PREVALENCE AND RISK FACTORS OF DEPRESSION IN TURKISH GERIATRIC POPULATION: GENDER DIFFERENCES IN A FIELD STUDY

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Abstract: *Background:* *Aging is associated with increased morbidity, mortality, hospitalization, and loss of functional status related to common mental disorders in the elderly. The aim of this study is the need to identify new and unmet problem areas in geriatric depression and develop efficient interventions for gender-based differences.*
Methods: The cross-sectional, field-based study was conducted with 2269 participants. The nurses serving in primary health care facilities collected data. The Questionnaire consisted of socio-demographic characteristics, illnesses, medications, Non-communicable diseases (NCDs), EQ-5D, General Health Status (GHS), Geriatric Depression Scale (GDS) and Visual Analog Scale for health status (VAS) was collected in face-to-face interviews at the participants' homes.
Results: In the study, the mean age was 73.3 (6.7), 50.3% were male. Of the older individuals' 71.8% had a chronic disease and 62.2% used at least one medication. The prevalence of depression was 31.2%. Women had a higher prevalence (35.6%) of severe depression than men (26.7%). Age, living alone, being single, being unemployed, having a chronic disease, and perception of poor health condition was associated with high depressive scores in the elderly whereas education, working status, and having a chronic disease were important factors in men.
Conclusions: Depression evaluation in primary health care is an important part of geriatric health check-ups. The incidence of depressive symptoms significantly changes according to gender. Gender-based strategies like increasing the retirement age for men and providing post-retirement job opportunities can be effective in reducing depression.

Key words: *Depression, Elderly, Gender, Risk, Population-based*

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1. Background

The elderly group usually lives with disadvantages of more than one chronic disease. Depression is one of the preventable chronic diseases, however; it remains to be a major public health concern both at the global and national level [1]. Almost half of severe depression cases have never been diagnosed before. Late diagnose is more common especially in older ages. The frequency of depression varies in studies conducted with the elderly. The range of depression changes between 1-15% (2-4) and this rate increases up to 30% with hospital and rest home admissions [5-7].

The decrease in daily life activities, poor physical functioning, and low quality of life (QOL) decrease cognitive functions. The cognitive decline seen in the elder ages is one of the risk factors of depression (8-9). Other risk factors are being female, low education, not receiving a pension, hypertension, a diagnosed mental illness, having had hunger and no leisure activities, and worse self-perception of health. Additionally, persons, who are not satisfied with their lives, who do not want to live, and those who feel hopeless, are at increased risk of depression [10-12].

Most of the elderly people living at home might have different risks and higher rates of depression than institutional living. Due to the delay experienced by the caregiver or family physician in recognizing the symptoms of depression, the quality of life of elderly patients may decrease [13, 14]. Another reason for the delay in recognizing the symptoms of depression is the lack of appropriate service provision for elderly people or individual factors [14].

Depression prevalence might differ according to age, sex, race, or ethnicity and in particular subsets (medical status, care facilities). Rates of depression seem to be higher in elderly women than in men [15]. Depression in women may present with subjective complaints of somatic symptoms (e.g. appetite disturbance) unlike men (16). Therefore, treatment approaches for a disease with different symptoms between the sexes should also be different.

The population of Turkey is aging as well as in other countries and the number of older people staying at homes is increasing. Prevalence of major depression in elderly individuals living in the community and institutions in Turkey ranges between 1-10%; 10.2-48% respectively [5-7], [11, 12], [17].

The aim of this study is to investigate the prevalence of depression, differences in prevalence between genders, and potential risk factors associated with depression in the elder population.

2. Methods

The study sample was chosen from Sinop province, thought to have the highest rate of the elderly population (19%) in Turkey [18]. Sinop is divided into one central and eight peripheral districts. Fifty-eight GPs are serving for 100,595 men and 102,432 women in the city. The total number of served 65 years and over age is 32,506 (14,607 male, 17.893 female).

The cross-sectional design was conducted and a universe of the known size sampling method was used to calculate the sample size (S=0.05; p=0.5). The design effect was 1, and the confidence interval was 97%. The

calculated minimum sample size was 2093. Participants were chosen with a systematic random sampling method from the 65 and over age proportionated group of GPs in Sinop.

Some socio-demographical features like age, gender, education status, working status, and living with a partner; Health-Related Quality of Life Questionnaire (EQ-5D), Geriatric Depression Scale (GDS), and health perception of own were asked at the interviews.

Eser E. performed validity and reliability studies for EQ-5D developed by EuroQol for the Turkish population (19). York style was used in the calculation of EQ-5D scores in this study.

Yesavage developed GDS in 1983 (20), and Turkish validity and reliability study was performed by Ertan T. in 1997. The scale consists of 30 questions with a score between 0-30. The pre-diagnosis of depression cutoff is '14' in the Turkish population (21).

Descriptive statistics, chi-square test, and logistic regression were used to analyze data in SPSS 23.0 (Chicago, Illinois). Logistic regression analyses were conducted using the backward conditional method. The cut points of GDS were set as the dependent variables in LR. The significant variables associated with depression were used as independent variables. The independent variables were education (high/low), marital status (married/not), employment (yes/no), age, living together (with a partner/alone), having a chronic disease (yes/no), using medication (yes/no) and the VAS. Subsequent regression analyses run for GDS.

Ethical approval was taken from The University of Hacettepe Non-Invasive Research Ethical Committee. Sinop Public Health Directorate approved the study and all participants gave verbal consent.

3. Results

3.1. Demographic and socio-economic profile

A total of 2269 elderly participated to the survey. Most of the participants %57.6 (n=1307) were between 65-74 years, while 34.4% (n=781) was 75-84 years and 8% was (n=181) 85 years and older (the mean age was 73.3; SD: 6.67; range=65-99). For the study group, 54.5% (n=1.236) was married, 31.4% (n=712) were illiterate and 35.3% (n=801) had completed primary school.

The majority of participants were never employed (56.1%) and lived with a partner (71.7%). Participants having NCDs was 71.0% (n=1605) and 62.1% (n=1.410) of them were using medication. Hypertension (55.5%), diabetes mellitus (29.2%), and cardiovascular diseases (20.9%) were the most common diseases among participants. Antihypertensive (30.4%) and antidiabetics (19.6%) were the most common medications used in our study.

3.2. Prevalence and correlates of depression

In the study, 32.2% of the participants had no depression (GDS score ≤ 14). The mean EQ-5D score for the sample was 0.79 (range: 0.63-1); for VAS was 56.08 (range: 10-100) and for GDS was 11.2 with the scores ranging from 0 to 29. The mean VAS scores for men and women were 61.38 (SD 19.6) and 50.84 (SD 17.5) respectively. The mean EQ-5D score for men was 0.78 (SD 0.1) and for women was 0.79 (SD 0.1). The mean EQ-5D score was

0.78 (SD 0.1) at depressed and 0.81(SD 0.1) at the non-depressed (p=0.040).

In examining the association of demographic characteristics and depression; 30.4% of 65-74 age, 34.8% of 75-84 age, and 21.5% of 85 and over age were depressed (p=0.001). In the study, 25.2% of married and 38.3% of single (p<0.001); 33.3% of lower and 21.7% of higher educated participants were depressed (p<0.001). There was nobody with depression in the still working group; 21.6% of retired and 44.0% of never employed group had depression (p<0.001). Depressive symptoms were more common in patients with chronic diseases (34.6% vs. 22.9%; p<0.001) and in alone participants (46.8% vs. 25.1%; p<0.001). Poor health status was strongly associated with depression (83.7% vs. 8.8%: p<0.001).

We found that 26.7% of men and 35.6% of women had depression (p<0.001). The significant risk factors for men were employment status, having a chronic disease and marital status, living with a partner, and perception of own health for women. Geriatric depression scale scores according to some socio-demographical features based on gender are given in Table 1.

Logistic regression analyses conducted using the cut points of GDS as the dependent variables and the significant variables associated with depression in descriptive analyses as the independent variables (see methods section). The risk factors for depression were age, education, employment, marital status, general health, living with a partner, VAS, and having a chronic disease. As indicated in Table 2, the perception of health as poor and as fair (12.92; 4.35 respectively), low VAS (1.9), and living alone (3.62) were significant factors associated with higher GDS (p < 0.001). Age (1.04), having a chronic disease (1.48), being single (1.5), and being unemployed (1.47) were significant factors associated with higher GDS (p < 0.05). Health perception as poor was identified as the highest significant factor associated with a higher GDS (p = 0.025) and fair health was associated with a lower GDS (p < 0.001) in Model 1. Using the same independent variables, Model 2 and Model 3 were obtained. Age, general health status, and living with a partner were significant variables for both sexes in Models 2 and 3. Education status, employment, and chronic illness were significant variables for males in Model 2, and visual analog score for females in Model 3 (Table 2).

Geriatric Depression Scale Scores According to some Socio-demographical Features Based on Gender   Table 1

		Geriatric Depression Scale Score								
		Male				Female				
		Not-depressed		Depressed		Not-depressed		Depressed		p
		N	%*	N	%*	N	%*	N	%*	
Age group	65-74	497	75.1	165	24.9	413	64.0	232	36.0	
	75-84	258	66.8	128	33.2	251	63.5	144	36.5	**0.001**
	85 and over	71	89.9	8	10.1	71	69.6	31	30.4	
Marital status	Single	570	77.8	163	22.2	354	70.4	149	29.6	**<0.001**
	Married	256	65.0	138	35.0	381	59.6	258	40.4	
Education attainment	Primary school and below	695	71.5	277	28.5	673	62.3	407	37.7	**0.001**
	Secondary school and higher	131	84.5	24	15.5	62	100.0	-	-	
Employment status	Employed	88	100.0	-	-	66	100.0	-	-	
	Retired	524	75.9	166	24.1	104	78.4	49	32.0	**<0.001**
	Unemployed	214	61.3	135	38.7	565	61.2	358	38.8	
Chronic disease	Yes	503	70.3	212	29.7	554	61.6	346	38.4	**0.003**
	No	323	78.4	89	21.6	181	74.8	61	25.2	
Living with A partner	No	194	67.8	92	32.2	147	41.4	208	58.6	**0.016**
	Yes	632	75.1	209	24.9	588	74.7	199	25.3	
VAS**	≤55	500	78.5	137	21.5	404	80.8	96	19.2	**<0.001**
	>55	326	66.5	164	33.5	331	51.6	311	48.4	
Perception of Health	Good	467	88.6	60	11.4	341	95.0	18	5.0	
	Fair	332	69.5	146	30.5	367	64.0	206	36.0	**<0.001**
	Poor	27	22.1	95	77.9	27	12.9	183	87.1	
Total		**826**	**73.3**	**301**	**26.7**	**735**	**64.4**	**407**	**35.6**	

* row percentage
** VAS: Two groups were made from the cut point (Median score)

Table 2

The relationship between demographic characteristics with GDS score for 65 years and older age group based on logistic regression

Variables		Model			Model II			Model III		
		N	OR (CI 95%)	p	N	OR (CI 95%)	p	N	OR (CI 95%)	p
Age		2269	1.04 (1.02-1.06)	**0.023**	1127	1.03 (1.01-1.06)	0.015	1142	1.05 (1.03-1.08)	**<0.001**
General Health status	Good*	886			527			359		
	Fair	1051	4.35 (3.26-5.79)	**<0.001**	478	4.73 (3.12-7.16)		573	10.3 (5.91-18.02)	**<0.001**
	Poor	332	12.92 (1.35-25.87)	**<0.001**	122	8.95 (1.61-15.98)	**<0.001**	210	12.41 (6.20-12.83)	**<0.001**
Living with A partner	Yes*	1628			841			787		
	No	641	3.62 (2.73- 4.80)	**<0.001**	286	2.19 (1.44-3.33)	**<0.001**	355	6.04 (4.22-8.66)	**<0.001**
VAS	>55*	1137				-		500		
	≤55	1132	1.90 (1.51-2.39)	**<0.001**				642	3.84 (2.66-5.54)	**0.002**
Education	High*	1018			733					
	Low	1251	0.56 (0.42-0.74)	**<0.001**	557	2.81 (1.91-4.13)	**<0.001**			
Employment status	Employee/retired*	997			778					
	Unemployed	1272	1.47 (1.15-1.88)	**0.002**	349	2.58 (1.81-3.68)	**<0.001**			
Chronic disease	No*	654			715					
	Yes	1615	1.48 (1.15-1.92)	**0.003**	412	2.33 (1.55-3.50)	**<0.001**			
Marital status	Married*	1236								
	Single	1033	1.50 (1.14-1.98)	**0.004**						

* reference

Model I includes all participants, Model II only males and Model III only females.

Overall percentage of prediction in Models were 77.4, 78.1 and 75.3 respectively.

4. Discussion

This study investigated the prevalence of depressive symptoms and the risk factors that may lead to depression in the elderly living at home. Using a score of 14 as the cut-off point for GDS, our study found that 31.2% of the participants had depressive symptoms. van der Wurff FB. et al reported 61.5% depressive symptoms at Turkish elderly living in the Netherlands [22] and at the national level the prevalence of depressive symptoms was 24.9%, 16%, and 32% respectively [22-24]; The depressive symptom prevalence in the field studies is lower than in institutional studies addressing the need of different interventions.

According to the logistic regression model, personal perceptions of own health and general health status are the primary factors that affect GDS. The results presented demonstrate that health status and affective social functioning contribute to the risk of depression. Low GHS was considered as associated with less mobility and low self-competence in researches (6, 25). Less functioning and low self-competence increase dependence on others and lowers self-esteem in the elderly resulting in symptomatical depression. Moreover, high EQ-5D scores did not correspond with a lower score of depression, whereas low VAS scores and poor general health perception increased the probability of a higher score of GDS. Chronic diseases and low general health may lead them to home dependency and more depressive symptoms. Elderly people with illnesses may show more depression symptoms due to the use of many drugs and the side effects of these drugs.

Among these factors, our study found that general health was a significant factor that's negatively associated with overall GDS. Previous studies conducted in the local contexts have consistently reported that physical health is a predictor of GDS, suggesting that effective health control is necessary to enhance the mental health status of this population [17]. We have to note that having poor or fair general health was highly associated with depressive scores. The high correspondence of this finding across studies draws our attention to the need for home-based health control interventions in primary health care [26, 27].

The relationship between chronic diseases and depressive symptoms is controversial in the literature (20-27). We saw that at least one chronic disease increases depressive symptoms (OR=1.48). In the elderly population, there are comorbidities and multi-drug usage. Early detection of chronic disease might decrease the comorbidities and consequent mental disorders. Research declared a non-significant relationship between self-reported chronic diseases and depression (26) however, chronic diseases do not only affect physical health but also, have harmful effects on nutrition and personal self-care that are directly associated with mental health status (27).

According to our model, living with a partner is one of the factors associated with low depression scores. Bozo O. indicated that being alone was a significant factor that negatively influences the participants' overall depression (28). In our study population, elderly living with their children after their partner's death may increase their expectations of life. Spending time with grandchildren and feel compelled to care

for them can be preventive from depression. Besides, our study population has a higher level of family support than the elderly living in institutions. Living with a partner may lead our study population to lower GDS scores and depression. Modernization of family structure and stressors like the economy threaten the security of the elderly in society, especially related to mental health issues. We need to integrate the services provided by institutions and the community to improve the quality of life in the older age population.

The marital status was related to the occurrence of depressive symptoms (OR=1.5) and higher GDS scores. Approximately 35% of our population introduced themselves as single. Couples are more engaged in community than single persons. In Turkey, the community accepts couples more easily (27) and they can easily participate in different activities related to cultural lifestyle (28). Bozo O. also suggested higher perceived social support, especially from a partner, predicted lower depression (27, 28). The social relationships domain of QOL is relevant to personal relationships, social support, and working life. Moreover, many of our participants were experiencing physical, psychological, and cognitive problems. Mental health problems may likely have a negative impact on both the elderly engagement in social activities and maintaining employment life. While distancing from friends and work-life causes social alienation, it also triggers depression (30).

Working status is a significant factor that was related to the occurrence of depressive symptoms in the LR model (OR=1.47). This finding was consistent with Turkish (7, 31) and in the Australian

studies (31). However, in Japanese and Pakistani studies, employment was not a significant predictor for the probability of depressive symptoms (31-33). These findings are consistent with an established association between various sources of support in occupational life and depression.

Finally, age was related (OR=1.04) to depressive symptoms according to the LR model in our study. Health restrictions and comorbidities bring a considerable high illness-related burden in our sample. Since the time spent with early-onset depression is longer than with late-onset depression, the severity of the disease increases (6, 31, 34, 35). In our sample, we found that one-year of age increases depressive symptoms (4%). Age can have a bi-directional association as seen in the literature (5, 31-33). There is a need to conduct new research to make assumptions to untangle age and cohort effect in different samples.

5. Limitations

To our knowledge, this is the first cross-sectional study to explore the presence of depression and depressive symptoms in a primary care elderly population living in community in Turkey. Our findings cannot be generalised to all elderly populations and this project was aimed to provide a snapshot of the depression status and risk factors of those with depression in community level. Moreover our study is comparable with other prevalence studies conducted outside instutions. Field research influenced by the cultural issues and detection of depression status and availability of participants limits the generalisability of our results. Self-report may be a barrier and a clinical assessment

with a comprehensive mental state examination is optimum for mental disorders.

6. Conclusion

The findings suggest that the level of depression should be monitored with different interventions at the community level. Furthermore, having social support, having good health and employment was positively associated with depression. This study also provides essential information to help primary healthcare staff identify those at risk of depression. Lastly, to shed more light on the depression of the elderly, future studies should involve larger sample sizes in a country-based level with a clinical verification of depression. The long-term mortality risk associated with depression depends on its detection status, with a better prognosis with detected depression. The absolute impact of undetected depressive symptoms in terms of life expectancy can be prominent.

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Author Contributions

The study team: responsibility for the integrity of the work as a whole, conception and design; performing the experiment, acquisition of data; analysis and interpretation of data and preparing the paper, responsibility for analysis and interpretation of data, drafting the article and revising it critically for important intellectual content; final approval of the version to be published.

Conflict of Interests

No

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