The epidemiology of suicide in the elderly population in Southern Iran, 2011–2016

Ali Mohammad Mokhtari[a], Sadaf Sahraian[b], Soheil Hassanipour[c,d], Ali Baseri[e], Alireza Mirahmadizadeh[f,*]

[a] *Student Research Committee, Shiraz University of Medical Sciences, Shiraz, Iran*
[b] *Division of Neuroradiology, The Russell H. Morgan Department of Radiology and Radiological Science, Johns Hopkins Medical Institutions, Baltimore, USA*
[c] *Gastrointestinal and Liver Diseases Research Center, Guilan University of Medical Sciences, Rasht, Iran*
[d] *GI Cancer Screening and Prevention Research Center, Guilan University of Medical Sciences, Rasht, Iran*
[e] *Shiraz University of Medical Sciences, Shiraz, Iran*
[f] *Non-Communicable Diseases Research Center, Shiraz University of Medical Sciences, Shiraz, Iran*

ARTICLE INFO

ABSTRACT

Background: The epidemiology of suicide within the elderly is unique to each cultural setting. In most countries, despite the higher rate of suicide attempts among adolescents and young people, the rate of suicide deaths in the elderly is higher than other age groups. The purpose of this study was to investigate the suicide rates among persons 65 years and above in Fars, Iran.

Methods: In this cross-sectional study, we investigated suicide cases (65 years and older) during 2011–2016 in Fars, Iran. The data were collected from the Mental Health and Suicide Surveillance Systems of Fars province, using filled forms that included suicide and demographic information. After eliminating duplications, suicidal rates were calculated.

Results: Of 299 suicide attempts, 64.9% were men, and 69.6% were urban residents. The rate of suicide attempts and deaths were 21.47 and 4.52 per 100,000 population, respectively; and the case fatality rate (CFR) of suicide was 21.07% during the study period. The rate of suicide attempts and deaths in this population showed an increase during the study years.

Conclusions: Considering the increasing trend of suicide rates in the elderly in Fars, Iran, measures should be taken to facilitate the access of this group to the mental health care system and psychological counseling.

1. Background

Suicide is one of the most critical public health concerns for the elderly (Conejero et al., 2018; Conwell and Thompson, 2008; Heisel et al., 2010). The epidemiology of suicide, either regarding the rates or the methods, is unique for any cultural context in this group (Fassberg et al., 2019). Although in most countries suicide attempts are more frequent among adolescents and young people, suicide mortality in the elderly is higher than any other age groups (Conwell and Thompson, 2008; McIntosh, 1995). In all Asian countries, death because of suicide was among the top 15 leading causes of death (Tandon and Nathani, 2018). Available data suggest that for each suicide mortality in the general population, 8–40 suicide attempts occur. In the adult group, this ratio is as high as 1 in 200. However, among the elderly, a large proportion of suicide attempts cause death (one out of two to four

attempts) (Conwell et al., 2002; Sturgiss, 2009).

Developing strategies for suicide prevention in the elderly places on the definition of risk factors and protective factors of suicide in this group. Old people are unwilling to talk about their emotional problems and are less likely to report depression and suicidal thoughts (Arafat and Khan, 2019; Conwell et al., 2002). As a result, less than half of the elderly who have mood disorders, are diagnosed with depression in primary care centers, and very few follow the treatment of their disorder. Among those who seek the treatment many receive insufficient dose and duration of medication (Conwell and Thompson, 2008; Hassanipour et al., 2019; Veisani et al., 2018).

Suicide rates are affected by a wide range of cultural, biological and psychological factors (Jiang et al., 2018; Kettl, 1998; Malhi et al., 2018). For some nations, the highest rate of suicide is reported in young people (Mokhtari et al., 2019) and for some other in the elderly. In the

Iranian population, suicide rates within the age groups are ambiguous yet; however, evidences suggest that there is the highest rate of suicide among people aged 15–65 (Haghparast-Bidgoli et al., 2018; Mirahmadizadeh et al., 2019).

Hence, the literature shows that specific clinical (dementia, cognitive impairment, and physical illness) or sociodemographic (social isolation, marital status, bereavement) risk factors may be related with suicidal behavior in older adults (Van Orden and Conwell, 2016). Furthermore, they may have implications for explaining and understanding the etiology of suicide in old age. In addition, various theories have been specifically designed to explain suicide in the elderly; these focus primarily on the following aspects of suicide: psychological, especially emotion and cognition, developmental and longevity, demographic and epidemiological, and neurobiological (Chan et al., 2007; Richard-Devantoy et al., 2016; Stanley et al., 2016).

Suicide among the elderly is relatively less studied than that in adolescents and youths; therefore, in this study, we sought to investigate suicide attempts in people 65 years and older in Fars, Iran between 2011–2016.

2. Materials and method

In this cross-sectional study, we investigated all suicide cases in people aged 65 years and above between 2011 and 2016 in Fars, Iran. Fars province is located in Southern Iran; with an area of 122,608 square kilometers, it is the fourth largest and fourth most populated province of Iran with a population of 4,851,274 in 2016 (according to the population census of the Statistical Center of Iran) (Wikipedia, 2018). The data were collected by reviewing hand-filled reports from the Mental Health and Suicide Surveillance Systems, named as Fars Suicide Surveillance System (FSSS).

The reports in the FSSS included data such as demographic information, medical and psychological histories, former suicide attempts, and data about the cause, method, and outcome of the suicide. To eliminate duplicate and to find missing cases, data from the FSSS were rechecked with data from hospitals, emergency departments, private clinics, medical poisoning cares, psychiatric clinics, urban and rural health centers, forensics, and death registration centers.

2.1. Ethical consideration

This study was confirmed by the Ethics Committee of Shiraz University of Medical Sciences (Ethics code: IR.SUMS.REC. 1395. S950). Ultimately, 299 suicide cases aged 65 years and above were enrolled in this 6-year study.

2.2. Statistical analysis

To calculate suicide attempts and deaths rates, population statistics were obtained from national censuses of the Statistical Center of Iran in 2006 and 2016, and the National Organization for Civil Registration. The Cochran–Armitage test trend analysis was used to examine attempted and completed suicide rate trend. The sensitivity analysis was done to check the differences in age and sex for variables with more than 10% of missing data. Analyses were performed using SPSS (v.24, Chicago, IL). A p-value of < 0.05 was considered significant.

3. Results

In this study, data of 299 suicide cases were collected in people aged 65 and above. The mean age of subjects was 73.11 ± 6.43 (mean $\pm$ standard deviation) years. 69.6% of those who committed suicide were urban residents, and 64.9% were male. The suicide death rates were also higher in men and rural residents (Table 1).

In a large number of cases (37.1%) the precise cause of suicide was not mentioned in the reports. Among the others, family conflicts were the most frequent cause of suicide attempts (29.2%). 5.7% had at least one physical disease, and 8.4% had a history of at least one psychiatric disorder. Besides, our results showed that 57.7% suicides were committed using drug overdose (Table 2).

During our study period, the rates of suicide attempts and deaths were fluctuating; however, comparing the first year and the last year of the study indicated an increase in the frequency of both suicide attempts and deaths. Based on our findings, the rates of suicide attempts within the years 2011–2016 were 21.87, 17.12, 19.27, 17.42, 21.05, and 31.23 in 100,000 population, respectively (p-value for trend: 0.149). Furthermore, the deaths rates from suicide during these 6 years were 4.18, 3.60, 6.13, 2.12, 5.36, and 5.60 per 100,000 population, respectively (P-value for trend: 0.142). The general and segregated data on attempt rates, death rates, and case fatality rates (CFR) are presented in Table 3. Of all 299 attempts, 63 deaths were reported, and the CFR was 21.07%. Trend analysis of the rate of suicide attempt and fatal suicide in Fars province is presented in Fig. 1.

In the present study, suicide methods which have the highest CFR included firearms (100%), falling (100%), hanging (94.40%), and self-immolation (85.70%). Using methods with higher CFR was more prevalent in men compared to the women (Table 4).

4. Discussion

According to our results, the rates of suicide deaths were higher in men and rural residents. Family conflicts were the most frequent cause of suicide, and drug overdose was the most commonly used method. The incidence of suicide attempts and deaths increased during the study years, and the total CFR was 21.07%.

Various factors including old age, male gender and elder abuse are two common risk factors for committing suicide (Arab-Zozani et al., 2018; Pearson and Conwell, 1995). In the present study, suicide deaths rates were higher in men as well as for those living in the rural area, which seems necessary to concentrate these vulnerable people. According to another suicide study conducted in western Iran, more than three-quarters of suicide attempts occurred among rural inhabitants (Veisani et al., 2016). Surveying suicide in Australia showed that in a 10-year period between 2004 and 2013, men had a much higher suicide rate than women, and suicide rate among men over the age of 85 was the highest of all during the study years. Furthermore, suicide rates in men was higher in aged 70–79 than aged 55–65 (Burns, 2016). According study conducted by Snowdon et al. male to female ratios of suicide rates are higher in Western countries than East Asia (Snowdon et al., 2018).

Based on the findings of this study, family conflicts were the most frequent cause of suicide attempts in the subjects. Aligned with our results, in a systematic review that investigated social factors related to suicide based on the studies conducted in different parts of Iran, family conflicts (32%), marital problems (26%), economic pressures (12%), and educational failures (5%) were the most common risk factors for suicide attempts (Nazarzadeh et al., 2013). In our study, for a significant proportion of the elderly, the cause of their suicide was not explicitly stated in the reports, which is consistent with previous findings claiming older people are not willing to talk about their problems and suicidal ideas (Conwell et al., 2002).

Although hanging and absorbing toxic substances are the most commonly used suicide methods worldwide, the prevalence of the methods is different among various countries (Koo et al., 2017). A study in the United States showed that 72% of suicides in people over the age of 65 were committed using firearms (Conwell and Thompson, 2008). In Iran, a suicide survey during 2001–2007, collected suicide information from the health system of 41 medical universities. In most suicide cases over 50 years (62.7%) drug overdose was reported as the most commonly utilized method (Saberi-Zafaghandi et al., 2012; Yasuda and Kobayashi, 2019). Like other Iranian studies, the most frequently used suicide method in our study group was drug overdose;

Table 1

The frequency of demographic variables[*] in suicide cases (attempts and deaths) among people 65 years and older in Fars, Iran, 2011–2016.

Variables	65 years and older population	Suicide attempts			Suicide deaths		
		Number (%)	Rate in 100,000 population	P value	Number (%)	Rate in 100,000 population	P value
Sex				0.868			0.690
Women	700088	105 (35.1)	14.99		16 (25.4)	2.28	
Men	692090	194 (64.9)	28.03		47 (74.6)	6.79	
Residence				0.990			0.980
Urban	961107	197 (69.6)	20.49		36 (64.3)	3.74	
Rural	431071	86 (30.4)	19.95		20 (35.7)	4.63	

  * Excluding missing data.

Table 2

The frequency of characteristics of attempted suicides among people 65 years and older in Fars, Iran, 2011–2016.

| Variables		Number	Percent	Valid percent
Cause of suicide[*]	Familial conflicts	26	8.7	29.2
	Addiction	7	2.3	7.9
	Economic problems	5	1.7	5.6
	Mental disorders	13	4.4	14.6
	Mourning	2	0.7	2.2
	Others	33	11.0	37.1
	I do not want to say	3	1.0	3.4
	Unknown or missing	210	70.2	–
Suicide attempt history	Yes	17	5.7	6.0
	No	268	89.6	94.0
	Missing or Unknown	14	4.7	–
Family history of suicide[*]	Yes	3	1.0	1.2
	No	249	83.3	98.8
	Missing or Unknown	47	15.7	–
History of any somatic disease in the individual[*]	Yes	17	5.7	6.7
	No	236	78.9	93.3
	Missing or Unknown	46	15.4	–
History of any psychiatric disorder in the individual[*]	Yes	25	8.4	9.9
	No	228	76.3	90.1
	Missing or Unknown	46	15.4	–
Suicide's method[*]	Medication overdose	120	40.1	57.7
	Opioid consumption	19	6.4	9.1
	Hanging	18	6.0	8.7
	Toxic agent consumption	23	7.7	11.1
	Detergent consumption	5	1.7	2.4
	Firearm	2	0.7	0.9
	Cold weapon	5	1.7	2.4
	Self-immolation	7	2.3	3.4
	Fall	2	0.7	0.9
	Others	7	2.3	3.4
	Unknown or missing	91	30.4	–
Suicide's outcome (based on the last data recorded)	Recovered	63	21.1	22.5
	Hospitalized or under medication	202	67.6	72.1
	Death	15	5.0	5.4
	Unknown or missing	19	6.3	–

  * Sensitivity analysis was done and there was no difference between distributions of sex and age in missing and non-missing data.

Table 3

The frequency of suicide attempts and deaths (per 100,000) and the suicide CFR (%) among people 65 years and older by years in Fars, Iran.2011–2016.

Year	65 years and older population	Suicide attempts		Suicide deaths		Suicide CFR[*] (%)
		Number	Rate in 100,000 population	Number	Rate in 100,000 population	
2011	214887	47	21.87	9	4.18	19.14
2012	221852	38	17.12	8	3.60	21.05
2013	228276	44	19.27	14	6.13	31.81
2014	235241	41	17.42	5	2.12	12.19
2015	242207	51	21.05	13	5.36	25.49
2016	249714	78	31.23	14	5.60	17.94
Total	1392177	299	21.47	63	4.52	21.07
Trend for P value		0.149		0.142		0.677

  * CFR, Case Fatality Rate.
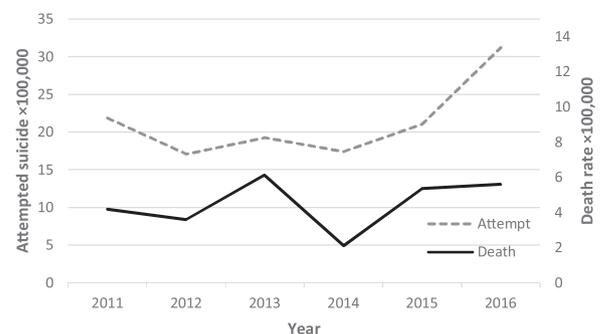
Fig. 1. Trend of suicide attempt and death rates among eldery in southern Iran, 2011- 2016.

Table 4
The frequency of use and the CFR (%) of different suicide methods in people 65 years and older in Fars, Iran (2011–2016).

Suicide's method	Total number	Used by men		Used by women		Suicide CFR* (%)
		Number	Percent	Number	Percent	
Medication overdose	120	76	55.1	44	62.9	3.33
Opioid consumption	23	17	12.3	6	8.6	21.73
Hanging	19	13	9.4	6	8.6	0
Toxic agent consumption	18	15	10.9	3	4.3	94.44
Detergent consumption	7	3	2.2	4	5.7	85.71
Firearm	5	3	2.2	2	2.9	0
Cold weapon	5	5	3.6	0	0	40.0
Self-immolation	2	2	1.4	0	0	100
Fall	2	1	0.7	1	1.4	100
Others	7	3	2.2	4	5.7	42.85

* CFR, Case Fatality Rate.

however, our results differ from some studies in other countries. One of the explanations for this difference is the issue of having access to suicide methods. Thus, one of the effective plans to prevent suicide is limiting accessibility of the mentioned means.

In recent years, the issue of suicide mortality has shifted from Western Europe to Eastern Europe and now is moving to Asia (Tandon and Nathani, 2018). According to a study conducted in China, the mortality rate of suicide for people 65 years and above was 34.5 per 100,000 people (Zhong et al., 2016). In the present study, the attempt and death rates of suicide during the study years were 21.47 and 4.25 per 100,000 population, respectively, which is significantly lower than that of the Chinese study, and is consistent with previous results noting that the eastern Mediterranean region, including Iran, has the lowest suicide rate of the elderly among the various WHO countries (Hassanian-Moghaddam and Zamani, 2017).

Based on the results of a review article investigating suicide studies from 1997 to 2016, in recent decades Iran had the highest increase in the rate of suicide deaths in the Eastern Mediterranean Region (EMRO) and Islamic countries (Hassanian-Moghaddam and Zamani, 2017). Like previous studies in Iran, we observed an increase in the incidence of suicide attempts and deaths in people aged 65 years and older in Fars, Iran, during the study years. A suicide study in Ilam, Iran between 2010 and 2014 also indicated an increase in the rate of suicide attempts; however, they reported no significant change in the mortality rate of suicide (Veisani et al., 2016). In our study, the CFR of suicide was 21.07%, which is distinct from another suicide study that reported the CFR of 13.4% in cases over 50 years of age in Iran (Saberi-Zafaghandi et al., 2012). This difference could be explained considering that the mentioned study used a younger group as the elderly (50+) in comparison to our study (65 years and older), knowing that the CFR of suicide is higher in older ages (Conwell and Thompson, 2008).

The present study had several strengths, including providing novel information, using several sources of data, targeting a sensitive group, a large geographic location, and a long-time interval.

This study has some limitations, including missing data on suicide causes and methods. For a large number of cases, the utilized method was not explicitly stated in the questionnaire. In addition to the less willingness of the elderly to speak about cause and method of suicide, these variables aren't matched for this age group in questionnaire. It should be considered in future studies to adjust the questionnaires regarding this age group. However, based on the sensitivity analysis, there was no difference between distributions of age and sex in missing and non-missing data.

Factors such as the availability of the methods, cultural acceptance, age, and gender have a particular impact on adopting different suicide

methods (Koo et al., 2019). Since the elderly are more likely to live alone, there is a higher risk of mortality if they commit suicide. Given that the most commonly used method in the elderly was drug overdose, we suggest developing some strategies to limit the access of this group to high-risk medications, and to raise their awareness on other ways of responding to life crises.

5. Conclusion

In the present study, the CFR of suicide was 21.07% in people aged 65 years and older in Fars, Iran, and the rate of suicide attempts and deaths showed an increase during the study years. Suicide deaths rates were higher in men and rural residents; family conflicts were the most frequent cause, and drug overdose was the most commonly used method of suicide. Considering the increasing suicide rates in the elderly in Fars, Iran, we recommend developing some strategies to limit the access of this population to high-risk medicines, and to enhance the availability of health care centers and psychological counseling. Mood disorders in this population should be diagnosed and treated as soon as possible; in general, we suggest approaching wiser to the prevention and treatment of suicide in the elderly.

6. Recommendation for future research

Improvement in the detection, treatment, and management of mood disorders should still be the primary focus of suicide prevention. In addition, new programs should involve relatives, because they are an important part of the lives of many elderly individuals. Moreover, family members, but also friends, formal and informal caregivers, who are in regular contact with distressed older adults, may have valuable information regarding life context. Research on suicide prevention and intervention in nursing homes patients is also a neglected area of study. Gatekeeper training, physician education, means restriction, and codes of conduct for media coverage are strategies that still need to be explored.

References

Arab-Zozani, M., Mostafazadeh, N., Arab-Zozani, Z., Ghoddoosi-Nejad, D., Hassanipour, S., Soares, J.J.F., 2018. The prevalence of elder abuse and neglect in Iran: a systematic review and meta-analysis. J. Elder Abuse Negl. 30, 408–423.

Arafat, S.M.Y., Khan, S.T., 2019. Suicide prevention in Bangladesh: only decriminalization would not be beneficial in an expected fashion. Asian J. Psychiatr. 42, 22–23.

Burns, R.A., 2016. Sex and age trends in Australia's suicide rate over the last decade: something is still seriously wrong with men in middle and late life. Psychiatry Res. 245, 224–229.

Chan, J., Draper, B., Banerjee, S., 2007. Deliberate self-harm in older adults: a review of the literature from 1995 to 2004. Int. J. Geriatr. Psychiatry 22, 720–732.

Conejero, I., Navucet, S., Keller, J., Olie, E., Courtet, P., Gabelle, A., 2018. A complex relationship between suicide, dementia, and amyloid: a narrative review. Front. Neurosci. 12, 371.

Conwell, Y., Duberstein, P.R., Caine, E.D., 2002. Risk factors for suicide in later life. Biol. Psychiatry 52, 193–204.

Conwell, Y., Thompson, C., 2008. Suicidal behavior in elders. Psychiatr. Clin. North Am. 31, 333–356.

Fassberg, M.M., Vanaelst, B., Jonson, M., Sterner, T.R., Ahlner, F., Wetterberg, H., Ryden, L., Kern, S., Sigstrom, R., Zettergren, A., Skoog, I., Waern, M., 2019. Epidemiology of suicidal feelings in an ageing Swedish population: from old to very old age in the Gothenburg H70 Birth Cohort Studies. Epidemiol. Psychiatr. Sci. 1–14.

Haghparast-Bidgoli, H., Rinaldi, G., Shahnavazi, H., Bouraghi, H., Kiadaliri, A.A., 2018. Socio-demographic and economics factors associated with suicide mortality in Iran,

2001-2010: application of a decomposition model. Int. J. Equity Health 17, 77.

Hassanian-Moghaddam, H., Zamani, N., 2017. Suicide in Iran: the facts and the figures from nationwide reports. Iran. J. Psychiatry 12, 73–77.

Hassanipour, S., Kazemi, H., Ghayour, A.R., Kazemi-Najafabadi, A., Nikbakht, H.A., Ghaem, H., 2019. Epidemiological trend of suicide in center of Iran from 2012 to 2016. Clin. Epidemiol. Glob. Health.

Heisel, M.J., Duberstein, P.R., Lyness, J.M., Feldman, M.D., 2010. Screening for suicide ideation among older primary care patients. J. Am. Board Fam. Med. 23, 260–269.

Jiang, H., Niu, L., Hahne, J., Hu, M., Fang, J., Shen, M., Xiao, S., 2018. Changing of suicide rates in China, 2002-2015. J. Affect. Disord. 240, 165–170.

Kettl, P., 1998. Alaska native suicide: lessons for elder suicide. Int. Psychogeriatr. 10, 205–211.

Koo, Y.W., Kolves, K., de Leo, D., 2017. Profiles by suicide methods: an analysis of older adults. Aging Ment. Health 1–7.

Koo, Y.W., Kolves, K., de Leo, D., 2019. Profiles by suicide methods: an analysis of older adults. Aging Ment. Health 23, 385–391.

Malhi, G.S., Das, P., Outhred, T., Irwin, L., Morris, G., Hamilton, A., Lynch, K., Mannie, Z., 2018. Understanding suicide: focusing on its mechanisms through a lithium lens. J. Affect. Disord. 241, 338–347.

McIntosh, J.L., 1995. Suicide prevention in the elderly (age 65–99). Suicide Life. Behav. 25, 180–192.

Mirahmadizadeh, A., Rezaei, F., Mokhtari, A.M., Gholamzadeh, S., Baseri, A., 2019. Epidemiology of suicide attempts and deaths: a population-based study in Fars, Iran (2011-16). J. Public Health (Oxf. Engl.).

Mokhtari, A.M., Gholamzadeh, S., Salari, A., Hassanipour, S., Mirahmadizadeh, A., 2019. Epidemiology of suicide in 10–19 years old in southern Iran, 2011–2016: a population-based study on 6720 cases. J. Forensic Legal Med.

Nazarzadeh, M., Bidel, Z., Ayubi, E., Asadollahi, K., Carson, K.V., Sayehmiri, K., 2013. Determination of the social related factors of suicide in Iran: a systematic review and meta-analysis. BMC Public Health 13, 4.

Pearson, J.L., Conwell, Y., 1995. Suicide in late life: challenges and opportunities for research. Int. Psychogeriatr. 7, 131–136.

Richard-Devantoy, S., Turecki, G., Jollant, F., 2016. Neurobiology of elderly suicide. Arch. Suicide Res. 20, 291–313.

Saberi-Zafaghandi, M.B., Hajebi, A., Eskandarieh, S., Ahmadzad-Asl, M., 2012. Epidemiology of suicide and attempted suicide derived from the health system database in the Islamic Republic of Iran: 2001-2007. East. Mediterr. Health J. 18, 836–841.

Snowdon, J., Chen, Y.-Y., Zhong, B., Yamauchi, T., 2018. A longitudinal comparison of age patterns and rates of suicide in Hong Kong, Taiwan and Japan and two Western countries. Asian J. Psychiatr. 31, 15–20.

Stanley, I.H., Hom, M.A., Rogers, M.L., Hagan, C.R., Joiner Jr, T.E., 2016. Understanding suicide among older adults: a review of psychological and sociological theories of suicide. Aging Ment. Health 20, 113–122.

Sturgiss, E.A., 2009. Suicide in people over 65 years of age in the Australian Capital Territory. J. Forensic Leg. Med. 16, 338–339.

Tandon, R., Nathani, M.K., 2018. Increasing suicide rates across Asia – a public health crisis. Asian J. Psychiatr. 36, A2–A4.

Van Orden, K.A., Conwell, Y., 2016. Issues in research on aging and suicide. Aging Ment. Health 20, 240–251.

Veisani, Y., Delpisheh, A., Sayehmiri, K., Moradi, G., Hassanzadeh, J., 2016. Suicide attempts in Ilam Province, West of Iran, 2010-2014: a time trend study. J. Res. Health Sci. 16, 64–67.

Veisani, Y., Mohamadian, F., Delpisheh, A., Khazaei, S., 2018. Socio-demographic factors associated with choosing violent methods of suicide, 2011-2016, Ilam province. Asian J. Psychiatr. 35, 72–75.

Wikipedia, 2018. Fars Province. https://en.wikipedia.org/wiki/Fars_Province.

Yasuda, M., Kobayashi, T., 2019. Suicide attempts by drug overdose at Jichi Medical University Hospital Emergency Centre: a study of patient characteristics and quantity of drug overdose. Asian J. Psychiatr. 41, 34–37.

Zhong, B.L., Chiu, H.F., Conwell, Y., 2016. Rates and characteristics of elderly suicide in China, 2013-14. J. Affect. Disord. 206, 273–279.