



Forms of Self-immolation in Iran: A Systematic Review and Meta-analysis

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Received 2018 September 01; Revised 2020 February 04; Accepted 2020 November 21.

Abstract

Context: Self-immolation is one of the most violent methods of suicide and is considered a psychosocial problem.

Objectives: The purpose of this study was to investigate the forms of self-immolation in Iran using a systematic review and meta-analysis method.

Data Sources: In this study, seven papers published from 1999 to January 2020 were selected using keywords such as self-immolation and Iran in SID, Google Scholar, PubMed, Web of Science (ISI), Scopus, and Elsevier databases.

Study Selection: Study selection was done by two independent researchers. The results of studies were pooled using the Freeman-Tukey Double Arcsine Transformation method. The heterogeneity among studies was checked using the Q-test and I² index.

Data Extraction: Data were extracted using a data extraction form.

Results: The total sample size was 9,470. The mortality rate in self-immolation subjects was estimated at 64% (95% CI: 0.56 - 0.73). The most important means of self-immolation was oil [89% (95% CI: 82% - 96%)]. Winter had the highest numbers of self-immolation [29% (95% CI: 22% - 37%)]. Meta-regression showed no significant correlation between the mortality of self-immolation and the year of study.

Conclusions: To reduce self-immolation, easy access to oil must be restricted in families, and high-risk people should have access to psychology consultation.

Keywords: Burns, Iran, Meta-analysis, Suicides, Systematic Review

1. Context

Suicide methods are different in countries based on culture, symbols, and religion. Complete suicide, or successful suicide, means the act of killing oneself and ending one's life successfully (1). Suicide is one of the social and psychological problems with a rising trend (2). Suicide is more common in the age group of 15 to 44 years and is the fourth leading cause of death and the sixth cause of disability in the world (3). In Iran, approximately 11 people per day and more than 4,000 people each year die due to suicide (4). One of the heinous methods of suicide is self-immolation that is very painful for the victim and the witness (5). Physical and psychological complications after self-immolation are heavy with a lot of costs (6).

In general, attempted suicide by self-immolation is

more prevalent in our country than in other western countries (7). Self-immolation leads to personal, family, and social disability and is a social pathology (8). Self-immolation may have an infectious pattern and may continue unconsciously and slowly among people in society and pass from one generation to another (9). The most important and effective way to reduce the complications and mortality of self-immolation is its prevention. Preventive measures at the community level have five stages: Identification and evaluation of the problem, identification of risk factors and protective factors, selecting and testing an intervention at a limited level, extensive intervention, and evaluation of the effect of the intervention. As the most credible epidemiologic studies have been conducted in Western societies and self-immolation is a rare suicide attempt in the

West, the examination of Iranian populations that have different social characteristics is necessary (10). The identification is likely to be an important step toward prevention and control. By identifying social, individual, and gender patterns of self-immolation, an effective step can be taken to identify people at risk and minimize the incidence of self-immolation (11, 12) by interventions.

There is no general picture of self-immolation and death rate in Iran. Self-immolation is common in the west and northwest of Iran (13). Studies have shown that the highest incidence of self-immolation is in Kohgiluyeh and Boyer-Ahmad, Ilam, and South Khorasan provinces (14). Since there are no accurate statistics on the causes of self-immolation in Iran and the incidence rate is different in various regions, recognizing these factors can lead the medical community to plan to Reduce the financial costs of self-immolation. According to the numerous studies on self-immolation methods and tools used for self-immolation and its seasons in Iran, as well as to validate the results of these studies, conducting a meta-analysis study seems necessary to provide precise and credible information for planners and researchers in this area.

2. Objectives

This study aimed to determine the frequency of self-immolation means and the mean rate among women and men by a meta-analysis.

3. Data Sources

3.1. Protocol and Registration

We registered the research proposal at Ilam University of Medical Sciences. The research protocol did not register on the PROSPERO website.

3.2. Study Eligibility Criteria

Studies' eligibility criteria in the review were as follows:

- 1) Studies done in Iran
- 2) Sample size and percent of self-immolation being cited in the articles
- 3) Method of self-immolation being cited in the article

3.3. Information Source and Search

Electronic databases including Google, Google Scholar, Scientific Information Database (SID), Web of Sciences, PubMed, Scopus, and Elsevier were searched for published articles in the Persian and English languages from 1999 to January 2020. Keywords used for the search were self-immolation, self-burning, self-inflicted burn, suicide by burning, suicidal burns, and self-incineration that were limited to affiliations from Iran (3).

The search strategy in PubMed was as follows:

((self-immolation [Abstract]) OR (suicidal burns[Abstract]) OR (self-inflicted burn[Abstract]) OR (self-burning[Abstract]) AND (Iran [Affiliation])).

4. Study Selection

Study selection and data extraction were done by two independent researchers (KS and HT). According to the search strategy, 123 studies were included in the primary checklist. Of them, 70 articles were selected. However, 53 selected articles were checked again for the secondary outcomes of interest, including sample size, time of data collection, and risk factors of self-immolation in Iran. Finally, 20 articles met the inclusion criteria, and their full texts were assessed. Studies that assessed solely self-immolation and risk factors were excluded from the list.

5. Data Extraction

A data extraction template was used to provide a primary checklist of the included studies. This checklist included the authors' name, title, year, location of study, sample size, population, gender, cases, risk factors, geographical region, the average percentage of self-immolation in males and females, age category, and demographic variables of self-immolation. The final checklist was generated by selecting studies that met the criteria for the present meta-analysis.

5.1. Statistical Analysis

We preferred to use the binomial distribution with the Freeman-Tukey Double Arcsine Transformation method. An overall prevalence was calculated as a weighted average of the individual studies. The heterogeneity among studies was checked using the Q-test and I^2 index. Data analysis was done with STATA ver. 11.1.

5.2. Ethical Considerations

Ethical issues (including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors. This study was approved by the Ethics Committee of Ilam University of Medical Sciences (code: IR.MEDILAM.REC.1397.178). The authors declare that there is no conflict of interest.

6. Results

The search done in electronic databases yielded the identification of 123 articles. Of them, 70 articles were deleted because of duplication. Then, the titles and abstracts of 53 articles were reviewed, and 25 articles were deleted because they were not related to our study. After reading the full texts of the articles, finally, 20 articles met the inclusion criteria for the meta-analysis (Figure 1). The eligible studies ($n = 20$) determined the frequency of used self-burning means and the mean self-immolation rate in Iran from 1999 to January 2020, with a total sample size of 9,470 (473 subjects per article). The characteristics of the included articles are found in Table 1.



Figure 1. Flowchart of the systematic review and meta-analysis process

The level of heterogeneity in this study was 99.6%, indicating that there was high heterogeneity among the studies (35, 36). Table 2 shows the mean percentage of self-immolation by sub-groups. Figure 2 shows that the mortality rate in people who committed self-immolation was

64% (CI: 0.56 - 0.73, $I^2 = 94.8\%$, $P < 0.001$). Figure 3 shows Meta-regression in study by years and sample size. Self-immolation showed an increasing trend from 1999 to 2017 (Figure 3). The publication bias in the obtained results is indicated in Figure 4. There was no bias in the results, as the funnel plot was symmetric. The sizes of the circles reflect the weight of studies (larger circles denote larger sample sizes and vice versa).

7. Discussion

This study aimed to determine the mortality rate after self-immolation and the means of self-immolation and compare it in different seasons of the year through a systematic review in Iran. According to the results of this study, the mean age at self-immolation was 27.5 years. The results of other studies are consistent with the results of the present study (15, 18, 19). People at this age should look for work, make a living, and play an important role in society. However, because they fail to achieve these goals and cannot solve their problems, they may commit self-immolation. Family disputes, mental illness, economic problems, and emotional issues are the causes of self-immolation.

The occurrence of self-immolation in adolescents and young people may be due to the crisis of puberty and problems associated with this period, as well as the lack of knowledge and awareness of problem-solving methods or escaping from the difficulty of life, along with the lack of preparedness to deal with factors such as failure, frustration, and poverty (18).

According to the results of this study, the number of self-immolations was higher in girls than in boys, which is similar to the results of other studies (26, 31-33). Female self-immolation can be attributed to different physiological from men, as well as sensitivity to psychological, social, and economic pressures. Perhaps, ignoring or neglecting the individual and social rights of women in some societies, especially rural communities, because of their dominant culture can cause depression and psychological problems.

Informing women of advocacy centers, appropriate counseling, and information to them, and pay attention to. The importance of mental health as an essential element of primary health care in rural and urban health centers can be effective in reducing cases of self-immolation. Also, training ways to cope with stress, problems, and failures can be effective in reducing self-immolation (18, 26, 37, 38). Another cause may be rape that makes them decide to

Table 1. Characteristics of Included Studies Concerning Self-immolation

First Author	City	Year	Sample Size	Female	Male	References
Ahmadi	Kermanshah	1999	216	191	25	(15)
Yoosoflabani and Mirzaei	Kurdistan	2009	16	16	0	(16)
Chaabi	Ahvaz	2013	100	100	0	(17)
Kashfi et al.	Shiraz	2008	439	310	129	(18)
Najafi	Kermanshah	2010	343	288	55	(19)
Yasemi et al.	Ilam	2000	587	476	111	(20)
Bazeyar et al.	Ilam	2012	236	168	68	(21)
Amirmoradi et al.	Tehran	2002	35	35	0	(22)
Nanbakhsh et al.	Uremia	2001	72	72	0	(23)
Ahmadi et al.	Kermanshah	2008	30	26	4	(24)
Rezaei et al.	Kermanshah	2011	63	60	3	(25)
Maghsodi et al.	Tabriz	2004	412	407	5	(26)
Mostafavi Rad et al.	Tehran	2012	53	53	0	(27)
Dehmardehei et al.	Zahedan	2014	315	212	103	(28)
Saadat et al.	Ahvaz	2004	561	301	260	(29)
Vaghardoost et al.	Tehran	2016	38	38.0	0	(30)
Moradinazar et al.	Kermanshah	2012	446	370	76	(31)
Veisani et al.	Ilam	2017	333	241	92	(32)
Hosseini et al.	Zanjan	2017	2590	899	1691	(33)
Shojaei et al.	Tehran	2013	2594	-	-	(34)

Table 2. Mean Percentage of Self-Immolation by Sub-groups

Variable	Articles (N)	Mean	95% CI	I ²	P-Value
Mean age					
Age	13	27.54	24.5 - 30.57	97.4	0.000
Mean percentage, %					
Burns	5	65	53 - 77	95.1	0.000
Self-immolation instrumentation, %					
Oil	4	89	82 - 96	89.6	0.000
Gas	3	6	4 - 8	0	0.993
Gasoline	4	5	1 - 9	89.3	0.000
Season, %					
Spring	5	25	24 - 26	0	0.647
Summer	5	24	19 - 29	93.7	0.000
Fall	5	20	15 - 26	95.7	0.000
Winter	5	29	22 - 37	97.5	0.000

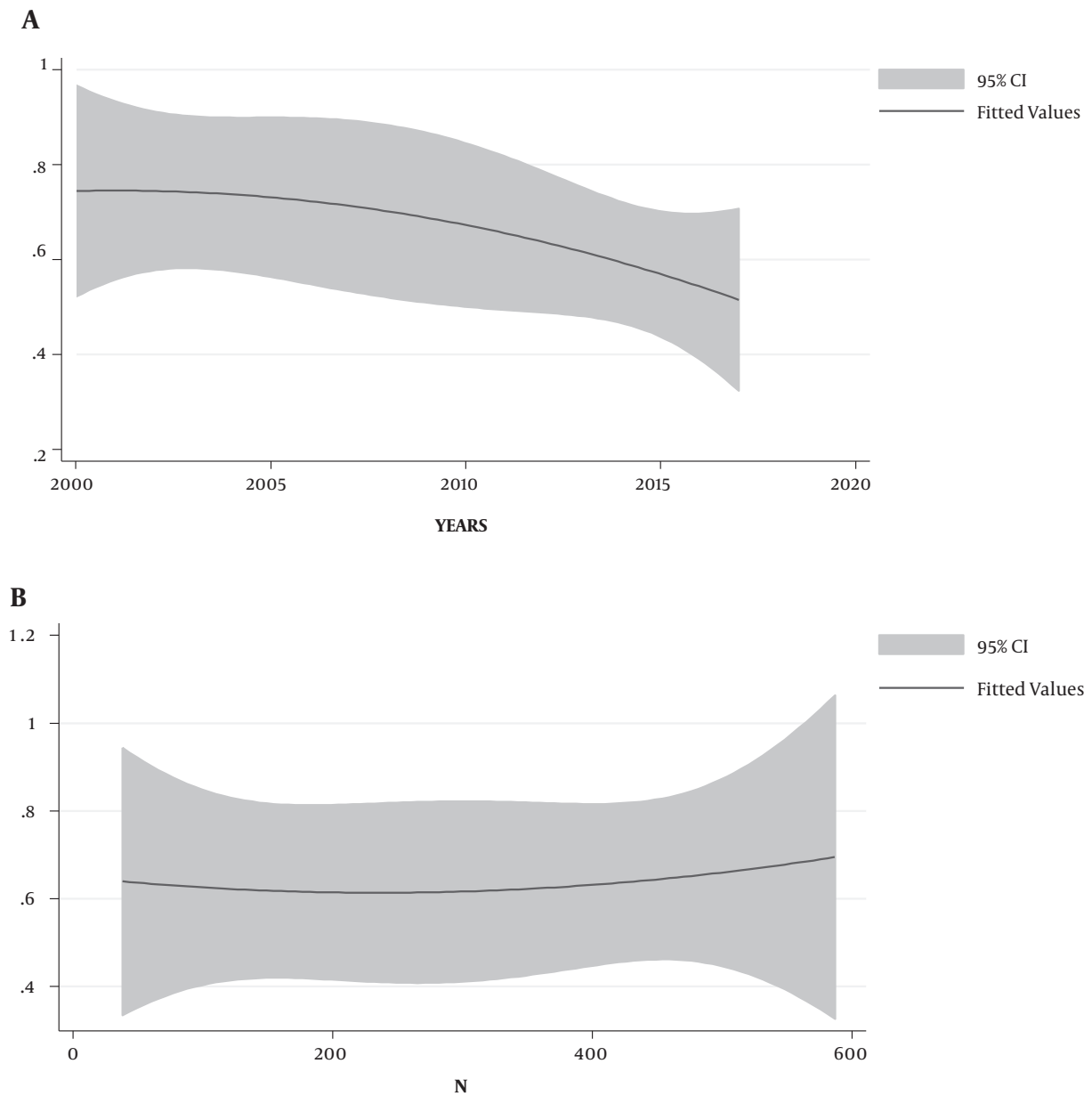


Figure 3. A, Meta-regression according to the year of studies: The decreasing trend of self-immolation is shown between 1999 and 2017 in Iran; B, relationship between sample size and self-immolation: Each circle represents the sample size and as the volume of each circle increases, the sample size increases

most means for self-immolation, which is consistent with other studies (23-25). Suicides occurred more in spring and winter, which is consistent with the results of various studies (22, 23, 29). Among the reasons is that in the winter, the necessary equipment is more available, and self-immolation is done quicker.

7.1. Limitations

There are several limitations in the selected studies for this meta-analysis, including non-random sample selection, a limited number of variables existing in the studies, and focusing on the cause, risk factors, and clinical symptoms of self-immolation without reporting its prevalence. In addition, there was no clear distinction between self-immolation type and cost in some studies. We were not

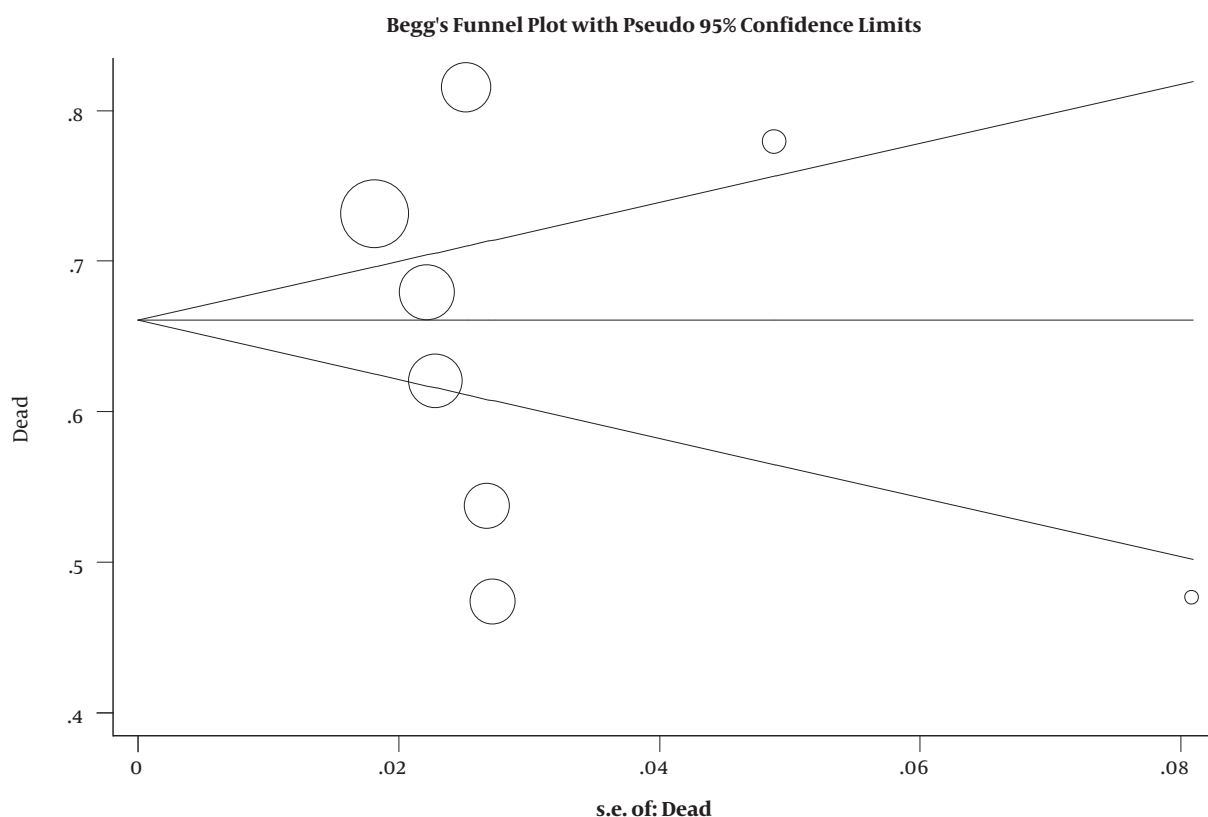


Figure 4. Publication bias in self-immolation: There is no bias in the results due to the symmetrical funnel plot. The sizes of the circles reflect the weight of studies (larger circles denote larger sample sizes and vice versa).

able to assess all risk factors of self-immolation in the quintet geographical area of Iran (north, south, west, east, and center) due to the absence of conducted studies in all areas.

8. Conclusions

To reduce self-immolation, the best way is to prevent it and educate people at puberty. It is suggested that people at risk be identified and the consequences of self-immolation become clear to them.

Footnotes

Authors' Contribution: Study concept and design: Hamed Tavan, Masoumeh Shohani, and Reza Valizadeh. Acquisition of data: Hamed Tavan. Analysis and interpretation of data: Kourosh Sayemiri and Hamed Tavan. Drafting of the manuscript: Hamed Tavan and Masoumeh Shohani. Critical revision of the manuscript for important intellectual content: Hamed Tavan and Masoumeh

Shohani. Statistical analysis: Kourosh Sayemiri. Administrative, technical, and material support: Hamed Tavan and Masoumeh Shohani. Study supervision: Masoumeh Shohani.

Conflict of Interests: The authors declare that they have no conflicts of interest.

Ethical Approval: This study was approved by the Ilam University of Medical Sciences. The cooperation and financial assistance of the Research Deputy of Ilam University of Medical Sciences are gratefully appreciated (Ethical code: IR.MEDILAM.REC.1397.178).

Funding/Support: Ilam University of Medical Sciences funded this research.

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