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## **THE RELATIONSHIP BETWEEN DEPRESSIVE SYMPTOMS EXPERIENCED BY ELDERLY PEOPLE AND THEIR SOCIODEMOGRAPHIC DATA, FUNCTIONAL CAPACITY, SELF-REPORTED HEALTH STATUS, PHYSICAL FITNESS AND HISTORY OF FALLS**

**Ocena związku między występowaniem objawów depresji wśród pacjentów w wieku podeszłym a wybranymi czynnikami socjo-demograficznymi, wydolnością funkcjonalną, samooceną zdrowia i sprawności fizycznej oraz występowaniem upadków w wywiadzie**

### **Streszczenie**

#### **Wstęp**

Obniżona wydolność afektywna, poprzedzona zaburzeniami emocjonalnymi jest częstym zaburzeniem, charakterystycznym dla wieku starszego, które może prowadzić do depresji.

#### **Cel**

Celem pracy była ocena związku między występowaniem objawów depresji wśród badanych, a czynnikami socjo-demograficznymi, samooceną zdrowia i sprawności fizycznej, wydolnością funkcjonalną i występowaniem upadków.

#### **Materiał i metody**

Badaniami objęto 304 osoby w wieku 65-100 lat. W badaniu zastosowano Geriatric Depression Scale, Barthel Scale i Geriatryczny Kwestionariusz Wywiadu Środowiskowego.

#### **Wyniki**

Wykazano, że depresji częściej doświadczały osoby starsze, osoby z niższym wykształceniem, samotne, będące w gorszej sytuacji bytowej i osoby, których rodziny nie były przygotowane do pełnienia opieki nieformalnej nad badanymi ( $p < 0,05$ ).

## **Wnioski**

Objawy depresji wśród badanych w znaczący sposób wiążą się z czynnikami socjo-demograficznymi, obniżoną sprawnością w wykonywaniu czynności dnia codziennego, niską samooceną zdrowia i sprawności fizycznej oraz z występowaniem upadków wielokrotnych.

**Słowa kluczowe:** depresja, upadki, osoby starsze

## **Abstract**

### **Backgorund**

Decreased *affective* efficiency, *preceded by* emotional problems, is a common advanced-age disorder which can lead to depression.

### **Aim**

The aim of this study was to assess the relationship between depressive symptoms experienced by elderly people and their sociodemographic data, self-reported health status, physical fitness, functional capacity, and history of falls.

### **Material and methods**

The study involved 304 individuals aged 65-100 years. The research instruments were the Geriatric Depression Scale-Short Form, the Barthel Scale, and the Background Survey Geriatric Questionnaire.

### **Results**

Depression was more common among the elders who had a lower education level, lived alone, were in a worse financial position, and among those whose families were unprepared to provide them with informal care ( $p < 0.05$ ).

### **Conclusions**

Depressive symptoms observed in the respondents were significantly related to their sociodemographic data, reduced ability to perform daily activities, low self-reported health status and physical fitness, and *recurrent* falls.

**Key words:** depression, falls, elderly people

## **Introduction**

An overall upturn in living conditions as well as progress in medicine and related sciences have resulted in longer life expectancy and consequently, a greater number of *post-working age people* [United Nations, 2017]. The *ageing of societies* is a global phenomenon that is also observed in Poland. According to the Polish Central Statistical Office, the population of Poland at the end of 2013 was 38.5 million, including about 5.7 million people over 65 years of age. In 1989-2013, the number of people of advanced age increased by nearly 1.9 million, and its share in the general population rose from 10% in 1989 to 14.7% in 2013. Moreover, in its demographic forecast for the years up to 2050, the Polish Central Statistical Office predicts elderly population boom and further lengthening of the average lifespan [GUS, 2014].

Ageing is a natural stage of human ontogeny, characterized by biological processes of varying dynamics. These are common one-direction changes, associated with high morbidity and leading to a decline in the body's overall capacity and immunity and progressive degradation of physical and mental functions. As a consequence, people of advanced age are less self-reliant and their locomotor and adaptive skills as well as ability to perform various social roles decline [Rosenthal, Williams and Naughton (red.), 2006]. The main role in the process of ageing is played by the so called involutinal structural and functional changes, leading to overall functional impairment on the molecular, cellular and organ levels [Rosenthal, Williams and Naughton (red.), 2006].

The processes of psychological ageing are related to the personality of a person. With age, we observe a difference in motivation and emotional behaviour, along with a decline in psychomotor skills and the ability to think, solve problems, remember, and learn [Szatur-Jaworska, Błędowski and Dzięgielewska, 2006; Zielińska-Więczkowska, Kędziora-Kornatowska and Kornatowski, 2008]. The awareness of the coming end of life is accompanied by reflective moods. This is the time when people re-examine their lives, which can be both satisfying and frustrating [Szatur-Jaworska, Błędowski and Dzięgielewska, 2006; Zielińska-Więczkow-

ska, Kędziora-Kornatowska and Kornatowski, 2008]. From a psychological point of view, late adulthood is the period when internal abilities (self-control, deliberation, experience, the depth of opinions, the ability to stand aloof) prevail over external abilities (fitness, functional and affective efficiency) [Szatur-Jaworska, Błędowski and Dzięgielewska, 2006; Zielińska-Więczkowska, Kędziora-Kornatowska and Kornatowski, 2008]. Old age is perceived as the time when people face numerous losses. Late adulthood is associated with the loss of a spouse, close relatives and friends, as well as social and economic status. When adults retire and start receiving a lower income, they can also lose the feeling of social usefulness and prestige. The above-mentioned factors, enhanced by the so called ageing, may have negative psychosocial consequences, such as psychological discomfort, social isolation, and depression [Szatur-Jaworska, Błędowski and Dzięgielewska, 2006; Zielińska-Więczkowska, Kędziora-Kornatowska and Kornatowski, 2008].

Decreased affective efficiency, preceded by emotional problems, is a common old-age disorder [Sözeri-Varma, 2012]. According to the PolSenior population-based study, clinically significant depressive symptoms, assessed by the Geriatric Depression Scale-Short Form (GDS-SF) have been observed in nearly 30% of 65- and over 65-year-olds in Poland [Mossakowska, Więcek and Błędowski (ed.), 2012]. It has been demonstrated that mood disorders and depression may be associated both with ageing and age-related involuntional changes [Sözeri-Varma, 2012]. Decreased affective efficiency may lead to depression and a decline in functional capacity to perform basic activities of daily living, thus predisposing to falls.

The study comparing healthy life expectancy with average life expectancy in Poland shows that Poles stay healthy considerably shorter than citizens of those countries of the European Union, where the expected number of years lived in health is highest. What is more, although women live on average longer than men, the part of life when they are healthy and do not suffer from functional limitations is shorter [Ojrzyńska, 2013].

Taking the above into account, the ageing of the Polish society requires a broader approach to health problems of elderly people. The nature of geriatrics obliges us to search for comprehensive solutions to problems experienced by patients of advanced age. Since primary healthcare should be the most important part of the elderly care system, multidimensional assessment of health status would be most effective as it is applied in people at risk of decreased fitness, the necessity of hospitalization, and transfer to nursing homes. The quality and length of elderly people's lives are determined by their physical and mental condition, the quality of social bonds, lifestyle, sense of coherence, and self-efficacy. These can be measured using instruments for comprehensive geriatric assessment [Jiang and Li, 2016].

### **Aim of the study**

The aim of this study was to assess the relationship between depressive symptoms in elderly patients receiving primary health care and their sociodemographic data, self-reported health status, physical fitness, functional capacity, and history of falls.

### **Material and methods**

The study involved 304 individuals, aged 65-100 years, using services of outpatient health care centres. Women constituted 77.30% of the study sample, and men – 22.70%. The median (Me) age was 79 years, and the quartile range (Q1–Q3) was 73–84 years. This survey-based study was performed using a 15-item short form (SF) of the GDS for measuring depressive symptoms in elderly people, the Barthel Scale (BS) for assessing the ability to perform activities of daily living and function independently, and the self-developed Background Survey Geriatric Questionnaire concerning the respondents' sociodemographic, environmental, and health status.

The GDS-SF evaluates respondents' wellbeing over the last two weeks. It contains 15 yes/no questions and gives the possibility of dividing patients into two groups, depending on the severity of depressive symptoms. Individuals with the scores of 6-15 are regarded as having depressive disorders, and those with the scores of 0-5 as showing no depressive symptoms [Albiński, Kleszczewska-Albińska and Bedyńska, 2011]. The BS singles out three groups of patients with regard to their level of self-reliance. Individuals who obtain the scores of 0-20 are described as severely disabled, those with the scores of 21-85 are regarded as moderately disabled, and those with the scores of 86-100 are considered fit.

The Background Survey Geriatric Questionnaire was applied to collect information on age, sex, education, marital status, financial standing, the family structure, and preparedness of its members to take informal care of the patients at home. The questionnaire also included data concerning self-reported health status and physical activity, a history of falls, and the fear of possible future falls. The assessment of the preparedness of the family members to provide the respondents with informal care in the event of a fall was based on evaluating measuring the components of the family nursing care efficiency, reflecting its potential to provide adequate, expected and required care (the family structure, financial standing, physical and mental abilities of the family members, social functioning with regard to employment and school learning, self-care related knowledge and skills, the type of emotional bonds and mutual relationship).

The respondents' financial situation was rated on a four-point scale: very good material status was understood as the lack of necessity to save. Living thrifty, but having enough money to provide the basic necessities of life was defined as good financial standing. The material situation was regarded as average if the money was almost entirely spent on food, medicines and bills, and as bad if financial resources were not sufficient to satisfy the necessities of life.

The international analyses demonstrated that self-reported health status is a good predictor of mortality from various diseases [Wu et al., 2013; Benjamins i in., 2004] and is closely related to morbidity and disability [Goldberg et al., 2001]. Subjective assessment of health status is recommended by the World Health Organization (WHO) [WHO, 2016] and can be performed by answering just one question that may take various forms, for example, "How would you describe your general health today?" Possible answers are: 'very good', 'good', 'average', 'bad', or 'very bad'. It is based on the WHO definition of health, which states that it is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. The respondents self-assessed their health using a five-point scale ('very good', 'good', 'average', 'bad', 'difficult to define') and self-assessed their physical activity using a four-point scale (high activity, moderate activity, little activity, sedentary lifestyle). High motor activity was understood as regular physical exercises or practicing sports. Spending most of the day moving around was defined as moderate physical activity, full capacity to perform daily activities as little physical activity, and functioning within the confines of one's own flat as a sedentary lifestyle.

Statistical analysis was performed using Statistica 12.0 (StatSoft, Inc. Tulsa, OK, USA). The normality of the distribution was assessed using Shapiro-Wilk's test. Quantitative data was analysed using the Mann-Whitney U test. The chi-square test was applied to analyse qualitative data. Logistic regression univariate analysis was employed to assess the relationship between depression and the selected data. The results of regression analysis were presented as odds ratios (OR) with 95% confidence interval (CI) and statistical significance (p) values. The level of significance was set as  $p < 0.05$ .

The study was conducted in accordance with the Declaration of Helsinki, and the protocol of this study was approved by the Bioethical Commission [covert for blind review] (approval number KB-0080/141/09).

## Results

The first stage of our research involved analysis of the selected sociodemographic data with regard to the presence of depressive symptoms assessed by the GDS-SF (Table 1). It revealed that 48.02% of the respondents had depressive symptoms. The mean age of the individuals with depressive symptoms was significantly higher than the mean age of their counterparts without depressive symptoms ( $79.82 \pm 7.67$  vs  $77.52 \pm 6.88$ ), (the Mann-Whitney U test;  $p = 0.006$ ). Sex was not a factor contributing to the occurrence of depressive symptoms (chi-square test;  $p = 0.093$ ). We found, however, that the women obtained considerably higher mean results for the GDS-SF than the men ( $5.84 \pm 3.31$  vs  $4.82 \pm 3.56$ ; Mann-Whitney U test;  $p = 0.027$ ). Furthermore, as results from the data presented in Table 1, depressive symptoms were substantially more common among those respondents who had primary education (chi-square test;  $p < 0.001$ ), those widowed (chi-square test;  $p = 0.048$ ), living alone (chi-square test;  $p = 0.007$ ), having a lower standard of living (chi-square test;  $p < 0.001$ ), and those whose families were unprepared to provide informal care (chi-square test;  $p < 0.001$ ).

At the next stage of this study, the respondents were asked about their experience of falls in the preceding year. At least one fall was reported by 233 respondents, 212 reported *recurrent* falls. Next, we analysed

data concerning functional capacity assessed by the BS, as well as self-reported health and physical fitness, the occurrence of falls, and the fear of possible falls in the future with regard to depressive symptoms assessed by the GDS-SF (Table 2).

It shows that the respondents with depressive symptoms considerably more often scored lower for the BS (chi-square test;  $p < 0.001$ ), perceived their health status as bad (chi-square test;  $p < 0.001$ ), assessed their physical fitness as lower (chi-square test;  $p < 0.001$ ), experienced recurrent falls (chi-square test;  $p = 0.007$ ), and were afraid of future falls (chi-square test;  $p < 0.001$ ).

Moreover, falls experienced in the past had major effect on a subjective assessment of physical fitness. The respondents with depressive symptoms more often had little physical activity and lived a sedentary lifestyle (chi-square test;  $p < 0.001$ ) than those without depressive symptoms.

The results of logistic regression univariate analysis (Table 3) confirm that the respondents with depressive symptoms measured by the GDS-SF were more likely to suffer from decreased functional capacity (OR = 0.953,  $p < 0.001$ ), lower self-reported health status (OR = 2.748,  $p < 0.001$ ), reduced physical fitness (OR = 2.969,  $p < 0.001$ ), and recurrent falls (OR = 1.352,  $p = 0.005$ ).

**Tabela 1. Ocena wydolności afektywnej badanych według Geriatric Depression Scale (GDS-SF) a wybrane czynniki socjo-demograficzne.**

**Table 1. The respondents' affective efficiency according to the Geriatric Depression Scale (GDS-SF) and the selected sociodemographic factors.**

		GDS-SF		
		Depression – No (n=158)	Depression – Yes (n=146)	p value
Age [years] (mean ± SD)		77.52 ± 6.88	79,82 ± 7.67	0.006
Sex (n, %)	woman	116 (73.42)	119 (81.51)	NS
	man	42 (26.58)	27 (18.49)	
Education (n, %)	primary	37 (23.42)	73 (50.00)	<0.001
	vocational	25 (15.82)	14 (9.59)	
	secondary	69 (43.67)	46 (31.51)	
	university	27 (17.09)	13 (8.9)	
Marital status (n, %)	single	10 (6.33)	17 (11.64)	0.048
	married	49 (31.01)	27 (18.49)	
	divorced	10 (6.33)	12 (8.22)	
	widowed	89 (56.33)	90 (61.65)	
Family structure (n, %)	solitary	92 (58.23)	108 (73.97)	0.007
	family	66 (41.77)	38 (26.03)	
Financial standing (n, %)	very good	53 (33.54)	31 (21.23)	<0.001
	good	84 (53.16)	51 (34.93)	
	average	19 (12.03)	55 (37.67)	
	bad	2 (1.27)	9 (6.17)	
Preparedness of the family to take informal care of the patient at home (n, %)	yes	75 (47.47)	40 (27.40)	<0.001
	no	83 (52.53)	106 (72.60)	

Abbreviations: NS – non significant

**Tabela 2. Ocena wydolności afektywnej badanych według Geriatric Depression Scale (GDS), BarthelScale (BS) i Geriatrycznego Kwestionariusza Wywiadu Środowiskowego**  
**Table 2. The respondents' results for the Geriatric Depression Scale (GDS-SF), the Barthel Scale (BS), and the Background Survey Geriatric Questionnaire**

		GDS-SF		
		Depression – No (n=158)	Depression – Yes (n=146)	p value
BS (mean±SD)		91.52 ± 11.55	81.88 ± 17.93	<0,001
BS (n,%)	fit	122 (77.22)	75 (51.37)	<0,001
	<i>moderately disabled</i>	36 (22.78)	70 (47.95)	
	<i>severely disabled</i>	0 (0.00)	1 (0.68)	
Self-reported health status (n, %)	verygood	14 (8.86)	2 (1.37)	<0,001
	good	39 (24.68)	9 (6.16)	
	avarage	82 (51.90)	60 (41.10)	
	bad	15 (9.49)	63 (43.15)	
	difficult to define	8 (5.06)	12 (8.22)	
Self-reported physical activity (n, %)	high	20 (12.66)	4 (2.74)	<0,001
	moderate	68 (43.04)	27 (18.49)	
	little	60 (37.97)	74 (50.68)	
	sedentary lifestyle	10 (6.33)	41 (28.08)	
Fall (n, %)	yes	117 (74.05)	116 (79.45)	NS
	no	41 (25.95)	30 (20.55)	
Number of falls (n, %)	0	41 (25.95)	30 (20.55)	0,007
	1	56 (35.44)	40 (27.40)	
	2	35 (22.15)	27 (18.49)	
	≥ 3	26 (16.46)	49 (33.56)	
Declaration of the fear of possible future falls (n, %)	yes	44 (37.61)	85 (73.28)	<0,001
	no	72 (61.54)	27 (23.28)	
	difficult to define	1 (0.85)	4 (3.45)	
Physical activity before a fall (n, %)	high	24 (20.51)	10 (8.62)	NS
	moderate	60 (51.28)	54 (46.55)	
	little	30 (25.64)	42 (36.21)	
	sedentary lifestyle	3 (2.56)	10 (8.62)	
Physical activity after a fall (n, %)	high	11 (9.40)	2 (1.72)	<0,001
	moderate	51 (43.59)	22 (18.97)	
	little	46 (39.32)	58 (50.00)	
	sedentary lifestyle	9 (7.69)	34 (29.31)	

Abbreviations: NS – non significant

**Tabela 3. Wyniki jednoczynnikowej regresji logistycznej dla objawów depresji, ocenionej według Geriatric Depression Scale (GDS-SF) a pozostałymi parametrami**

**Table 3. The results of logistic regression univariate analysis of depressive symptoms according to the Geriatric Depression Scale (GDS-SF) and other parameters**

	Score	p value	OR for Depression	CI – 95%	CI +95%
Age [years]	0.044	0.007	1.044	1.012	1.078
Sex	-0.467	0.094	0.627	0.363	1.083
Education	-0.480	<0.001	0.619	0.498	0.769
Marital status	0.061	0.414	1.063	0.918	1.232
Family structure	-0.712	0.004	0.490	0.302	0.798
Financial standing	0.772	<0.001	2.165	1.592	2.943
Preparedness of the family to take informal care of the patient at home	0.873	<0.001	2.395	1.483	3.867
BS	-0.049	<0.001	0.953	0.934	0.971
Self-reported health status	1.011	<0.001	2.748	2.005	3.765
Self-reported physical activity	1.088	<0.001	2.969	2.127	4.144
Fall	-0.304	0.267	0.738	0.432	1.262
Number of falls	0.302	0.005	1.352	1.097	1.667
Declaration of the fear of possible future falls	-1.639	<0.001	0.194	0.109	0.344
Physical activity before a fall	0.600	<0.001	1.823	1.279	2.598
Physical activity after a fall	1.059	<0.001	2.882	1.965	4.227

Abbreviations: OR – odds ratio, CI – confidence interval

### Discussion

The purpose of this study was to assess the relationship between depressive symptoms faced by elderly patients receiving primary health care and their sociodemographic data, self-reported health status and physical fitness, functional capacity, and history of falls. It should, however, be emphasized that depressive symptoms were not diagnosed on the basis of clinical examination but only the GDS-SF, regarded as a simple, accurate and reliable screening tool for measuring depressive symptoms in people over 65 years of age. Some researchers suggest that in a wider context, the use of the GDS-SF cannot substitute for clinical interview and a complex diagnostic process in this group of patients [Albiński, Kleszczewska-Albińska and Bedyńska, 2011].

Our results show that depressive symptoms are more common among older individuals, those with a lower education level, people living alone, those in a worse financial position, and patients whose families are unprepared to provide them with informal care. According to the *PolSenior*, the incidence of depressive symptoms increases with age, and in all age-brackets, depression affects mostly women, people with a lower level of education, and those unable to perform basic and complex daily activities [Mossakowska, Więcek and Błądowski (red.), 2012]. Other studies, on the other hand, have demonstrated that the incidence of depression declines with age and is independent of sex. Nevertheless, the relationship between depression and the ability to deal with basic everyday life activities is stronger in men than in women [Forlani et al., 2014]. Atlas et al. [2017] indicate that depression and falls occur together in people over 80 years of age and give emphasis to the role of a primary care physician in diagnosing these problems. According to Zhang et al. [2018], depression, a decrease in motor fitness, and inadequate social support are risk factors for falls among elderly patients with malignant disease.

Our study confirmed that people with depressive symptoms are more likely to experience decreased functional capacity, reduced self-reported health status, lower physical fitness, and *recurrent falls*.

Li et al. [2016] indicate that physical health status was found to be the most important factor associated with depression among community-based and hospitalized population. As reported by Briggs, Kennelly and Kenny [2018], the risk of falls associated with depression in older adults is more marked for unexplained falls, which require clinical assessment with regard to potential causes, such as cardiac arrhythmia or orthostatic hypotension. According to Sirohi et al. [2017] not only depression, but also low socioeconomic status, pain, blurred vision, *hearing impairment*, and functional disability are substantially linked to falls. The study of Kamel, Abdulmajeed and Ismail [2013] has provided unambiguous evidence that the strongest risk factors for falls among elderly people include little physical activity, using orthopedic *assistive gait devices*, and limited ability to perform daily activities. The studies conducted by Kato et al. [2012] demonstrated that the incidence of falls among elderly people was linked to their age, feeling of pain, diseases, as well as low self-reported health status and inability to perform complex daily activities. Tiernan et al. [2014] assert that falls and related disability are associated with unsatisfactory general well-being, low self-reported health status, and depression. According to Kempen et al. [2009], a history of falls, limited functional capacity, low self-reported health status, and low general self-efficacy, as well as a sense of loneliness, anxiety and depressive symptoms observed in older patients correlate with their fear of falls and avoidance of activity.

Meanwhile, motor activity, as a form of revitalization, plays a special role in elderly people's lives. Regular motor activity of suitable intensity is necessary for the proper functioning of a human body, especially in old age [NICE, 2010]. Regular physical training improves the parameters of quality of life [Martin et al., 2009] and its subjective perception [Searle et al., 2011], prevents disability, reduces the risk of falls [McMahon et al., 2016], improves well-being, and alleviates depressive symptoms [Bhamani et al., 2015]. Physical activity can also reduce the fear of falls [Olsen and Bergland, 2014; Huang et al., 2016]. As stated by Auais et al. [2018], the fear of falls puts elderly people at higher risk of impaired mobility and lower physical fitness. Reelick et al. [2009] assert that the fear of falls affects gait velocity. Park et al. [2014] claim that previous falls are significantly related to the fear of possible falls in the future and physical capacity of elderly people but also that the greater the fear of falls, the lower the physical fitness irrespective of a history of falls. The results obtained by Scheffer et al. [2008] indicate that the fear of falls strongly positively correlates with older age, female sex, poor self-reported health status, and recurrent falls. These variables are closely related to the limitation of physical activity. They are risk factors for falls in the future and substantially reduce patients' quality of life.

Conclusions: Depressive symptoms observed in the respondents were significantly related to their sociodemographic data, reduced ability to perform daily activities, low self-reported health status and physical fitness, and recurrent falls. These relationships should be taken into account when estimating the severity of problems resulting from decreased affective efficiency in older people.

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