

Chapter 9

Findings Regarding the Relationships Between Sociodemographic, Psychological, Comorbidity Factors, and Functional Status, in Geriatric Inpatients

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Abstract Objective To assess the impact of socio-demographic and comorbidity factors, and quantified depressive symptoms on disability in inpatients.

Methods Observational cross-sectional study, including a number of 80 elderly (16 men, 64 women; mean age 72.48 years; standard deviation 9.95 years) admitted

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in the Geriatrics Clinic of “St. Luca” Hospital, Bucharest, between May-July, 2012. We used the Functional Independence Measure, Geriatric Depression Scale and an array of socio-demographic and poly-pathology parameters. Statistical analysis included Wilcoxon and Kruskal-Wallis tests for ordinal variables, linear bivariate correlations, general linear model analysis, ANOVA.

Results FIM scores were negatively correlated with age ($R = -0.301$; 95% CI = $-0.439 -0.163$; $p = 0.007$); GDS scores had a statistically significant negative correlation ($R = -0.322$; 95% CI = $-0.324 -0.052$; $p = 0.004$) with FIM scores. A general linear model, including other variables (gender, age, provenance, matrimonial state, living conditions, education, respectively number of chronic illnesses) as factors, found living conditions ($p = 0.027$) and the combination of matrimonial state and gender ($p = 0.004$) to significantly influence FIM scores. ANOVA showed significant differences in FIM scores stratified by the number of chronic diseases ($p = 0.035$).

Discussion and conclusions Our study objectified the negative impact of depression on functional status; interestingly, education had no influence on FIM scores; living conditions and a combination of matrimonial state and gender had an important impact: patients with living spouses showed better functional scores than divorced/widowers; the number of chronic diseases also affected the FIM scores: lower in patients with significant polypathology. These findings should be considered when designing geriatric rehabilitation programs, especially for home – including skilled – cares.

Keywords Disability • Multi-poly-pathology • Functional Independence Measure (FIM) • Geriatric Depression Scale (GDS) • Geriatric inpatients

9.1 Introduction

Given the shift of the world’s population age structure, there is increasing interest among health care specialists, social care givers, and administrative organizations all over the world to promote independent living in late life and a healthy and active aging process. Depressive symptoms and functional limitations have a negative impact on patients’ quality of life and well-being, as well as on their families who provide care and support [1].

Life changes and events such as bereavement, retirement, chronic conditions and disabilities, cognitive impairment, loss of active social roles, and financial strains are all potential risk factors for depression, although it is recognized that elderly do benefit from a high level of resilience and inner resources to cope with these challenges [1–3]. Projections suggest that by 2020, depression will become the second leading cause of health problems worldwide, as measured by disability-adjusted life years [4].

Reports on depressive disorder prevalence in old age are few and contradictory mainly due to methodological issues, given the multiple comorbid diseases and cognitive impairment in old age [5]. Some research findings confirmed a positive

correlation of depressive symptoms with age [6] while others reported a decreasing prevalence of depression and anxiety in older age [7, 8]. While some studies reported higher incidence of minor depressive symptoms, compared with ratings of major depression disorder in people aged 65 and over [9, 10], others stated that depression score tends to increase with age, unlike the prevalence of depression [11]. In European countries, the percentages of elderly suffering from depressive symptoms and disorders were estimated as high as 55.1 in females over 60 years old, 71.8 in females over 75 years old, 32.1 in males over 60 years old, and 37.5 in men over 75 years old [12].

Depression symptoms and disorders often coexist with chronic conditions in old age, worsening health outcomes and limiting functionality. The relationship between physical disability and psychological disorders is complex and difficult to elucidate, especially in elderly [13]. A strong association between functional disability and depressive symptoms in old age has repeatedly been reported [13–20]. Depressive symptoms are recognized as a limiting factor of functional independence in the elderly [21, 22], and some have hypothesized a reciprocal, potentially spiraling relationship between depression and disability [23–25]. Conversely, some authors have pointed out that the psychological well-being is significantly correlated with better functional status and survival in elderly [26, 27].

To our knowledge, there are no reported research data on the relationship between geriatric depressive disorders and functional status in Romanian elderly. We conducted an observational study, aiming to assess the correlations between functional status and quantified depressive symptoms, and sociodemographic and comorbidity factors, in geriatric inpatients.

9.2 Methods

This is an observational cross-sectional study, aiming to analyze the association of depressive disorders with functional limitations, in patients admitted for various chronic conditions in our Geriatrics medical unit. We have selected a number of 80 patients 50 years of age and older (64 women and 16 men, mean age 72.48 ± 9.95 years) living in independent communities and referred to our Geriatrics Division by their general practitioners, for various diseases, over a period of 5 months (May 2012 to September 2012). The subjects were included in the study after signing an informed consent and based on the following exclusion criteria: younger than 50 years of age, patients living in care homes, suffering from terminal illnesses and/or cancer, diagnosed with dementia, patients who have undergone a surgical procedure within the last 2 months, hemiplegic and/or tetraplegic patients, and other neurological or psychiatric disorders that might have averted the subjects from completing evaluation scales.

All patients were screened for the following major chronic conditions: hypertension, hypotension, chronic ischemic heart disease, congestive heart failure, chronic venous insufficiency, peripheral arterial disease, chronic obstructive

pulmonary disease, asthma, chronic bronchitis, obesity, diabetes mellitus and other metabolic diseases, impaired visual acuity, hearing loss, balance disorders, and liver and kidney diseases. A prior diagnosis was accepted by interviewing the subjects and asking for medical documentation. De novo diagnoses were made by specific clinical, biological, and imagistic investigations. The number of diagnosed chronic conditions was recorded for each subject.

For each patient, a set of sociodemographic data was recorded: marital state (married/widower/divorced), living conditions (alone/with family), education (illiteracy or elementary/secondary/tertiary or higher education), and provenance (rural/urban).

Functional status was assessed using the Functional Assessment Measure (FIM). FIM is a widely accepted instrument that uses a scale to measure one's ability to function with degrees of independence quantified from 1 (Total Assistance) to 7 (Total Independence)—based on the ability to perform motor activities such as: grooming, sphincter/s control, transfer/s, locomotion and cognitive ones, such as comprehension, expression, social interaction, or memory, among others (totally 18 detailed items). Usually, a FIM score is collected within 72 h after admission, within 72 h before discharge, and between 80 and 180 days after discharge [28–31].

Depression and anxiety symptoms were evaluated using the Geriatric Depression Scale (GDS) Long Form (30 items). First developed by Yesavage et al. [32], GDS is a validated, largely used instrument, based on a self-reported evaluation; each of the 30 questions requires a simple yes or no answer. While this tool cannot substitute a psychiatric evaluation and diagnosis, it is very efficient and reliable for the screening and assessment of depression in elderly [33].

Statistical analysis was performed using SPSS 16.0 for Windows. It included the Wilcoxon and Kruskal-Wallis tests for ordinal variables, linear bivariate correlations (the Pearson correlation coefficient), and general linear model analysis.

9.3 Results

Our study group included 80 patients, 64 (80 %) women and 16 (20 %) men, aged between 52 and 92 years. The main features of the group are detailed in Table 9.1.

In order to analyze the impact of socio-demographic and comorbidity factors on FIM scores, we stratified the patients by: gender, age (we defined four age groups: patients aged 52–61 years, 62–71 years, 72–81 years, 82–92 years), marital status, living conditions, provenance, number of chronic conditions (we defined four groups, according to the number of associated diseases: patients with 2–3 chronic conditions, patients with 4 associated conditions, patients with 5 chronic conditions, patients diagnosed with 6–7 chronic conditions), and education. Since FIM values were not normally distributed ($p = 0.000$ for one-sample Kolmogorov-Smirnov test) in our study group, we employed the Wilcoxon signed-rank test (for two samples) and Kruskal-Wallis test (for multiple samples), for comparison between categories (Table 9.2).

Table 9.1 Mean and median values for age, number of chronic conditions, GDS and FIM scores in the study group

	Mean ± SD	Median
Age	72.48 ± 9.95	74
No. of chronic conditions	4.63 ± 1.14	5
GDS score	13.40 ± 7.45	14
FIM score	119.78 ± 10.75	126

SD standard deviation

As shown in the table, age had a significant impact on FIM scores ($p = 0.001$), which were lower in older patients. FIM scores were significantly higher in married patients, as compared to divorced ones (0.017). Patients living alone had lower FIM scores than the ones living with family, but this difference was not statistically significant ($p = 0.102$).

To further document the relationship between age and functional independence, we assessed the linear correlation between age and FIM using the Pearson correlation coefficient (R). FIM scores were negatively correlated with age ($R = -0.301$; $R^2 = 0.091$; 95 % CI -0.439 to -0.163 ; $p = 0.007$) (Fig. 9.1).

To explore a possible relationship between depressive symptoms and functional status, we first assessed the linear correlation between GDS and FIM scores, and we found a statistically significant negative correlation ($R = -0.322$; $R^2 = 0.104$; 95 % CI -0.324 to -0.052 ; $p = 0.004$) (Fig. 9.2).

A general linear model ($R^2 = 0.693$), including all the other variables (age, education, living conditions, provenance, gender, matrimonial state, respectively, number of chronic conditions) as factors, found living conditions ($p = 0.027$) and the combination of matrimonial state and gender ($p = 0.004$) to significantly influence the FIM score, alongside with GDS score ($p = 0.014$).

Finally, we performed a discriminant function analysis to further study the effect of each variable on FIM scores. To this end, we created an auxiliary binary variable, defined as 1, if $FIM \leq 122$ (28 patients) and 2, if $FIM > 122$ (52 patients). The obtained standardized canonical discriminant function coefficients were, in order: 0.541 for age, 0.412 for gender, 0.362 for marital state, 0.310 for GDS, 0.295 for education, 0.241 for number of chronic conditions, 0.138 for provenance, and 0.120 for living conditions. The highest coefficients, reflecting the strongest relationships with FIM, were those corresponding to age, gender, and marital state.

In conclusion, our study confirmed that functional independence significantly decreases with age. Interestingly, we found that physical functional limitations were more severe in single (widowers and especially divorced) persons, particularly men, as compared to married patients. Patients with more severe depressive symptoms (higher GDS scores) had more important limitations to their functional independence (lower FIM scores).

Table 9.2 FIM values by categories

Categories		Number (%)	Mean \pm SD	95 % CI for mean	<i>p</i>
Gender	Female	64 (80.00 %)	120.42 \pm 10.80	117.72–123.12	0.270
	Male	16 (20.00 %)	117.19 \pm 10.48	111.60–122.77	
Age group	52–61	14 (17.50 %)	124.64 \pm 4.53	122.03–127.26	0.001
	62–71	20 (25.00 %)	121.05 \pm 12.20	115.34–126.76	
	72–81	27 (33.75 %)	119.81 \pm 10.16	115.79–123.84	
	82–92	19 (23.75 %)	114.79 \pm 11.83	109.09–120.49	
Marital state	Widower	38 (47.50 %)	116.89 \pm 1.98	112.87–120.92	0.017
	Divorced	4 (5.00 %)	115.25 \pm 18.93	85.13–145.37	
	Married	38 (47.50 %)	123.13 \pm 6.74	120.92–125.35	
Living conditions	Alone	20 (25.00 %)	117.30 \pm 12.31	111.54–123.06	0.102
	With family	60 (75.00 %)	120.60 \pm 10.16	117.97–123.23	
Provenance	Rural	19 (23.75 %)	122.05 \pm 6.32	119.01–125.10	0.644
	Urban	61 (76.25 %)	119.07 \pm 11.75	116.06–122.08	
No. of chronic conditions	2–3	14 (17.50 %)	123.93 \pm 5.85	120.55–127.31	0.126
	4	23 (28.75 %)	119.43 \pm 11.46	114.48–124.39	
	5	25 (6.25 %)	121.96 \pm 8.71	118.37–125.55	
	6–7	18 (22.50 %)	113.94 \pm 13.29	117.38–122.17	
Education	Illiteracy or elementary	24 (30.00 %)	117.92 \pm 11.25	113.17–122.67	0.089
	Secondary	48 (60.00 %)	121.02 \pm 9.44	118.28–123.76	
	Tertiary	8 (10.00 %)	117.88 \pm 16.27	104.27–131.48	

CI confidence interval

p was generated using the Wilcoxon test, for two samples, and the Kruskal-Wallis test, for multiple samples

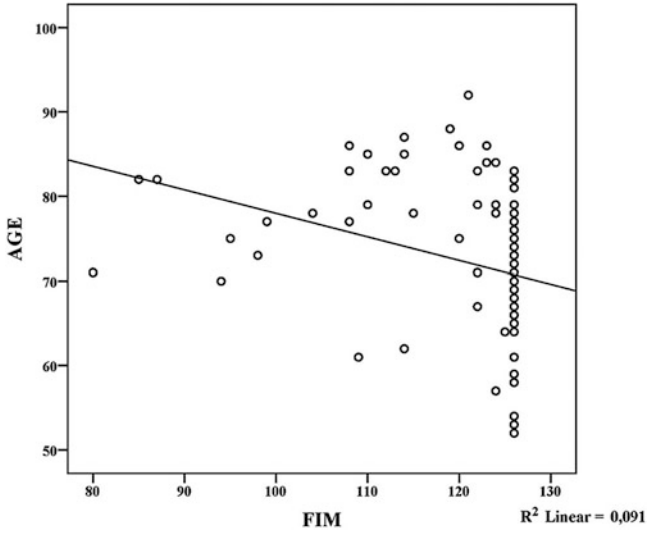


Fig. 9.1 The negative correlation between FIM scores and age

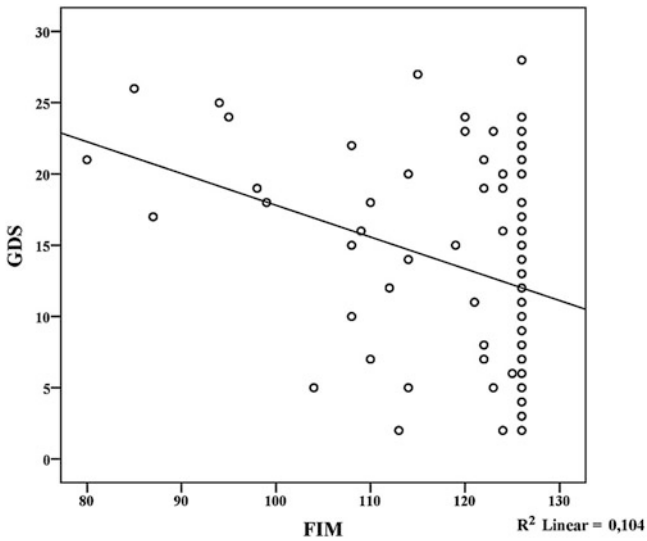


Fig. 9.2 The negative correlation between FIM and GDS scores

9.4 Discussion

Limitations of functional independence in elderly represent a serious socioeconomical concern [1]. It is therefore important to identify the risk factors for frailty and disability, to develop new preventive strategies.

Our study had some limitations: it included a small number of patients and being a cross-sectional study, did not allow establishment of a causal relationship between depression and disability, but our results obtained can offer interesting perspectives for subsequent longitudinal studies, with larger numbers of subjects to allow a rigorous analysis, by subgroups of interest.

As expected, we found a significant association between functional limitation and age in our group of community dwelling elderly. We also found a significant inverse correlation between GDS and FIM scores, suggesting that depression might contribute to functional capacity limitations. This relationship between depressive symptoms and functional decline in old age [14–22] and frailty [34] has been frequently described in literature. On the other hand, there is accumulating evidence to support the idea that that psychological well-being is correlated with better physical performance [26, 27, 35] and even better survival in elderly [26, 36, 37].

Some authors have described a bidirectional relationship between depression and disability in elderly, creating a vicious circle, where functional impairment leads to depression and this, in turn, enhances functional limitations [23–25].

The World Mental Health (WHM) Surveys are a conglomerate of general population surveys carried out in 17 countries across the world, which have used standardized diagnostic assessment of mental disorders and collected information on chronic physical disease prevalence and functional disability. Their results have shown that individuals with depression/anxiety disorders are more likely to be severely disabled than those with chronic physical conditions and the comorbid association tends to exert a synergistic effect on disability [19]. Another study, specifically targeting the geriatric population, has highlighted the negative effect of various degrees of depressive symptoms on functional status, but did not control for other chronic diseases [14].

In our study, marital status had an important impact on functional independence: patients with living spouses had significantly better functional scores than the widowers and divorced. These results are consistent with previously reported findings: recent data from the National Social Life, Health, and Aging Project (USA) showed that higher levels of loneliness were associated with more severe functional limitations [38].

Conclusions

Our study objectified the correlation between depression and functional status. Interestingly, education had no influence on FIM scores; the living conditions and the combination of marital state and gender had an important impact on functional scores: patients with living spouses showed better values than the divorced/widowers; the number of chronic diseases also affected FIM scores, which were lower in patients with increased polyopathy. These findings should be considered when designing geriatric rehabilitation programs, especially for home care.

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