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ORIGINAL PAPER

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Depression Among Elderly Users of Open and Closed Care Facilities in a Rural Region of Greece: an Important Public Health Issue

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ABSTRACT

Introduction: It is estimated that 5.7% of the total Greek population suffers from depressive disorders. Elderly may be particularly prone to depression compared to younger people. In Greece, there is a paucity of literature regarding the correlation between the existence of chronic diseases, sociodemographic features, participation in open/ closed structures, and the presence of depression or depressive symptoms, among seniors. The purpose of this study was to explore potential correlations between the above- mentioned variables, as a whole. **Methods:** This was a cross- sectional, questionnaire survey of 200 elderly aged 65 or above and were members of 12 Open Care Centers for the Elderly (OCCE) or residents in 2 nursing homes located in the rural region of Epirus, in Greece. Data collection took place in the form of structured individual interviews. For the identification of independent factors associated with the existence of depressive symptoms, stepwise logistic regression analysis was performed. **Results:** A total of 81 (40.5%) seniors experienced depressive symptoms, though only 39 of them (19.5%) had been diagnosed for depression. Depression rates were higher for those with more chronic diseases ($p=0.01$) and at divorced, widowed and single seniors compared to married ones (50.5% vs. 28.1% respectively, $p=0.002$). The prevalence of depression was higher among the elderly who lived in nursing homes compared to the participants who were registered members of the OCCE (50% vs. 35.6% respectively, $p=0.049$), while elderly who often participated in the social activities of OCCE, had significantly lower rates of depressive symptoms compared to those who scarcely were involved in these activities

(23% vs. 46.2% respectively, $p=0.019$). Participants who suffered from osteoporosis were more likely of displaying depressive symptoms compared to those who didn't; OR (95% Confidence Interval) = 2.61 (1.28-5.33), $p=0.009$. **Conclusions:** The existence of an action plan that includes education and training of health professionals on mental health of the elderly and the satisfactory operation of public facilities to promote the wellbeing of seniors and offer more incentives for activity participation, may reduce depression rates and the under-diagnosis of the disease.

Key Words: chronic diseases, depression, depressive symptoms, elderly, nursing homes, open care centers

1. INTRODUCTION

Depression is a debilitating mental illness that affects more than 350 million people worldwide (4.4% of the global population) (1-2). It is characterized by sadness, loss of interest, guiltiness, feelings of worthlessness, changes in weight and sleeping habits, fatigue and diminished ability to think and concentrate (3-4). Depressive disorders are strongly correlated with functional impairment and greater morbidity and mortality (5). World Health Organization (WHO) classified depression as the topmost contributor to global disability (7.5% of all years lived with disability in 2015) (2). Depression is also the major risk factor for approximately 800 000 suicide deaths yearly (2). Increasing trends in the prevalence of depression have been noted over the last decade, which can be attributed

to the global aging of the population (6). Depression incidence rises with age, with one in ten individuals aged 65–84 years experiencing a major depressive episode in their lifetime (7–8).

Aging itself is not the reason for higher depression rates. Rather, factors that are tied to aging, such as disability, pain, cognitive impairment, retirement, low sense of control over life, perception of health status, chronic diseases, and so on, enhance the risk of depression among the elderly (9–12). Chronic and degenerative diseases are more common in elderly individuals and increase the risk of depression (13). Diabetes mellitus, hypertension, arthritis, chronic pulmonary, cerebrovascular and heart disease are only some of the chronic medical conditions that may relate to an elevated presence of clinical depression and depressive symptoms (13–14). In the study of Madianos et al, those who valued the existence of a serious physical illness as a stressful life event exhibited a higher number of depressive symptoms than others (15). The diagnosis of a chronic disease may give rise to symptoms of depression, provoking a negative impact on the course of the medical illness (16), thus the issue evolves into a vicious circle. The problem is more exacerbated between the frail elderly residing in nursing homes, who appear to exhibit greater susceptibility to depression compared to those in community settings, reaching 30% versus 8–15% respectively (17–18).

Greece holds the second-highest aging rate in Europe after Italy. Today, 21.3% of the total Greek population is aged 65 years or older, which is higher than the EU average (19.2% in 2016). An increase of 2.8% in the elderly has been observed compared with 10 years earlier (2006 vs. 2016) (19). Bearing in mind the growing share of old people in Greece, it is expected that depression rates will elevate. Currently, it is estimated that 5.7% of the total Greek population, about 600,000 cases, are suffering from depressive disorders (20), proportion that corresponds to 9.1% of total years lived with disability (21). The prevalence of depressive symptoms in individuals over 60-years old ranges from 16.3% to 84.3%, depending on study design, the assessment methods, and the population under study (22–23). According to the last population census of the Greek Statistical Authority (EL-STAT), 14.3% and 25% of the total population live in suburban and rural areas respectively (census of ELSTAT 2011) (24). In Greece, the biggest share of elderly people lives in remote rural regions with less than 2000 residents, which may further intensify the probability of developing depression and the under-diagnosis of it, due to the limited access to healthcare services (25).

Considering the consequences of depression on daily function, onset and prognosis of physical illness and the overall quality of life in senior, diagnosis, and treatment of the disease is of vital importance. Hence, this study was undertaken to assess the prevalence of depression among elderly people living in the rural area of Epirus, Western Greece, and to determine the sociodemographic and medical factors that may influence its development.

2. METHODS

Study design

This survey was designed as a cross-sectional study

to evaluate the current prevalence of depression and the contributing factors among elderly people in the remote region of Epirus, Greece.

Sample characteristics and settings

A convenience sample of 200 elderly participants was recruited from 12 Open Care Centers for the Elderly (OCCE) and 2 Nursing Homes for five months in 2014. OCCE are public legal entities aimed at preventing isolation of the elderly and contributing to their active participation in society (26). Of the total number of participants, 133 were registered members of the OCCE and 67 were residents in nursing homes. The enrollment of the participants was performed at both settings to identify any possible variation in the prevalence of depressive symptoms between open and closed care structures. The inclusion criteria were: (i) age over 65 and (ii) ability to understand the Greek language to be able to take part in the interview process. The exclusion criterion was a significant reduction in the cognitive function of the respondents, established by a healthcare professional. Considering the frail status and the short attention span of the sample group, structured interviews were conducted by the first researcher. These were conducted by the use of questionnaires, in private rooms located inside the study settings. All participants were informed about the aim of the study and were assured about confidentiality and about their right to withdraw with no compromise to the standard of care they received. It was assumed that completing the questionnaire equated with consent.

Instruments

Two measurement instruments were included in this study. The first one was the short version of the Geriatric Depression Scale (GDS-15) which is weighted in Greek, presenting a satisfactory level of reliability and validity and can be used in the population under study (27). The GDS-15 is a brief 15 item self-rating scale, appropriate to assess the presence of depression in older adults and/or to monitor depressive symptoms over time. It was found to have 92% sensitivity and 89% specificity when evaluated against diagnostic criteria. Of the 15 items, 10 indicate the presence of depression when answered positively, while the rest (question numbers 1, 5, 7, 11, 13) indicate depression when answered negatively. Scores of 0–4 are considered normal; 5–8 indicate mild depression; 9–11 indicate moderate depression; and 12–15 severe depression (28).

As far as it concerns the second questionnaire, it was developed by the research team to address the socio-demographic profile and the health status of the participants.

Statistical analysis

Descriptive statistics were used to present quantitative variables (Mean, Standard Deviation (SD). Absolute (N) and relative (%) frequencies were used for the analysis of qualitative data. Pearson's chi-square or Fishers's exact test were used to compare ratios, as appropriate. For the comparison of quantitative variables between two groups the Mann-Whitney parametric test was applied. Stepwise logistic regression analysis was performed for the identification of independent factors associated with the existence of depressive symptoms and the Odds ratio

		Depressive symptoms				p Pearson's x ² test
		No		Yes		
		N	%	N	%	
Gender	Men	56	66.7	28	33.3	0.079
	Women	63	54.3	53	45.7	
Age, Mean		76.7		76.0		0.506
Facility	OCCE	85	64.4	47	35.6	0.049
	Nursing homes	34	50.0	34	50.0	
Marital status	Single, Divorced, Widower	55	49.5	56	50.5	0.001
	Married or living with partner	64	71.9	25	28.1	
Living alone at home	No	104	61.9	64	38.1	0.112
	Yes	15	46.9	17	53.1	
Educational level	No/Elementary school	85	56.3	66	43.7	0.268
	Middle/High school	27	69.2	12	30.8	
	University/ Technical school	7	70.0	3	30.0	
Financial status	Good/Very good	35	66.0	18	34.00	0.402
	Average	52	59.1	36	40.9	
	Bad/Very bad	31	53.4	27	46.6	

Table 1. Correlation of depressive symptoms with sociodemographic features

(OR) was calculated with a 95% confidence interval (CI). Statistical significance was determined by a p-value <0.05. Data analysis was performed using SPSS version 18.0.

Ethics approval

This study was conducted according to the ethical guidelines of the declaration of Helsinki (29) and was approved by the competent bodies, the health research ethics body in the district of Epirus (1979/24-07-2013, 111/18-02-2014, 474/21-11-2013).

3. RESULTS

The overall survey response rate was 65.3% (200/306). Of the total participants, 133 (66%) were OCCE members, while 67 (34%) were residents in one of the nursing homes under study. The sociodemographic features of the participants are presented in detail in table 1. Out of the 200 participants (116 women and 84 men) 81 had depressive symptoms, though only 39 of them (19.5%) had been diagnosed for depression by a mental health professional. Furthermore, the percentages of people with depressive symptoms were significantly higher in the divorced, single or widowed elderly compared to the married ones (50.5% vs. 28.1% respectively, $p=0.002$). The percentages of people with depressive symptoms did not differ significantly according to other demographics of the participants as seen in Table 1.

The prevalence of depression was higher among the elderly who lived in nursing homes or scarcely visited the OCCE lounge compared to those who were registered

members of the OCCE and visited it frequently (50% vs. 35.6% respectively, $p=0.049$). Also, it was found that the elderly who often participated in the social activities that were arranged within the OCCE, had significantly lower rates of depressive symptoms compared to those who had never participated in these activities and to those who were sometimes involved (23% vs. 46.2% respectively, $p=0.019$) (Table 2).

Almost all participants (98.0 %) suffered from a chronic disease with more frequent hypertension at a rate of 72.5 %, followed by hypercholesterolemia (59.5%), arthritis (35.5%) and diabetes (34%). The rates of depressive symptoms were significantly higher among participants who suffered from osteoporosis (OR (95% CI) = 2.61 (1.28-5.33), $p=0.009$). Also, those who had depressive symptoms had significantly more chronic diseases compared to participants who did not have these symptoms (Table 3).

Marital status and the presence of osteoporosis were the only variables that found to be independently associated with the presence of depressive symptoms. Specifically, married ones were 0.3 times less likely to manifest depressive symptoms compared to single/ divorced or widowers (OR (95% CI) = 0.39 (0.21-0.72), $p=0.002$). Elderly suffering from osteoporosis was 2.61 times more likely to have depressive symptoms compared to those who did not suffer from the disease ($p=0.009$) (Table 4).

		Depressive symptoms				p Pearson's x ² test
		No		Yes		
		N	%	N	%	
Do you visit OCCE?	No	34	50.0	34	50.0	0.049
	Yes	85	64.4	47	35.6	
If yes, how often?	A few times per month or 1-2 times per week	49	59.0	34	41.0	0.094
	3-4 times per week or daily	36	73.5	13	26.5	
	Often	47	77.0	14	23.0	0.019
Do you par- ticipate at the activities organized by the OCCE?	Sometimes	17	53.1	15	46.9	0.019
	Never	21	53.8	18	46.2	

Table 2. Correlation of depressive symptoms with participation at the OCCE activities

4. DISCUSSION

Prevalence rates vary depending on the diagnostic tool that is used. However, our study population presented a 40.5% prevalence of depressive symptoms, a rate that is expected, compared to the findings of other studies conducted in rural Greece (22, 30-34). From the participants who had depressive symptoms, only 19.5% were diagnosed with depression by a mental health professional, which confirms the under-diagnosis of the disease. As was demonstrated during the interview process of this study,

		Depressive symptoms				P Pearson's χ^2 test
		N	%	N	%	
Osteoporosis	No	102	64.6	56	35.4	0.005
	Yes	17	40.5	25	59.5	
Cancer	No	115	59.9	77	40.1	0.717
	Yes	4	50.0	4	50.0	
Peptic ulcer	No	115	60.5	75	39.5	0.322
	Yes	4	40.0	6	60.0	
Parkinson's disease	No	116	60.7	75	39.3	0.162
	Yes	3	33.3	6	66.7	
Cataract	No	98	60.9	63	39.1	0.423
	Yes	21	53.8	18	46.2	
Hip bone fracture	No	114	58.8	80	41.2	0.404
	Yes	5	83.3	1	16.7	
Other illnesses	No	109	60.6	71	39.4	0.362
	Yes	10	50.0	10	50.0	
Total, mean \pm SD		3,2 \pm 1.5		3,9 \pm 1.8		0.010

Table 3. Correlation of depressive symptoms with the presence of chronic illnesses

		OR (95% CI)	P
Marital status	Single, Divorced, Widower	1.00	0.002
	Married or living with spouse	0.39 (0.21-0.72)	
Osteoporosis	No	1.00	0.009
	Yes	2.61 (1.28-5.33)	

Table 4. Correlation of osteoporosis and marital status with manifestation of depressive symptoms

older people are reluctant to answer personal questions about emotional problems. The fear of stigmatization from their social surroundings leads elderly to seek care at primary health care settings instead of mental health specialists, which restricts early screening of the disease. According to Mitchell and Kakkadasams, primary care nurses have reduced ability to identify depressive patients accurately (35). Therefore, staff training in primary health care structures is vital.

Our study revealed that single, divorced or widowed participants had higher rates of depression compared to married seniors and those who did not live alone in the house, a result which is in agreement with other studies conducted in Greece (32,36) and other countries (37,38). Marriage seems to create an environment of economic and emotional security as well as social support by enhancing the psychosocial skills needed to meet everyday challenges (39). Therefore, the establishment of supporting networks for the mental health of the elderly is very important.

As far as it concerns closed and open structures, it was found that a sizable proportion of the elderly suffers from depression in both settings. However, this percentage is higher among those who receive healthcare at nursing homes which might be attributed to the limited activity of

the elderly and the lack of social interaction, a fact which is also supported by various studies (40-42). Indeed, the notion of loss, including loss of autonomy, loved ones, room-mates etc, may be experienced more extensively among the elderly who reside in nursing homes (43). Lower rates of depression were observed among the elderly who participated regularly in activities of OCCE or visited the lounge frequently, compared to those who attended less or not at all. This indicates the beneficial effect of active engagement in social groups as well as the importance of building social support networks for maintaining health in old age, as highlighted by another study (44). It is well established that physical activity is positively associated with psychological well-being in older adults (45). Physical exercise is usually included in programs organized by OCCE, resulting in improvements in mental health-related quality of life and reduction of depressive symptom manifestation, as noted by Salguero and his colleagues (46). In our study, those who did not participate in the activity schedule of OCCE justified their abstention due to the limited interest in these particular activities. Indeed, the programs offered by the OCCE are usually quite specific. Therefore older people could propose activities that they would like to join in, to increase their participation rates and thus maximize their social interaction.

Also, almost the entire sample suffered from a chronic disease with predominant hypertension, hypercholesterolemia and coronary disease. The association of depression with the presence of chronic diseases has occupied the literature extensively (47-49). However, the percentage of depressive symptoms was significantly higher among participants who had osteoporosis and to those who suffered from multiple chronic illnesses. Such independent correlations of osteoporosis to depression have been studied specifically the last years, while various studies bring depression as a risk factor for osteoporosis under causal models some of which include hormonal pathways (50-52).

Specifically, patients with osteoporosis are expected to be more prone to development of depressive symptoms as osteoporosis directly affects the quality of life and daily activities by reducing them significantly. According to other theories, in stressful conditions or depression, hyperactivity of the HPA axis is observed (53). The hypothalamus is activated each time a healthy person is confronted with a stress generating agent with the secretion of corticotropin-releasing hormone (CRH) which triggers the release of adrenocorticotrophic hormone by the pituitary gland, and causes the release of glucocorticoids and catecholamines in bloodstream. Elevated cortisol levels are associated with malabsorption of calcium and osteoporosis (54) while the production of catecholamines leads to increased interleukin levels which are associated with increased production of osteoclasts (55). Moreover, some studies indicate the existence of correlation of taking selective serotonin reuptake inhibitors (SSRIs) in elderly depressed patients with increased bone resorption markers (56) and increased risk for fractures (57).

Limitations

This study was not without limitations. The demographic and medical variables were measured through a non-

validated questionnaire, which might have resulted in misclassification of information. Also, the sample was not assigned randomly, which might limit the generalizability of the results. However, participants were recruited by 12 different OCCE and 2 nursing homes, making the sample more representative.

5. CONCLUSION:

In conclusion, depression was found to be a significant health problem among the elderly in the Greek remote region of Epirus. Consequently, to make certain the early diagnosis and treatment of depression among this vulnerable group, it would be beneficial to screen them routinely. Moreover, it is necessary to develop an action plan that introduces education and training, especially for primary health care professionals, on mental health issues of the elderly. It is also important to establish proper functioning of public primary care structures like OCCE and nursing homes in order to offer more incentives and create interests and activities for the elderly according to their potential and also provide adequate information on mental health issues. These findings could inform community-based programs in order to prevent elderly depression and develop adequate strategies for its early diagnosis.

- **Ethics approval:** Ethics approval: This study was conducted according to the ethical guidelines of the declaration of Helsinki (29) and was approved by the competent bodies, the health research ethics body in the district of Epirus (1979/24-07-2013, 111/18-02-2014, 474/21-11-2013).
- **Authors contribution:** K.K, S.T, M.I and P.K gave substantial contribution to the conception and design of the work and in the acquisition, analysis and interpretation of data for the work. Each author had role in drafting the work and revising it critically for important intellectual content. Each author gave final approval of the version to be published and they agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.
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