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Prevalence of psychiatric disorders in the aging population in the northeastern of Iran

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Abstract

Background The prevalence of psychiatric disorders by demographic characteristics in elderly people is poorly understood, at least in the northwest of Iran. We aimed to estimate the prevalence of various psychiatric disorders in the elderly population in East Azerbaijan Province, Tabriz. A total of 1000 aging people were randomly selected from the general population. Data were collected using valid structured instruments and face-to-face interviews by trained psychologists. The Structured Clinical Interview for DSM-IV-TR (SCID-IV) and Abbreviated Mental Test Questionnaire were used. Chi-square (χ^2) test was used for categorized variables, and an independent *T*-test was carried out for quantitative variables.

Results Overall, 38.5% of the elderly had at least one mental disorder (47.2% women, 27.3% men). The prevalence of major depressive disorder (MDD) and *any anxiety disorders* was 16.6% (22.4% female and 9.3% male) and 16.7% (23.1% female and 8.6% male), respectively. Likewise, the overall prevalence of *any depressive symptoms*, post-traumatic stress disorder (PTSD), general anxiety disorder (GAD), obsessive-compulsive disorder (OCD), and panic disorders were 21.6%, 7%, 5.3%, and 5.9%, respectively. The prevalence of any mental disorder in the first, second, and third quartiles of the socio-economic level was 54.3%, 37%, and 17.8%, respectively. The prevalence of any mental disorders among the marginalized and the non-marginalized population is 55.3 and 31.5%, respectively.

Conclusions We found 38.5% (47.2% women, 27.3% men) of the elderly people had any mental disorders, and 21.6% of them had any depressive disorders. The prevalence of mental disorders in elders was almost like adults and middle-aged people in this study. However, the prevalence of mental disorders was higher than in marginalized population and low socio-economic status.

Keywords Mental disorder, Aged, Prevalence, Depression, Tabriz

Background

In recent years, old age is one of the main challenges for mental health systems around the world [1, 2]. Annually, the aging population of the world increased by 1.7%, and this is 4.2% for people with an age of at least 65 [3]. It is estimated that the elderly population will reach 1.5 billion by 2025, and two billion by 2050 [4]. In fact, Iran has had its own share of this population change, such that it is predicted that the elderly population will increase from its present share, 7.8%, to 28% in the year 2050 [5].

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The World Health Organization (WHO) predicts that the world's elderly population will increase from 800 million to 2 billion by 2050. Of them, 29% are in developed countries and 9% in developing countries. In Iran, according to the latest national census, 9.69% and 11.74% of the population are elderly people in the Country and East Azerbaijan province, respectively [5].

Depression is the second most common mental disorder among aging people [6]. In 2018, a meta-analysis study indicated that the pooled prevalence of depression is 43% among Iranian elderly people [7]. Currently, a meta-analysis in 2022 found that the overall prevalence of depression among Iranian elderly people was 53.7% [8]. Several physical and social factors contribute to the morbidity of depression. Isolation resulting from retirement and disablement, lack of a proper caring approach towards the elderly in society, economic problems, and physical diseases, can all pave the way for a reduction in social status and the emergence of depression [9]. According to a report from the World Health Organization (WHO), 20% of people over 60 years suffer from psychological or neurological problems, except pain, and this group is responsible for 6.6% of the disability among people older than 60. The most prevalent mental or neurological disorders are dementia and depression, which are estimated to constitute respectively 5% and 7% of these groups of disorders. One fourth of the deaths caused by suicide happens in people older than 60 [10]. Indeed, many factors play a role in the incidence and prevalence of mental disorders in the elderly. The role of social and demographic factors is bolder and more effective. Several studies count depression as one of the reasons for disability in older ages, loss of loved ones, the solitary and long life in the house, being cared for in special institutes, and retirement, as the effective factors causing depression in the elderly [11, 12].

In the aging process, different systems of the body lose strength, and the abilities of a person decrease. The elderly are exposed to increased disability, reduced independence, and increased dependence on others [13].

Considering low studies conducted on psychiatric disorders among elderly people, at least in East Azerbaijan Province, conducting a population-based survey is necessary to estimate the actual measures of psychiatric disorders so that a precise and valid rate is provided for planners and researchers in the field. Regarding the mentioned notes above, the increasing aging elderly population in Iran, and the importance of their mental health in enhancing their quality of life and health status, the current survey was aimed to investigate the prevalence of psychiatric disorders in aging people based on demographic characteristics.

Methods

Study design and setting

A population-based cross-sectional study was conducted to estimate the prevalence of psychiatric disorders in the aging population in Tabriz, 2019. Target population was people 60 years or above in Tabriz. The sample size was determined based on the prevalence of elderly depression and mental disorders in Iran in previous meta-analysis studies [8, 14, 15] for p=0.53, α= 0.05, and d = 0.1p, and considering the effect of the design effect (DE) and dropouts, 1000 samples were selected.

A random cluster sampling was carried out to select the participants in the study where each community health center is considered as a cluster based on protocols for cross-sectional studies of surveillance of risk factors of non-communicable diseases in Iran [16]. In the current study, there were 150 clusters, each with 20 families inside them, have been selected randomly, based on the results of the population census. The households were surveyed from the right of clusters in the presence of elderly people, and if agreed and cooperated, the questionnaires were completed by trained interviewers. In the absence of an older person in the household or lack of cooperation, the next household was surveyed.

Measurements

Socio-economic status

In this questionnaire, questions regarding age, sex, marital status, education, and economic status have been asked. To check the socio-economic status of the elderly, the brief Iranian questionnaire "The Iranian Questionnaire for Measuring the Socio-Economic Status" has been used. The validity and reliability of this questionnaire have been checked and verified in previous studies [17]. This questionnaire has six questions and addresses the variables of job, education, property, income, and costs related to family health. Career status codes have been assigned to different jobs based on the presented table, and then, for lining up with the other variables, the results are inversed. Finally, the results of the six variables are summed together. The results for the three questions have been multiplied by 0.33. Quartiles are used for classifying socio-economic status.

Structured clinical interview for DSM-IV-TR (SCID-IV)

This is a structured clinical interview based on the DSM-IV-TR criteria, which is used to diagnose axis I and axis II disorders. This scale has been frequently used in psychiatric studies. Previous studies have confirmed the validity of the Persian version of SCID-IV for clinical and researching usages [18]. In the present research, the clinical version of SCID-IV has been used to confirm the diagnosis of psychiatric disorders.

Abbreviated Mental Test Questionnaire

Cognitive disorders were assessed using the Persian version of the Abbreviated Mental Test Questionnaire. The psychometric properties of this instrument were confirmed in the Iranian population. Sensitivity of 92.15% and specificity of 81.5% of the tool were reported by Bakhtiyari et al. [19] in Iran. The internal consistency and the external reliability (intra-rater) of this instrument were 0.76 and ICC = 0.89, respectively.

Statistical analysis

Data were analyzed using SPSS software (version 19.0, Chicago, IL, USA). Descriptive statistics were used to describe and present frequency and prestige. Chi-square (χ^2) test was used to test categorical variables. Independent *T*-test was used for the comparison of normal quantitative variables [20, 21] (Mann-Whitney for non-parametric variables). *P*-value <0.05 was considered significant in all of the tests.

Results

A total of 1000 older people (60 years or above) participated in this study. Sex distribution was 454 (43.9%) men and 581 (56.1%) women. The average of men's age was 70.36 (95% CI: 69.64–71.08). The elderly participants' age-sex pyramid has been shown in Fig. 1.

Table 1 showed that the prevalence of mental disorders among aging people by sex. Overall, 38.5% of the participants had one or more mental disorders (47.2% women and 27.3% men). Concerning the number of mental disorders, 23.6% of the elderly had one, 9.8% had two, and 5.2% had more than two mental disorders. There were statistically significant differences in the number of disorders by sex (*P*-value = 0.001).

Regarding mental disorder type, the overall prevalence of major depressive disorder (MDD) and *any anxiety disorder* was 16.6% (22.4% female and 9.3% male) and 16.7% (23.1% female and 8.6% male), respectively. There was a significant difference in the prevalence of depression and anxiety between females and males (*P*=0.001). However, the prevalence of *any depressive disorders* (symptoms) were 21.6% (29.3% female and 11.9% male). The prevalence of panic disorder was 3% (4.3% female and 1.3% male). We found 5.9% of the depressed subjects had Obsessive Compulsive Disorder (OCD), and 5.3% of them had General Anxiety Disorder (GAD). In both disorders, there was a significant statistical difference between men and women (*P*=0.001). Moreover, the overall prevalence of phobia, agoraphobia, and PTSD was 4.4%, 7, and 7%, respectively (Table 1).

The prevalence of any mental disorders in the first, second, and third quartiles of the socio-economic level was 54.3, 37, and 17.8%, respectively. Likewise, the prevalence

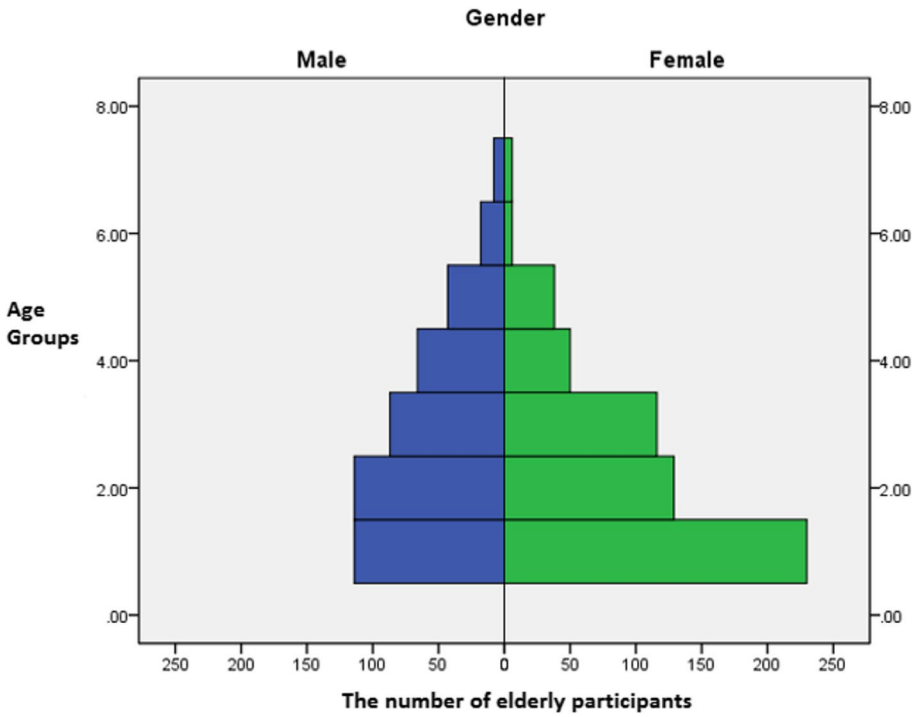

Fig. 1 The age pyramid of the elderly participants. Age groups: 0–2 : 60–70 years; 2–4 : 71–80 years; 4–6 : over 80 years

Table 1 The prevalence of mental disorders among aging people by sex in Tabriz, 2017

Mental disorder[a]	Female (*n*=580)		Male (*n*=420)		Total (*n*= 1000)		*p*-value
	n	%	*n*	%	*n*	%	
MDD	130	22.4	42	9.3	172	16.6	0.001
Dysthymia	81	13.9	25	5.5	106	10.2	0.001
Minor depression	15	2.6	2	4	17	1.6	0.005
phobia	34	5.9	12	2.6	46	4.4	0.009
Agoraphobia	7	1.2	0	0	7	7	0.017
Panic disorder	25	4.3	6	1.3	31	3	0.003
OCD	48	8.3	13	2.9	61	5.9	0.001
Adjustment disorder	53	9.1	48	10.6	101	9.8	0.249
PTSD	4	7	3	7	7	7	0.633
GAD	44	7.6	11	2.4	55	5.3	0.001
Hypochondria	1	0.2	0	0	1	0.1	0.591
Body dysmorphic disorder	1	0.2	0	0	1	0.1	0.561
Psychosis	0	0	2	0.4	2	0.2	0.192
BMD	1	0.2	0	0	1	0.1	0.561
Social phobia	0	0	1	0.2	1	0.1	0.439
Any anxiety disorder	134	23.1	39	8.6	173	16.7	0.001
Any depressive disorder	170	29.3	54	11.9	224	21.6	0.001
Any mental disorder	274	47.2	124	27.3	398	38.5	0.001

[a] Some participants had more than one disorder. Therefore, the total number of disorders was more than the total number of participants

of any anxiety disorder was 27.9, 20.7, and 9.3%, respectively (Table 2).

The prevalence of panic disorder among the marginalized and the non-marginalized populations was 7.2 and 1.2%, respectively (p-value = 0.001). The prevalence of MDD among the marginalized and the non-marginalized populations was 23.4 and 12.6%, respectively (p-value = 0.001). The prevalence of OCD among the marginalized and the non-marginalized populations was 9.3 and 4.4%, respectively. The difference between these two regions is statistically significant (p-value = 0.003).

The prevalence of GAD among the marginalized and the non-marginalized populations was 7.2% and 5%, respectively. 26.5% of the marginalized population and 13.2% of the non-marginalized population had any anxiety disorder (p-value = 0.001). The prevalence of any mental disorders among the marginalized and the non-marginalized population is 55.3 and 31.5%, respectively. The difference between these two regions is statistically significant (p-value = 0.0001). The prevalence of MDD in 60–74 years old, 75–84 years, and 85 years and more were 15.3, 20.9, and 27.8%, respectively (Table 3).

Table 2 The prevalence of mental disorders in elderly people by quartile in Tabriz, 2017

Mental disorders[a]	1st quartile		2nd quartile		3rd quartile		*p*-value
	N=207	%	*N*=601	%	*N*=120	%	
MDD	44	21.2	95	15.8	8	6.8	0.003
Phobia	11	5.3	29	4.8	2	1.7	0.27
Panic	4	1.9	18	3	1	0.8	0.34
OCD	14	6.7	36	6	5	4.2	0.65
GAD	18	8.7	31	5.1	0	0	0.003
Any anxiety disorder	43	20.7	103	17.1	8	6.8	0.004
Any depressive disorder	58	27.9	125	20.7	11	9.3	0.000
Any mental disorder	113	54.3	223	37	21	17.8	0.001

[a] Some participants had more than one disorder. Therefore, the total number of disorders was more than the total number of participants

Table 3 The prevalence of mental disorders in elderly people by age groups in Tabriz, 2017

Mental disorder[a]	60–74		75–84		≥85		*p*-value
	N= 804	%	*N*=160	%	*N*=36	%	
MDD	128	15.3	34	20.9	10	27.8	0.041
Dysthymia	78	9.3	24	14.7	4	3.8	0.1
Phobia	38	4.5	8	4.9	0	0	0.4
Panic	25	3	5	3.1	1	2.8	0.9
OCD	52	6.2	7	4.3	2	5.6	0.63
GAD	46	5.5	9	5.5	0	0	0.35
Any anxiety disorder	145	17.3	25	15.3	3	8.3	0.32
Any depressive disorder	172	20.6	41	25.2	11	30.6	0.18
Any mental disorder	317	37.9	65	39.9	16	44.4	0.64

[a] Some participants had more than one disorder. Therefore, the total number of disorders was more than the total number of participants

Discussion

The increase in the elderly population is creating new challenges, and the health system should make the necessary strategies to manage this situation. Psychological problems are among the most important problems in elderly people, and they can adversely affect the quality of their life.

Our study is one of the rare surveys in East Azerbaijan Province, Tabriz assessing common psychiatric disorders among elderly people. Depression is common mental disorder among the aging population [7, 22] and also young adults in Iran [9]. Evidence confirmed that the prevalence of depression increased from 43 to 53.7% among Iranian elderly people [8, 14]. Besides, a review study in Iran revealed that female gender, marring status, living in a nursing home, education level, age, and socio-economic status were the most important factors associated with depression [23].

In our study, 38.5% of the elderly had at least one mental disorder, and this measure was 47.2 and 27.3% among women and men, respectively. 23.6% of the subjects had one mental disorder. In a study about people older than 55, which was conducted in Europe, 19.1% of the subjects had mental disorders. Seventeen percent of them had depression disorder, and 11.3% of them had anxiety disorders [24].

Findings of a study conducted among the elderly people in Khoy, Iran demonstrated that 1.3% of the elderly people suffer from very severe stress, 1.3% from severe depression, and 3.1% from severe anxiety. Moreover, this study showed that there is a significant association between anxiety, stress, and depression disorders and demographic characteristics such as sex, education, marital status, medical condition, as well as their housing conditions [25]. The results of a study conducted by Ghafari et al. on the elderly in Tehran also have shown that 4.8% of elderly patients have severe stress, 4.8% severe depression, and 11.5% severe anxiety [26].

In a study conducted in Australia, 13% of the subjects reported psychiatric disorder symptoms in the previous month, and 16% reported these symptoms in the previous year. Majority of women had mood disorders and GAD than men, and fewer women had substance use disorders than men. Except for cognitive disorders, the increase in age did not coincide with an increase in the probability of mental disorders [27]. Kessler showed that the prevalence of depression and its symptoms in developing countries (42%) is more than in developed countries (33%) [28]. In a study that investigated the prevalence of mental disorders in the elderly people of Europe, one in every two persons had experienced a mental disorder in the course of life, one in every three persons had been mentally sick in the previous year, and one in every four persons was mentally sick at the time of the study. Anxiety disorders, mood diseases, and drug-related diseases had the most prevalence [29].

In a study that assessed the prevalence of depression and related issues in elderly people, 13.7% of men and 18.2% of women had depression. In both of the sexes, there was a specific relation between depression and age, education, income, life quality, and marital status.

Our results showed that the prevalence of any mental disorder in the first, second, and third quartiles of socioeconomic status was 54.3, 37, and 17.8%, respectively. The prevalence of depressive disorder in this quartile was 27.9, 20.7, and 9.3%, respectively. In another study which had analyzed the effects of socioeconomic differences on depression in old people, it was shown that depression was evidently more prevalent among people with less income and education [30]. In the present study, the prevalence of major depression is estimated to be 16.6% in total, 29.3% in women, and 11.9% in men. The results

were similar to a study conducted in the United States, which had estimated it to be 14.4% [31]. In another study which had analyzed the prevalence of depression among elderly patients hospitalized in wards other than the psychiatric ward, the prevalence of major depression was varying between 10% and 21% [32]. Shah et al reported the prevalence of depression disorder at 35.9% in elderly care centers [33]. In the conducted study, the prevalence of anxiety disorder is estimated to be 16.7. This measure was 23.1 among women and 8.6 among men. This result was similar to the result of Reynold et al which was reported to be 11.71 [34]. It was also similar to the results of Skoogl and Bryant's studies [35, 36].

In the conducted study, the prevalence of Mood and anxiety disorders among women (22.4 and 23.1%, respectively) is reported more than those of men (9.3 and 8.6%, respectively), and this result was similar to the results of Volkert et al. [37].

Strengthens and limitations

The current study is the first population-based study investigating the prevalence of common psychiatric disorders among the elderly population in Tabriz, Iran. Our study had some limitations. The first concern for prevalence studies is needed a sufficient sample size and a well-defined sampling process to estimate parameters. To solve this issue, we chose a large sample size and clustering sampling based on protocols for cross-sectional studies of surveillance of risk factors of non-communicable diseases in Iran [16].

The second concern was information bias to collect and interview the participants. We used trained interviewers by referring to households and using face-to-face interviews.

Conclusions

Findings indicated that 38.5% (47.2% women and 27.3% men) of elderly people had any mental disorder. The prevalence of MDD and any depressive symptoms were 16.6% and 21.6%, respectively. The prevalence of mental disorders in elders was almost like adults and middle-aged people. We found the prevalence of mental disorders was more in marginalized populations and low socioeconomic status.

Abbreviations

MDD	Major depressive disorder
OCD	Obsessive-compulsive disorder
GAD	Generalized anxiety disorder

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Authors' contributions

AF designed the original idea and developed the protocol; SH, MF, HS, SA, SGN, HA, HB, and MM contributed to the protocol development and developed the manuscript and analyses, data extraction, content analysis, interpretation, and edition. All authors approved the final submitted version.

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Availability of data and materials

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

The study protocol was approved by the Ethics Committee, Tabriz University of Medical Sciences. Written informed consent was obtained before the study. We confirm that all methods were performed in accordance with the relevant guidelines and regulations.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests regarding this study and its publication.

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References

1. Odejimi O, Tadros G, Sabry N (2020) A systematic review of the prevalence of mental and neurocognitive disorders amongst older adults' populace in Egypt. Middle East Current Psychiatry 27(1):1–12
2. El Tallawy HN, Farghly WM, Badry R, Rageh TA, Shehata GA, Hakeem MNA, El Hamed MA, Sayd MA, Hamed Y, Kandil MR (2014) Prevalence of dementia in Al-Quseir city, Red Sea Governorate, Egypt. Clin Interv Aging 9:9–14. https://doi.org/10.2147/CIA.S48325
3. Blackburn JA, Dulmus CN (2007) Handbook of gerontology: Evidence-based approaches to theory, practice, and policy. Wiley
4. Adib HM, Akbari H (2009) The severity of old age disability and its related factors
5. Esmaeili ED, Fakhari A, Naghili B, Khodamoradi F, Azizi H (2022) Case fatality and mortality rates, socio-demographic profile, and clinical features of COVID-19 in the elderly population: a population-based registry study in Iran. J Med Virol 94(5):2126–2132
6. Baldwin RC, Chiu E, Graham N, Katona C (2002) Guidelines on depression in older people: practising the evidence. CRC Press
7. Sarokhani D, Parvareh M, Dehkordi AH, Sayehmiri K, Moghimbeigi A (2018) Prevalence of depression among iranian elderly: systematic review and meta-analysis. Iran J Psychiatry 13(1):55
8. Golboni F, Mahmoodi H, Baghi V, Ghanei Gheshlagh R, Valiee S, Dalvand P, Kurdi A (2022) Prevalence of Depression among Iranian Elderly: A Systematic Review and Meta-analysis of Observational Studies. Novelty Clin Med 1(2):70–80
9. Fakhari A, Farahbakhsh M, Azizi H, Esmaeili ED, Mirzapour M, Rahimi VA, Hashemi L, Gaffarifam S (2020) Early marriage and negative life events affect on depression in young adults and adolescents. Arch Iranian Med 23(2):90–98
10. Kułak-Bejda A, Bejda G, Waszkiewicz N (2021) Mental disorders, cognitive impairment and the risk of suicide in older adults. Front Psychiatry 12:695286
11. Lapid MI, Rummans TA (2003) Evaluation and management of geriatric depression in primary care. In: *Mayo clinic proceedings: 2003*. Elsevier, pp 1423–1429

12. Kashfi S, Khani Jeihooni A, Farhadi S (2011) The relationship between social and demographic factors and prevalence of depression among over 60 years old individuals, Shiraz, Iran. Bimonthly J Hormozgan Univ Med Sci 14(4):319–325
13. Melzer D, McWilliams B, Brayne C (1999) Medical Research Council Cognitive Function and Ageing Study (MRC CFAS) and Resource Implications Study (RIS MRC CFAS). Profile of disability in elderly people: estimates from a longitudinal population study. BMJ 318:1108–1111
14. Sarokhani D, Parvareh M, Hasanpour Dehkordi A, Sayehmiri K, Moghimbeigi A (2018) Prevalence of Depression among Iranian Elderly: Systematic Review and M. Iran J Psychiatry 13(1):55–64
15. Mortazavi SS, Ardebili HE, Mohamad K, Beni RD (2011) Assessing the mental health status of elderly in Shahrekord and relationship with sociodemographic factors. Payesh (Health Monitor) 10(4):485–492
16. Djalalinia S, Modirian M, Sheidaei A, Yoosefi M, Zokaiee H, Damirchilu B, Mahmoudi Z, Mahmoudi N, Hajipour MJ, Peykari N (2017) Protocol design for large–scale cross–sectional studies of surveillance of risk factors of non–communicable diseases in Iran: STEPs 2016. Arch Iranian Med 20(9):608–616
17. Sadeghi-Bazargani H, Aboubakri O, Asghari-Jafarabadi M, Alizadeh-Aghdam M, Imani A, Tabrizi JS, Salari-Lak S, Farahbakhsh M (2015) Psychometric properties of the short and ultra-short versions of socioeconomic status assessment tool for health studies in Iran (SES-Iran). J Clin Res Govern 4(2):1–12
18. Amini H, Sharifi V, Asaadi S, Mohammadi MR, Kaviani H, Semnani Y, Shabani A, Shahrivar Z, Seddigh A, Jalali-Roodsari M (2008) Validity of the Iranian version of the structured clinical interview for DSM-IV (SCID-I) in the diagnosis of psychiatric disorders. Payesh (Health Monitor) 7(1):0
19. Bakhtiyari F, Foroughan M, Fakhrzadeh H, Nazari N, Najafi B, Alizadeh M, Arzaghi M, Sharifi F, Shoaee S, Mostafa Q (2014) Validation of the persian version of Abbreviated Mental Test (AMT) in elderly residents of Kahrizak charity foundation. Iranian J Diab Metab 13(6):487–494
20. Farahbakhsh M, Asgari MN, Aslrahimi V, et al. (2021). Socio-demographic status and 12 years trend of completed suicide in East Azerbaijan Province, Iran, during the period 2007–2018. Middle East Curr Psychiatry 28:32. https://doi.org/10.1186/s43045-021-00111-x
21. Azizi H, Fakhari A, Farahbakhsh M, Esmaeili ED, Mirzapour M (2021) Outcomes of community-based suicide prevention program in primary health care of Iran. Int J Ment Heal Syst 15(1):1–11
22. Majdi MR, Mobarhan MG, Salek M, Taghi M, Mokhber N (2011) Prevalence of depression in an elderly population: A population-based study in Iran. Iranian J Psych Behavior Sci 5(1):25–32
23. Sajadi H, Mohaqeqi Kamal H, Vameghi M, Forozan AS, Rafei H, Nosratabadi M (2013) Systematic review of prevalence and risk factors associated with depression and its treatment in Iranian elderly. Iranian J Ageing 7(4):7–15
24. McCombe G, Fogarty F, Swan D, Hannigan A, Fealy GM, Kyne L, Meagher D, Cullen W (2018) Identified mental disorders in older adults in primary care: A cross-sectional database study. Eur J Gen Pract 24(1):84–91
25. Babazadeh T, Sarkhoshi R, Bahadori F, Moradi F, Shariat F (2016) Prevalence of depression, anxiety and stress disorders in elderly people residing in Khoy, Iran (2014-2015). J Res Clin Med 4(2):122–128
26. Ghafari M, Sharifirad GR, Zanjani S, Hassanzadeh A (2012) Stress, anxiety and depression levels among elderly referrals to Tehran Elderly Club. Iranian J Ageing 7(2):53–59
27. Trollor JN, Anderson TM, Sachdev PS, Brodaty H, Andrews G (2007) Prevalence of mental disorders in the elderly: the Australian National Mental Health and Well-Being Survey. Am J Geriatr Psychiatry 15(6):455–466
28. Kessler RC, Birnbaum HG, Shahly V, Bromet E, Hwang I, McLaughlin KA, Sampson N, Andrade LH, De Girolamo G, Demyttenaere K (2010) Age differences in the prevalence and co-morbidity of DSM-IV major depressive episodes: results from the WHO World Mental Health Survey Initiative. Depress Anxiety 27(4):351–364
29. Andreas S, Schulz H, Volkert J, Dehoust M, Sehner S, Suling A, Ausín B, Canuto A, Crawford M, Da Ronch C (2017) Prevalence of mental disorders in elderly people: the European MentDis_ICF65+ study. Br J Psychiatry 210(2):125–131
30. Koster A, Bosma H, Kempen GI, Penninx BW, Beekman AT, Deeg DJ, van Eijk JTM (2006) Socioeconomic differences in incident depression in older adults: The role of psychosocial factors, physical health status, and behavioral factors. J Psychosom Res 61(5):619–627
31. Kessler RC, Petukhova M, Sampson NA, Zaslavsky AM, Wittchen HU (2012) Twelve-month and lifetime prevalence and lifetime morbid risk of anxiety and mood disorders in the United States. Int J Methods Psychiatr Res 21(3):169–184
32. Koenig HG, George LK, Peterson BL, Pieper CF (1997) Depression in medically ill hospitalized older adults: prevalence, characteristics, and course of symptoms according to six diagnostic. Am J Psychiatr 154(10):1376–1383
33. Shah D, Evans M, King D (2000) Prevalence of mental illness in a rehabilitation unit for older adults. Postgrad Med J 76(893):153–156
34. Reynolds K, Pietrzak RH, El-Gabalawy R, Mackenzie CS, Sareen J (2015) Prevalence of psychiatric disorders in US older adults: findings from a nationally representative survey. World Psychiatry 14(1):74–81
35. Skoog I (2011) Psychiatric disorders in the elderly. Can J Psychiatr 56(7):387–397
36. Bryant C, Jackson H, Ames D (2008) The prevalence of anxiety in older adults: methodological issues and a review of the literature. J Affect Disord 109(3):233–250
37. Volkert J, Schulz H, Härter M, Wlodarczyk O, Andreas S (2013) The prevalence of mental disorders in older people in Western countries–a meta-analysis. Ageing Res Rev 12(1):339–353

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