Bulletin of Emergency And Trauma

Self-Immolation in Iran: Systematic Review and Meta-Analysis

Mohammad Saadati¹, Saber Azami-Aghdash², Mahdieh Heydari³, Naser Derakhshani⁴, Ramin Rezapour⁵*

¹Road Traffic Injury Research Center, Tabriz University of Medical Sciences, Tabriz, Iran
²Tabriz Health Services Management Research Center, Health Management and Safety Promotion Research Institute, Tabriz University of Medical Sciences, Tabriz, Iran
³Department of Health Management and Economics, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran
⁴Health Management and Economics Research Center, Iran University of Medical Sciences, Tehran, Iran
⁵Iranian Center of Excellence in Health Management, School of Management and Medical Informatics, Tabriz University of Medical Sciences, Tabriz, Iran

*Corresponding author: Ramin Rezapour
Address: Iranian Center of Excellence in Health Management, School of Management and Medical Informatics, Tabriz University of Medical Sciences, P. O. Box: 14496-16535, Tabriz, Iran. **Tel/Fax:** +98-21-88610122
e-mail: rezapour2012@yahoo.com

ABSTRACT

Objective: To perform a systematic review and meta-analysis of self-immolation epidemiology and characteristics in Iran.
Methods: This was a systematic review and meta-analysis study. PubMed, Scopus, Web of science and Science Direct were searched for English literature and SID and Magiran for Persian in the time period of 2000 to 2016. The retrieved studies were screened and reviewed then quality assessed. Random Effect model was applied for meta-analysis. The qualitative data were analyzed by content analysis method.
Results: After literature screening, 39 studies included in the analysis. Women were subject to self-immolation more than men. The rate of self-immolation estimated to be 4.5 cases in every 100,000 populations and it was the reason of 16% of hospitalized burns. The average length of hospital stay calculated to be 12.24 (95% CI: 8.85-15.59) days. The total burnt surface area was 65.3% (95% CI: 56.71-73.89). Death due to self-immolation was 62.1%. The major risk factors of self-immolation were having mental health issues, family problems and characteristics and problems in relation/communication with spouses.
Conclusion: Despite the low rate of self-immolation in Iran, it comprises one sixth of the hospitalized burns. The mortality rate of self-immolation also is high and this highlights the importance of providing special care. Psychological consultations and mental health screening in the primary health care would help to prevent the self-immolation.

Keywords: Self-immolation; Iran; Risk factor; Systematic review.

Introduction

Suicide is one of the big challenges of the most countries and the 15th cause of death in the world by 800,000 deaths annually [1]. It is the third cause of death among the 15 to 44 years old population in the world and the sixth cause of death among 15-24 years' population of the United States [2]. According to the World Health Organization (WHO) (2014) more than 80% of the suicides occur in low-and-middle-income countries (LMICs) [3]. There are plenty of ways to suicide and it is chosen according to the cultural characteristics of the community [2, 4].

Self-immolation as a way of suicide is one of the most violent and irritating ways. Although the rate of self-immolation is low globally, but its death rate is high- about 60%. There is a consistent gap between the high-income countries (HICs) and the LMICs so that in the HICs only 0.6 to 1 percent of the suicides are self-immolation while it comprises more than 40% of the suicides in LMICs [4-8]. Iran is reported as one of the countries with high prevalence of self-immolation [9]. In fact, some regions of it have the highest rate of the self-immolation in the world (22.4 cases in every 100,000 population each year) [10-12]. Suicides comprise 1.3 to 9.5 percent of the hospital inpatient admissions of which 25-71% is the self-immolations [4, 12]. In the HICs it is more prevalent in men [13] but in countries such as Iran, Afghanistan, India, and Sri Lanka it is more prevalent in young adults[14-17], women, people with hard economic experiences, and people with lower education [13, 18, 19].

Recent researches in Iran had introduced the adjustment disorders as the most predisposing psychological factors of self-immolation [4, 14, 20]. Yet studies conducted in other countries reported depression disorder, insanity, alcohol, and drug addiction as the common mental factors of self-immolation [13, 21]. Although the overall rate of suicide is low in Iran, the proportion and fatality of self-immolation makes it a social and health challenge [2]. Thus it is needed to be investigated by public health experts. The first step in this regard, like any other issues, is having valid evidence on severity and the causes. One useful source of such evidence is the research articles. So this study tried to provide a comprehensive picture of self-immolation and its risk factors in Iran by systematic review and meta-analysis.

Materials and Methods

This was a systematic review and meta-analysis conducted in 2017 using MOOSE (meta-analysis of observational studies in epidemiology) guideline. The guideline proposes a checklist including items on reporting of systematic reviews and meta-analysis of observational studies in epidemiology and health research [22].

Literature Search Strategy

We have searched studies on self-immolation in Iranian people. English and Persian language literature were searched between 2000 and 2016. International bibliographic databases including PubMed, Scopus, Web of science, Science Direct and Google Scholar and Iranian databases SID and Magiran were used for literature search. Medical subject heading (MeSH) terms in combination with keywords ("self-burning, self-immolation, suicide, burn, self-inflicted and Iran") used in search with 'OR' and 'AND' logical operations. The Persian equivalents of the key words were used in Iranian databases. Moreover, reference list of the relevant articles checked for possible additional records. To identify the relevant grey literature, the databases of European Association for Grey Literature Exploitation (EAGLE), the Health Care Management Information Consortium (HMIC) and IranDoc were searched.

Eligibility Criteria

Quality of identified studies was assessed using the STROBE checklist (Strengthening the Reporting of Observational studies in Epidemiology) independently by two authors (MH and RR) and in case of disagreements another author (MS) made the final decision. The checklist was chosen because it is designed specifically for the observational studies and the Persian translation of it was validated [23] and contains 22 items [24]. Papers that could not get the 50% of the total score of the checklist, excluded from the study. All the articles with cross-sectional, case-control and cohort design, conducted in Iran and reporting the population and self-immolated patient's characteristics were included in the study. Case reports, editorials, educational articles, and papers with no full text available such as conference abstracts excluded. In case of publishing duplication, such as publishing similar study in both English and Persian journals, we included English language article. Also, study with large number of case were included, in case of data duplication.

Data Extraction and Outcomes

A data extraction form was developed in MS Excel. The extracted data contained the first author last name, year of publication, city where study was conducted, study design, study period, data source, study setting, sample size, mean and standard deviation (SD) age of the subjects, gender distribution, marital status, mean and standard deviation (SD) of burnt surface area, incidence of self-immolation, death rate of self-immolation, average hospital length of stay (LOS) and the risk factors of self-immolation. Data from 5 studies extracted as pilot. Then the form revised and improved. Extracted data was reviewed independently by two authors (RR and ND). Disagreements were resolved by consensus.

Data Synthesis and Analysis

Meta-analysis was used to calculate the mean and SD of burnt surface area of the body, incidence of self-immolation, death rate of self-immolation, and the average hospital length of stay. Random Effect model was used for combining the results of the included studies considering both within and between-study variation. Forest plots were used to report the results in which the size of the squares shows the effect size and the lines beside it shows the confidence interval. To assess the heterogeneity of the studies the Q statistics and the I^2 were used in which an I^2 value bigger than 50% was considered as moderate and high heterogeneity. The potential sources of between-study heterogeneity were investigated by performing subgroup analysis. The included studies were categorized in two groups: hospital-based and population-based studies. Moreover, the population-based studies were categorized into two groups: metropolitans and small towns. All the analysis was applied by CMA 2 (Comprehensive Meta-Analysis) software.

The content analysis method was used for analysis of the qualitative data about the influencing factors on self-immolation. It is useful in analysis of text data and in this method, the themes in the text are identified, analyzed and reported [25, 26]. Coding was done by two researchers independently (MS and SA). The coding included these steps: familiarizing with text data, identifying the primary codes, identifying the themes by categorizing the relevant codes into groups, revising the themes, naming and defining the themes, assuring the reliability of the codes and themes by assessing the agreement between the two coders, resolving the disagreements by discussion.

Results

Of the total 389 retrieved studies 263 were duplicates, 60 were excluded in title and abstract screening, and 27 were excluded due to lack of eligibility after full-texts were reviewed. (Figure 1).

Finally, 39 eligible articles were included in the qualitative synthesis and 33 in meta-analysis comprising studies on self-immolation in 16 provinces of 31 in Iran. Most of the studies were from Kermanshah and Tehran and Fars provinces, respectively. Included studies characteristics are summarized in supplementary online material.

The mean age of the self-immolated people in Iran was 27.18±10.86. Women were more attempted to self-immolate (male to female ration: 3:31). Because of high heterogeneity of the studies, the Random Effect model was applied. The incidence rate of self-immolation, according to hospital-based/facility-based data, was 16.6% in metropolitans and 15.7% in towns (Figure 2). The incidence of self-immolation, based on population-based data was 4.5 (CI: 2-6) in every 100,000 populations. Towns had a higher incidence rate (7 in every 100,000 population) (Figure 3). Total burnt surface area (TBSA) was calculated to be 65.3% (56.71% - 73.89%). Since only 12 studies reported data on TBSA, the meta-analysis was limited to these studies only (Figure 4). The mortality rate due to self-immolation among hospitalized patients was estimated to be 62.1% (58.2-65.8%) (Figure 5). The mean hospital length of stay (LOS)
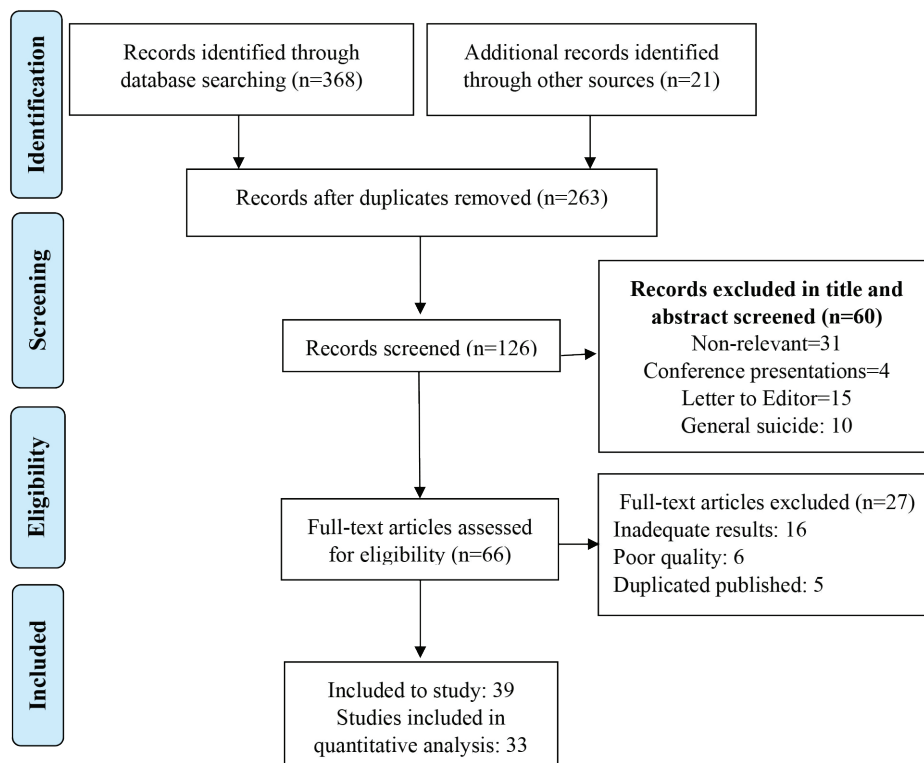
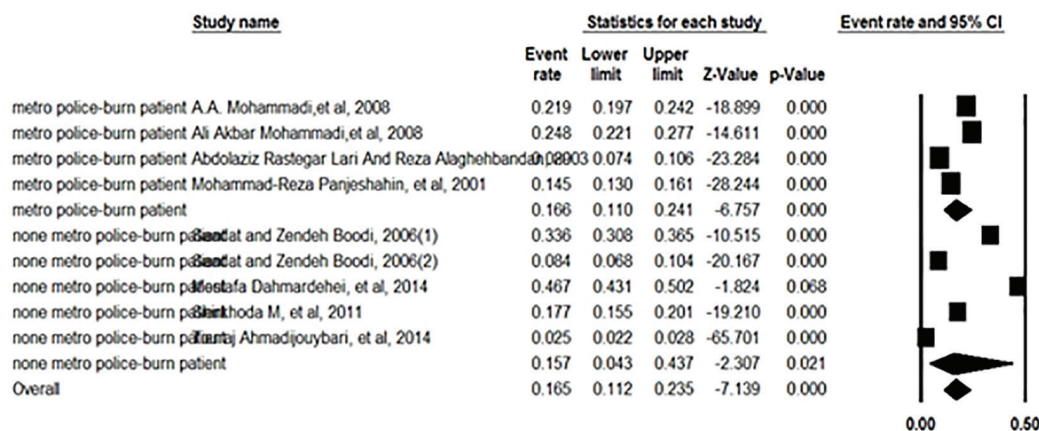**Fig. 1.** Flow diagram of the articles screening.

Study name		Statistics for each study					Event rate and 95% CI
	Event rate	Lower limit	Upper limit	Z-Value	p-Value		
metro police-burn patient A.A. Mohammadi,et al, 2008	0.219	0.197	0.242	-18.899	0.000		
metro police-burn patient Ali Akbar Mohammadi,et al, 2008	0.248	0.221	0.277	-14.611	0.000		
metro police-burn patient Abdolaziz Rastegar Lari And Reza Alaghehbanda	0.0903	0.074	0.106	-23.284	0.000		
metro police-burn patient Mohammad-Reza Panjeshahin, et al, 2001	0.145	0.130	0.161	-28.244	0.000		
metro police-burn patient	0.166	0.110	0.241	-6.757	0.000		
none metro police-burn patient Saadat and Zendeh Boodi, 2006(1)	0.336	0.308	0.365	-10.515	0.000		
none metro police-burn patient Saadat and Zendeh Boodi, 2006(2)	0.084	0.068	0.104	-20.167	0.000		
none metro police-burn patient Mostafa Dahmardehei, et al, 2014	0.467	0.431	0.502	-1.824	0.068		
none metro police-burn patient Shirkhoda M, et al, 2011	0.177	0.155	0.201	-19.210	0.000		
none metro police-burn patient Touraj Ahmadijouybari, et al, 2014	0.025	0.022	0.028	-65.701	0.000		
none metro police-burn patient	0.157	0.043	0.437	-2.307	0.021		
Overall	0.165	0.112	0.235	-7.139	0.000		

Fig. 2. Incidence Rate of self-immolation in Iran, according to hospital-based studies in metropolitans and towns, using Random Effect model

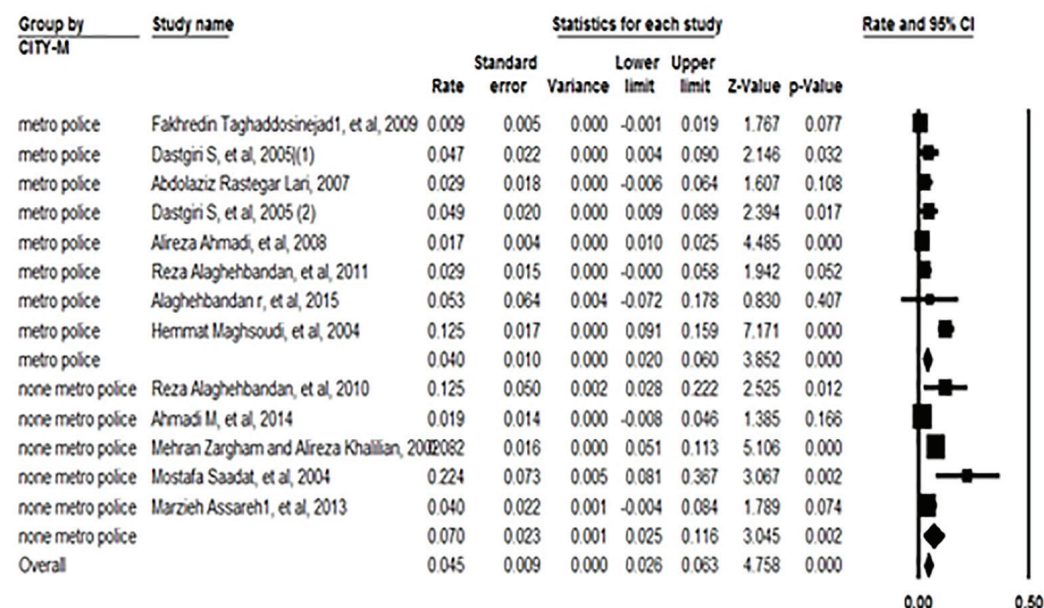| Group by CITY-M	Study name		Statistics for each study							Rate and 95% CI
		Rate	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value		
metro police	Fakhredin Taghaddosinejad1, et al, 2009	0.009	0.005	0.000	-0.001	0.019	1.767	0.077		
metro police	Dastgiri S, et al, 2005](1)	0.047	0.022	0.000	0.004	0.090	2.146	0.032		
metro police	Abdolaziz Rastegar Lari, 2007	0.029	0.018	0.000	-0.006	0.064	1.607	0.108		
metro police	Dastgiri S, et al, 2005 (2)	0.049	0.020	0.000	0.009	0.089	2.394	0.017		
metro police	Alireza Ahmadi, et al, 2008	0.017	0.004	0.000	0.010	0.025	4.485	0.000		
metro police	Reza Alaghehbandan, et al, 2011	0.029	0.015	0.000	-0.000	0.058	1.942	0.052		
metro police	Alaghehbandan r, et al, 2015	0.053	0.064	0.004	-0.072	0.178	0.830	0.407		
metro police	Hemmat Maghsoudi, et al, 2004	0.125	0.017	0.000	0.091	0.159	7.171	0.000		
metro police		0.040	0.010	0.000	0.020	0.060	3.852	0.000		
none metro police	Reza Alaghehbandan, et al, 2010	0.125	0.050	0.002	0.028	0.222	2.525	0.012		
none metro police	Ahmadi M, et al, 2014	0.019	0.014	0.000	-0.008	0.046	1.385	0.166		
none metro police	Mehran Zargham and Alireza Khalilian, 2002	0.082	0.016	0.000	0.051	0.113	5.106	0.000		
none metro police	Mostafa Saadat, et al, 2004	0.224	0.073	0.005	0.081	0.367	3.067	0.002		
none metro police	Marzieh Assareh1, et al, 2013	0.040	0.022	0.001	-0.004	0.084	1.789	0.074		
none metro police		0.070	0.023	0.001	0.025	0.116	3.045	0.002		
Overall		0.045	0.009	0.000	0.026	0.063	4.758	0.000		

Fig. 3. Incidence Rate of self-immolation in Iran, according to population-based studies in metropolitans and towns, using Random Effect model.

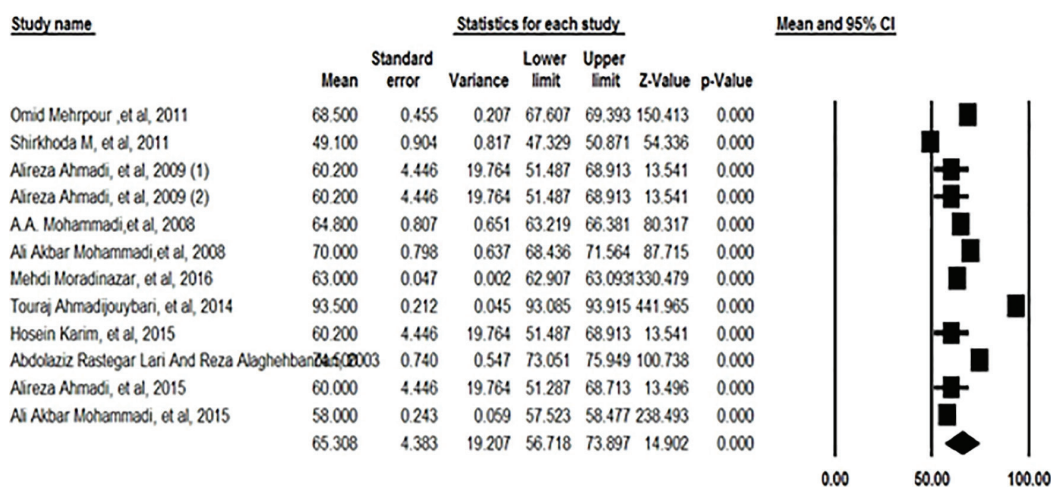| Study name		Statistics for each study						Mean and 95% CI
	Mean	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value	
Omid Mehrpour ,et al, 2011	68.500	0.455	0.207	67.607	69.393	150.413	0.000	
Shirkhoda M, et al, 2011	49.100	0.904	0.817	47.329	50.871	54.336	0.000	
Alireza Ahmadi, et al, 2009 (1)	60.200	4.446	19.764	51.487	68.913	13.541	0.000	
Alireza Ahmadi, et al, 2009 (2)	60.200	4.446	19.764	51.487	68.913	13.541	0.000	
A.A. Mohammadi,et al, 2008	64.800	0.807	0.651	63.219	66.381	80.317	0.000	
Ali Akbar Mohammadi,et al, 2008	70.000	0.798	0.637	68.436	71.564	87.715	0.000	
Mehdi Moradinazar, et al, 2016	63.000	0.047	0.002	62.907	63.093	1330.479	0.000	
Touraj Ahmadijouybari, et al, 2014	93.500	0.212	0.045	93.085	93.915	441.965	0.000	
Hosein Karim, et al, 2015	60.200	4.446	19.764	51.487	68.913	13.541	0.000	
Abdolaziz Rastegar Lari And Reza Alaghehban	74.500	0.740	0.547	73.051	75.949	100.738	0.000	
Alireza Ahmadi, et al, 2015	60.000	4.446	19.764	51.287	68.713	13.496	0.000	
Ali Akbar Mohammadi, et al, 2015	58.000	0.243	0.059	57.523	58.477	238.493	0.000	
	65.308	4.383	19.207	56.718	73.897	14.902	0.000	

Fig. 4. Total burnt surface area (TBSA) in self-immolations in Iran, based on Random Effect model.

in self-immolation burns was 12.24 (8.85-15.59) days (Figure 6). Categorization of the risk factors of self-immolation in Iran revealed that mental status and illnesses, family characteristics and problems, and problems in relation/communication of spouses as the main risk factors (Figure 7). Complete list of identified risk factors of self-immolation in Iran are available in supplementary online material.
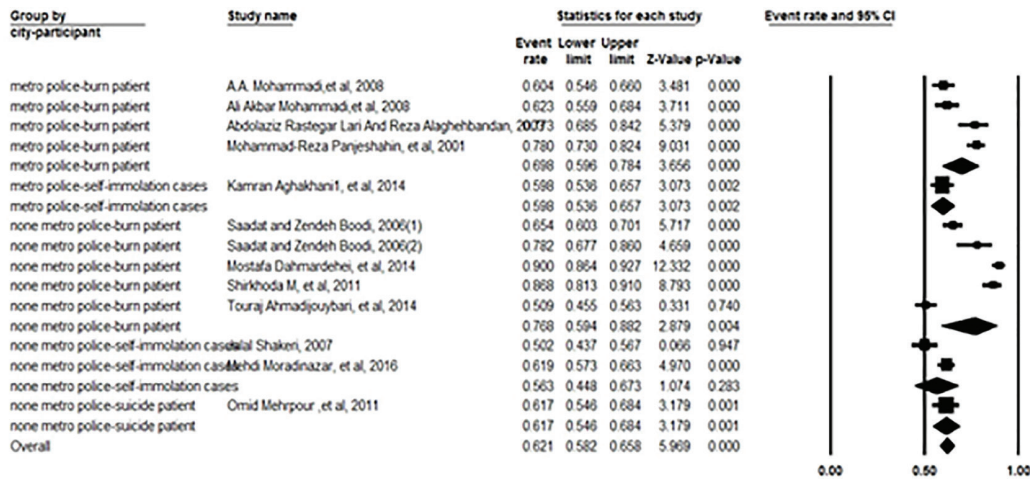
Fig. 5. Mortality rate due to self-immolation in Iran among hospitalized patients, based on Random Effect model.
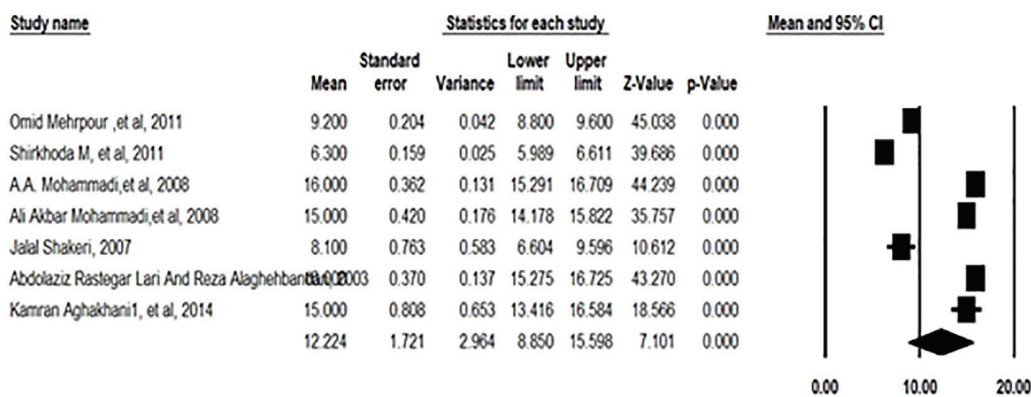

Fig. 6. Estimated hospital length of stay among self-immolation burns in Iran, based on Random Effect model.
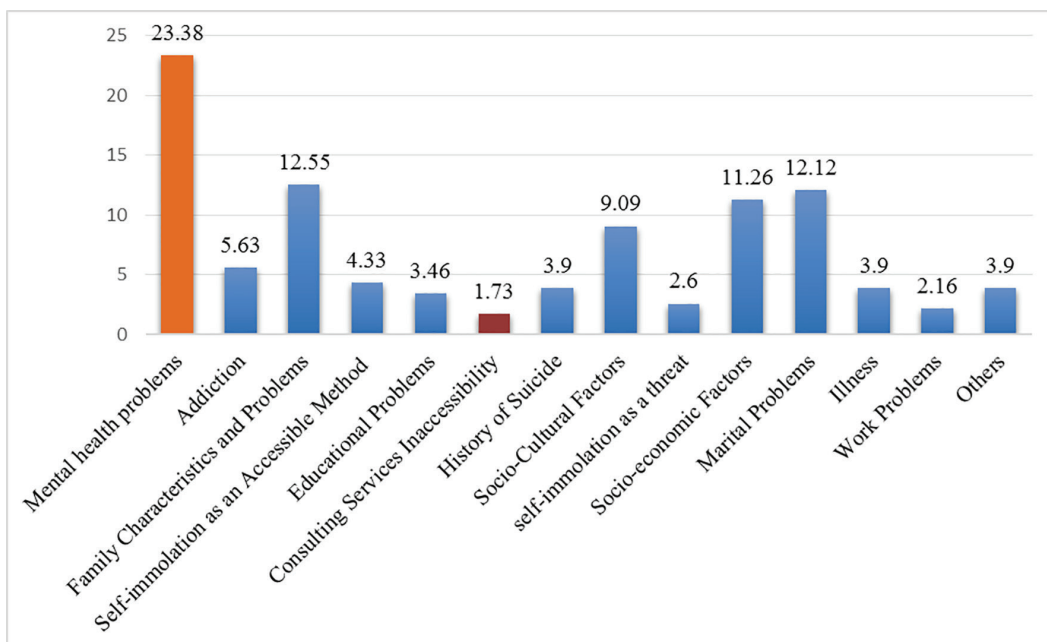

Fig. 7. Risk factors of self-immolation in Iran, based on their frequency of being reported in studies.

discussion

We have performed a systematic review and meta-analysis to synthesize the result of pervious Iranian studies on self-immolation. The results revealed that the self-immolation in Iran was higher in younger ages (mean age=27.18 years) and women. The self-immolation rate was 4.5 cases in every 100,000 populations and comprised 16% of all burnt hospital admissions. Most of the studies conducted in Iran reported mental health issues as the most important risk factor for elf-immolation.

More prevalence of self-immolation among Iranian women has also been reported in previous studies [2, 27-29]. The pattern was reverse in Portugal where it was more prevalent among men [30]. Studies in Italy and Britain also showed no difference between men and women in this regard [31, 32]. The gender pattern in self-immolation is different among countries and it seems that to some extent it relies on cultural issues.

Results of meta-analysis found the rate of self-immolation in Iran as 4.5 cases in every 100,000 populations. Dastgiri *et al.*, (2005) had reported the rate of self-immolation in northwest of Iran as 4.9 cases in every 100,000 populations [33]. Ahmadi *et al.*, (2008), by studying the data from two national registries, reported it as 1.74 in every 100,000 populations [10]. The rate ranges from 10 to 35 in Egypt and countries of Baltic region (Lithuania, Finland, Russia, and so on) [34]. Yet, it was 5.8 in Sri Lanka [35]. Thus the rate is low in Iran and considering the low rate of suicide in the country (rank 154 in the world) [36], it seems understandable.

The self-immolations comprised 16% of all burnt hospitalizations in Iran. Studies have shown that it ranges from 7.5% to 36.6% [37-39]. The proportion was 10.8% in a study in Tabriz, East Azarbaijan province [27]. Another study in Fars province which investigated the burns of 4 years, also reported that the self-immolations comprised 41.3% and 10.8% of women and men admitted to hospitals, respectively [40]. Studies in other countries have reported that 2-6% of the burns admitted to hospitals of Europe and North America and more than 25% of developing countries are the self-immolations [41-44]. Since the rate of self-immolation varies in different regions of Iran, this study provided a summarized and comprehensive picture of it. The results highlight the importance special care of the burns in the hospitals and the psychological consultation to prevent self-immolation.

The meta-analysis showed that the TBSA in self-immolations in Iran was 65.3%. The burnt area usually is wide in self-immolations. It is reported as 60% in a study in Zimbabwe [45], 71% in Tehran, Iran [37], and 52-65.8% in Fars Province, Iran [46]. This wide burnt area results in harder work of caring, longer hospital stay, and higher mortality rate. Findings of the meta-analysis in this study estimated the average LOS of self-immolations in Iran as 12.24 (8.85-15.59) days. It is reported to be 7.16 days in Pakistan, ranging from 1 to 37 days [47]. The median LOS of self-immolations in USA in the study of Bert *et al.*, (2008) was 23 days [48]. Another study in Netherlands stated that the LOS of self-immolation patients is longer than other burns and it is 27 days in average [49]. Training the nurses of burns wards on special care of the burns along with consultations for the self-immolation patients may help the betterment of them and then reduce their mortality.

In the meta-analysis the case fatality rate of self-immolation in Iran was estimated to be 62.1%. Previous studies have reported it as ranging from 50 to 90% [40, 50, 51]. The rate is reported to be 27% in Sri Lanka, 84.95% in Pakistan, and 79% in Eastern Mediterranean Region [44, 47, 52]. In Iran the study by Mehrpour *et al.*, (2012) in Birjand city and the study by Mohammadi et al in Fars Province reported the fatality rate as 64% and 60.4%, respectively [28, 53]. Findings of this review showed the high fatality of self-immolation which is mainly related to high TBSA.

Various factors have been reported as the risk factors of self-immolation. This review found the mental status and illnesses, family problems and characteristics, and problems in relation/communication of spouses as three major risk factors of self-immolation in Iran. A study in USA (2007) found that 69% of self-immolation cases had signs of mental illnesses and drug abuse [54]. Mulholland *et al.*, (2008) also reported that the signs of mental illnesses were more prevalent in self-immolation cases [55]. Another study by comparing the mental risk factors in low and high income countries concluded that the self-immolation is connected with history of mental problem and drug abuse [7]. Shahana *et al.*, also found in their review study that 43 to 91 percent of self-immolation cases had mental health problems [56]. Study of Ramim *et al.*, (2013) among patients of a burns ward in Tehran, Iran found that 94% of the self-immolation cases had introduced the physical and verbal violence as the cause of their action [57]. Size of the Family, birth order of children, and problems in relation of spouses are the other risk factors [51, 58]. The prevention plans should focus on screening programs for mental problems, increasing the access to psychological consultations, training for communication skills -especially in family environments, and improving the knowledge and ability of the younger population for marriage and marital relations. Moreover, community based initiatives such as safe community must be employed in local communities to promote safety [59]. Due to different forms of reporting the results in the studies, we were not able to estimate the survival rate of self-immolation in Iran.

In conclusion, despite the low rate of self-immolation in Iran compared to similar countries, these burns comprise nearly one fifth of all burnt hospitalizations. Moreover, the burnt surface area in these patients is wide, the hospital stay is long, and the fatality is high. Thus especial care of these burns may reduce the mortality. Also it is necessary to provide primary and secondary prevention by considering to the identified risk factors.

Conflicts of Interest: None declared.

References

1. Statistics WH. Monitoring Health for the SDGs Sustainable Development Goals. World Health Organization: Geneva; 2016.

2. Suhrabi Z, Delpisheh A, Taghinejad H. Tragedy of women's self-immolation in Iran and developing communities: a review. *Int J Burns Trauma*. 2012;**2**(2):93-104.

3. Organization WH. Preventing suicide: a global imperative: World Health Organization; 2014.

4. Ahmadi A. Suicide by self-immolation: comprehensive overview, experiences and suggestions. *J Burn Care Res*. 2007;**28**(1):30-41.

5. Ahmadi A, Ytterstad B. Prevention of self-immolation by community-based intervention. *Burns*. 2007;**33**(8):1032-40.

6. Peck MD. Epidemiology of burns throughout the World. Part II: intentional burns in adults. *Burns*. 2012;**38**(5):630-7.

7. Poeschla B, Combs H, Livingstone S, Romm S, Klein MB. Self-immolation: socioeconomic, cultural and psychiatric patterns. *Burns*. 2011;**37**(6):1049-57.

8. Ahmadi A, Mohammadi R, Schwebel DC, Hassanzadeh M, Yari M. Classic philosophy lessons and preventing self-inflicted burns: a call for action. *Burns*. 2009;**35**(1):154-5.

9. Parvareh M, Hajizadeh M, Rezaei S, Nouri B, Moradi G, Esmail Nasab N. Epidemiology and socio-demographic risk factors of self-immolation: A systematic review and meta-analysis. *Burns*. 2018;**44**(4):767-775.

10. Ahmadi A, Mohammadi R, Stavrinos D, Almasi A, Schwebel DC. Self-immolation in Iran. *J Burn Care Res*. 2008;**29**(3):451-60.

11. Saadat M, Bahaoddini A, Mohabatkar H, Noemani K. High incidence of suicide by burning in Masjid-i-Sulaiman (southwest of Iran), a polluted area with natural sour gas leakage. *Burns*. 2004;**30**(8):829-32.

12. Ahmadi A, Mohammadi R, Schwebel DC, Khazaie H, Yeganeh N, Almasi A. Demographic risk factors of self-immolation: a case-control study. *Burns*. 2009;**35**(4):580-6.

13. Palmu R, Isometsä E, Suominen K, Vuola J, Leppävuori A, Lönnqvist J. Self-inflicted burns: an eight year retrospective study in Finland. *Burns*. 2004;**30**(5):443-7.

14. Zarghami M, Khalilian A. Deliberate self-burning in Mazandaran, Iran. *Burns*. 2002;**28**(2):115-9.

15. Shrivastava P, Som D, Nandy S, Saha I, Pal PB, Ray TG, Haldar S. Profile of postmortem cases conducted at a morgue of a tertiary care hospital in Kolkata. *J Indian Med Assoc*. 2010;**108**(11):730-3.

16. Padovese V, De Martino R, Eshan MA, Racalbuto V, Oryakhail MA. Epidemiology and outcome of burns in Esteqlal Hospital of Kabul, Afghanistan. *Burns*. 2010;**36**(7):1101-6.

17. Fernando R, Hewagama M, Priyangika WD, Range S, Karunaratne S. Study of suicides reported to the Coroner in Colombo, Sri Lanka. *Med Sci Law*. 2010;**50**(1):25-8.

18. Onarheim H, Vindenes HA. High risk for accidental death in previously burn-injured adults. *Burns*. 2005;**31**(3):297-301.

19. Subba SH, Binu VS, Menezes RG, Kanchan T, Arun M, Patil R, Pant S, Saha A, De A, Rana MS. Pattern and trend of deliberate self-harm in western Nepal. *J Forensic Sci*. 2009;**54**(3):704-7.

20. Hassanzadeh S, Mosavi S, editors. An investigation about self-immolation. Proceedings of the 2nd Annual Psychiatry and Clinical Psychology Congress; 1994.

21. Pham TN, King JR, Palmieri TL, Greenhalgh DG. Predisposing factors for self-inflicted burns. *J Burn Care Rehabil*. 2003;**24**(4):223-7.

22. Stroup DF, Berlin JA, Morton SC, Olkin I, Williamson GD, Rennie D, Moher D, Becker BJ, Sipe TA, Thacker SB. Meta-analysis of observational studies in epidemiology: a proposal for reporting. Meta-analysis Of Observational Studies in Epidemiology (MOOSE) group. *JAMA*. 2000;**283**(15):2008-12.

23. Poorolajal J, Tajik P, Yazdizadeh B, Sehat M, Salehi A, Rezaei M, et al. Quality assessment of the reporting of cohort studies before STROBE statement. *Iranian journal of epidemiology*. 2009;**5**(1):17-26.

24. Von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP, et al. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *PLoS medicine*. 2007;**4**(10):e296.

25. Grbich C. Qualitative data analysis: An introduction: Sage; 2012.

26. Pope C, Ziebland S, Mays N. Analysing qualitative data. *Qualitative research in health care*. 2006:63-81.

27. Maghsoudi H, Garadagi A, Jafary GA, Azarmir G, Aali N, Karimian B, Tabrizi M. Women victims of self-inflicted burns in Tabriz, Iran. *Burns*. 2004;**30**(3):217-20.

28. Mohammadi AA, Danesh N, Sabet B, Jalaeian H, Mohammadi M. Self-burning: a common and tragic way of suicide in Fars Province, Iran. *Iranian journal of medical sciences*. 2008;**33**(2):110-3.

29. Fardiazar Z, Sadeghi-Bazargani H, Mohammadi R. Domestic injuries and suicide among women of reproductive age in Iran. *Int J Gen Med*. 2012;**5**:547-52.

30. Moniz P, Casal D, Mavioso C, Videira-Castro J, Angélica-Almeida M. The self-inflicted burns-Typology and its prognostic relevance in a 14-year review of self-inflicted burns in a tertiary referral centre. *Burns*. 2011;**37**(2):322-7.

31. Castellani G, Beghini D, Barisoni D, Marigo M. Suicide attempted by burning: a 10-year study of self-immolation deaths. *Burns*. 1995;**21**(8):607-9.

32. Sonneborn CK, Vanstraelen PM. A retrospective study of self-inflicted burns. *Gen Hosp Psychiatry*. 1992;**14**(6):404-7.

33. Dastgiri S, Kalankesh L, Pourafkary N. Epidemiology of self-immolation in the North-West of Iran. *European Journal of General Medicine*. 2005;**2**(1):14-9.

34. Abdi A, Kholahi A, Naghavi M. Diagnosis and registration of the mortality and morbidity causes. Tehran: Ministry of Health, WHO, Simindoght. 2004;1382:45-6.

35. Laloë V, Ganesan M. Self-immolation a common suicidal behaviour in eastern Sri Lanka. *Burns*. 2002;**28**(5):475-80.

36. World Population Review. Crude Suicide Rate by Country 2018. 2018; Available from: http://worldpopulationreview.com/countries/suicide-rate-by-country/.

37. Rastegar Lari A, Alaghehbandan R. Epidemiological study of self-inflicted burns in Tehran, Iran. *J Burn Care Rehabil*. 2003;**24**(1):15-20.

38. Saadat M. Epidemiology and mortality of hospitalized burn patients in Kohkiluye va Boyerahmad province (Iran): 2002-2004. *Burns*. 2005;**31**(3):306-9.

39. Groohi B, Alaghehbandan R, Lari AR. Analysis of 1089 burn patients in province of Kurdistan, Iran. *Burns*. 2002;**28**(6):569-74.

40. Panjeshahin MR, Lari AR, Talei A, Shamsnia J, Alaghehbandan R. Epidemiology and mortality of burns in the South West of Iran. *Burns*. 2001;**27**(3):219-26.

41. Malic CC, Karoo RO, Austin O, Phipps A. Burns inflicted by self or by others--an 11 year snapshot. *Burns*. 2007;**33**(1):92-7.

42. Rashid A, Gowar JP. Self-inflicted burns: a sporadic phenomenon. *Burns*. 2004;**30**(8):833-5.

43. Laloë V. Patterns of deliberate self-burning in various parts of the world. A review. *Burns*. 2004;**30**(3):207-15.

44. Laloë V. Epidemiology and mortality of burns in a general hospital of Eastern Sri Lanka. *Burns*. 2002;**28**(8):778-81.

45. Mzezewa S, Jonsson K, Aberg M, Salemark L. A prospective study of suicidal burns admitted to the Harare burns unit. *Burns*. 2000;**26**(5):460-4.

46. Mohammadi AA, Tohidinik HR, Zardosht M, Seyed Jafari SM. Self-Burns in Fars Province, Southern Iran. *World J Plast Surg*. 2016;**5**(1):32-6.

47. Saaiq M, Ashraf B. Epidemiology and outcome of self-inflicted burns at pakistan institute of medical sciences, islamabad. World J Plast Surg. 2014;**3**(2):107-14.

48. Thombs BD, Bresnick MG. Mortality risk and length of stay associated with self-inflicted burn injury: evidence from a national sample of 30,382 adult patients. *Crit Care Med*. 2008;**36**(1):118-25.

49. Cornet PA, Niemeijer AS, Figaroa GD, van Daalen MA, Broersma TW, van Baar ME, Beerthuizen GIJM, Nieuwenhuis MK; Dutch Burns Repository Group Martini Hospital. Clinical outcome of patients with self-inflicted burns. Burns. 2017;**43**(4):789-795.

50. Ahmadijouybari T, Najafi F, Moradinazar M, Karami-matin B, Karami-matin R, Ataie M, Hatami M, Purghorbani S, Amee V. Two-year hospital records of burns from a referral center in Western Iran: March 2010-March 2012. J Inj Violence Res. 2014;**6**(1):31-6.

51. Ahmadi M, Ranjbaran H, Azadbakht M, Heidari Gorji M, Heidari Gorji A. A survey of characteristics of self-immolation in the northern iran. *Ann Med Health Sci Res*. 2014;**4**(Suppl 3):S228-32.

52. Othman N, Kendrick D. Epidemiology of burn injuries in the East Mediterranean Region: a systematic review. *BMC Public Health*. 2010;**10**:83.

53. Mehrpour O, Javadinia SA, Malic C, Dastgiri S, Ahmadi A. A survey of characteristics of self-immolation in the east of Iran. *Acta Med Iran*. 2012;**50**(5):328-34.

54. Thombs BD, Bresnick MG, Magyar-Russell G. Who attempts suicide by burning? An analysis of age patterns of mortality by self-inflicted burning in the United States. *Gen Hosp Psychiatry*. 2007;**29**(3):244-50.

55. Mulholland R, Green L, Longstaff C, Horner B, Ross E, Myers S, Catalan J. Deliberate self-harm by burning: a retrospective case controlled study. *J Burn Care Res*. 2008;**29**(4):644-9.

56. Shahana N, Turin TC, Rumana N, Rahman AM, Hossain S, Nahar S. Mental illness as a contributor to intentional self inflicted suicidal burn injury. *Journal of Dhaka National Medical College & Hospital*. 2012;**18**(1):49-57.

57. Ramim T, Mobayen M, Shoar N, Naderan M, Shoar S. Burnt wives in Tehran: a warm tragedy of self-injury. *Int J Burns Trauma*. 2013;**3**(1):66-71.

58. Ahmadi A, Mohammadi R, Almasi A, Sadeghi-Bazargani H, Bazargan-Hejazi S. Risk and protective factors of self-immolation: a population based case control study from Iran. *Injury prevention*. 2012;**18**(Suppl 1):A165-A.

59. Tabrizi JS, Bazargani HS, Mohammadi R, Saadati M. Iranian designated Safe Communities: a quantitative analysis. *Trauma monthly*. 2017.