) were established¹ based on the responses collected from 522 people² aged between 60 and 88 ($M = 69.07$, $SD = 6.22$). This sample included 359 women (68.8%) and 160 men (31.2%).

I conducted the study in Central Poland, mainly in the Łódzkie Voivodship, and used purposive sampling. The main selection criterion was age over 60 years and sex: the sex profile of the sample was meant to reflect that of the general population (GUS, *Population aged 60+...*, 2016).

¹ The studies were carried out within the framework of a graduate seminar.

² This is the final number of people whose details were included in further analyses, after the elimination of a few dozen of incompletely filled answers sheets.

I also planned to select subjects based on the diversity of activities and functioning among older people, to gain an insight into the broad array of lifestyles and ways of spending free time during retirement, specific to this age group. Therefore, the sample included seniors diverse in terms of activity and in a variety of life situations: those attending the University of the Third Age ($N = 192$), members of senior clubs ($N = 97$), those not affiliated with any organizations ($N = 174$), and cardiac outpatients ($N = 59$). In terms of the place of residence, 35.5% of the respondents were rural residents, 35% were small-town residents (population up to 50,000 inhabitants), and 29.5% lived in cities (with a population over 50,000 inhabitants, mainly the city of Lodz). The majority of the respondents had completed upper secondary education (48%), 25.8% had completed elementary or vocational education, and 26.2% had higher education. Married people constituted 40% of the sample; the others were unmarried: widowers or widows (27%) and single or divorced (32%).

Most research was carried out in groups and on an individual basis, during classes at the University of the Third Age and in senior clubs, during meetings in schools or kindergartens attended by the respondents' grandchildren, in clinics, and sometimes in the subjects' homes. The tests were anonymous and voluntary; the respondents were informed about their purpose and instructed on how to complete the tests.

The process of scale construction

The initial version of the tool was tested on a group of 270 people aged 60-88 years ($M = 69.83$, $SD = 5.98$): attendees of the University of the Third Age, individuals who were not registered as members of any organizations, and patients at health clinics. This sample comprised part of the total number of subjects in the subsequent sample (522 people). The group was composed of 111 men (41.1%) and 159 women (58.9%); most of them were inhabitants of large cities, who had elementary or vocational (23.2%), secondary (39.1%), or higher education (37.7%). I performed an analysis of the discriminatory power of the questionnaire: the items with the lowest item-total correlation (lower than .40) was eliminated. This resulted in the removal of 12 items. Then, I performed factor analysis to determine the structure of health-related behaviors (principal component analysis with Varimax orthogonal rotation). A five-factor structure was adopted for the scale based both on the Kaiser criterion, recommending factors with loadings above 1, and on the results of scree plot analysis. Items that were not specific to any factor and those that were equally strongly correlated

with two or more factors, were removed. The final version of the questionnaire consisted of 24 items. The factor structure is presented in Tables 1 and 2.

Table 1
The Results of Factor Analysis

Factor	Eigenvalue	Percentage of explained variance	Cumulative variance
Positive attitude towards life	6.60	27.51	27.51
Behavior associated with physical health	1.84	7.68	35.19
Attention to mental health	1.79	7.47	42.66
Behavior related to prevention and treatment	1.57	6.53	49.19
Environmental behavior	1.31	5.46	54.65

The obtained factors reflect the behaviors associated with the different dimensions of health: physical, mental (emotional and intellectual), public (caring for the environment), and medical behavior (related to treatment and the prevention of diseases). Thus, the preliminary classification of items was confirmed with regard to the various health aspects.

The largest proportion of variance was explained by the factor describing behaviors associated with the emotional dimension of health: positive attitude towards life (27.51%). The contribution of other factors was smaller, ranging from 7.68% (physical health-related behavior) to 5.46% (environmental behavior).

The items that make up each of the factors demonstrated loadings ranging from .40 to .79. The exact values of these loadings and item-total correlations are given in Table 2.

Further analysis was conducted on the entire sample of 522 people, which included the 270 people previously tested. In order to confirm the factor structure, I performed confirmatory factor analysis in Deducer software using structural equation modelling according to the maximum likelihood method. The structure we sought to reflect incorporated the five intercorrelated theoretical constructs. The analysis of the factorial model demonstrated its satisfactory fit, with the following indices: CFI = .91, TLI = .89 and RMSEA = .046 (95% CI [.041; .051]). The analysis revealed no fit in terms of the CMIN index: $\chi^2(242) = 545.97, p < .001$. Taking all these indices into account, the model turned out to be well fitted and acceptably reflected the theoretical structure of the analyzed data system (cf. Bentler & Bonnet, 1980; Bedyńska & Książek, 2012). The analysis revealed that the chosen theoretical construct had a significant influence on

the variability of scores on specific items, explaining from 17% (item 15) to 49% (item 23) of score variance (Table 3).

Table 2
Factor Structure of the KZZ-S

Item number	Factor					Item-total correlation
	1	2	3	4	5	
5	.51	.19	.20	-.03	.27	.46
11	.68	.04	.24	.11	.17	.50
16	.63	.23	.16	.07	.20	.53
17	.64	.19	.01	.28	.02	.47
19	.78	.01	.05	.14	.01	.40
20	.65	.15	.02	.07	.09	.40
1	-.09	.67	.11	.02	.43	.46
6	.22	.66	.14	.19	-.08	.48
7	.06	.68	.09	.34	.01	.49
12	.22	.64	.27	-.02	-.02	.47
13	.17	.59	.01	.13	.12	.43
15	.15	.58	-.06	.01	.36	.43
2	-.06	.05	.59	.14	.39	.39
4	.05	.18	.70	.07	.15	.44
10	.20	.07	.79	.09	-.05	.42
22	.22	.07	.75	.09	.05	.46
3	.13	.26	.46	.49	.12	.58
18	.15	.07	.07	.78	.18	.47
23	.08	.16	.08	.72	.28	.50
24	.189	.14	.14	.72	.05	.48
8	.15	.08	.06	.32	.58	.44
9	.14	.35	.16	.09	.39	.45
14	.31	.16	.01	.07	.60	.44
21	.08	.01	.20	.18	.74	.44

Note. Factor 1 – Positive attitude towards life; Factor 2 – Behavior associated with physical health; Factor 3 – Attention to mental health; Factor 4 – Behavior related to prevention and treatment; Factor 5 – Environmental behavior.

Table 3
The Results of Confirmatory Factor Analysis

Factors	Items	R^2	β	B	Standard error	CR
Positive attitude towards life	5	.32	0.56***	1.00		
	11	.46	0.68***	1.18	0.10	11.64
	16	.35	0.59***	1.09	0.10	10.75
	17	.27	0.52***	1.06	0.11	9.82
	19	.37	0.61***	1.19	0.11	10.94
	20	.34	0.59***	1.08	0.10	10.66
Behavior associated with physical health	1	.40	0.63***	1.00		
	6	.42	0.65***	1.08	0.09	12.09
	7	.42	0.65***	1.16	0.10	12.07
	12	.26	0.51***	0.91	0.09	10.09
	13	.31	0.55***	1.04	0.10	10.75
Attention to mental health	15	.17	0.41***	0.79	0.09	8.42
	2	.30	0.55***	1.00		
	4	.45	0.67***	1.33	0.13	10.60
	10	.41	0.64***	1.27	0.12	10.37
Behavior related to prevention and treatment	22	.39	0.63***	1.20	0.12	10.25
	3	.39	0.63***	1.00		
	18	.36	0.60***	1.03	0.09	11.32
Environmental behavior	23	.49	0.70***	0.99	0.08	12.45
	24	.38	0.62***	1.03	0.09	11.54
	8	.31	0.56***	1.00		
	9	.27	0.52***	1.04	0.11	9.16
	14	.38	0.62***	1.14	0.11	10.20
	21	.29	0.54***	1.08	0.11	9.41

Note. *** $p < .001$.

Further analysis indicated strong correlations between dimensions. The weakest correlation was $r = .52$, $p < .001$, and the strongest one was $r = .74$, $p < .001$ (Table 4).

Table 4
Correlations Between Questionnaire Dimensions

Variables	Positive attitude towards life	Behavior associated with physical health	Attention to mental health	Behavior related to prevention and treatment	Environmental behavior	<i>M</i>	<i>SD</i>	Cronbach's α
Positive attitude towards life	1	.61*** CR = 7.87	.62*** CR = 7.40	.63*** CR = 7.91	.74*** CR = 7.92	23.83	4.17	.79
Behavior associated with physical health		1	.52*** CR = 6.98	.63*** CR = 8.20	.65*** CR = 7.74	22.61	4.75	.76
Attention to mental health			1	.57*** CR = 7.23	.60*** CR = 6.97	16.25	3.42	.75
Behavior related to prevention and treatment				1	.66*** CR = 7.74	15.46	3.60	.73
Environmental behavior					1	15.84	3.26	.63

Note. *** $p < .001$.

Reliability and accuracy of the KZZ-S

The internal consistency of the questionnaire, determined on the basis of Cronbach's alpha, was .87 for the test as a whole and ranged from .63 to .79 for its specific dimensions (Table 4).

Absolute stability, determined by means of the test-retest method with an interval of a month in a group of 32 students of the University of the Third Age (included in the total sample), was .88 for the overall score, attesting to the high stability of the tested construct.

I determined the validity of the measure by correlating KZZ-S scores with the scores obtained in an instrument testing similar behaviors: Juczyński's Health Behavior Inventory. In a 130-person group of seniors (chosen from the total surveyed group) I found a strong positive correlation between the overall scores in both tests ($r = .67, p < .001$) as well as mostly strong and medium correlations for various dimensions, particularly those with similar contents (Table 5).

Table 5
Correlations Between the Dimensions of the Health-Related Behavior Questionnaire for Seniors and the Health Behavior Inventory

Variables	KZZ-S Overall result	KZZ-S Positive attitude towards life	KZZ-S Behavior associated with physical health	KZZ-S Attention to mental health	KZZ-S Behavior related to prevention and treatment	KZZ-S Environmental behavior
IZZ Overall result	.67***	.49***	.54***	.26**	.57***	.51***
IZZ Proper eating habits	.63***	.31***	.62***	.32***	.44***	.51***
IZZ Prevention behaviors	.58***	.35***	.37***	.23**	.66***	.46***
IZZ Positive mental attitudes	.53***	.66***	.29***	.17	.41***	.31***
IZZ Health practices	.40***	.28***	.41***	.07	.29**	.31***

Note. *** $p < .001$; ** $p < .01$.

I also determined the correlations with characteristics believed to be related to health behavior: optimism and resiliency. In a group of 98 people aged over 60 years (which was part of the total sample), I performed a general analysis of correlation between the overall level of health-related behavior, measured by the KZZ-S, and the overall level of resiliency, measured by the Resiliency Measurement Scale (SPP-25; Ogińska-Bulik & Juczyński, 2008), obtaining a correlation of $r = .46$, $p < .001$. The overall level of resiliency also correlated positively with all dimensions of the KZZ-S: from $r = .23$ ($p < .05$) for attention to mental condition, to $r = 0.44$ ($p < .01$) for positive attitude to life. Similarly, there were significant positive correlation coefficients between all resiliency factors and the overall level of health-related behavior: from $r = .29$ ($p < .01$) for openness to new experiences and a sense of humor, to $r = .46$ ($p < .001$) for optimistic attitude to life and the ability to mobilize in difficult situations. Also, I found positive correlations between the dimensions of both tools, with the highest correlation be-

tween positive attitude to life and optimistic attitude to life and the ability to mobilize in difficult situations, $r = .47$ ($p < .01$).

In the group of 130 seniors (part of the total sample), there was a correlation between overall health-related behavior measured by the KZZ-S and optimistic disposition measured by the Life Orientation Test – Revised (LOT-R) by Scheier, Carver, and Bridges, adapted into Polish by Poprawa and Juczyński (Juczyński, 2001). A significant positive correlation was also found between the presence of optimistic disposition and health-related activity in the emotional domain: positive attitude to life, $r = .40$, $p < .001$. The correlation coefficients between the overall scores and the other behavior categories were not significant.

Normalization

The normalization was based on the results of the group of 522 seniors aged 60 to 88 years ($M = 69.07$, $SD = 6.22$), diverse in terms of sex and environment.

Initially, it was examined whether sociodemographic variables, such as sex, age, education, place of residence, and marital status, differentiated the level of health-related behavior in the test group. I also compared the levels of health-related behavior in the various groups of seniors (Table 6).

Sex was found to differentiate the overall level of health-related behavior, but only on the verge of significance ($p < .047$). As regards specific behavior categories, only the scores on care for mental health were higher for women than for men; scores on the remaining categories were similar for both sexes.

In addition, I computed the differences in health behaviors associated with other sociodemographic variables. No significant difference was observed between the younger group (< 69 years; $M = 93.99$, $SD = 14.51$) and the older group (≥ 69 years; $M = 94.01$, $SD = 14.17$) regarding overall levels of health-related behavior ($t = 0.19$, $p < .98$); the division point was the mean age. I found that older people took more care of their physical health ($M = 23.05$, $SD = 4.12$) than younger seniors ($M = 22.21$, $SD = 4.99$, $t = 2.02$, $p < .043$). However, the opposite was the case in the mental domain, with the older subjects taking less care ($M = 15.87$, $SD = 3.62$) than the younger ones ($M = 16.61$, $SD = 3.21$) in this respect ($t = -2.50$, $p < .013$).

Education only slightly differentiated the overall level of health-related behavior ($F = 3.15$, $p < .044$). Seniors with a university degree ($M = 94.22$, $SD = 12.97$) took more care of their overall health than seniors with elementary or vocational education ($M = 88.23$, $SD = 18.54$). However, when it comes to specific types of behavior, these differences are visible only in the categories

associated with care for mental health: subjects with higher education ($M = 17.61$, $SD = 2.55$) reported paying greater attention to this domain than those with secondary education ($M = 16.02$, $SD = 3.18$) or those with elementary and vocational education ($M = 14.00$, $SD = 3.95$, $F = 21.77$, $p < .001$).

Marital status did not differentiate the level of health behavior in the tested sample.

Table 6
A Comparison of Mean KZZ-S Scores Across Groups

Group	Health behavior – overall result		F. 1		F. 2		F. 3		F. 4		F. 5	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Overall (<i>N</i> = 522)	94.00	14.34	23.83	4.17	22.61	4.75	16.25	3.42	15.46	3.60	15.84	3.26
Men (<i>N</i> = 163)	92.04	15.75	23.81	4.24	22.12	5.23	15.52	3.79	15.01	2.87	15.57	3.34
Women (<i>N</i> = 359)	94.89	13.58	23.84	4.15	22.83	4.50	16.59	3.20	15.67	3.45	15.96	3.22
	$t = -1.99$, $p < .047$		$t = -0.06$, <i>ns</i>		$t = -1.51$, <i>ns</i>		$t = -3.12$, $p < .002$		$t = -1.93$, <i>ns</i>		$t = -1.27$, <i>ns</i>	
Test groups:												
UTA students (<i>N</i> = 192)	96.54	12.69	24.29	3.83	23.40	4.55	17.22	2.99	15.67	3.46	15.96	2.86
Senior Club members (<i>N</i> = 97)	90.37	14.63	22.56	4.51	22.02	3.92	15.66	3.27	14.89	3.81	15.25	3.60
Seniors not affiliated to organization (<i>N</i> = 174)	93.06	15.87	23.79	4.45	21.85	5.23	15.96	3.65	15.41	3.78	16.05	3.50
Outpatients (<i>N</i> = 59)	94.47	12.83	24.56	3.37	23.29	4.74	14.97	3.59	15.86	3.09	15.80	3.09
	$F(3, 518)$ = 4.43 $p < .004$		$F(3, 518)$ = 4.47 $p < .004$		$F(3, 518)$ = 4.21 $p < .006$		$F(3, 518)$ = 9.72 $p < .001$		$F(3, 518)$ = 1.30 <i>ns</i>		$F(3, 518)$ = 1.40 <i>ns</i>	

Note. Factor 1 – Positive attitude towards life; Factor 2 – Behavior associated with physical health; Factor 3 – Attention to mental health; Factor 4 – Behavior related to prevention and treatment; Factor 5 – Environmental behavior.

By contrast, place of residence did show associations with health-related behavior ($F = 12.72$, $p < .001$). The results of Tukey's test revealed that people from a rural background ($M = 88.98$, $SD = 15.64$) engaged in healthy behaviors less often than residents of small towns ($M = 94.03$, $SD = 14.49$), particularly

those from major cities ($M = 98.17$, $SD = 12.63$). Similar differentiation could also be seen in each factor of health behavior, except environmental behavior.

Of the tested subgroups (Table 6), the highest overall level of health-related behavior occurred in seniors who were students of the University of the Third Age (UTA). Tukey's test results suggest that statistically significant differences between UTA students and the members of senior clubs exist in behavior related to emotional health. UTA students scored higher on physical health than seniors who were not members of any organization, and higher than all other subgroups on health behavior pertaining to the intellectual domain. No differences were found between the groups regarding prevention or environmental behavior.

The results of the normalization group were used as the basis for the transformation of the raw results into standardized sten units (Table 7). The mean sten score was 5.5 ($SD = 2.0$). The 5-6 sten score was treated as average, 1-4 sten as low, and 7-10 sten as high.

Table 7
Preliminary Sten Standards (N = 522)

Raw score	Sten
≤ 59	1
60-71	2
72-78	3
79-88	4
89-95	5
96-101	6
102-107	7
108-112	8
113-116	9
$117 \leq$	10

Description of the measure, research procedure, and interpretation of the KZZ-S scores

The Health-Related Behavior Questionnaire for Seniors (KZZ-S) is composed of 24 statements that describe various health-related behaviors. It is designed to measure health-related behavior (through self-report) in people over 60 years of age. It makes it possible to determine the overall level of health-related behavior, as well as the levels of five behavioral categories, namely:

1. Positive attitude to life: a category comprising behaviors belonging to the domain of mental health and reinforcing positive emotionality, such as taking

care that one is in a good mood every day, calmly expressing emotions, or avoiding depressing situations (e.g., *I try to think positively about life*).

2. Behavior related to physical health: this category encompasses behaviors associated with 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: activities aimed at improving intellectual functioning, such as reading books, broadening knowledge, or acquiring new skills (e.g., *I pursue my interests*).

4. Behavior associated with prevention and treatment: treatment-related behaviors and avoidance of illness, such as searching for information about diseases and their treatment, reporting to a doctor immediately after noticing disease symptoms, following medical recommendations based on one's health condition (e.g., *I report for periodic medical examinations*).

5. Environmental behavior: behavior relating to the domain of public health associated with the environmental protection, such as actively reacting to littering the environment, considering the impact of the products purchased on the environment, conserving water and electricity for the sake of the environment (e.g., *I segregate my rubbish, disposing of it in appropriate containers*).

The items are preceded by a short instruction: "The purpose of this questionnaire is to evaluate different health-related behaviors. For each statement, please select the answer that best describes you." The answers are given on a five-point scale: 1 – *false (for me)*, 2 – *rather inaccurate*, 3 – *difficult to say*, 4 – *quite true*, 5 – *true*.

A higher score indicates a higher level of behavior beneficial to health. The items included in each health-related behavior category are indicated in Tables 2 and 3.

To identify which health behavior category is rated the highest, the total score obtained for each factor is divided by the number of items in it (six items in the case of Factors 1 and 2; four items in the case of Factors 3, 4, and 5). The raw score reflecting the overall level of health behaviors can be converted to sten scores (Table 7).

The measure can be used in individual and group studies to assess the both the overall level of health behavior and the levels of specific types of health behaviors. The questionnaire can be useful in determining how to modify lifestyle, monitor changes in health care, and plan prevention interventions.

CONCLUSION

Research on groups of older people is necessitated by the demographic situation in Poland and worldwide. Seniors' quality of life becomes particularly important, and engaging in appropriate health behaviors is of particular importance in maintaining it. In late adulthood, these behaviors contribute to the longer expectancy of life in good health and facilitate successful aging.

There is a need for a better understanding of senior health-related activity, not only for the purposes of description and explanation, but also for the creation of health modification and promotion programs. Both satisfaction with life and quality of life can be supported at any age, including old age (Zadworna-Cieślak, 2015). The specificity of the period of late adulthood demands specialized measures of health behavior, such as the Health-Related Behavior Questionnaire for Seniors.

REFERENCES

- Albert, S. M., & Freedman, V. (2010). *Public health and aging: Maximizing function and well-being*. New York: Springer Publishing.
- Bartoszewicz, R., Gandziarski, K., Lewandowska, M., & Szymańska, K. (2014). Zachowania prozdrowotne i poczucie koherencji osób w okresie późnej dorosłości objętych wsparciem społecznym instytucji edukacyjnej w obszarze kultury fizycznej [Health behaviors and the sense of coherence in people in their late adulthood receiving social support from an educational institution in the area of physical education]. *Rozprawy Naukowe*, 47, 108–116.
- Bedyńska, S., & Książek, M. (2012). *Statystyczny drogowcaz 3. Praktyczny przewodnik wykorzystania modeli regresji oraz równań strukturalnych [Statistical signpost 3: A practical guide to the use of regression models and structural equations]*. Warsaw, PL: Wydawnictwo Akademickie Sedno.
- Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, 88, 588–606. DOI:10.1037/0033-2909.88.3.588
- Central Statistical Office of Poland, GUS (2014). *Prognoza ludności na lata 2014-2050 [Population forecast for 2014-2050]*. Warsaw, PL: Central Statistical Office of Poland. Retrieved April 20, 2015, from <http://stat.gov.pl/obszary-tematyczne/ludnosc/prognoza-ludnosci/prognoza-ludnosci-na-lata-2014-2050-opracowana-2014-r-,1,5.html>
- Central Statistical Office of Poland, GUS (2014). *Sytuacja demograficzna osób starszych i konsekwencje starzenia się ludności Polski w świetle prognozy na lata 2014-2050 [Demographic situation of the elderly and the consequences of Polish population aging in the light of forecasts for 2014-2050]*. Warsaw, PL: Central Statistical Office of Poland. Retrieved June 10, 2016, from <http://stat.gov.pl/obszary-tematyczne/ludnosc/ludnosc/sytuacja-demograficzna-osob-starszych-i-konsekwencje-starzenia-sie-ludnosci-polski-w-swietle-prognozy-na-lata-2014-2050,18,1.html>

- Central Statistical Office of Poland, GUS (2015). *Trwanie życia w 2014 roku [Life expectancy in 2014]*. Warsaw, PL: Central Statistical Office of Poland. Retrieved August 6, 2015, from <http://stat.gov.pl/obszary-tematyczne/ludnosc/trwanie-zycia/trwanie-zycia-w-2014-r-,2,9.html>
- Central Statistical Office of Poland, GUS (2016). *Ludność w wieku 60+. Struktura demograficzna i zdrowie [Population aged 60+. Demographic structure and health]*. Warsaw, PL: Central Statistical Office of Poland (GUS). Retrieved March 17, 2016, from <http://stat.gov.pl/obszary-tematyczne/ludnosc/ludnosc/ludnosc-w-wieku-60-struktura-demograficzna-i-zdrowie,24,1.html>
- Davis, M. A., Neuhaus, J. M., Moritz, D. J., Lein, D., Barclay, J. D., & Murphy, S. P. (1994). Health behaviors and survival among middle-aged and older men and women in the NHANES I Epidemiologic Follow-up Study. *Preventive Medicine, 23*(3), 369–376.
- Dolińska-Zygmunt, G. (2000). *Podmiotowe uwarunkowania zachowań promujących zdrowie [Subjective determinants of health-promotion behaviors]*. Warsaw, PL: Institute of Psychology Press, Polish Academy of Sciences.
- Dziedzic, B., Zajac, P., Wiśniewski, A., & Sienkiewicz, Z. (2015). Ocena wybranych zachowań zdrowotnych dotyczących profilaktyki choroby niedokrwiennej serca wśród osób starszych będących słuchaczami uniwersytetów trzeciego wieku [Evaluation of selected health behaviors regarding the prevention of coronary heart disease among seniors who are students of the Universities of the Third Age]. *Pielęgniarstwo i Zdrowie Publiczne // Nursing and Public Health, 5*(2), 141–149.
- Ewles, L., & Simnett, I. (1992). *Promoting health: A practical guide*. London: Sartori Press.
- Finogenow, M., & Zadworna-Cieślak, M. (2013). Wydarzenia krytyczne w okresie późnej dorosłości [Critical events in late adulthood]. *Przedsiębiorczość i zarządzanie, 14*(5), 97–116.
- Ford, J., Spallek, M., & Dobson, A. (2008). Self-rated health and a healthy lifestyle are the most important predictors of survival in elderly women. *Age Ageing, 37*(2), 194–200. DOI: 10.1093/ageing/afm171
- Franklin, N., & Tate, C. (2009). Lifestyle and successful aging: An overview. *American Journal of Lifestyle Medicine, 3*(1), 6–11. DOI: 10.1093/geront/42.6.727.
- Gochman, D. S. (1988). *Health behavior: Emerging research perspectives*. New York: Plenum Press.
- Havighurst, R. (1981). *Developmental tasks and education*. New York: Longman and Green.
- Juczyński, Z. (2001). *Narzędzia pomiaru w promocji i psychologii zdrowia [Measurement instruments in health promotion and psychology]*. Warsaw, PL: Wydawnictwo Naukowe PWN.
- Kozieł, D., Kaczmarczyk, M., Naszydlowska, E., & Gałuszka, R. (2008). Wpływ kształcenia w Uniwersytecie Trzeciego Wieku na zachowania zdrowotne ludzi starszych [The influence of education in the University of the Third Age on elderly people's health behaviors]. *Studia Medyczne, 12*, 23–28.
- Kupcewicz, E., Gontarz, A., Wilk, B., & Kuśmierczyk, M. (2016). Evaluation of health behaviors of individuals aged over 60 years. *Hygeia Public Health, 51*(2), 202–208.
- Młynarska, M., Nowicki, G., Rudnicka-Drożak, E., Zagaja, A., Misztal-Okońska, P., Dyndur, J., & Majcher, P. (2015). Health behaviors of people over 65 years of age and their socio-demographic factors. *Gerontologia Polska, 4*, 179–185.
- Mossakowska, M., Więcek, A., & Błędowski, P. (Eds.) (2012). *Aspekty medyczne, psychologiczne, socjologiczne i ekonomiczne starzenia się ludzi w Polsce [Medical, psychological, sociological, and economic aspects of aging in Poland]*. Poznań, PL: Termedia Wydawnictwa Medyczne.

- Muszałik, M., Zielińska-Więczkowska, H., Kędzióra-Kornatowska, K., & Kornatowski, T. (2013). Ocena wybranych zachowań sprzyjających zdrowiu wśród osób starszych w oparciu o Inwentarz Zachowań Zdrowotnych Juczyńskiego w aspekcie czynników socjo-demograficznych [Assessment of selected health behavior among elderly people in Juczyński's Inventory of Health Behavior regarding sociodemographic factors]. *Problemy Higieny i Epidemiologii*, 94(3), 509–513.
- Ogińska-Bulik, N., & Juczyński, Z. (2008). Skala Pomiaru Prężności – SPP-25 [Resilience Measurement Scale – SPP-25]. *Nowiny Psychologiczne*, 3, 39–56.
- Ogińska-Bulik, N., & Zadworna-Cieślak, M. (2014). Rola rozwoju potraumatycznego w podejmowaniu zachowań zdrowotnych u osób w okresie późnej dorosłości, *Polskie Forum Psychologiczne*, 19(2), 243–257. DOI: 10.14656/PFP20140205
- Olejnik, M. (2015). Średnia dorosłość [Middle adulthood]. In J. Trempała (Eds.), *Psychologia rozwoju człowieka [The psychology of human development]* (pp. 312–325). Warsaw, PL: Wydawnictwo Naukowe PWN.
- Peel, N., McClure, R., & Bartlett, H. (2005). Behavioral determinants of healthy aging. *American Journal of Preventive Medicine*, 28(3), 298–304. DOI: 10.1016/j.amepre.2004.12.002
- Prohaska, T. R., Leventhal, E. A., Leventhal, H., & Keller, M. L. (1985). Health practices and illness cognition in young, middle aged, and elderly adults. *Journal of Gerontology*, 40(5), 569–578. DOI: 10.1093/geronj/40.5.569
- Selivanova, A., & Cramm, J. M. (2014). The relationship between healthy behaviors and health outcomes among older adults in Russia. *BMC Public Health*, 14(1), 1–25. DOI: 10.1186/1471-2458-14-1183
- Smoleń, E., Gazdowicz, N., & Żyłka-Reut, A. (2011). Zachowania zdrowotne osób starszych [Elderly people's health behaviors]. *Pielęgniarstwo XXI wieku*, 3(36), 5–9.
- Straś-Romanowska, M. (2015). Późna dorosłość [Late adulthood]. In J. Trempała (Eds.), *Psychologia rozwoju człowieka [The psychology of human development]* (pp. 326–350). Warsaw, PL: Wydawnictwo Naukowe PWN.
- Swindell, W., Ensrud, K., Cawthon, P., Cauley, J., Cummings, S., & Miller R. (2010). Indicators of 'Healthy Aging' in older women (65-69 years of age). A data-mining approach based on prediction of long-term survival. *BMC Geriatrics*, 10(55), 1–24. DOI: 10.1186/1471-2318-10-55
- Sygit-Kowalkowska, E. (2013). Zachowania zdrowotne osób w okresie późnej dorosłości – socjodemograficzne korelaty i różnice między środowiskami społecznymi [Health behaviors of people in late adulthood: Sociodemographic correlates and differences between social environments]. *Annales Academiae Medicae Stetinensis // Roczniki Pomorskiej Akademii Medycznej w Szczecinie*, 59(1), 103–113.
- Szczerbinska, K., Piórecka, B., & Malinowska-Cieślak, M. (2011). Fazy gotowości do zmiany zachowań i ich uwarunkowania a zachowania w sferze aktywności fizycznej i żywienia wśród starszych pacjentów objętych w Krakowie opieką pielęgniarek środowiskowo-rodzinnych. Implikacje dla promocji zdrowia [Phases of readiness to change behaviors and their determinants as related to behaviors in the area of physical activity and nutrition in elderly patients under the care of district and family nurses in Cracow, Poland]. *Zeszyty Naukowe Ochrony Zdrowia. Zdrowie Publiczne i Zarządzanie*, 9(1), 60–75. DOI: 10.4467/20842627OZ.11.004.0341
- Walker, S. N., Volkan, K., Sechrist, K. R., & Pender, N. J. (1988). Health-promoting life styles of older adults: Comparisons with young and middle-aged adults, correlates and patterns. *Advances in Nursing Science*, 11(1), 76–90.

- World Health Organization, WHO (1984). Health promotion: A WHO discussion document on the concepts and principles. Reprinted in *Journal of the Institute of Health Education* (1985), 23(1), 11–14.
- World Health Organization, WHO (2002). *Active ageing. A policy framework*. Retrieved July 20, 2016, from http://www.who.int/ageing/publications/active_ageing/en/
- Zadworna-Cieślak, M. (2015). Dobrostan psychiczny seniorów – znaczenie oddziaływań psychoedukacyjnych [Seniors' psychological well-being: The significance of psychoeducational interventions]. In V. Tanaś & W. Welskop (Eds.), *Lifelong learning* (pp. 321–328). Łódź, PL: The Academy of Business and Health Sciences Press.
- Zadworna-Cieślak, M., & Finogenow, M. (2012). Perspektywa pozytywnego starzenia się w okresie późnej dorosłości [The perspective of positive aging in late adulthood]. *Pedagogika Rodziny*, 2(4), 117–128.
- Zadworna-Cieślak, M., & Ogińska-Bulik, N. (2013). Zachowania zdrowotne osób w wieku senioralnym – rola optymizmu [Seniors' health behaviors: The role of optimism]. *Psychogeriatrya Polska*, 10(4), 145–156.
- Ziarko, M. (2006). *Zachowania zdrowotne młodych dorosłych – uwarunkowania psychologiczne* [Young adults' health behaviors: Psychological determinants]. Poznań, PL: Wydawnictwo Naukowe „Bogucki”.