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

Katerina Kouvatsou1, Maria Iliadou1,2, Panagiota Kalatzi1, Sakellari Evanthia3, Prapas Christos3, Kalafati Maria4, Styliani Tziaferi1

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 prevalence of depression and chronic diseases, sociodemographic features, participation in open/closed structures, and the presence of 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 an 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 (15). 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 (ELSTAT), 14.3% and 25% of the total population live in urban 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, 153 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.
Depression Among Elderly Users of Open and Closed Care Facilities in a Rural Region of Greece: an Important Public Health Issue

Depressive symptoms were assessed with the help of a diagnostic interview, where the presence of depressive symptoms was diagnosed by a mental health professional. 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 5).

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).

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 5).

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).

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,
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 (32,56) and other countries (37,58). 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, roommates 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 adrenocorticotropic 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.
- Conflict of interest: There is no conflict of interest to declare.
- Financial support and sponsorship: None.

REFERENCES

1. Summergrad P. Investing in global mental health: the time for action is now. The Lancet Psychiatry 2016; 3(5): 390-391.
2. World Health Organization. Depression and Other Common Mental Disorders: Global Health Estimates. Geneva: License: CC BY-NC-SA 3.0 IGO, 2017.
3. Lu Y, Tang CS, Liow CS, Ng WW, Ho CS, Ho RC. A regressional analysis of maladaptive rumination, illness perception and negative emotional outcomes in Asian patients suffering from depressive disorder. Asian journal of psychiatry 2014; 12(Dec): 69-76.
4. American Psychiatric Association. Diagnostic and statistical manual of mental disorders, 5th edn. Washington, 2013.
5. Walker ER, McGee RE, Druss BG. Mortality in mental disorders and global disease burden implications: a systematic review and meta-analysis. JAMA Psychiatry 2015; 72(4): 334–41.
6. GBD 2015 Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. The Lancet 2016; 388(10055): 1545-1602.
7. Solhaug HI, Romuld EB, Romild U, Stordal E. Increased prevalence of depression in cohorts of the elderly: An 11-year follow-up in the general population—the HUNT study. International Psycho Geriatrics 2012; 24(1): 151–158.
8. Andreas S, Schulz H, Volkert J, Dehoust M, Sehner S, Suling A, et al. Prevalence of mental disorders in elderly people: the European MentDis_1Cf65+ study. Br J Psychiatry 2017; 210(2): 125–131.
9. Verhaak PFM, Dekker JH, de Waal MWM, van Marwijk HWJ, Comijs HC. Depression, disability and somatic diseases among elderly. Journal of Affective Disorders 2014; 167(Oct): 187-191.
10. Park JI, Park TW, Yang JC, Chung SK. Factors associated with depression among elderly Koreans: the role of chronic illness, subjective health status, and cognitive impairment. Psycho geriatrics 2016; 16(1): 62–69.
11. Dey A. Depression among elderly residents of Kolkata: A comparative study on pre retirement and post retirement conditions of elderly. International Journal of Home Science 2017; 3(3): 159-162.
12. Calvó-Perxas L, Vilalta-Franch J, Turró-Garriga O, López-Pousa S, Garre-Olmo J. Gender differences in depression and pain: A two year follow-up study of the Survey of Health, Ageing and Retirement in Europe. Journal of Affective Disorders 2016; 193(Mar): 157–164.
13. Niti M, Ng TP, Kua EH, Ho RC, Tan CH. Depression and chronic medical illness in Asian older adults: the role of subjective health and functional status. Int J Geriatr Psychiatry 2007; 22(11): 1087-1094.
14. Huang CQ, Dong BR, Lu ZC, Yue JR, Liu QX. Chronic disease and risk for depression in old age: a meta-analysis of published literature. Ageing Res Rev 2010; 9(2): 131-141.
15. Madianos MG, Gournas G, Stefanis CN. Depressive symptoms and depression among elderly people in Athens. Acta Psychiatr Scand 1992; 86(4): 320–326.
16. Talbot F, Nouwen A. A review of the relationship between depression and diabetes in adults: is there a link? Diabetes Care 2000; 23(10): 1556–1562.
17. Birrer RB, Vemuri SP. Depression in later life: a diagnostic and therapeutic challenge. Am Fam Physician 2004; 69(10): 2375–2382.
18. Leon FG, Ashton AK, D’Mello DA, Dantz B, Hefner J, Matson GA, et al. Depression and comorbid medical illness: therapeutic and diagnostic challenges. J Fam Pract 2003; Suppl: S19–23.
19. Eurostat. Population structure and ageing: Statistics Explained. 2017. Available: http://ec.europa.eu/eurostat/statisticsexplained/ (Accessed 12 January 2018).
20. Global Health Data Exchange. Global Health Estimates 2015. Available: http://www.who.int/healthinfo/global_burden_disease/en/ (Accessed 30 January 2018).
21. Global Health Data Exchange. Global Burden of Disease study 2015. Available: http://ghdx.healthdata.org/gbd-results-tool/ (Accessed 30 January 2018).
22. Zyga S, Mitropoulou E, Alikari V, Prezerakos P, Tsirroni M, Andriopoulos P, et al. Primary mental health in rural Greece: a single center experience. American Journal of Nursing Science 2018; 7(3-1): 1–6.
23. Babatsikou F, Kon solaki E, Notara V, Kouri M, Zyga S, Koutis C, et al. Depression in the elderly: a descriptive study of urban and semi-urban Greek population. International Journal of Caring Sciences 2017; 10(3): 1286-1295.
24. Hellenic Statistical Authority. 2011 General Censuses of Buildings and Population-Housing. Available: http://www.statistics.gr/en/2011-census-pop-hous/ (Accessed 9 August 2018)
25. Maulik S, Dasgupta A. Depression and its determinants in the rural elderly of West Bengal: A cross sectional study. International Journal of Biological and Medical Research 2012; 3(1): 1299-1502.

Mater Sociomed. 2020 Mar; 32(1): 35-40 • ORIGINAL PAPER 39
26. Sissouras A, Ketsetzopoulo M, Bouzas N, Fogadaki E, Papaliou O, Fakoura A. Providing integrated health and social care for older persons in Greece. Providing integrated health and social care for older persons. Aldershot: Ashgate. 2004:329-370.

27. Fountoulakis KN, Tzolaki M, Iacovides A, Yesavage J, O’Hara R, Kazis A, Ierodiakonou C. The validation of the short form of the Geriatric Depression Scale (GDS) in Greece. Aging Clinical and Experimental Research. 1999 Dec 1;11(6):367-72.

28. Yesavage JA, Sheikh JI. 9/Geriatric depression scale (GDS) recent evidence and development of a shorter version. Clinical gerontologist. 1986 Nov 18;5(1-2):165-73.

29. World Medical Association. World Medical Association Declaration of Helsinki. Ethical principles for medical research involving human subjects. Bulletin of the World Health Organization 2001;79(4):373.

30. Alefantinou A, Vlasiadis K, Philalithi S A. The prevalence of depression in elderly members of the Open Care Centre for the Elderly in a mountain village of Crete. Archives of Hellenic Medicine/Arheia Ellenikes Iatrikes 2016;33(3).

31. Tika C, Tsironi M, Prezerakos P, Zyga S, Tziaferi S, Babatsikou F, Kolovos P. Prevalence of depression among elderly population of a district nursing home and their satisfaction from the nursing care provided. Nursing Care & Research 2014 May 1;39:13-15.

32. Argyropoulos K, Bartsokas C, Argyropoulou A, Gourzis P, Jelastopulu E. Depressive symptoms in late life in urban and semi-urban areas of South-West Greece: An undetected disorder?. Indian journal of psychiatry. 2015 Jul;57(5):295.

33. Tzolaki M, Gkioka M, Verykouki E, Galoutzi N, Kavalou E, Papaliou O, Kostopoulou I, Armagos P, Ifanti E, Hesouli E. Providing integrated health and social care for older per - sons. Mater Sociomed. 2020 Mar; 32(1): 35-40

34. Chang P J, Wray L, & Lin Y. Social relationships, leisure activity, and health in older adults. Health Psychology 2014; 33(6):516.

35. Palsson S, & Skoog I. The epidemiology of affective disorders in the elderly: a review. International clinical psychopharmacology 1997 Dec; 12, S3-15.

36. Schwarczbach M, Luppa M, Sikorski C, Fuchs A, Maier W, van den Bussche H, et al. The relationship between social integration and depression in non-demented primary care patients aged 75 years and older. Journal of Affective Disorders 2013;145(2):172-178.

37. Schwarzbach M, Luppa M, Sikorski C, Fuchs A, Maier W, van den Bussche H, et al. The relationship between social integration and depression in non-demented primary care patients aged 75 years and older. Journal of Affective Disorders 2013;145(2):172-178.

38. Andrade L, Caraveo Anduaga JJ, Berglund P, Bijl RV, Vol - derbruggen P, et al. The International Consortium of Psychiatric Epidemiology (ICPE) Sur - vey. International Journal of Methods in Psychiatric Research. 2003 Feb; 12(1):3-21.

39. Simon RW. Revisiting the relationships among gender, marital status, and mental health. American Journal of Sociology 2002 Jan;107(4):1065-96.

40. Getson I, Korobilis I, Kostopoulo I, Armagos P, Ifanti E, Hesouli E. Frequency of anxiety disorders in the elderly living in a Social Welfare residential home. Interscientific Health Care 2011; 3(2): 52-58.

41. Boorsma M, Joling K, Dussel M, Ribbe M, Frijters D, van Marwijk et al. The incidence of depression and its risk factors in Dutch nursing homes and residential care homes. The American Journal of Geriatric Psychiatry 2012; 20(11): 952-942.

42. Schwarzbach M, Luppa M, Forstmeier S, König H, Riedel-Heller SG. Social relations and depression in late life—a systematic review. International Journal of Geriatric Psychiatry 2014; 29(1): 1-21.

43. Towheed R, Mudbo Y, Aleman A, de Vries E. Hypercortisolemia is Associated with Severity of Bone Loss and Depression in Hypothalamic Amenorrhea and Anorexia Nervosa. The Journal of Clinical Endocrinology & Metabolism 2009 Dec 1;94(12):4710-6.

44. Schwarzbach M, Luppa M, Sikorski C, Fuchs A, Maier W, van den Bussche H, et al. The relationship between social integration and depression in non-demented primary care patients aged 75 years and older. Journal of Affective Disorders 2013;145(2):172-178.

45. Schwarzbach M, Luppa M, Sikorski C, Fuchs A, Maier W, van den Bussche H, et al. The relationship between social integration and depression in non-demented primary care patients aged 75 years and older. Journal of Affective Disorders 2013;145(2):172-178.

46. Schwarczbach M, Luppa M, Sikorski C, Fuchs A, Maier W, van den Bussche H, et al. The relationship between social integration and depression in non-demented primary care patients aged 75 years and older. Journal of Affective Disorders 2013;145(2):172-178.

47. Stavrou G, Paikousis L, Jelastopulu E, & Charalambous G. Mental Health in Cypriot Citizens of the Rural Health Centre Kolfinou. In Healthcare 2016;4(4): 81

48. Bocker E, Glasser M, Nielsen K, & Weidenbacher-Hoper V. Rural older adults’ mental health: status and challenges in care delivery. Rural and Remote Health 2012 Oct 1;12(4).

49. Winters C A, Cudney S, & Sullivan T. Expressions of depression and Significant Other. Mental Health in Cypriot Citizens of the Rural Health Centre Kolfinou. In Healthcare 2016;4(4): 81

50. Mezuk BB, Eaton WW, Golden SH. Depression and osteoporosis: epidemiology and potential mediating pathways. Osteoporosis International 2008; 19(1):1-12.

51. Cizza G, Primmsa S, Coyle M, Gourgiotis L, & Csako G. Depression and osteoporosis: a research synthesis with meta-analysis. Hormone and metabolic research= Hormon-und Stoffwechselforschung= Hormones et metabolisme 2010; 42(7): 467.

52. Cheng B H, Chen PC, Yang YH, Lee CP, Huang KE, & Chen VC. Effects of depression and antidepressant medications on hip fracture: A population-based cohort study in Taiwan. Medicine 2016 Sep; 95(36).

53. Lamers F, Vogelzangs N, Merikangas KR, P de Jonge, Beekman ATF and Penninx BWJH. Evidence for a differential role of HPA-axis function, inflammation and metabolic syndrome in melancholic versus atypical depression. Molecular Psychiatry 2013 Jun;18(6):692–699.

54. Lawson EA, Donoho D, Miller KL, Misra M, Meenanag E, Lydecker J, et al. Hypercortisolemia is Associated with Severity of Bone Loss and Depression in Hypothalamic Amenorrhea and Anorexia Nervosa. The Journal of Clinical Endocrinology & Metabolism 2009 Dec 1;94(12):4710-6.

55. Cumano H. Osteoporosis and stress. Clin Calcium 2005;15(9):1544-1547.

56. Saha ML, Garfield LD, Teitelbaum S, Civitelli R, Mulsant BH, Reynolds CF, et al. Serotonin–norepinephrine reuptake inhibitor therapy in late-life depression is associated with increased marker of bone resorption. Osteoporosis International 2013;24(5):1741-1749.

57. Ginzburg R, Rosero E. Risk of fractures with selective serotonin-reuptake inhibitors or tricyclic antidepressants. Annals of Pharmacotherapy 2009 Jan;43(1):98-103.