

## Original Article

## Depressive Symptoms and Quality of Life in Elderly People undergoing Physical Therapy

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### Abstract

**Background:** Physical therapy is regularly applied in painful medical conditions, which have been related to depression and reduced quality of life (QoL).

**Aims:** The aim of the study was to explore depressive symptoms and QoL in a sample of elderly people; and to explore the differences in depressive symptoms and QoL among elderly adults undergoing physiotherapy and those who were not.

**Methodology:** A total of 105 participants were assessed with the use of the Health Assessment Questionnaire (HAQ), the Beck Depression Inventory II (BDI II), and the World Health Organization Quality of Life questionnaire (WHOQOL-BREF).

**Results:** The mean age of participants was 75.5 years, and 52.4% were women. The rate of depression in the sample was 37.1%, and included subjects with score  $\geq 17$  in the BDI II, plus those with lower scores but receiving antidepressant treatment. Disability, as measured with the HAQ index was higher in the group of physical therapy, whereas subjects who were not in physical therapy had higher scores in the WHOQOL-BREF. The mean score in the BDI II for subjects that were undergoing physical therapy (17.8) was above the threshold that is indicative of depressive symptomatology. Scores on the HAQ-DI were statistically significantly inversely correlated to scores on the BDI II and to scores on the WHOQOL BREF.

**Conclusions:** Elderly patients that underwent physical therapy had higher rates of disability, displayed more depressive symptoms and had worse QoL. The findings of the study may have implications for clinical practice in physical therapy settings.

**Key-words:** depression, elderly, painful physical conditions, physical therapy, quality of life

### Introduction

Aging is an inevitable process leading to physical and emotional changes, as well as to many pathological processes that affect seniors' autonomy and independent daily activity (Frank et al, 2019). It is considered one of the major risk factors for most diseases (Zis et al, 2017). These changes may affect endurance, fitness, mood and social activity (Kirkwood, 2017). Multiple comorbidities and chronic diseases can accumulate emotional burden in the elderly, and lead to depression, which is the most common mental disorder in this age group (Zis et al, 2017)

and also one of the leading causes of disability and death (Byeon, 2019). Previous research has found that >10% of the elderly in the community and 35% in long-term care facilities present depressive symptoms (Almeida, 2012; Thakur & Blazer, 2008). Depression is related to decreased mental, physical and emotional well-being, and has a negative impact on quality of life (QoL) (Bryant et al, 2013). Moreover, depressive symptoms and chronic diseases, such as osteoarthritis, heart failure and chronic trauma usually have a significant negative impact on physical functioning (Gallegos-Carrillo et al,

2009) and multimorbidity can seriously affect the so-called health related QoL (HRQoL) (Hopman et al, 2009). The co-occurrence of chronic pain and depression is common and seems to reduce the treatment's effectiveness for both conditions (Sullivan-Singh et al, 2014). Importantly, chronic pain is highly prevalent in older adults, with reported rates in age >60 years and >75 years to be 55% and 62%, respectively (Jakobsson, 2010).

Physical activity in advanced age may be reduced, and this is a risk factor for many non-communicable diseases, such as cardiovascular disease, which lead to increased mortality (Langhammer, Bergland & Rydwik, 2018). Clinical guidelines suggest that properly adapted exercise may be helpful in the management of chronic geriatric diseases and age-related disorders (Kim, 2019). Physiotherapy and physical activity have been found to improve the health status of the elderly population (Zis et al, 2017). They are also associated with improved mental health, increased quality of life, reduced pain and depressive symptoms, strength and balance preservation (Paterson & Warburton, 2010; Perez-Cruzado et al, 2018). Physiotherapeutic techniques and therapeutic exercises have been included in patient support protocols for mental illness and long-term physical comorbidities (Probst, 2017). They are also recommended as an evidence-based treatment in people with depression (Andrew et al, 2019). Depression is associated with chronic pain and exercise programs, biofeedback, relaxation techniques and acupuncture can be effectively used as combined treatment (Probst & Skjaerven, 2017). Moreover, exercise may have a protective effect with regards to depression. Research has found that older adults who regularly exercise were 54% less likely to develop depression than those who do not (Byeon, 2019; Kim et al, 2015). Notably, physiotherapy may improve QoL in patients, via the reduction of pain (Sempere-Rubio et al, 2019).

The aim of the present study was to explore depressive symptoms and QoL in elderly people. Another study objective was to report on the correlations of depressive symptoms and QoL with demographic and clinical factors. An additional aim of the study was to explore the differences in depressive symptoms and QoL among elderly adults undergoing physiotherapy and those who were not.

## Methods

### Participants and settings

This is a cross-sectional study, that was conducted over a 6-month period (from September 2019 to February 2020). The study included elderly participants, who were recruited from care units and rehabilitation centers in Athens and as independent members of the community in Athens and Sitia, Crete. The recruitment procedure was run until the number of subjects that were undergoing physical therapy was sufficient for statistical analysis. Participants were informed about the study and gave their consent. Only elderly adults (>65 years) were eligible to participate in the study. Exclusion criteria were inadequate understanding of Greek language, the history of a psychotic disorder, and a diagnosis of dementia and other cognitive impairment. All eligible participants were assessed with the use of the Mini Mental State Examination (MMSE). From 115 subjects that were initially approached, 5 declined to participate in the study and 5 were excluded due to history of dementia, or due to low score (<28) in the MMSE. A total of 105 elderly participated in the study.

Medical history was obtained by all participants, however we decided not to record medical history in detail and to form two groups of subjects according to whether or not they were under physical therapy at the time of interviewing. Physical therapy was considered as an indicator that an older adult suffers a chronic painful condition, such as a rheumatologic disease, a neurologic disorder, and an orthopedic condition.

### Research tools

**Health Assessment Questionnaire (HAQ):** For the assessment of physical functioning, the Health Assessment Questionnaire (HAQ) was used. The scale consists of 20 questions, which assess 8 different aspects of functioning, each of which corresponds to two or three questions. The four-grade (0 to 3) Likert method is used for scoring to the items. The result is the HAQ Disability Index (HAQ-DI). The higher the index, the higher the patient's functional impairments. The scale was translated and validated in the Greek population and has high validity, reliability and consistency (Cronbach  $\alpha$  = 0.9) (Chatzitheodorou et al, 2008).

**Beck Depression Inventory II:** The Beck Depression Inventory II (BDI II) was used for the measurement of the depressive symptoms in the participants. This is a self-reported questionnaire which includes 21 items measuring depressive symptomatology. Total score ranges from 0 to 62, indicating the severity of the depression symptoms. Scores  $\geq 17$  are suggestive of depressive symptomatology. The inventory has been translated and validated in Greek and has shown good psychometric properties and high interrater validity (Giannakou et al, 2013). It has been previously used in research in Greece (Bolosi et al, 2018).

**The World Health Organization Quality of Life questionnaire:** The short form of the World Health Organization Quality of Life questionnaire (WHOQOL-BREF) is used to promote a cross-cultural system of quality of life assessment, as an abbreviated version of WHOQOL-100. It is a valid, yet simple questionnaire, that has been used in many studies and produces a quality of life profile. WHOQOL-BREF consists of 24 items corresponding to 24 QoL facets, plus two items comprising an overall quality of life/general health facet. Items are organized into 4 domains, which are physical health, psychological health, social relationships, and environment. Scores denote an individual's perception of quality of life in each particular domain. A Greek translation is available, which has been shown to have high validity and satisfying consistency (Cronbach  $\alpha = 0.67-0.81$ ) (Ginieri-Coccosis et al, 2012).

**Data Collection & Ethics Approvals:** The care and rehabilitation units for the elderly granted permission to use the questionnaires, after relevant arrangements. Patients who freely decided to participate in the study were informed orally and through the consent form that preceded the questionnaire. That form included information on the subject and the purpose of the research. The electronic files created for all participants with an individual ID code are accessible only by the researchers. All the procedures of the study were approved by the board of the Hellenic Open University.

**Statistical Analyses:** Variables were measured as continuous and were expressed as mean, median and standard deviation, while qualitative variables were expressed in frequencies and proportions. The Linear Bivariate Correlation

method was used to compare ratios between (i) the level of depression symptoms and the physiotherapy treatment and (ii) quality of life and physiotherapy treatment. Also, First-Order Partial Correlation method was used to investigate the mediating role of gender and antidepressant therapy in the relationship between the degree of depression and physiotherapy and the mediating role of gender and antidepressant therapy in the relationship between quality of life and physiotherapy. Statistical analyses were performed using the SPSS-25 statistical and Shapiro-Wilk test was used for normality. The level of significance was set as a p value of 0.05 or less.

## Results

The study sample consists of 105 older adults, with a mean age of 75.5 years, with a slight preponderance of females (52.4%). The proportion of the sample that were undergoing physiotherapy was 43.8% (46 subjects). A proportion of participants (17 subjects, 16.2%) were receiving antidepressant treatment. The characteristics of the sample and the mean scores in the assessment tools are presented in table 1. Eight out of the 17 subjects that were receiving antidepressants had score  $\geq 17$  in the BDI II, which is suggestive of depressive symptomatology. The rest 9 patients with a diagnosis of clinical depression that were receiving antidepressant medication were added to the 30 participants with score  $\geq 17$  in the BDI II. Thus, 39 participants (37.1% of the sample) have been diagnosed with depression, and/or currently displayed depressive symptoms.

Table 2 presents the differences between the two defined groups of the study subjects, that is the group of elderly that were undergoing physical therapy and those who were not. The elderly in the physical therapy group were significantly older and more likely to have been diagnosed with depression and receive antidepressant medication. The male/female ratio was significantly lower in subjects who were not in physical therapy. A total of 48 out of 59 (81.3%) from the subjects that were not in physiotherapy were married, whereas 13.5% (8 out of 59) were widowed vs 52.2% (24 out of 46) and 41.3% (19 out of 46), respectively in the other group. The two groups did not differ with regards to education (data not shown in table). The scores in the HAQ index, which is suggestive of disability were higher in the group of physical

therapy, whereas subjects who were not in physical therapy had higher scores in almost all domains of the WHOQOL-BREF. The mean score in the BDI II for subjects that were undergoing physical therapy (17.8) was above the threshold (17) that is indicative of depressive symptomatology.

The correlation of disability with depressive symptoms and quality of life is presented in table

3. It is shown that scores on the HAQ-DI, which are suggestive of disability, are statistically significantly inversely correlated to scores on the BDI II and to scores on all domains of the WHOQOL BREF, except to the environment domain. That is the higher the disability, the more depressive symptoms and the worst QoL the participants have.

**Table 1. Characteristics of the sample and scores on the assessment scales**

		N	%	Mean	Standard Deviation	Median
Age (years)				75.5	7.5	75.0
Gender	Female	55	52.4%			
	Male	50	47.6%			
Antidepressant treatment	No	88	83.8%			
	Yes	17	16.2%			
Undergoing physiotherapy	No	59	56.2%			
	Yes	46	43.8%			
HAQ-DI				.3	.4	.2
BDI II score				14.4	8.6	14.0
WHOQOL-BREF (Overall Quality of Life and General Health)				60.1	19.1	62.5
WHOQOL-BREF (Physical Health)				64.0	15.9	64.3
WHOQOL-BREF (Psychological Health)				62.2	15.1	66.7
WHOQOL-BREF (Social relationships)				61.2	10.8	62.9
WHOQOL-BREF (Environment)				62.1	10.1	62.5

**Table 2. Differences among older adults who were undergoing physiotherapy and those who were not**

	Subjects not in physiotherapy (n=59)	Subjects undergoing physiotherapy (n=46)	p-value
Age (years)	72.5	79.5	< 0.001 *
Gender (male/female)	35/24	31/15	< 0.001 *
Antidepressant treatment	3	14	0.001 *
HAQ-DI score	.1	.6	< 0.001 *
BDI II score	11.8	17.8	< 0.001 *
WHOQOL-BREF (Overall Quality of Life and General Health)	66.7	51.6	< 0.001 *
WHOQOL-BREF (Physical Health)	70.0	56.4	< 0.001 *

WHOQOL-BREF (Psychological Health)	66.9	56.2	< 0.001 *
WHOQOL-BREF (Social Relationships)	65.2	56.0	< 0.001 *
WHOQOL-BREF (Environment)	63.3	60.6	0.177

\*: statistically significant at the 0.01 level (2-tailed)

**Table 3. The correlation of disability with depressive symptoms and quality of life**

		BDI II	WHOQOL-BREF (Overall Quality of Life and General Health)	WHOQOL-BREF (Physical Health)	WHOQOL-BREF (Psychological Health)	WHOQOL-BREF (Social relationships)	WHOQOL-BREF (Environment)	
Spearman's rho	HAQ-DI	Correlation Coefficient	.556*	-.535*	-.663*	-.551*	-.607*	-.127
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.198
		N	105	105	105	105	105	105

\*: Correlation is significant at the 0.01 level (2-tailed)

## Discussion

To the best of our knowledge this is the first study in Greece that address the issue of depression and quality of life in older adults that undergo physical therapy. The total rate of depression in the sample of older adults, that is subjects with scores  $\geq 17$  in the BDI II plus those who had been diagnosed with depression and received antidepressant medication, but scored  $< 17$  in the BDI II, was 37.1%. This figure is comparable to that of a recent study in Northwest Greece, in which 40.5% of the elderly subjects presented depressive symptoms, according to the Geriatric Depression Scale (Kouvatsou et al, 2020). A previous Greek study in patients attended a primary healthcare center reported a 32.6% rate of depressive symptoms with the use of the Zung self-rating depression scale (Andriopoulos et al, 2013). Another study that was conducted in Southwest Greece found the highest rate of depression among elderly people (48.1%) with the use of the Geriatric Depression Scale (Argyropoulos et al, 2015). The observed differences are probably accounted for by the

different scales that were used across studies for the assessment of depressive symptoms and the different samples of elderly persons that were recruited. Importantly, all the aforementioned studies showed a noticeable under-detection of depressive symptoms in older adults and this was the case of the present study as well. Indeed, only 16.2% of the sample had been diagnosed with depression and received antidepressant treatment, compared with the 37.1% who presented depressive symptoms. This finding is particular important, and should be taken into account by all health professionals who treat elderly patients, in various clinical settings (Peritogiannis & Lixouriotis, 2019; 2020).

The comparison of the two groups of elderly subjects in this study, that is those that underwent physical therapy vs those who were not, yielded some results that is worthy to mention. Older adults that were in physical therapy had significantly higher rates of depressive symptoms, as measured with the BDI II, compared to those who were not in physical therapy. Indeed, as a group the elderly in

physical therapy had a mean score  $>17$ , which is indicative of depression. Moreover, those subjects had significantly higher disability and worse quality of life, when compared to the elderly that did not undergo physical therapy, as measured with the HAQ-DI and the WHOQOL BREF, respectively. Notably, there was a correlation of the scores on the HAQ-DI with scores on the BDI II, and an inverse correlation with the scores on the WHOQOL BREF. That is, the higher the disability, the more the depressive symptoms and the worse quality of life in the elderly. This finding is in line with previous research (Gallegos-Carrillo et al, 2009). A previous study addressed the prevalence and impact of depressive symptoms on a large sample of patients seeking treatment in outpatient physical therapy settings. It was found that depressive symptoms were associated with higher pain intensity and lower functional status. Importantly, oldest age was associated with decreased rates of depressive symptoms in this study (George et al, 2011).

Several painful medical syndromes, such as rheumatoid arthritis, have been causally related to depression, decreased quality of life, and disability (Scott et al, 2010). Moreover, the impact of depression on pain, functional disability and quality of life in patients with painful medical disorders, such as rheumatoid arthritis is well documented (Zhang, Cai & Zhu, 2020). Indeed, in a previous study in primary care patients in Greece, arthritis was found to be associated with depressive symptomatology and physical impairment (Andriopoulos et al, 2013). Patients suffering by those syndromes are more likely to receive physical therapy. Depressive symptoms in those patients should be readily recognized and promptly treated. Notably, previous research suggested that elderly residents in Greece had more depressive symptoms and worse well-being outcomes than elderly in North European countries (Ploubidis & Grundy, 2009). Moreover, a recent study in elderly population in Greece found low levels of HRQoL, which was related to economic hardship (Karanikola et al, 2018).

A proportion of the study subjects (16.2%) had been receiving antidepressant medication. Most were in the group that were under physiotherapy. The practice of administration of antidepressants and other psychiatric medication in subacute rehabilitation settings has been reported in the international (Hammond et al, 2015) and national

(Peritogiannis et al, 2018) literature. This practice corresponds to the increased rates of depression in patients with several neurologic, orthopedic, and other painful medical conditions (Zis et al, 2017). It is interesting to note that 8 out of 17 patients that received antidepressant medication still presented clinically relevant depressive symptoms, as shown by their scores in the BDI II. This may mean that treatment was not effective in those patients, perhaps due to underdosing or due to medical co-morbidities. This finding could inform all specialties that are involved in the treatment of the elderly to monitor depressive symptoms and antidepressant treatment properly. Psychiatric consultation should be sought in cases of persistent depressive symptoms.

**Strengths and limitations:** The present study has some limitations. Subjects in the two groups (those who were undergoing physiotherapy and those who were not) were not matched, according to age, gender and marital status. Moreover, the generalizability of the findings is questionable. Indeed, multi-site research with larger sample of elderly people is warranted to measure the complex association of disability, depression and QoL. It could be argued that subjects who already received antidepressant medication should be excluded from the study. However, we decided not to exclude those subjects, and, in this way, the sample is even more representative, given the rates of depressive symptoms in the Greek population of the elderly. The strengths of the study include the two-site (urban and rural area) recruitment of the participants, the advanced age of the participants (mean age  $>75$  years) and the adequate sample size.

### Implications of the study

This study may have some potential implications for clinical practice. Given the high rates of depressive symptoms and the lower QoL in patients that undergo physical therapy, it seems that the need for such therapy could be used as an indicator of depression and worse QoL in older adults. Health professionals, such as physiotherapists, rheumatologists, and orthopedics, should regularly assess their patients for depressive symptoms, and promptly refer them for psychiatric consultation, when necessary. The prescription of optimal doses of antidepressant medications should be ensured by

mental health specialists and the response to treatment should be regularly assessed.

**Conclusions:** Rates of depressive symptoms in the elderly participants in this study were within the range previously reported in Greece, whereas those that underwent physical therapy had higher rates of disability, displayed more depressive symptoms and had worse QoL. These results are informative for everyday clinical practice in rehabilitation settings. The need of elderly for physical therapy could be a potential indirect indicator of poor mental health and worse quality of life, but further research is warranted.

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