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The Rate, Trends, and Lethality of Common Violent Suicide Attempt Methods in Iran, a Systematic Review and Meta-Analysis

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ABSTRACT

This systematic review aimed to determine frequency, trend, and lethality of common methods of suicide in Iran through literature in relevant studies by meta-analysis. We searched MeSH heading suicide and/or keyword combinations in published articles in English major databases (PubMed, Scopus, and ISI) and Persian databases (Magiran, Medlib, SID, and Iran Medex). Based on the inclusion and exclusion criteria, we enrolled 47 relevant studies for the final analysis. The data were analyzed based on a random-effects model using Stata11.2. We found that hanging had the highest lethality among suicide methods; so that hanging with 14.9% (95% CI: 12.6, 17.3) and followed by self-immolation with 11.8% (95% CI: 10.2, 13.3) lethality were the common lethal methods. Results showed a decreasing trend in the rate of using lethal methods ($\beta=-0.02$, 95% CI: $-0.005-0.05$), ($p=0.017$) across the study period. Our results approve this assumption that the rate of using lethal methods for suicide is decreasing in recent years in Iran, perhaps opposite to non-violent methods. This is an important finding that investigators should be assessed it in forward studies to clarify the possible causes.

Keywords: Hanging, meta-analysis, self-immolation, suicide attempts, systematic review

INTRODUCTION

In the current late decade, more than 800,000 suicides occurred annually worldwide, which equal about 11.4 per 100,000 in the general population (1). Suicide is the third leading cause of death among U.S. young peoples (2). It has been estimated that in 2020 about 1,530,000 people will attempt suicide (3). Although the rate of suicide is low in most Muslim countries (4), recent evidence suggests an increasing trend of suicide in these countries (5). According the current literature estimates, the rate of attempted suicide in Iran to be 41.8 and 64.5 per 100,000 people for males and females, respectively (6).

Previous epidemiological studies in Iran show that the common violent methods of suicide were hanging, self-immolation, self-harm, and firearm (7, 8). In the last decade, despite the increase of non-violent suicide methods, the risk of death caused by violent methods has been decreased (9). The suicide outcome is depending on the methods chosen by attempters, including; availability of methods, age, and gender of attempters (10). Results of the meta-analysis by Nazarzadeh et al. (11) in 2013 showed that family conflicts are a significant factor associated with suicide in Iran.

One of the main violent methods in Iran is self-immolation which is defined as the action that one person destroy-ing or causing serious self-harm. Results of the conducted study in the west part of Iran showed that self-immola-tion in 44% of suicide attempters leads to death; moreover, the rate of death from the hanging method was 31% (12). Razaiean and Sharifirad in their study were demonstrated that self-immolation is one of the most important methods of suicide, especially among young illiterate, deprived women, in Ilam Province (13). People that using violent methods had different characteristics compared to non-violent attempters even in neuropsychological and neurobiological characteristics (14). The background risk factors in attempters such as age, gender, and biological factors can be an important element to the choice of violent methods (15, 16). This situation is more complicated when we apply for prevention programs because according to this approach each specific method had specific risk factors (16).

In recent years, several studies have been conducted in Iran to explore the common suicide attempt methods, but the precise information at the national level is not clear. Really, which of the violent methods is prevalent in Iran and how is the long-term trend? Our knowledge about the mentioned question is fundamental for designing preventive strategies, and therefore this review can be useful for policymakers. We aimed to determine the rates and trends of violent methods of suicide in Iran by this systematic review and meta-analysis.

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METHODS

Data Sources

We carried out a systematic review and meta-analysis to determine the rates and trend of using violent methods of suicide in Iran. The PRISMA recommendation was used to conduct this article (17). Relevant studies published in English databases (PubMed, Scopus, and ISI) and Persian databases (Magiran, Medlib, SID, and Iran Medex) were systematically searched.

Search Strategy

The search strategy for English databases was performed by the MeSH heading suicide and/or keyword combinations in the title, keywords, affiliations (methods, attempts, death, violence, rate, hanging, self-immolation, self-harm, and firearm and Iran). We had assessed articles that focused on the violent method in the title. After the removal of duplicates, relevancies of remained were checked by abstract review. When in doubt, to ensure the relevance of articles, the full texts were reviewed. As a result, those full-text articles which reported at least one of the mentioned violent methods were assessed. To increase the sensitivity of the arrival studies, all of the included studies were reviewed by cross-referring publications to identify more related articles.

Inclusion and Exclusion Criteria

All cross-sectional studies assessing the estimate of violent methods in Iran from 2000 to 2016 were entered into the study. Duplicate articles and articles with the same source of data were excluded from the study.

Data Extraction and Quality Assessment

To reduce the errors in data collection, the extraction of data was done using a data extraction form. The following key information was extracted from included articles by the data extraction form: Publications year, first author, study design, subject's characteristic, sample size, data gaining period, and suicide attempt method. Initial disagreements on classifications of study characteristics were resolved by discussion within the authors as long as consensus was reached. The Strengthening the Reporting of Observational studies in Epidemiology statement was used to assess the quality of studies.

Statistical Analysis

At least two studies are necessary to perform the meta-analyses in relation to each risk factor. The pooled effect size was reported at a 95% confidence level. The I^2 and Cochran's Q statistics were used to assess the heterogeneity. In this study, according to Brockwell et al. (18) study, because the heterogeneity was high and significant ($p < 0.05$, $I^2 > 75$) the random-effects model was used. The possible sources of heterogeneity were investigated by meta-regression. Begg and Egger's (19) tests were used to assess the publication bias in the included studies.

RESULTS

Totally, 310 potentially relevant articles were identified from the initial search. After removing duplicates, 125 articles remained and then we excluded 41 articles by screening titles and abstracts. Then, 84 remained articles were reviewed in full text to identify the relevant articles. Of these, 37 articles were excluded

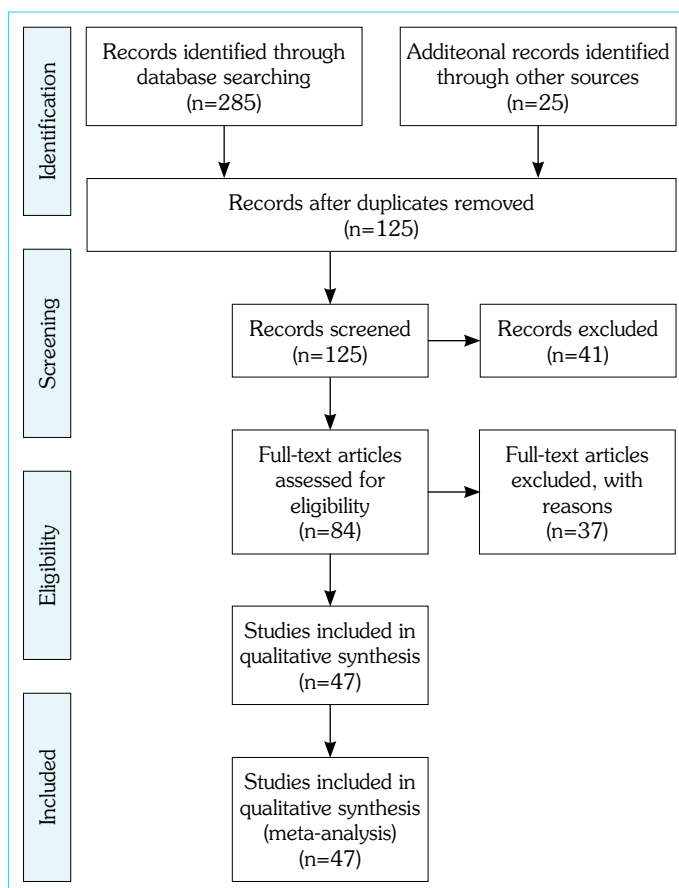


Figure 1. The flowchart of selected articles in meta-analysis

ed because of non-relevant and duplicated results. Finally, 47 primary studies met the inclusion criteria and were included in this meta-analysis (Fig. 1). Details regarding 47 enrolled studies are shown in Table 1. Included articles were in the English and Persian languages. The included studies were conducted in 26 different provinces of the country with a sample size of 164,136 cases (Table 1).

The pooled rate of hanging was 14.9% (95% CI: 12.6, 17.3, $n=24456$). The rate of hanging in fatal and non-fatal outcome was 40.7% (95% CI: 26.4, 54.9) and 3.20% (95% CI: 1.26, 4.73), respectively. Therefore, the lethality of this suicide method was 40.7% (95% CI: 26.4, 54.9). The results of I^2 statistic showed a positive heterogeneity in the articles ($I^2=99.9\%$; $p < 0.001$). The pooled rate of self-immolation was 11.8% (95% CI: 10.2, 13.3, $n=19368$). The rate of self-immolation in fatal and non-fatal suicide was 16.1% (95% CI: 12.9, 19.3) and 9.30% (95% CI: 10.2, 13.3), respectively. Therefore, the lethality of this method was 16.1% (95% CI: 12.9, 19.3). The results of I^2 statistic showed a positive heterogeneity in the articles ($I^2=99.6\%$; $p < 0.001$). The pooled firearm rate was 4.9% (95% CI: 4.2, 5.5, $n=8042$). The rate of firearm in fatal and non-fatal suicide outcome was 11.5% (95% CI: 7.9–15.0) and 1.9% (95% CI: 1.4, 2.3), respectively. Therefore, the lethality of this method among methods of suicide was 11.5% (95% CI: 7.9, 15.0). The results of I^2 statistic showed a positive heterogeneity in articles ($I^2=99.5\%$; $p < 0.001$). The pooled rate of free-fall was 1.7% (95% CI: 1.1, 2.2, $n=2790$). The rate of free-fall in fatal and

Table 1. The characteristic of included studies

Ref.	Authors	Pub year	Subjects	Data duration period	Suicide behavior	Place
(20)	Mohamadian et al.	2015	3492	2004–2008	Death	National
(21)	Rostami et al.	2016	19	2006–2013	Attempts	Kermanshah
(22)	Shojaei et al.	2016	15822	2006–2010	Death	National
(23)	Shakeri et al.	2015	400	2008–2013	Attempts	National
(24)	Sadeghi et al.	2015	251	2013–2014	Attempts	Kermanshah
(25)	Shojaei et al.	2013	15822	2006–2010	Death	National
(26)	Haghighi et al.	2015	80	2011–2012	Attempts	Bandar Abass
(27)	Ghaleiha et al.	2009	146	2004–2005	Death	Hamadan
(28)	Sharghi	2009	185	1997–2006	Death	Ardabil
(29)	Panaghi et al.	2010	3492	2003–2008	Death	National
(30)	Saberi-Zafarghandi et al.	2005	383	2001–2002	Attempts	Semnan
(31)	Tavallaii et al.	2005	1463	1980–2002	Death	National
(32)	Sadegh al-Islam and Rezaei	2005	60	1999–2003	Attempts	Tehran
(33)	Molavi et al.	2007	218	2002–2003	Attempts	Ardebil
(34)	Shirzad and Gharedaghi	2007	260	2003–2004	Death	National
(8)	Poorolajal et al.	2015	185	2011–2012	Attempts	Kermanshah
(35)	Sayadrezai et al.	2009	64	2003–2008	Attempts	Ardabil
(36)	Ansari et al.	2009	269	2006–2007	Attempts	Rafsanjan
(37)	Rezaeian et al.	2011	88	2005–2006	Death	Ilam
(38)	Monsef Kasmaie et al.	2013	424	2010–2011	Attempts	Guilan
(39)	Astaraki et al.	2014	581	2004–2009	Death	Ilam
(40)	Yaraghi et al.	2012	600	2008–2009	Attempts	Isfahan
(41)	Piraei et al.	2014	185	2011–2012	Attempts	Kohgiluyeh
(42)	Shaholi	2012	40	2005–2009	Death	Izeh
(12)	Veisani et al.	2016	7364	2010–2014	Attempts	Ilam
(43)	Nazarzadeh et al.	2016	1537	2011–2012	Attempts	Ilam
(44)	Behmanesh et al.	2014	369	2010–2012	Attempts	Zahedan
(45)	Amiri et al.	2012	5414	2008–2009	Attempts	Hamadan
(46)	Saberi-Zafarghandi et al.	2012	53100	2001–2007	Attempts	National
(13)	Rezaeian et al.	2012	2412	1995–2002	Attempts	Ilam
(47)	Arefi	2002	2793	1998–1999	Attempts	Azarbayjane gharbi
(48)	Salari-lak et al.	2006	4015	2001–2002	Attempts	Azarbayjanegharbi
(49)	Taziki et al.	2005	1857	2003–2004	Attempts	Golestan
(50)	Rafiei and Seyfi	2008	4226	2005–2006	Attempts	Arak
(51)	Shams Alizadeh et al.	2010	180	2009–2010	Attempts	Kurdistan
(52)	Rezaeian et al.	2011	2404	1995–2002	Attempts	Ilam
(53)	Hossini et al.	2012	2748	2006–2011	Suicide	Bojnurd
(54)	Khajeh et al.	2013	712	2011–2012	Attempts	Hormozgan
(55)	Nouri et al.	2012	341	2004–2007	Attempts	Tehran
(56)	Mobasheri et al.	2012	3206	2003–2012	Attempts	Chahar&Bakhtiari
(57)	Moradi et al.	2012	107	2007–2008	Attempts	Bahar
(58)	Jabbari fard et al.	2014	233	2001–2011	Attempts	Lordegan
(59)	Hajivandi et al.	2013	611	2009–2010	Attempts	Bushehr
(60)	Gorgi et al.	2014	792	2008–2012	Attempts	Larestan
(61)	Gorgi et al.	2016	17342	2009–2012	Attempts	Shiraz
(62)	Moravveji et al.	2010	2867	2003–2008	Attempts	Kashan
(63)	Bakhsha et al.	2011	4977	2003–2007	Attempts	Golestan

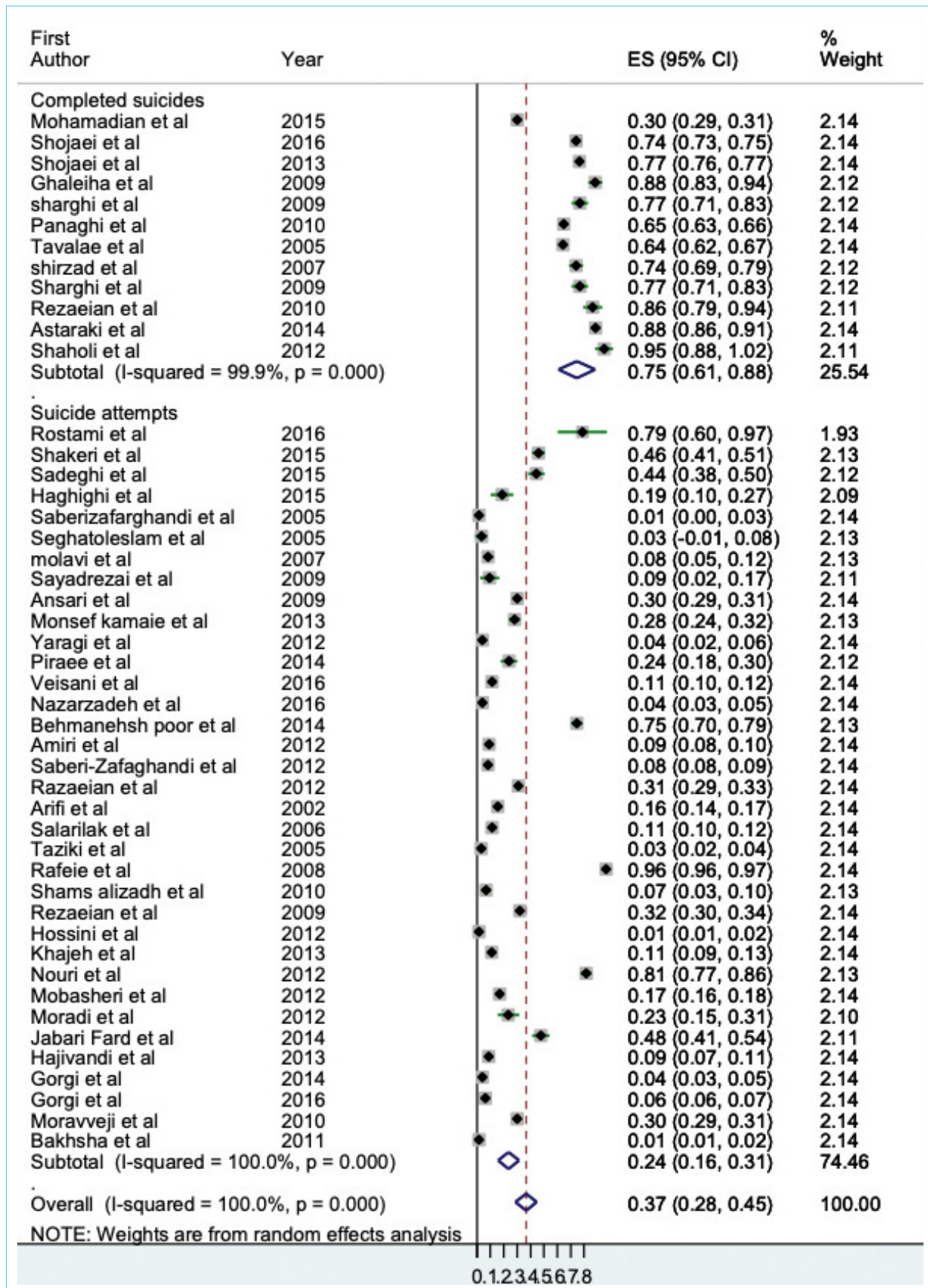
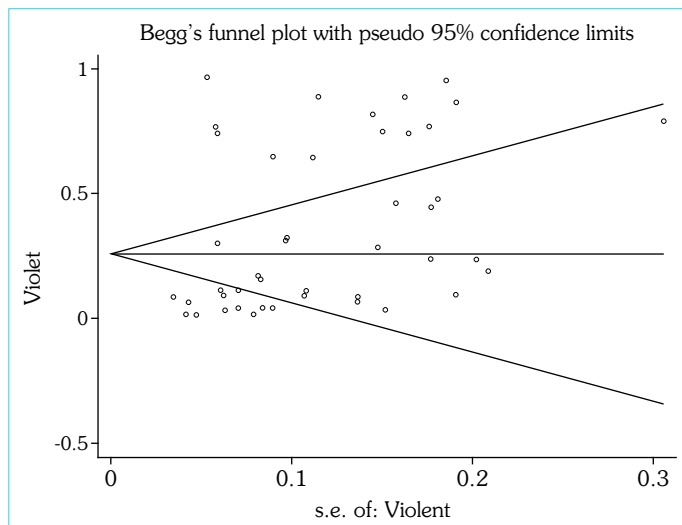


Figure 2. The pooled rate of violent methods in included studies by death and attempted suicide in study period (2000–2016) in Iran

Table 2. The rate of death in violent suicide method by suicide outcome

Methods	Suicide outcome	Pooled rate % (CI 95%)	Heterogeneity	
			I ² * (%)	p
Hanging	Death	40.7% (26.4–54.9)	99.9	<0.0001
	Non-death	3.20% (1.26–4.73)	99.9	<0.0001
Self-immolation	Death	16.1% (12.9–19.3)	99.9	<0.0001
	Non-death	9.30% (10.2–13.3)	99.6	<0.0001
Firearm	Death	11.5% (7.9–15.0)	97.8	<0.0001
	Non-death	1.9% (1.4–2.3)	99.4	<0.0001
Free fall	Death	2.7% (0.0–0.05)	97.7	<0.0001
	Non-death	1.2% (0.0–2.2)	97.1	<0.0001

*: I² I- Squared; CI: Confidence interval

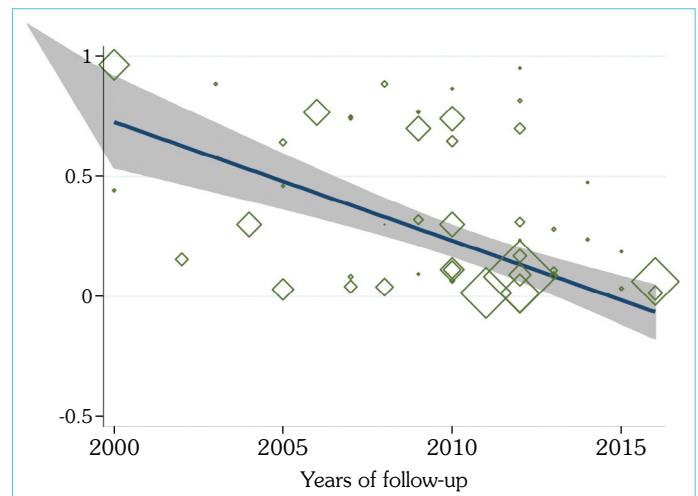
**Figure 3.** Begg's plot, results for selected articles by violent methods, publication bias

non-fatal suicide was 2.7% (95% CI: 0.0, 0.05) and 1.2% (95% CI: 0.0, 2.2), respectively. Therefore, the lethality of this method among methods of suicide was 2.7% (95% CI: 0.0, 5.00). The results of I² statistic showed a positive heterogeneity in the articles (I²=99.4%; p<0.001) (Table 2).

The pooled rate of all violent methods was 33.3% (95% CI: 28.5, 44.7, n=60074). The rate of free-fall fatal and non-fatal suicide was 75.5% (95% CI: 60.9, 88.2) and 23.5% (95% CI: 15.7, 31.4), respectively. Therefore, the lethality among all violent methods of suicide was 75.5% (95% CI: 60.9, 88.2). The results of I² statistic showed a positive heterogeneity in the studied articles (I²=100.0%; p<0.001) (Fig. 2).

The possibility of publication bias was explored by different violent suicide methods, but the publication bias was not found (Z: 1.93; p=0.054). Hence, we tried to consider the most of retrieved articles in this subject (Fig. 3).

As shown in Figure 4 a significant decreasing rate of violent methods was observed ($\beta=-0.02$, 95% CI: -0.05, -0.005), (p=0.017) across the study period (2000–2016) (Fig. 4).

**Figure 4.** Changes in rate of violent method of suicide in Iran by Meta-regression plot in selected studies in our study period (2000–2016)

DISCUSSION

In this systematic review using meta-analysis, we determined the rate of violent suicide attempts methods and its trends in the long-term period from 2000 to 2016 in Iran. According to the best of our knowledge, the current review is the first study to determine the common violent methods of suicide including hanging, self-immolation, self-harm, and firearm in Iran. It is documented that one of the key steps to prevention, control, and eventually decreasing the rate of suicide is methods that victims attempted; therefore, our results can be applied to conduct the preventive programs by policymakers (64, 65).

Our results showed that the rate of violent suicide methods in Iran is 36.6%. Furthermore, we found that the rate of violent methods is differing according to the suicide outcomes. The rate of violent methods in fatal and non-fatal suicide was 78.0% and 23.0%, respectively. In the previous studies in different countries, the important risk factors that were related to choose violent methods by attempters were short birth length for gestational age (66), childhood trauma (67). In the self-immolation method; suicide attempt

history, relationship break-up, and also financial difficulties were the three risk factors that effects on choice of violent method (68).

The main violent suicide method in this study was hanging (14.9%) and self-immolation (11.8%). Results of the meta-analysis in the Eastern Mediterranean Region showed that the common violent suicide methods were 39.7% for hanging, 17.4% for self-immolation, and 7% for the firearm (11). According to relevant studies some factors effects, the choice suicide methods by attempters including; history of suicide attempts, break-up the intimate relationships, and financial difficulties (13). In one other meta-analysis in Iran by Parvareh et al. (69) in 2018, 70% of all self-immolation attempts in Iran occurred in women also, 39% of all self-immolation were among singles. Furthermore, Runeson et al. (9) estimated that 69% of attempters had comorbid psychotic disorder, eventually died from suicide in the 1st year after committing. Therefore, as demonstrated that attempted suicide is a strong risk factor for suicidal death, especially in the 1st year after the attempt, so intervention programs can reduce the risk of death in hanging users.

A significant decline was observed in the pooled rate of violent methods in the study period. As shown in previous studies, the rate of suicide attempted by non-fatal methods was increased in recent years (70). Hence, our results approve this assumption that the violent suicide methods tend to decline in recent years in Iran. In recent decades increasing in rate of education in women acted as preventive factors to decreasing of violent methods such as hanging and self-immolation (71).

Our systematic review has some limitations. In first, this meta-analysis was limited by high heterogeneity in our findings and we could not explore the source of heterogeneity. Second, the information on gender did not exist in the retrieved studies and we could not determine the rate of the violent methods by gender. Third, we were not able to access to data in some provinces; therefore, the pooled estimate is limited. Fourth, the majority of studies were conducted in the west of Iran, which besides the differences in the study population in the retrieved studies can affect the generalizability of the findings at the national level as well as specific age groups, respectively. Another potential limitation of our study is that there has been debate about the quality of investigated suicide data, and differences in the way of suicide definition and identification which can influence the reported rates of suicide. However, despite some variation from year to year, but systematic under-reporting of suicide occurred in all the years of included studies and the findings of this meta-analysis are valuable. Finally, the lack of information and consequently the impossibility of examining the impact of contextual factors such as societal changes on trend changes were other limitations in this study.

CONCLUSION AND SUGGESTIONS

In summary, we propose that determining the risk factors of violent methods such as hanging and self-poisoning should be conducted in several parts of Iran especially in the regions with the high incidence rate, so it can be critical point to beginning next steps. Our results approve this assumption that the violent suicide methods tend to decline in recent years in Iran, perhaps opposite to non-violent methods. Our results suggested that preventive programs should be taken to reduce violent methods in Iran.

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Conflict of Interest: The authors have no conflict of interest to declare.

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REFERENCES

1. World Health Organization. Suicide Data 2018. Geneva: World Health Organization; 2018. Available from: http://www.who.int/mental_health/prevention/suicide/suicideprevent/en. Accessed November, 2018.
2. Cash SJ, Bridge JA. Epidemiology of youth suicide and suicidal behavior. *Curr Opin Pediatr* 2009; 21(5): 613–9. [CrossRef]
3. Mental Health Atlas 2017; 2018. Available from: https://www.who.int/gho/mental_health/reports/en.
4. Lester D. Suicide and Islam. *Arch Suicide Res* 2006; 1: 40–63. [CrossRef]
5. World Health Organization. Preventing Suicide: A Global Imperative 2014. Geneva: World Health Organization; 2014. Available from: http://www.apps.who.int/iris/bitstream/handle/10665/131056/9789241564779_eng.pdf;jsessionid=0C9C4112A96191D6BD-437C7662364ECC?sequence=1. Accessed November, 2018.
6. Rasouli MR, Saadat S, Haddadi M, Gooya MM, Afsari M, Rahimi-Movaghar V. Epidemiology of injuries and poisonings in emergency departments in Iran. *Public Health* 2011; 125(10): 727–33.
7. Janghorbani M, Sharifirad GR. Completed and attempted suicide in Ilam, Iran (1995-2002): Incidence and associated factors. *Arch Iran Med* 2005; 8(2): 119–26.
8. Poorolajal J, Rostami M, Mahjub H, Esmailnasab N. Completed suicide and associated risk factors: A six-year population based survey. *Arch Iran Med* 2015; 18(1): 39–43.
9. Runeson B, Tidemalm D, Dahlin M, Lichtenstein P, Langstrom N. Method of attempted suicide as predictor of subsequent successful suicide: National long term cohort study. *BMJ* 2010; 341: c3222.
10. Hawton K. Restricting access to methods of suicide: Rationale and evaluation of this approach to suicide prevention. *Crisis* 2007; 28(Suppl 1): 4–9. [CrossRef]
11. Nazarzadeh M, Bidel Z, Ayubi E, Asadollahi K, Carson KV, Sayehmiri K. Determination of the social related factors of suicide in Iran: A systematic review and meta-analysis. *BMC Public Health* 2013; 13(1): 4.
12. Veisani Y, Delpisheh A, Sayehmiri K, Moradi G, Hassanzadeh J. Suicide attempts in Ilam Province, Western Iran, 2010-2014: A time trend study. *J Res Health Sci* 2016; 16(2): 64–7.
13. Razaeeian M, Sharifirad G. Case fatality rates of different suicide methods within Ilam province of Iran. *J Educ Health Promot* 2012; 1: 44.
14. Giner L, Jaussent I, Olié E, Béziat S, Guillaume S, Baca-Garcia E. Violent and serious suicide attempters: One step closer to suicide? *J Clin Psychiatry* 2014; 75(3): 191–7. [CrossRef]
15. Jokinen J, Nordstrom AL, Nordstrom P. Cholesterol, CSF 5-HIAA, violence and intent in suicidal men. *Psychiatry Res* 2010; 178(1): 217–9. [CrossRef]
16. Jollant F, Bellivier F, Leboyer M, Astruc B, Torres S, Verdier R, et al. Impaired decision making in suicide attempters. *Am J Psychiatry* 2005; 162(2): 304–10. [CrossRef]
17. Peters JPM, Hooft L, Grolman W, Stegeman I. Reporting quality of systematic reviews and meta-analyses of otorhinolaryngologic articles based on the PRISMA statement. *PLoS One* 2015; 10(8): e0136540.
18. Brockwell SE, Gordon IR. A comparison of statistical methods for me-

- ta-analysis. *Stat Med* 2001; 20(6): 825–40. [CrossRef]
19. Egger M, Davey Smith G, Schneider M, Minder C. Bias in meta-analysis detected by a simple, graphical test. *BMJ* 1997; 315(7109): 629–34. [CrossRef]
 20. Mohamadian F, Delpisheh A, Shiry F, Faramarzi S, Direkvand-Moghadam A. Epidemiological aspects of suicide lead to death in Iranian population during 2004-2008; A retrospective study. *Pharm Lett* 2015; 7(12): 154–8.
 21. Rostami M, Jalilian A, Rezaei-Zangeneh R, Salari A. Factors associated with the choice of suicide method in Kermanshah Province, Iran. *Ann Saudi Med* 2016; 36(1): 7–16. [CrossRef]
 22. Shojaei A, Moradi S, Alaeddini F, Khodadoost M, Abdizadeh A, Khademi A. Evaluating the temporal trend of completed suicides referred to the Iranian forensic medicine organization during 2006-2010. *J Forensic Legal Med* 2016; 39: 104–8. [CrossRef]
 23. Shakeri J, Farnia V, Abdoli N, Akrami MR, Arman F, Shakeri H. The risk of repetition of attempted suicide among Iranian women with psychiatric disorders as quantified by the suicide behaviors questionnaire. *Oman Med J* 2015; 30(3): 173–80. [CrossRef]
 24. Sadeghi S, Heydarheydari S, Darabi F, Golchinnia A. Suicide attempts among patients admitted to hospital of Kermanshah university of medical sciences. *Int J High Risk Behav Addict* 2015; 4(1): e23028. [CrossRef]
 25. Shojaei A, Moradi S, Alaeddini F, Khodadoost M, Ghadirzadeh MR, Khademi A. The association between completed suicides and season of the year in an Iranian population. *Iran J Public Health* 2013; 42(3): 293–7.
 26. Haghghi H, Golmirzaee J, Mohammadi K, Moradabadi AS, Dadipoor S, Hesam AA. Investigating the relationship between the demographic variables associated with suicide in different seasons, among suicidal people in the Shahid Mohammadi Hospital, Bandar Abass, Iran. *J Educ Health Promot* 2015; 4: 3.
 27. Ghaleiha A, Khazae M, Afzali S, Matinnia N, Karimi B. An annual survey of successful suicide incidence in hamadan, Western iran. *J Res Health Sci* 2009; 9(1): 13–6.
 28. Sharghi S. Study of demographic and suicide methods in suicide victims and suicide incidence in Ardabil city based on suicide death registries in legal medicine center from 1997 to 2006. *Int J Food Microbiol* 2009; 15(2): 108–14.
 29. Panaghi L, Ahmadabadi Z, Peiravi H, Zahra Abolmasoomi F. Suicide trend in university students during 2003 to 2008. *Iran J Psychiatry Clin Psychol* 2010; 16(2): 87–98.
 30. Saberi-Zafarghandi MB, Ghorbani R, Mousavi S. Epidemiologic study on suicide attempt in affiliated hospitals of Semnan University of medical sciences. *Koomesh J* 2005; 6(4): 311–8.
 31. Tavallaii SA, Ghanei M, Assari SH, Nezhad ML, Habibi M. Risk factors correlated to suicide in deceased Iranian veterans. *J Military Med* 2006; 8(2): 143–8.
 32. Sadegh al-Islam T, Rezaei O. Investigating cases of suicide in children referred to Loghman Hakim Hospital. *Int J Food Microbiol* 2005; 11(3): 123–7.
 33. Molavi P, Abbasi-Ranjbar V, Mohammad-Nia H. Assessment of suicide risk factors among attempted suicide in Ardabil within first half of 1382. *Arch Rehabil* 2007; 8(1): 1–7. [CrossRef]
 34. Shirzad J, Gharedaghi J. Study of methods and causes of suicides resulting in death referred to legal medicine organization of IRAN in first six month of 2004. *Int J Food Microbiol* 2007; 13(3): 163–70.
 35. Sayadrezai E, Farzaneh E, Azamy A, Mogaddam AE, Shahbazzadegan S, Mehrgany R. The epidemiologic study of suicide in Ardabil Province from 2003 to 2009. *J Ardabil Univ Med Sci* 2009; 9(4): 299–306.
 36. Ansari A, Khodadadi A, Sayadi A, Negahban T, Allahtavakoli M. Suicide attempt and related factors among referring to Ali Ebn-e Abitaleb hospital in during Rafsanjan 2006-2007. *J Community Health* 2010; 5(1): 38–44.
 37. Rezaeian M, Sharifirad G, Foroutani MR, Moazam N. Suicide and attempted suicide in Ilam, Iran; risk factors and the directions of function. *J Health Syst Res* 2011; 6(1): 86–94.
 38. Monsef Kasmaie V, Asadi P, Maleki Ziabari SM. A demographic study of suicide methods in the patients aided by emergency paramedics Guilan. *J Guilan University of Med Scien* 2013; 22(87): 31–7.
 39. Astaraki P, Kikhavani S, Bashiri S, Mansoorian M, Ghorbani M. A comparative study of the causes and methods of suicide lead to death referred to ilam legal medicine center in 2004-2009. *Int J Food Microbiol* 2014; 20(1): 385–92.
 40. Yaraghi A, Mood NE, Akoochakian s, Masoomi G, Naderalaslami M, Ahmadloo H, et al. Comparison of factors associated with suicide among employed women and housewives. *Int J Food Microbiol* 2014; 20(2): 47–54.
 41. Pirae E, Shahkolahi Z, Salehiniya H. Epidemiological study of suicide and attempted suicide and related factor in Kohgiluyeh. *J Isfahan Med Sch* 2014; 32(305): 1–12.
 42. Shaholi ASR. Study of the status and causes of suicide in a 8-year period in Izeh city. *Crime Prevention Studies Quarterly* 2012; 7(23): 159–76.
 43. Nazarzadeh M, Bidel Z, Ranjbaran M, Hemmati R, Pejhan A, Asadolahi K, et al. Fatal suicide and modelling its risk factors in a prevalent area of Iran. *Arch Iran Med* 2016; 19(8): 571–6.
 44. Behmanesh Poor F, Tabatabaei SM, Bakhshani NM. Epidemiology of suicide and its associated socio-demographic factors in patients admitted to emergency department of Zahedan Khatam-Al-Anbia hospital. *Int J High Risk Behav Addict* 2014; 3(4): e22637. [CrossRef]
 45. Amiri B, Pourreza A, Foroushani AR, Hosseini SM, Poorolajal J. Suicide and associated risk factors in Hamadan Province, West of Iran, in 2008 and 2009. *J Res Health Sci* 2012; 12(2): 88–92.
 46. Saberi-Zafarghandi MB, Hajebi A, Eskandarieh S, Ahmadzad-Asl M. Epidemiology of suicide and attempted suicide derived from the health system database in the Islamic Republic of Iran: 2001-2007. *East Mediterr Health J* 2012; 18(8): 836–41. [CrossRef]
 47. Arefi M. Survey of suicide rate in West Azarbaijan province between 1998 and 1999 and achievement of some of the variables affecting it. *J Psychol Educ* 2002; 32(1): 141–62.
 48. Salari-lak S, Entezar NR, Afshininaghadeh MT, Abasi H. Investigating the rate and factors affecting the suicide event in a West Azarbaijan Province in a one year. *Urmia Med J* 2006; 17(2): 9–15.
 49. Taziki MH, Semnani S, Gosalipour MJ, Behnampour N, Taziki AS, Rajae S, et al. Epidemiological survey of suicide in Golestan province in the North of Iran (2003). *J Mazandaran Univ Med Sci* 2006; 16(55): 72–7.
 50. Rafiei M, Seyfi A. The epidemiologic study of suicide attempt referred to hospitals of university of medical sciences in Markazi-Province from 2002 to 2006. *Iran Journal of Epidemiol* 2009; 4(3): 59–69.
 51. Shams Alizadeh N, Afkhamzadeh A, Mohsenpour B, Salehian B. Suicide attempt and related factors in Kurdistan Province. *Sci J Kurdistan Univ Med Sci* 2010; 15(1): 79–86.
 52. Rezaeian M, Daneshkohan A, Sharifirad G, Jahani B, Bahmani R, Fathollahi E, et al. Suicide Epidemiological Pattern within Ilam Province, Iran. *Journal of Health System Research*. 2011;7(6):819-28.
 53. Hossini S, Toroski M, Asadi R, Rajabzadeh R, Alavinia S, Khakshor A. Trend of attempted suicide and its related factors in Bojnurd city 2006 -2011. *J North Khorasan Univ Med Sci* 2012; 4(4): 552. [CrossRef]
 54. Khajeh E, Hosseinpour M, Sedigh B, Rezvani Y. Image of suicide in Hormozgan province, 2012. *Hormozgan Med J* 2014; 17(1): 61–7.

55. Nouri R, Fathi-Ashtiani A, Salimi SH, Nejad AS. Effective factors of suicide in soldiers of a military force. *J Mil Med* 2012; 14(2): 99–103.
56. Mobasheri M, Imani R, Alidosti M, Khosravi N. Epidemiologic study of suicide attempt cases in Chaharamahal and Bakhtiari Province in 2003-2012. *J Clin Res Paramed Sci* 2012; 1(4): 19–30.
57. Moradi AR, Moradi R, Mostafavi E. The study of factors related suicide Bahar Town. *J Rea Behav Sci* 2012; 10(1): 50–8.
58. Jabbari fard F, Qari A, Yazdekhashti FF, Masudi S. The epidemiology of suicide and related factors in the city of Lordegan from 2001 to 2011. *J Shahrekord Univ Med Sci* 2013; 15(6): 75–86.
59. Hajivandi A, Akbarizadeh F, Janghorbani M. Epidemiology of suicide in province of Bushehr in 2009. *J Health Syst Res* 2014; 9(11): 1252–61.
60. Gorgi Z, Fathollahi MS, Askarizadeh MK, Rezaeian M. Epidemiology of suicide and attempted suicide in the larestan and gerash during 2008 to 2012. *J Rafsanjan Univ Med Sci* 2014; 13(7): 597–608.
61. Gorgi Z, Rezaeian M, Rezaei F, Fathollahi MS. Epidemiology of suicide and suicide attempts in counties under the supervision of Shiraz university of medical sciences from 2009 to 2012. *J Health Dev* 2016; 5(1): 58–70.
62. Moravveji SA, Saberi H, Akasheh G, Ahmadvand A, Kiani-Pour S. Epidemiology of attempted suicide in Kashan during 2003-8. *Feyz J Kashan Univ Med Sci* 2011; 15(4): 374–81.
63. Bakhsha F, Behnampour N, Charkazi A. The prevalency of attempted suicide in Golestan province, North of Iran during 2003-07. *J Gorgan Univ Med Sci* 2011; 13(2): 79–85.
64. Suominen K, Isometsä E, Ostamo A, Lönnqvist J. Level of suicidal intent predicts overall mortality and suicide after attempted suicide: A 12-year follow-up study. *BMC Psychiatry* 2004; 4: 11. [\[CrossRef\]](#)
65. Bailey RK, Patel TC, Avenido J, Patel M, Jaleel M, Barker NC, et al. Suicide: Current trends. *J Natl Med Assoc* 2011; 103(7): 614–7.
66. Stenbacka M, Jokinen J. Violent and non-violent methods of attempted and completed suicide in Swedish young men: The role of early risk factors. *BMC Psychiatry* 2015; 15: 196. [\[CrossRef\]](#)
67. Lopez-Castroman J, Jaussent I, Beziat S, Guillaume S, Baca-Garcia E, Olié E, et al. Posttraumatic stress disorder following childhood abuse increases the severity of suicide attempts. *J Affect Disord* 2015; 170: 7–14. [\[CrossRef\]](#)
68. Ahmadi A, Schwebel DC, Bazargan-Hejazi S, Taliee K, Karim H, Mohammadi R. Self-immolation and its adverse life-events risk factors: Results from an Iranian population. *J Inj Violence Res* 2015; 7(1): 13–8.
69. Parvareh M, Hajizadeh M, Rezaei S, Nouri B, Moradi G, Nasab NE. Epidemiology and socio-demographic risk factors of self-immolation: A systematic review and meta-analysis. *Burns* 2018; 44(4): 767–75.
70. Bidel Z, Nazarzadeh M, Ayubi E, Sayehmiri K. Prevalence of important poisoning methods used in Iranian suicides: A systematic review and meta-analysis. *Koomesh J* 2013; 14(3): 257–64.
71. Azizpour Y, Asadollahi K, Sayehmiri K, Kaikhavani S, Abangah G. Epidemiological survey of intentional poisoning suicide during 1993-2013 in Ilam Province, Iran. *BMC Public Health* 2016; 16(1): 902. [\[CrossRef\]](#)