

*The Prevalence of Depression and its Associated Demographic Factors
in the Elderly with Electronic Health Records in Zanjan*

Pourrahimi A¹, Sheikhlar A², Keshavarz Afshar M³, Abdi M¹,
Aghajanloo A¹, Mohammadi S⁴, Bayat F^{3*}

¹Department of Nursing, School of Nursing and Midwifery, Zanjan University of Medical Sciences, Zanjan, Iran

²Bsc. Student Research Committee, Zanjan University of Medical Sciences, Zanjan, Iran

³Department of Midwifery, School of Nursing and Midwifery, Zanjan University of Medical Sciences, Zanjan, Iran

⁴MSc, School of Science, Zanjan University, Zanjan, Iran

***Corresponding Author:** Department of Midwifery, School of Nursing and Midwifery, Zanjan University of Medical Sciences, Zanjan, Iran

Email: f.bayat680@gmail.com

Received: 20 June 2019

Accepted: 13 Oct 2019

Abstract

Background: The highest prevalence of depression is observed in the elderly, and the cultural difference in each region causes a difference in the incidence of this disorder.

Objectives: Therefore, this study aimed to investigate the prevalence of depression and its associated demographic factors in the elderly with electronic health records in Zanjan during 2018.

Methods: A total of 400 elderly people with electronic health records participated in this descriptive cross-sectional study, who were selected by the cluster random sampling method from 18 urban community health centers of Zanjan. The data were collected using a demographic questionnaire and the geriatric depression scale). Finally, data entered the SPSS software and analyzed utilizing descriptive statistics, as well as Chi-square, ANOVA, and logistic regression tests.

Results: The mean age of the elderly was 77.7 ± 5.56 and 68.5% of them had some degrees of depression, including mild (40.5%), moderate (19.2%), and severe (8.8%) depression. Mild depression was more prevalent among younger adults while moderate to severe depression was common in older adults over 75. The results revealed that depression had a significant relationship with age and educational level while not having any significant relationship with sex, marital status, and the dwelling place.

Conclusion: Considering the high prevalence of depression among the elderly in Zanjan, health managers suggested to prioritize educational programs and social support for this group of individuals and monitor the performance of supportive institutions such as insurance in this regard. Eventually, they are recommended to pay attention to the geographical and cultural diversity of different regions of the country to reduce the elderly's depression level.

Keywords: depression, the elderly, electronic health records

Introduction

According to the World Health Organization statistics, the world population has been aging rapidly since 2015 and the population over the age of 60 will double by 2050, indicating an increase from 12% to 22%. In addition, there are more than 800 million people over the age of 60 in the world, which reaches one billion people by 2020

[1]. A comparison of the age pyramids of the Iranian population over the last two decades shows that the pyramid structure pushes back every year [2]. According to the last census in Iran (2016), the population of the country was reported 79 million and 600 thousand, among whom, 9/2% included the elderly population [3].

The strength of youth diminishes by age and the organs of the body no longer function as before during a physiological routine. Further, the elderly suffer from various physical, mental, social, and economic problems if no one takes care of this group of people [4]. Psychological problems are of great importance because they harm the individual directly and help accelerate other problems as well. Depression is a common psychological problem of the 21st century, especially in the elderly [5]. This disorder has several consequences such as dramatically reducing the quality of life of the elderly people and the family, increasing the treatment costs, decreasing self-esteem, accelerating dementia, increasing other mental illnesses and suicide rates in the elderly [4,6]. Depression is not only an important disorder in one's life but it also accelerates the other psychological problems. For instance, depression in the elderly in small communities with high relative affinity increases the sense of rejection [7].

The highest prevalence of depression in the age pyramid relates to the elderly and the prevalence of severe type is estimated to be around 10 to 20% depending on the culture of each region [8]. Furthermore, the incidence of depression in Brazilian and Dutch elderly people was estimated at 52.6 and 17.1%, respectively [9,10]. Moreover, its prevalence varies between 10 and 77.5% in low- to middle-income countries [11]. The prevalence of severe depression in the elderly was reported by 8.9% in India [12]. A study in Hormozgan showed that 65, 25.83, and 9.17% of the elderly suffered from mild, moderate, and severe depression, respectively [13]. There are many challenges regarding the prevalence of depression in different geographic regions, which can be due to cultural differences and various demographic factors. For example, in the study by Mirzaei et al., the prevalence of mild, moderate, and severe depression was estimated at 28.2, 19.2, and 16.6%, respectively, in the nursing home of Khorramabad. However, in another study by Sajid et al., the prevalence of depression in the entire elderly population of Iran in the nursing home and at home was 85.81 and 57.58%, respectively [14]. These differences are probably related to different geographical conditions and the cultural diversity of Iranian communities. There are also many differences in terms of demographic indicators.

For example, subclinical depression in younger adults (60-74 years old) is at least two to three times more than severe depression and 8 to 10% of these people develop severe depression annually. Female gender, disability, comorbidity, and poor social support can accelerate further problems and suicidal ideation [15]. Moreover, factors associated with depression include female gender, marital status, living in a nursing home, education, age, and socioeconomic status [14]. Similarly, Bralin et al. showed that the range of depression in the elderly was related to gender and cognitive function while the rate of depression failed to increase in the elderly with age [16]. The results of another study in India demonstrated that age, female gender, monthly income, living conditions with a spouse, chronic illnesses, and smoking were significantly associated with the rate of the elderly's depression [17].

The population of Iran is aging and there are cultural and geographical diversities of our country. Considering the lack of a study on the prevalence of depression in the elderly in Zanjan and the contradictory factors associated with depression in various studies, the present study aimed to determine the prevalence of depression and its associated factors in the elderly with electronic health records in Zanjan.

Methods

This descriptive cross-sectional study was conducted during May-July 2018. The population of the study included approximately 60,000 elderly people with electronic health records in Zanjan, who referred to comprehensive urban health service centers in 2018. The researcher referred to all 18 comprehensive urban health service centers in Zanjan after getting permission from the Ethics Committee of Zanjan University of Medical Sciences under the code of IR.ZUMS.283. The sample size was estimated to be 380 according to Cochran's formula with a confidence level of 95%, the test power of 90%, and the mean depression of 38% in the elderly

[18-20].

$$n = \frac{z^2 pq}{d^2 \left(1 + \frac{1}{N} \left(\frac{z^2 pq}{d^2} - 1 \right) \right)}$$

To prevent the falling in the sample, 480 elderly people were included in the study through a multi-stage sampling technique and 30 individuals were

randomly selected from each comprehensive urban health service center to participate in the study. During the study, 48 participants refused to continue their cooperation thus the research was continued with the collaboration of 400 people. The inclusion criteria were being in the age over 60, having no history of mental stress in the last three months (e.g., the death of close relatives, economic crisis, no natural disasters), demonstrating no history of mental illness, and completing of the questionnaire. The exclusion criteria included an incomplete completion of the questionnaire and unwillingness to continue the cooperation. According to the World Health Organization, people in the age range of $60 \geq$ are referred to as elderly, those withing the age range of 60-74 are younger adults, and those who are $90 \geq$ are called older adults [21].

Additionally, 32 participants were excluded from the study since they filled up the forms incompletely. The study instruments included the Geriatric depression scale (GDS) and a demographic questionnaire. GDS questionnaire was used to evaluate the elderly's depression. The questionnaire contained five versions of 60, 30, 15, 5, and 4 questions and its 15-question form was validated in Argentine, Brazil, China, and several other countries [22-24]. In addition, Malekotti et al. validated the 15-question version of the questionnaire in Iran [25]. For further validation, the questionnaire was again administered to 10 faculty members and the reliability of the test was 0.9. Further, the best

cutoff point was 8 with 0.9 sensitivity and 0.84 specificity. In this questionnaire, each question encompassed "Yes" or "No" answer, which was given a score of zero and one. The highest score was 15 and the scores of 0-4, 5-8, 8-10, and 10-15 indicated no depression and mild, moderate, and severe depression, respectively. Furthermore, a demographic questionnaire of the elderly was used, which included the items of age, sex, marital status, educational level, and the dwelling place.

The data were fed into SPSS software, version 16 and the normality of the data was then determined using the Kolmogorov-Smirnov test. Descriptive tests were utilized to calculate the mean, frequency, as well as percentage and standard deviation. Moreover, the Chi-square test for binomial variables was applied to compare the qualitative factors such as sex, education level, and marital status with the prevalence of depression. Finally, ANOVA and logistic regression tests were applied to compare quantitative factors such as age and to investigate the correlation between variables with the dependent variable, respectively.

Results

Generally, 400 people with a mean age of 7.77 ± 0.56 participated in this study, including 263(65.8%) females and 137(34.2%) males. Additionally, 306(79.5%), 70(17.5%), and 24(6%) people were elderly, younger adults, and older adults, respectively (Table1).

Table 1: Demographic Characteristics of the Elderly with Electronic Health Records in Zanjan

	Variables	N(%)
Gender	Male	137(34.2)
	Female	263(65.8)
Age	60-74	306(79.5)
	75-90	70(17.5)
	Over 90	24(6)
Marital status	Single	52(13)
	Married	348(87)
Education	Lower than Diploma	358(89.5)
	Diploma or higher	42(10.5)
Dwelling place	Urban	243(60.8)
	Rural	127(31.8)
	Suburbs	30(7.5)

Overall depression in this study was 68.5% so that 40.5, 19.2, 8.8% of the elderly suffered from mild, moderate, and severe depression, respectively.

The results showed that the prevalence of depression was significantly related to age ($P=0.008$) and education level ($P=0.036$) so that

the prevalence of mild depression was higher in younger adults (75-90) compared to the frequency of severe depression in older adults (over 90 years). In addition, the prevalence of depression was lower in the elders not having a high school diploma as compared to those with a high school diploma or higher. On the other hand, there was no significant relationship between the prevalence

of depression and sex (P=0.553), marital status (P=0.32), and dwelling place (P=0.56), the details of which are provided in Table 2. The results of logistic regression demonstrated that age and education are the strong predictors of depression in the elderly while gender, marital status, and dwelling place were not the predictor variables of depression in the elderly in Zanjan (Table 3).

Table 2: Comparison of Depression Prevalence with Related Factors in the Elderly with Electronic Records in Zanjan

Variable	N (%)	No Depression N (%)	Mild Depressio n N (%)	Moderate Depressio n N (%)	Severe Depressio n N (%)	Total Depressio n N (%)	P value	
The Total Elderly	400(100)	126(31.5)	162(40.5)	77(19.2)	35(8.8)	274(68.5)		
Gender	Male	137(34.2)	46(33.6)	51(37.2)	30(21.9)	10(17.5)	0.553*	
	Female	263(65.8)	80(30.4)	111(42.2)	47(17.9)	25(9.5)		183(69.6)
Age	60-74	306(79.5)	105(34.3)	125(40.8)	55(18)	21(6.9)	0.008**	
	75-90	70(17.5)	19(27.1)	29(41.4)	20(14)	8(11.4)		51(72.9)
	Over 90	24(6)	2(8.3)	8(33.3)	8(33.3)	6(25)		22(91.7)
Marital status	Single	52(13)	20(38.5)	19(36.5)	8(15.4)	5(9.6)	0.32*	
	Married	348(87)	106(30.5)	143(41)	69(19.8)	30(8.6)		242(69.5)
Education	Lower than Diploma	358(89.5)	117(32.7)	147(41.1)	62(17.3)	32(8.9)	0.036*	
	Diploma or higher	42(10.5)	9(21.4)	15(35.7)	15(35.7)	3(7.1)		33(78.3)
Dwelling place	Urban	243(60.8)	81(33.3)	96(39.5)	45(18.5)	21(8.6)	0.559**	
	Rural	127(31.8)	39(3.7)	52(40.9)	27(21.3)	9(7.1)		88(69.3)
	Suburbs	30(7.5)	6(20)	14(7.46)	5(16.7)	5(16.7)		24(80)

* chi-square ** one-way ANOVA

Table 3. Correlation Between Depression in the Elderly in Zanjan and Demographic Factors

Variables	Standardized Coefficients	Unstandardized Coefficients		T	Sig.
	Beta	B	Std. Error		
Sex	.071	.137	.102	1.344	.180
Age	.198	.319	.080	4.008	.000
Marital status	-.061	-.168	.140	-1.195	.233
Education	.195	.316	.076	4.073	.000
Dwelling place	.054	.080	.072	1.109	.268

Logistic regression

Discussion

The present study investigated the prevalence of depression and its related demographic factors in the elderly in Zanjan. The overall prevalence of depression was 68.5%, and the incidence of mild, moderate, and severe depression was 40.5, 19.2,

and 8.8%, respectively. Kashefi et al. evaluated the relationship between personal and social variables with depression prevalence in old people over 60 in Shiraz and reported a prevalence of 65, 25, and 9.17% for mild, moderate, and severe depression, respectively [13]. Likewise, Sengupta

et al., studying the prevalence of depression and its associated factors in urban and rural elderly people, reported that the prevalence of severe depression was 9.7% [8]. The results of these studies are consistent with those of the present study regarding the frequency of the severity of depression (i.e., mild, moderate, and severe). Both types of studies were descriptive cross-sectional and the elderly were divided into elderly, younger adults, older adults and a closer examination of the age groups. However, in the study by Kashefi et al., Beck's questionnaire (i.e., a general measurement scale for all ages) was used to measure depression while, in the present study, the GDS questionnaire was utilized as a specialized criterion of the elderly's depression. The strength of their study was to examine the level of the elderly's income as an independent variable in the acceleration of depression, but the sample size was 120 people, which seems to be a small sample size while that of the present study was 400. On the other hand, Sengupta et al. included a high sample size with 3038 elderlies from rural and urban areas. The criterion for measuring depression in this study was GDS, which is the same as the present study. Another strength of this study is the study of cognitive impairment and physical defect. It seems that the details of the risk factors were not fully reported despite the high sample size and investigation in different areas.

Similarly, Sajedi et al. conducted a systematic study of the prevalence and risk factors of depression and its treatment in Iranian elderly people in 2013. Based on their results, the prevalence of depression in the elderly living at home was reported 57.58%, indicating that more than half of the elderly had some degrees of depression, which is in line with the results of the present study [14]. The current study and the study by Sajedi et al. investigated the prevalence of depression in the elderly who were healthy and had no chronic mental illness. Contrarily, the above-mentioned study was a systematic review and multi-year analysis of studies related to the depression of the elderly in Iran while the present study was a descriptive cross-sectional one. However, the concordance between the two studies may indicate the proximity of depressive disorder in the elderly in Zanjan and the use of

appropriate scales for sampling and data analysis in the present study.

Bakhtiari et al. reported the overall prevalence of depression 51.87% so that in this study, the rate of mild, moderate, and severe depression was 17.41, 25.58, and 8.88%, respectively, which corroborates with the total depression of the present study [26], but the severity of depression is not consistent with the present study since the mean depression in this study is more than mild depression. Further, Beck's questionnaire was used to assess depression, but the GDS questionnaire in the current study may be the reason for the difference in these results. The strengths of this study were the use of social and insurance supports and economic status. The above-mentioned study was also descriptive cross-sectional research. The multi-stage sampling was performed only from the health centers of the north, east, and Shemiranat in Tehran province. Considering the vastness of Tehran province and its cultural, economic, and social differences in various parts of the province, as well as its large population, the results cannot be generalized with high confidence to the whole province.

In another descriptive cross-sectional study by Mirzaei et al. in Khorramabad, the total prevalence of depression was 64%, and the prevalence of mild, moderate, and severe depression was 28.2, 19.2, and 16.6%, respectively [27]. The findings of this study were also in line with those of the present study in terms of the total depression prevalence, but it was not consistent with the present study in terms of the severity of depression prevalence since mild depression in Zanjan was significantly higher than moderate and severe depression. However, there was no significant difference in the severity of depression (i.e., mild, moderate, and severe) in the study of Mirzaei et al. in Khorramabad. The main reason for the difference in the results is the cultural differences between the two regions of "Lor" ethnicity in Khorramabad and "Turk" ethnicity in Zanjan. Another difference may be related to the low sample size in this study (about 78 elderly). Both studies used the GDS questionnaire to assess depression. However, the above-mentioned study only examined the elderly living in a nursing

home. Further, the inclusion criteria failed to indicate the time interval after which the person participated in the study following losing their first-degree relatives, which is a very important factor in the incidence of depression.

Grover et al., analyzing 53 articles in a review study in India, reported the depression prevalence of 8.9-62.16% and 42.2-72% in the elderly in community-based and clinical-based studies, respectively [28]. The findings of this study, which was conducted on the broad level of Asia continent, is in conformity with the findings of the current study in terms of the frequency of the total depression in the elderly (68/5%). Lupa et al. also found that the severe depression in the elderly (over 75 years) was 7.2% and the prevalence of depression was 17.1 in the Netherlands [10], which contradicts the results of the present study. In the above-mentioned study, reputable databases such as Medline, Web of Science, Cochrane Library, and PsycINFO were surfed while no considering other valid databases such as Google Scholar, Pubmed, and Embase. Twenty-four studies were selected, out of which only 12 had moderate to high-quality studies. A review of these studies showed that depression in the elderly was higher in Asian countries as compared to European countries.

In a study by Tanjani et al., depression among Iranian elderly people was estimated to be 36.7%, which is not consistent with the frequency of the total depression (68.5%) in the present study [20]. The reason for this difference may be that in their study only moderate and severe depression were studied in the elderly without considering mild depression. Various studies indicate the importance of dealing with mild depression in the elderly and the seriousness of the prevalence of severe depression in the elderly. On the other hand, it does not demonstrate the high prevalence of depression in the population of Zanjan in comparison to the whole country. Nevertheless, the lack of addressing the mild depression in the elderly is the cause of this difference.

Babazadeh et al. found that the severe depression in the elderly in Khoy was 1.3% whereas, in the present study, the severity of depression among the elderly in Zanjan was 8.8% and several times higher than that of the above-mentioned study [29]. The prevalence of severe depression in the elderly over 90 was higher in the present study

and this may be due to the lower number of the elderly over 90 in that study.

Regarding the demographic variables, the prevalence of depression was significantly related to age and education in this study. The strength of this descriptive-analytical study was a suitable sample size of 383 elderly people. Furthermore, Beck's depression questionnaire was used to assess depression in this study, which is a general criterion to evaluate depression, but the present study utilized the GDS questionnaire in this regard. It is noteworthy that the study did not determine the participation of the elderly with mental disorders.

Likewise, Mirzaei et al. reported a statistically significant positive relationship between aging and education with depression [27]. This demonstrates the importance of the age of the elderly people in terms of younger and older adults on the level of depression and its severity, as well as the importance of their education. However, life satisfaction was not measured in this study. On the other hand, education level was consistent with the current study but the marital status inconsistent. The findings of Taheri Tanjani et al. showed that depression was significantly associated with sex, education, marital status, income adequacy, occupation, leisure time, physical activity in daily life, relationship with financial service providers, and the frequency of visits with friends and acquaintances [20]. In addition, in the study by Babazadeh et al., depression had a significant relationship with sex, education, marital status, medical status, and home ownership [29], which is consistent with the findings of the present study in terms of depression and education but it contradicts the result of the present study in terms of marital status. The strength of this study was to investigate the simultaneous review of anxiety, depression, and stress in the elderly in Khoy. Depression, anxiety, and stress scale 21 (DASS-21) questionnaire was used to study depression, which is not a specialized criterion of depression in the elderly. Probably the cultural and geographical differences between the two regions are due to the differences in the factors associated with the elderly's depression.

Overall, the depression prevalence, is high among the elderly, especially mild depression, which suggests the need for preventive interventions.

Some demographic factors such as age and education were significantly associated with depression. Most of the elderly had electronic health records in Zanjan, which indicated the positive attitude of the ministry of health in the field of elderly health. Due to the aging of our country, it is suggested that the elderly health managers prioritize elderly health education programs, social support, and the supervision of the function of support institutions such as insurance and pay special attention to geographical and cultural diversity in different regions of the country.

Limitations of the study

The present study ignored the other socioeconomic factors affecting the incidence of depression among the elderly, including financial capability, socioeconomic status, physical condition, various aspects of mental health and benefit from the supportive organizations. In addition, the researchers had to interview the participants due to the lack of a standard questionnaire which includes all these items. However, there was not enough time for the research team to interview 400 people. Therefore, future studies are recommended to use clinical interviews with the elderly in different groups and consider more factors.

Acknowledgments

This study is the result of a student research project approved by Zanjan University of Medical Sciences with an ethical code of IR.ZUMS.283. Finally, we would like to appreciate the Research Unit of Zanjan University of Medical Sciences, University Student Research Committee and the Faculty of Nursing and Midwifery, Health Vice-chancellor, and all colleagues working in the health centers of Zanjan University of Medical Sciences.

Conflict of interest

There is no conflict of interest among the authors.

References

1. Taheri A. Evaluation of Prevalence of Geriatric Depression among Elderly Patients Admitted to non-Psychiatric Wards of Golestan and Imam Khomeini Hospitals in Ahwaz. [dissertation]. Ahwaz: ahwaz jundishapur university of medical sciences. 2017: 1664-67. [In Persian]

2. Noroozian M. The elderly population in iran: an ever growing concern in the health system. *Iran J Psychiatry Behav Sci.* 2012; 6(2): 1-6.
3. Jafari A, Hesampour F. Predicting Life Satisfaction Based On Spiritual Intelligence and Psychological Capital in Older People. *Iranian Journal of Ageing.* 2017;12(1):90-103.
4. Han SB, Yang HK, Hyon JY, Wee WR. Association of dry eye disease with psychiatric or neurological disorders in elderly patients. *Clin Interv Aging.* 2017; 12: 785-92.
5. Bandelow B, Michaelis S. Epidemiology of anxiety disorders in the 21st century. *Dialogues clin Neurosci.* 2015; 17(3): 327-35.
6. Stoppe G, de Mendonça Lima CA. Challenges for Old Age Psychiatry. *Adv Psychiatr.* 2019; 305-13.
7. An JH, Lee KE, Jeon HJ, Son SJ, Kim SY, Hong JP. Risk of suicide and accidental deaths among elderly patients with cognitive impairment. *Alzheimers Res Ther.* 2019;11(1):32.
8. Sengupta P, Benjamin AI. Prevalence of depression and associated risk factors among the elderly in urban and rural field practice areas of a tertiary care institution in Ludhiana. *Indian J Public Health.* 2015; 59(1): 3-8.
9. Matias AG, Fonseca Mde A, Gomes Mde L, Matos MA. Indicators of depression in elderly and different screening methods. *Einstein (Sao Paulo).* 2016; 14(1): 6-11.
10. Luppá M, Sikorski C, Luck T, et al. Age- and gender-specific prevalence of depression in latest-life – Systematic review and meta-analysis. *J Affect Disord.* 2012; 136(3): 212-21.
11. Guerra M, Prina AM, Ferri CP, et al. A comparative cross-cultural study of the prevalence of late life depression in low and middle income countries. *J Affect Disord.* 2016; 190: 362-68.
12. Sengupta P, Benjamin AI. Prevalence of depression and associated risk factors among the elderly in urban and rural field practice areas of a tertiary care institution in Ludhiana. *Indian J Public Health.* 2015; 59(1): 3-8.
13. Kashfi S.M, Khani Jeihooni A, Farhadi S. The relationship between social and demographic factors and prevalence of depression among over 60 years old individuals, Shiraz, Iran. *Bimonthly Journal of Hormozgan University of Medical Sciences.* 2011;14(4):319-25.
14. Sajadi H, Mohaqeqi Kamal H, Vameghi M, Forozan A S, Rafei H, Nosratabadi M. Systematic

- Review of Prevalence and Risk Factors Associated With Depression and Its Treatment in Iranian Elderly. *Salmand Iran J Ageing*. 2013; 7(4):7-15.
15. Meeks TW, Vahia IV, Lavretsky H, Kulkarni G, Jeste DV. A tune in "a minor" can "b major": a review of epidemiology, illness course, and public health implications of subthreshold depression in older adults. *J Affect Disord*. 2011; 129(1-3): 126-42.
16. Brailean A, Guerra M, Chua K-C, Prince M, Prina MA. A multiple indicators multiple causes model of late-life depression in Latin American countries. *J Affect Disord*. 2015 Sep 15;184:129-36.
17. Radhakrishnan S, Nayeem A. Prevalence of depression among geriatric population in a rural area in Tamilnadu. *Int J Nutr Pharmacol Neurol Dis*. 2013; 3(3): 309.
18. Yu J, Rawtaer I, Fam J, et al. Sleep correlates of depression and anxiety in an elderly Asian population. *Psychogeriatrics*. 2016; 16(3): 191-95.
19. Cuijpers P, Vogelzangs N, Twisk J, Kleiboer A, Li J, Penninx BW. Comprehensive meta-analysis of excess mortality in depression in the general community versus patients with specific illnesses. *Am J Psychiatry*. 2014; 171(4): 453-62.
20. Taheri Tanjanai P, Moradinazar M, Najafi F. Prevalence of depression and related social and physical factors amongst the Iranian elderly population in 2012. *Geriatr Gerontol Int*. 2017; 17(1):126-31.
21. Organization WH. Global health and aging. Geneva: World Health Organization. 2011:1-32.
22. Carrete P, Augustovski F, Gimpel N, et al. Validation of a telephone-administered geriatric depression scale in a Hispanic elderly population. *J Gen Intern Med*. 2001;16(7):446-50.
23. Almeida OP, Almeida SA. Short versions of the geriatric depression scale: a study of their validity for the diagnosis of a major depressive episode according to ICD-10 and DSM-IV. *Int J Geriatr Psychiatry*. 1999; 14(10): 858-65.
24. Boey KW. The use of GDS-15 among the older adults in Beijing. *Clin Gerontol*. 2000;21(2):49-60.
25. Malakouti K, Fathollahi P, Mirabzadeh A, Salavati M, Kahani S. Validation of geriatric depression scale (GDS-15) in Iran. *Res Med*. 2006; 30(4): 361-69.
26. Bakhtiyari M, Emaminaeini M, Hatami H, Khodakarim S, Sahaf R. Depression and perceived social support in the elderly. *Iran J Ageing*. 2017; 12(2): 192-207.
27. Mirzaei M, Sahaf R, Mirzaei S, Sepahvand E, Pakdel A, Shemshadi H. Depression and Its Associated Factors in Elderly Nursing Home Residents: A Screening Study in Khorramabad. *Salmand: Iran J Ageing*. 2015; 10(1): 54-61. [In Persian]
28. Grover S, Malhotra N. Depression in elderly: A review of Indian research. *J Geriatr Ment Health*. 2015; 2(1): 4-15.
29. Babazadeh T, Sarkhoshi R, Bahadori F, Moradi F, Shariat F, Sherizadeh Y. Prevalence of depression, anxiety and stress disorders in elderly people residing in Khoy, Iran (2014-2015). *J Anal Res Clin Med*. 2016; 4(2): 122-28.