

EMOTIONAL STATE IN RELATION TO PHYSICAL ACTIVITY AMONG OLDER PEOPLE

Agnieszka Błaszczak,^{1, A, B, C, D} Ewa Dołowy,^{1, B} Siemowit Muszyński^{2, C, D}

¹ Department Tourism and Recreation, University of Life Sciences in Lublin, Lublin, Poland

² Department of Physics, University of Life Sciences in Lublin, Lublin, Poland

^A Study Design; ^B Data Collection; ^C Statistical Analysis; ^D Manuscript Preparation; ^E Funds Collection

Address for correspondence:

Siemowit Muszyński

University of Life Sciences in Lublin

Akademicka 13, 20-950 Lublin, Poland

E-mail: siemowit.muszynski@up.lublin.pl

Abstract Old age is a stage in human life associated with alteration of physical, mental and social functioning. The aim of this study was to investigate the associations between regular physical activity (PA) and purpose of life, intensity of depressive moods, sense of coherence (SoC) and the level of anxiety in older adults. Forty six individuals physically active (A) and 49 physically inactive (NA) without mental or physical disability were included in the study. The purpose of life was assessed by Purpose of Life Scale (PIL), intensity of depressive moods by Beck Depression Inventory (BDI), SoC by Antonovsky's questionnaire and level of anxiety by State-Trait Anxiety Inventory (STAI). An NA individuals had lower BDI-feelings level compared with A group ($p < 0.05$). The NA group also showed a significantly lower scores in anxiety-feature domain of the STAI ($p < 0.05$). Our results suggest that improved self-perceived quality of life is significantly associated to PA among older adults and regular PA may be effective for improving depression and anxiety symptoms in older adults. A better understanding of the relationship between the PA and depressive moods and level of anxiety is important to develop recommendations regarding modifications in life-style.

Key words physical activity, sense of coherence, anxiety, aging

Introduction

Old age is a stage in human life associated with numerous changes in physical, mental and social functioning. The intensity of these changes is largely determined by previous phases of life. As a result of it, the efficiency of all systems decreases, especially cardio-respiratory, secretory, genitourinary and nervous system; organism immunity also decreases (Zych, Kaleta-Witusiak, 2010). Moreover, the capacity of various senses deteriorates, including vision and hearing receptors which are extremely important for independent functioning (Kielar-Turska, 2007).

The "threshold of old age" is considered to be the age of 60 years (Studen, 2012), but due to considerable diversification of the older population in terms of health, physical ability, mental condition and life and social situation, it is further divided into two sub-periods: early old age, usually associated with a fairly good psychophysical

efficiency and late old age characterized by a significant decline in physical ability and mental condition, which lower the quality of life and functional independence. The age of 75 years is the boundary between these sub-periods (Kawula, 2003). In the consecutive age ranges, the efficiency of adaptive mechanisms decreases, the resistance of the body to harmful bacterial and viral factors and mental stress is reduced, which can lead to chronic diseases in consequence. Physical efficiency and fitness decreases, muscle sarcopenia intensifies and muscle strength and mass drops, which adversely affects the functional status of elderly people (Steuden, 2012). The cognitive functions deteriorate: including especially memory, attention, orientation and logical thinking, hindering professional activity as well as social and day to day functioning (Steuden, 2012). Deterioration of intellectual functioning is often observed. It is associated with disturbances of short-term memory system, deterioration of concentration, increase of response time (Kielar-Turska, 2007).

Changes also refer to mental and social functioning (Janiszewska-Rain, 2005). Resistance to stressful events becomes lower. A serious problem among mental disorders affecting elderly people is posed by depressive moods, which affect 15 to 25% of people over 65 years of age (Parnowski, 2005). Neuroses are also no less important, including existential neuroses affecting from 14 to 21% of elderly people, resulting from the lack of meaning of life. These disorders are very often the reason for the loss of enjoyment of life, social isolation, withdrawal from all activities which leads to a further increase in health problems, decrease in the quality of life, and even death.

As many years of research indicate, the key to obtain high psychophysical condition of an individual, allowing for the so-called successful aging, can be in regular physical activity, allowing for effective adaptation and satisfying, independent life. Numerous studies have documented the importance of regular exercise in vascular diseases of the brain (Drygas, 2006), hypertension (Sobieszcańska, Kalka, Pilecki, Adamus, 2009), osteoporosis (Jessup, Home, Vishen, Wheeler, 2003), diabetes, states of pain or in the prevention of cancer (Drygas, 2006). It was proved that moderate physical effort improves the efficiency of the immune system, preventing respiratory infections (Kostka, 2001). Regular exercise also contributes to raising respiratory, hemodynamic parameters associated with the improvement of the time of heart rate and blood pressure restitution and fitness parameters, as regards agility, stamina, strength and speed (Trzeciak, Zawadzki, 1997). When undertaken at any age it inhibits motor regression and leads to increased efficiency and physical fitness, which is extremely important in preventing from falling over (MacAuley, 2000). Physical exercise is important in the prevention and treatment of obesity which can cause numerous health problems among elderly people.

These reports confirm that physical activity is an important factor in determining the widely-understood human health, and therefore in recent years, the scope of recommendations for physical exercise among elderly people has been expanded (Sęk, 2001). Regular physical activity of moderate intensity strengthens the physical and mental condition of seniors, becoming not only an important element in the prevention and treatment of many diseases, but also plays an important role in building the psycho-physical potential which increases immunity resources that help to cope with difficult situations, helping to reduce the level of anxiety, depressive moods or negative moods, recognized as indicators of mental health (Sęk, 2001).

The key role in achieving, protecting and restoring health is attributed to a sense of coherence, which, according to A. Antonovsky is the main determining factor of how people perceive different kinds of stressors and how they deal with them (Sęk, 2001). People who are characterized by a high sense of coherence enjoy a better psycho-physical condition and are more willing to undertake activity, accept the difficulties encountered more easily, experience greater satisfaction with life and rate its quality higher (Kocięcka, Andruszkiewicz, Wrońska, 2010).

A strong sense of coherence positively correlates with adopting healthy behaviour types by a person, such as healthy diet, physical activity and preventive behaviour (Heszen, Sęk, 2002).

Numerous studies indicate that the sense of life meaningfulness plays an important role in maintaining physical and mental health (Takkiainen, Suutama, Ruoppila, 2001). It reduces the risk of Alzheimer's disease and mild cognitive impairments, the maintenance of functional status and mobility of elderly people and in addition it is also associated with the reduction of the risk of death (Wysocka-Pleczyk, Słowik, 2012). Therefore, the meaning of life is considered to be one of the main elements of psychological well-being and the most important motivational factor of an individual.

The aim of this study was to investigate the relationship between taking up physical activity by seniors and their emotional state determined by variables such as the level of depressive moods, the level of anxiety, experiencing the meaning of life, a sense of coherence, self-assessment of health condition.

It was assumed that elderly people who declare pursuing systematic physical activity will be in a better emotional state than their inactive peers. Physical exercise undertaken by them will reduce the level of anxiety and depressive moods and will strengthen the sense of life meaningfulness and the sense of coherence. Moreover, the emotional state of active seniors will positively affect the perception of their own health condition.

Material and methods

The study was conducted during the period from January to April 2014. 123 people at retirement age participated in research. Participation in the study was voluntary. In order to obtain information regarding physical activity and health condition, as well as personal data, a questionnaire designed for the purpose of this study was used. After a preliminary analysis questionnaires of people under the age of 60 were rejected. Finally, 95 people aged 60 to 88 (average age 66.94) formed the study group (Table 1). The participants were city residents, living in their own flats; most of them had higher education (54.73% – 52 people). Respondents who declared secondary education accounted for 35.78% (34 people) of the total respondents' number, only 6.31% (6 people) of the respondents declared vocational education, and 3.15% (3 people) declared basic education (Table 1).

Table 1. Characteristics of the research participants

	A group	NA group	p-value
Participants, n	46	49	
Women, n (%)	40 (87.0%)	44 (89.8%)	0.755
Age, $\bar{x} \pm sd$	66.5 \pm 4.7	67.4 \pm 5.7	0.620
Education, n (%)			0.192
Basic	0 (0.0%)	3 (6.1%)	
Vocational	2 (4.3%)	4 (8.2%)	
Average	15 (32.6%)	19 (38.8%)	
Higher	29 (63.0%)	23 (46.9%)	
BMI, $\bar{x} \pm sd$	27.2 \pm 3.8	26.5 \pm 3.5	0.392

A – physically active; NA – physically inactive; BMI – body mass index; \bar{x} – mean; sd – standard deviation.

On the basis of the replies to the survey questions, concerning the pursue of systematic physical exercises, the study participants were divided into two groups: a group of physically active (A) and inactive (NA) individuals. People

who regularly took physical exercises lasting 2–3 hours at least 2–3 times a week, were considered physically active. 46 people, including 40 women and 6 men, were qualified as a physically active group, while 49 people, including 44 women and 5 men, were qualified as a physically inactive group. Almost 87% (40 respondents) of the active group declared participation in exercises twice or more times a week, only 6 people said they did exercise once a week, while 37 people from this group exercised regularly once a week by taking part in gymnastics classes, as part of UTA. More than 30% of people from group A declared that they had exercised for over 15 years, 43.4% had done exercise for at least 4 years, and the remaining 28.2% had exercised for at least one year. The distinguished groups were homogeneous with relation to age ($p = 0.620$), gender ($p = 0.755$) and the level of education ($p = 0.192$). Also, the BMI index in both groups did not differ significantly ($p = 0.392$).

Standardised research tools, having satisfactory psychometric properties, which can also be applied to elderly people, were used in order to assess the mental state of the participants.

To assess the degree of the realisation of the meaning of life part A of Purpose in Life Scale (PIL) was used (Crumbaugh, Maholick, 1964).

To study the Sense of Coherence (SOC-29) a questionnaire by A. Antonovsky was used. The questionnaire consists of 29 questions. Test questions comprise three sub-scales corresponding to the components of the sense of coherence: comprehensibility, resourcefulness and meaningfulness. The results allow for specifying both a global sense of coherence and its individual components (Antonovsky, 1987).

Beck Depression Inventory (BDI) was used to assess the intensity of depressive moods and to distinguish healthy people from ill ones. It consists of 21 items representing the affective, cognitive, motivational, and physiological symptoms of depression (Hammen, Watkins, 2008).

To measure the level of anxiety as a “state” Spielberger’s State-Trait Anxiety Inventory (STAI) was used. In this test the anxiety is understood as the current, volatile emotional state of an individual and fear as “features”, so relatively constant dispositions to experience anxiety states (Spielberger, 1983).

A statistical analysis of the collected results was conducted. In case of quantitative data, the arithmetic mean (\bar{x}) and standard deviation (sd) were calculated, while for qualitative data – the frequency and percentage figures. The verification of distribution normality was accomplished with the use of the Shapiro-Wilk W test. In order to compare average values of the results in terms of psychological variables between the two groups, the non-parametric U Mann-Whitney test for independent samples was applied and qualitative data were compared by means of the chi-square test (χ^2), assuming the level of statistical significance $p \leq 0.05$. Statistical analysis was performed with the use of SPSS 20.0 programme.

Results

Table 2 shows the results of investigating self-assessment of health condition by the participants in both groups. The results indicate significant differences in the self-assessment of health condition of people physically active and inactive ($p = 0.006$). Over 39% of the people from group A and only 10.2% from the NA group evaluate their health as good. More than 39% of participants from group A and up to 55.1% from the NA group evaluated their health status as “average”. Only one person from group A and 7 from the NA group consider their health condition as “rather bad”, and one person from the NA group evaluated it as “definitely bad”. An equal number of people from both groups ($n = 9$) stated that their health condition is “rather good”. It is interesting that the respondents from both groups, while answering the question of whether they suffered from chronic diseases, responded similarly. Almost

35% of people from group A and over 40% from the NA group gave positive answers to this question, and the difference in responses was not statistically significant ($p = 0.509$). Thus, slightly fewer people from group A suffer from chronic diseases, but these respondents perceive their current health condition better.

Table 2. The characteristics of the health condition self-assessment by the participants

	A group	NA group	p-value
The self-assessment of the current health condition, n (%)			0.006
Good	18 (39.1%)	5 (10.2%)	
Rather good	9 (19.6%)	9 (18.4%)	
Average	18 (39.1%)	27 (55.1%)	
Rather bad	1 (2.2%)	7 (14.3%)	
Definitely bad	0 (0.0%)	1 (2.0%)	
Incidence of chronic diseases, n (%)	30 (65.0%)	29 (59.2%)	0.509

A – physically active; NA – physically inactive.

Comparing the intensity of the meaning of life perception of the seniors declaring systematic physical activity and those physically inactive, there were no significant differences in the result pertaining to the general purpose of life, nor in the subscales: affirmation of life, self-acceptance, awareness of goals, a sense of freedom, the attitude towards future and attitude towards death, which is presented in Table 3.

Table 3. Purpose in Life (PIL) of A and NA individuals

Variable	A group		NA group		p-value
	\bar{x}	sd	\bar{x}	sd	
PIL, the overall result	109.02	18.90	102.44	23.20	0.256
Affirmation of life	43.47	8.36	41.08	9.85	0.327
Self-acceptance	17.13	2.90	15.87	3.93	0.133
Awareness of goals	16.36	3.74	15.51	4.03	0.293
The sense of freedom	10.67	2.21	9.91	2.98	0.276
Attitude towards the future	10.63	2.62	9.69	2.85	0.101
Attitude towards death	10.73	2.15	10.36	2.80	0.801

A – physically active; NA – physically inactive; \bar{x} – mean; sd – standard deviation.

Statistical analysis also showed that there was no significant difference in the level of coherence between those physically active and inactive, although, as with the meaning of life, within the group of active people there are higher average values observable, both in the general result, as well as in the particular components. These data are presented in Table 4.

Table 5 shows the results of measuring depressive moods in both examined groups. On the basis of the obtained data, significant differences between physically active and inactive persons were found only in the BDI subscale feelings ($p = 0.034$), which includes factors such as mood, pessimism, sense of failure, dissatisfaction, a sense of punishment, self-hatred, self-accusation, the desire of self-punishment and propensity for crying. These factors are strongly associated with the affective sphere of the individual. On other scales, i.e. in general result, interpersonal contacts and somatic symptoms, there were no statistically significant differences. It is worth noting that the average overall score in both groups indicates a slight worsening of the depressive moods of the

respondents, while in the group of inactive persons they are significantly higher ($p = 0.067$). On other scales, despite the lack of significant differences, one can see a clear trend towards decreasing moods of depression in the group of people taking up exercise.

Table 4. The sense of coherence (SOC) of A and NA individuals

Variable	A group		NA group		p-value
	\bar{x}	sd	\bar{x}	sd	
SOC, overall result	140.86	23.95	129.91	28.69	0.079
The sense of comprehensibility	49.17	10.14	44.81	12.24	0.128
The sense of manageability	48.89	8.40	45.20	10.43	0.077
The feeling of meaningfulness	42.80	7.86	39.89	8.97	0.094

A – physically active; NA – physically inactive; \bar{x} – mean; sd – standard deviation.

Table 5. The intensification of depressive moods (BDI) in the A and NA group of individuals

Variable	A group		NA group		p-value
	\bar{x}	sd	\bar{x}	sd	
BDI, overall result	10.23	8.40	12.57	7.89	0.067
Feelings	3.45	4.66	4.40	3.98	0.034
Interpersonal contacts	2.06	2.22	2.83	2.25	0.074
Somatic symptoms	4.71	3.08	5.32	2.96	0.205

A – physically active; NA – physically inactive; \bar{x} – mean; sd – standard deviation.

The mental health of older people is affected, to a large extent, by the level of perceived anxiety, hence there was also made a comparison between the groups of active and physically inactive people in terms of this variable. The obtained results are presented in Table 6.

Table 6. The level of anxiety in A and NA groups

Variable	A group		NA group		p-value
	\bar{x}	sd	\bar{x}	sd	
Anxiety, state	11.73	7.00	13.44	6.10	0.087
Anxiety, feature	18.10	8.78	22.24	9.88	0.023

A – physically active; NA – physically inactive; \bar{x} – mean; sd – standard deviation.

A significant difference was found in the characteristics of anxiety ($p = 0.023$) between the physically active and inactive individuals and no significant difference in the case of the state of anxiety ($p = 0.087$). These results therefore indicate that the physically active people are characterized by a significantly lower tendency to react with fear in threat situations.

Discussion

The period of late adulthood is a time when man, in the face of numerous losses, must revise their own identity, adapt to the changes (self-image, social status, professional status, economic status, loss of loved ones) and redefine the way they function; give it value and meaning (Janiszewska-Rain, 2005). Improving the emotional state of seniors involves, among other things, a positive attitude to life, a sense of its value and meaningfulness and the lack of negative states such as anxiety or depressed mood.

In the present study it a decision was made to verify whether physical activity, undertaken regularly, can affect the emotional state of the elderly, as well as their self-evaluation of health condition.

The presented results only partially confirm the hypothesis, which assumes that exercise undertaken by seniors has a beneficial effect on the level of anxiety and depressive moods and the sense of purpose in life and coherence, because statistically significant differences between the group of physically active and inactive individuals occurred only in terms of negative moods and referred to the feature of anxiety ($p = 0.023$) and the subscale of feeling in the evaluation of depressive moods BDI ($p = 0.034$). Significant differences between the groups were not established in the sense of purpose in life, the sense of coherence, the general result of the BDI and the other subscales (interpersonal contacts, somatic symptoms), as well as in the anxiety state. It is worth highlighting the fact that the physically active people were much more appreciative than their inactive peers in perceiving their health condition ($p = 0.006$), although in terms of contracting chronic diseases they were not significantly different in statistical terms ($p = 0.509$). This is especially important in relation to older people because positive assessment of their own health contributes to a more positive balance of life and may have an impact on the psychological well-being (Izdebski, Polak, 2005).

The study found no significant differences between active and inactive seniors in terms of the meaning of life, which leads to the conclusion that doing physical exercises does not affect the well-being of the respondents in this respect. However, the analysis of the obtained data can help one to notice that in the group of physically active individuals the average values on all PIL scales are significantly higher. One can therefore conclude that in better controlled test conditions, the obtained results could have been more favourable. The confirmation of this thesis lies in the data available in the literature, demonstrating the positive effect of regular physical activity on the meaning of life in older women (Takkienen et al., 2001; Guskowska, 2012). The obtained result could have been affected by the fact that the PIL test, applied in research, differentiates better people experiencing existential frustration than purpose in life. Thus, in the case of healthy people, differences may be too small to capture.

It was not proved either, that physical activity significantly affects the level of the sense of coherence in respondents. At the same time, experimental studies available in publications suggest that people taking regular exercise improve their emotional state; there is an increase in their sense of life meaningfulness, and the sense of coherence; lower incidence of mental health problems is observed (Guskowska, 2012). In the case of the sense of coherence, the direction of this relation was not defined, so it is difficult to determine whether physical activity affects the growth of the sense of coherence, or whether people with a high sense of coherence often take physical exercise (Włodarczyk, Ziółkowski, Włodarczyk, 2008).

The sense of coherence takes shape up to about the age of 30 under the influence of multiple experiences of an individual related to their environment and lifestyle. It can therefore be assumed that the sense of coherence, as a persistent, generalized, emotional and cognitive perception of the world, oneself and one's own life, does not undergo major changes in later periods of life. However, it should be noted that with a high sense of coherence

comes the belief that life is meaningful, predictable and orderly, which triggers the motivation to be healthy, to function efficiently, trying to improve the quality of one's own life (Dolińska-Zygmunt, 2001).

This study had a comparative character and was based on declarations, and thus it was impossible to verify the actual level of physical activity of the active individuals, which could have been crucial for the obtained results. Additionally, in the research only the activity in the form of recreational physical exercises was considered, while in the case of elderly people every type, duration and intensity of physical activity, including those related to day-to-day activities or working in a garden, may be significant for their well-being. Thus, perhaps only a tendency of active people towards improvement in depressive moods, sense of coherence and the meaning of life was outlined. The predominance of women among the research respondents could have been significant, as it has been shown that in the case of women physical activity contributes to reducing symptoms of depression to a lesser extent than in men (Reichert, Diogo, Vieira, Dalacorte, 2011).

The results indicate that active people are characterized by a significantly lower tendency to react with fear in threat situations, and therefore should also be less prone to experiencing situational anxiety. The observed lack of significant difference in the case of the "state" of fear may stem from the fact that the questionnaire was not filled in immediately after doing exercise and, therefore, the subjects could have been exposed to various factors causing a momentary sense of fear at that time. In the research on the impact of exercise on anxiety, the time that elapses between exercise and survey may be significant (Guszkowska, 2013). Too large a gap may trigger the fading of the anxiolytic effects of exercise, which primarily reduce physical tension and bring satisfaction.

The results suggest that physical activity is more significant in reducing adverse conditions, namely in the field of anxiety and depressive moods (Guszkowska, Kozdroń, 2009). Physical activity improves moods of older women, and contributes to the weakening of the dependence of the mood on the feature of fear, bringing benefits in the emotional sphere (Guszkowska, Kozdroń, 2009). Moreover, exercise allows one to relieve emotional tension and decreases the readiness to respond with negative emotions (Guszkowska, 2005).

Also, other studies have shown that regular physical activity, can slow down the process of change in terms of cognitive functions and abilities (O'Dwyer, Burton, Pachana, Brown, 2007; Miller, Taler, Davidson, Messier, 2012), improve self-perception and social interaction (Fox, Stathi, McKenna, Davis, 2007), have positive influence on reducing the level of anxiety and depression (Teixeira, Vasconcelos-Raposo, fernandes, Brustad, 2013), improve mood (Arent, Landers, Etnier, 2000), self-esteem, one's own body image, memory, concentration, family relationships (Sheridan, Radmacher, 1992). In the review by Vagetti and co-workers, discussing the results of studies from recent years on the impact of physical activity on the quality of life of older people, it was found that over 85% of all research reports positive effects of physical exercise on the perception of the quality of life in the field of mental health. These authors did not find works dealing with the negative impact of physical activity on these domains of life (Vagetti et al., 2014).

In conclusion, this study has revealed no significant differences between physically active and inactive individuals in terms of the sense of coherence and sense of life meaningfulness – variables which are important resources for human immunity. There were, however important differences between physically active and inactive individuals in terms of the perception of their own health, depressive moods (the scale of emotionality) and anxiety feature, thus suggesting a positive effect of systematic physical activity on negative moods of seniors. These results encourage one to conduct further research in this area in experimental conditions, because physical activity can be used as a widely available prophylactic and therapeutic means, supporting other forms of treatment of the emotional

states of seniors. Unfortunately, people who in their youth did not develop the need to be active and take up physical activity in themselves, do not undertake physical activity in older age; not only as a result of deteriorating health and physical function, but also due to social stereotypes regarding elderly people and old age (Błaszczak, Dołowy, Bednarska, 2015). Hence there is ample justification for the actions aimed not only at encouraging older people to pursue physical activity, but also to create conditions for its practice, so that it could become a regular part of their lifestyle.

References

- Antonovsky, A. (1987). *Unraveling the mystery of health. How people manage stress and stay well*. San Francisco: Jossey-Bass Publishers.
- Arent, S., Landers, D., Etnier, J. (2000). The effects of exercise on mood in older adults: A meta-analytic review. *Journal of Aging and Physical Activity*, 8, 407–430.
- Błaszczak, A., Dołowy, E., Bednarska, B. (2015). Physical activity in the lifestyle of elderly persons. In: B. Sawicki (ed.), *Promotion of healthy lifestyle in European countries* (pp. 254–270). Lublin: University of Life Sciences.
- Crumbaugh, J., Maholick, L. (1964). An experimental study in existentialism: The psychometric approach to Frankl's concept of noogenic neurosis. *Journal of Clinical Physiology*, 20, 200–207.
- Dolińska-Zygmunt, G. (2001). Orientacja salutogeniczna w problematyce zdrowotnej. Model Antonovsky'ego. In: G. Dolińska-Zygmunt (ed.), *Podstawy psychologii zdrowia* (pp. 19–33). Wrocław: Wydawnictwo Uniwersytetu Wrocławskiego.
- Drygas, W. (2006). Czy „siedzący” styl życia nadal stanowi zagrożenie dla zdrowia społeczeństwa polskiego? *Medycyna Sportowa*, 2 (6), 111–116.
- Fox, K., Stathi, A., McKenna, J., Davis, M. (2007). Physical activity and mental well-being in older people participating in the Better Ageing Project. *European Journal of Applied Physiology*, 100, 591–602.
- Guszkowska, M. (2005). *Aktywność ruchowa a przebieg transakcji stresowej u młodzieży*. Warszawa: Wydawnictwo AWF.
- Guszkowska, M. (2012). Aktywność fizyczna a nastrój i zadowolenie z życia kobiet w wieku późnej dorosłości. In: J. Nowocień, K. Zuchora (eds.), *Aktywność fizyczna i społeczna osób trzeciego wieku* (pp. 217–227). Warszawa: Wydawnictwo AWF.
- Guszkowska, M. (2013). *Aktywność fizyczna i psychika*. Toruń: Adam Marszałek Press.
- Guszkowska, M., Kozdroń, A. (2009). Wpływ ćwiczeń fizycznych na stany emocjonalne kobiet w starszym wieku. *Gerontologia Polska*, 17, 71–78.
- Hammen, C., Watkins, E. (2008). *Depression* (2nd ed.). London: Physiology Press/Taylor & Francis.
- Heszen, I., Sęk, H. (2002). *Psychologia zdrowia*. Warszawa: Wydawnictwo Naukowe PWN.
- Izdebski, P., Polak, A. (2005). Bilans życia i poczucie koherencji osób starszych w zależności od ich sytuacji życiowej. *Gerontologia Polska*, 13, 188–194.
- Janiszewska-Rain, J. (2005). Okres późnej dorosłości. Jak rozpoznać potencjał ludzi w wieku podeszłym. In: A. I. Brzezińska (ed.), *Psychologiczne portrety człowieka* (pp. 591–622). Gdańsk: Gdańskie Wydawnictwo Pedagogiczne.
- Jessup, J., Horne, C., Vishen, R., Wheeler, D. (2003). Effects of exercise on bone density, balance and self-efficacy in older women. *Biological Research for Nursing*, 4, 171–180.
- Kawula, S. (2003). *Pedagogika społeczna. Dokonania-aktualność-perspektywy*. Toruń: Adam Marszałek Press.
- Kielar-Turska, M. (2007). Rozwój człowieka w pełnym cyklu życia. In: J. Strelau (ed.), *Psychologia* (vol. 1, pp. 285–332). Gdańsk: Gdańskie Wydawnictwo Pedagogiczne.
- Kocięcka, A., Andruszkiewicz, A., Wrońska, I. (2010). Poczucie koherencji a stan zdrowia pielęgniarek czynnych zawodowo. *Problemy pielęgniarstwa*, 18, 139–144.
- Kostka, T. (2001). The role of physical activity in health promotion in older people. *Medycyna Sportowa*, 5 (suppl. 2), 149–150.
- MacAuley, D. (2000). Rola aktywności ruchowej w promocji zdrowia u osób starszych. *Medycyna Sportowa*, 4, E7–E14.
- Miller, D., Taler, V., Davidson, P., Messier, C. (2012). Measuring the impact of exercise on cognitive aging: methodological issues. *Neurobiology of Aging*, 33, e29–e43.

- O'Dwyer, S., Burton, N., Pachana, N., Brown, W. (2007). Protocol for fit bodies, fine minds: a randomized controlled trial on the effect of exercise and cognitive training on cognitive functioning in older adults. *BMC Geriatrics*, 7, 23.
- Parnowski, T. (2005). *Depresje w wieku podeszłym*. Warszawa: Instytut Psychiatrii i Neurobiologii, Warszawa.
- Reichert, C., Diogo, C., Vieira, J., Dalacorte, R. (2011). Physical activity and depressive symptoms in community-dwelling elders from southern Brazil. *Revista Brasileira de Psiquiatria*, 33, 165–170.
- Sęk, H. (2001). Salutogeneza i funkcjonowanie właściwości poczucia koherencji. In: H. Sęk, T. Pasikowski (eds.), *Zdrowie – Stres – Zasoby. O znaczeniu poczucia koherencji dla zdrowia* (pp. 23–42). Poznań: Wydawnictwo Humaniora.
- Sheridan, C., Radmacher, S. (1992). *Health psychology: challenging the biomedical model*. New York: Wiley & Sons.
- Sobieszczarska, M., Kałka, D., Pilecki, W., Adamus, J. (2009). Aktywność fizyczna w podstawowej i pierwotnej prewencji choroby sercowo-naczyniowej. *Polski Merkuriusz Lekarski*, 26, 156–159.
- Spielberger, C. (1983). *State-Trait Anxiety Inventory*. Palo Alto: Consulting Psychologists Press.
- Studen, S. (2012). *Psychologia starzenia się i starości*. Warszawa: Wydawnictwo Naukowe PWN.
- Takkienen, S., Suutama, T., Ruoppila, I. (2001). More meaning by exercising? Physical activity as a predictor of a sense of meaning in life and of self-rated health and functioning in old age. *Journal of Aging and Physical Activity*, 9, 128–141.
- Teixeira, C., Vasconcelos-Raposo, J., Fernandes, H., Brustad, R. (2013). Physical activity, depression and anxiety among the elderly. *Social Indicators Research*, 113, 307–318.
- Trzeciak, B., Zawadzki, M. (1997). Kinezyterapia a wydolność fizyczna osób starszych. *Kultura Fizyczna*, 7–8, 21–23.
- Vagetti, G., Barbosa Filho, V., Moreira, N., de Oliveira, V., Mazzardo, O., de Campos, W. (2014). Association between physical activity and quality of life in the elderly: a systematic review. *Revista Brasileira de Psiquiatria*, 36, 76–88.
- Włodarczyk, P., Ziółkowski, A., Włodarczyk, A. (2008). Wpływ składników poczucia koherencji na podejmowanie aktywności fizycznej. In: M. Krawczyński (ed.), *Psychologiczne konteksty aktywności fizycznej człowieka* (pp. 225–240). Gdańsk: Wydawnictwo Ateneum – Szkoła Wyższa w Gdańsku.
- Wysocka-Pleczyk, M., Słowik, P. (2012). Poczucie sensu życia i style radzenia sobie u pacjentów z chorobą niedokrwienną serca. *Problemy Higieny i Epidemiologii*, 93, 771–778.
- Zych, A., Kaleta-Witusiak, M. (2010). Geragogika specjalna-moralnym obowiązkiem naszych czasów. In: A. Nowicka (ed.), *Wybrane problemy osób starszych* (pp. 27–41). Kraków: Oficyna Wydawnicza Impuls.

Cite this article as: Agnieszka Błaszczak, A., Dołowy, E., Muszyński, S. (2019). Emotional State in Relation to Physical Activity Among Older People. *Central European Journal of Sport Sciences and Medicine*, 1 (25), 63–72. DOI: 10.18276/cej.2019.1-07.