

Psychosocial Factors Associated with Suicidal Behavior among Iranian Women: A Meta-analysis

Abstract

Suicide is one of the public health problems worldwide, but it lacks regular relevant reporting system. This issue is more important among women who play an influential role in the family and society. Therefore, the assessment of recent relevant studies is important to detect suicide-related factors and to help make the decisions about public health. The aim of the current study was to determine socioeconomic and psychological factors of suicide attempts in Iranian women using a descriptive meta-analysis method. All domestic scientific databases were searched using “suicide” keyword. A search was also done using keywords of corresponding to Medical Subject Headings including “Iran,” “suicide,” “psychosocial determinants,” “behavior,” “suicide commitment,” “suicide thoughts,” and “women.” Overall, 3061 articles were retrieved through the initial search. Finally, 69 studies from nine provinces were included for the analysis. All statistical analyses were performed using R software version 3.2.6 with Metafor package version 1.9-9. Using nine selected studies, frequency of urban family (prevalence = 85%, 95% confidence interval [CI] = 0.68–1.00), nonacademic education (prevalence = 53%, 95% CI = 0.45–0.61), and family problems (prevalence = 34%, 95% CI = 0.19–0.49) was identified as the most important related factor of suicide compared to any other related factors. According to the results, family problems and lower education are associated with suicide attempts. Thus, providing training programs and family consultant services are recommended to reduce the incidence of suicide attempts.

Keywords: Meta-analysis, psychosocial, suicidal, women

Introduction

Suicide defined as the act of killing oneself intentionally and as a phenomenon has been closely tied up with human life for a long time from one’s traditional relations to today’s complicated relations in big cities, it is considered as one of the social and medical problems in the world,^[1] and it imposes a heavy burden on community.^[2] Today, suicide is the tenth leading cause of death worldwide and the second cause of death among teenagers.^[3] Every 3 s one suicide and every 40 s one death caused by suicide occur in the world.^[3,4] Thus, the incidence, patterns, and causes of suicide are significantly different from one country to another one. On average, the rate of completed suicide is different from <0.4/100,000 people in Nigeria to >22.7/100,000 people in Switzerland.^[5] The latest figures provided by forensic medicine in Iran indicates

that in 2001–2002, the rate of suicide in men was 5.7/100,000 people and in women 3.1/100,000 people.^[6]

In recent years, suicide rates have increased significantly worldwide, along with modernization, industrialization, and urbanization.^[7] Some of the most important risk factors for suicide are old age, deprivation of love, living in urban, population density, and the heterogeneity of individuals, homesickness and loneliness due to reduction of family affection, poverty, unemployment, mental illness, and dozens of other factors; thereby one may find the suicide as the only way to save oneself.^[8]

However, the suicide-related factors are different, but they can be placed in three areas of physical and mental illnesses, social issues, and economic issues,^[9] and in each areas, various factors can be mentioned. For example, in the social area, some issues such as economic and family problems, academic failure, and in the

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affective domain, some issues such as marital problems between wife and husband and emotional problems between younger people against opposite sex can be considered. Therefore, it can be stated that different rates of suicide in the communities, regions, sectors, and different age and sex groups represent this matter.

On the other hand, despite the fact that in all regions of the world (excluding China) and even in Iran, suicide rate among men is higher than women, but more interesting matter is that women are more likely to suicide almost 3.2 times more than men. Thus, a higher rate of suicides in men compared to women can be a result of reliance upon the official statistics on suicide and ignorance or underestimating many cases of suicide or suicidal tendencies.^[10] In this regard, it is estimated that each time attempt to suicide increases the risk of completed suicide up to 32%.^[11,12] Thus, it is important to know the factors associated with such measure and to create hypotheses based on research to prevent further actions.

On the other hand, the gender is considered as an important variable in the suicide phenomenon and various studies have been conducted in this regard. Researchers in Iran have been sensitive to this issue, and they have tried to highlight the role of gender in suicidal behavior in their scattered studies. However, all studies have limitations and gaps that renewing efforts are required.

Therefore, according to the importance of this issue as one of the public health problems in the country and the lack of care and regular relevant reporting system and the importance of subject among women regarding their influential role in the family and society, it seems that summing up the results of the studies conducted in the past years and achieving an unique conclusion help us achieve a better understanding and formulate hypotheses about the related factors of suicide in the country. Furthermore, there is no accurate and credible statistics suggesting the share of social and economic problems in the incidence of suicide.

In addition, meta-analysis studies or reviews from experts in this field which can sum up all studies conducted on the suicide-related factors in recent decades in the country and extract a little out of it are rarely seen. Therefore, in this study, we tried to achieve a better understanding of the share of socioeconomic and psychological factors in the formation of this phenomenon through reviewing and analyzing previous studies in a systematic review based on relevant studies on suicide in the past two decades in Iran.

Materials and Methods

This systematic review has been conducted to examine the psychosocial determinants of suicidal behavior among women. The reviewed documents and evidences have been selected using the databases including Medline, The Cochrane Central, CINAHL, EMBASE, Psyc INFO, Google Scholar, Register of Controlled Trials, Pro Quest,

student theses in all academic levels, internal and external scientific journals, papers presented at conferences and congresses.

Because some internal databases did not show sensitivity to the search operators (such as not and or), we searched by “suicide” alone as the keyword for high sensitivity. However, to search in international databases, we used keywords corresponding to Medical Subject Headings such as “Iran,” “suicide,” “women,” “suicide commitment,” “suicide thoughts,” “psychosocial determinants,” and “behavior.” It should be noted that all searches were conducted by two researchers to collect all relevant literature, and finally, we excluded papers with duplicate titles. Then, a list of titles and abstracts of all available papers and materials provided by the researcher through databases mentioned above, and to identify and select relevant topics, were studied independently. In the next step, relevant papers were initially assessed using blinding method and were entered into the study process separately. In addition, providing the two researchers did not agree to select specific paper, the judgment was handed over to a third party expert.

The main criteria to include the various articles in this study were all articles in Persian and English languages, student theses in all academic levels, abstracts of relevant papers presented congresses, cohort and correlation articles, systematic reviews, case reports, related articles to the girls and women population without age restrictions, studies in which diagnosis is conducted through authentic instruments or psychiatric interview according to one of the versions of Diagnostic and Statistical Manual of Mental Disorders. However, to achieve the most relevant and highest quality studies, we excluded irrelevant studies in terms of study design and research topics, studies when the full text of article are not shared by the authors, studies in which are not used valid and reliable instruments or studies in which are not provided information on the validity and reliability of applied testes, studies in which vague and irrelevant statistical tests have been used, and finally studies without adequate information.

Considering purpose of this study which is determination of demographic, social, economic, psychological, and family factors affecting women’s suicide, in this study, psychological factors including a history of psychiatric disorders, medications, and personality disorders, social factors including educational factors, factors of identity, social protection, family structure, socioeconomic status, belonging to ethnic, religious, legal issues, domestic violence, marital satisfaction, and divorce, and demographic variables such as age, education, income, place of residence, and marital status were considered.

To collect and record this information, at the next stage, we examined the full text of articles, and if there was no access to the full text, we had communicated using an

e-mail to the corresponding author. Providing we did not access to full text of article yet and also in the absence of sufficient information in the abstract, and about studies that have been conducted on both sexes, but the separation of factors contributing to suicide commitment in each sex was unknown, we compulsively excluded these articles. Then, all articles were evaluated using STROBE checklist. In the final stage, data of included articles such as first author, state, city in where the study conducted, publication date of article, sample size in the study, average age of people, and their standard errors were recorded [Table 1].

A total of 3061 articles were found that ultimately we selected nine studies out of them based on mentioned inclusion and exclusion criteria. All information of studies usually was collected through files of suicide cases available in health centers, hospitals, and files of patients referred to emergency department of hospitals in this regard. Since here, the analysis was conducted separately for various reasons; therefore, these nine selected articles could not provide required information to analyze all the factors separately, so we entered articles providing required information for each factor, separately to analyze [Figure 1].

Finally, to evaluate information, the prevalence of different related factors of suicide including psychological factors and social factors was analyzed to estimate point prevalence and 95% confidence intervals (CIs). In each study, we used the formulae of binominal distribution to estimate the variance, and we evaluated the heterogeneity among studies by Cochran *Q*-test at significance level of <0.10 and *I*² index.^[13,14] For the *Q*-test, a $P < 0.10$ was considered statistically significant. If $P > 0.10$, there was a lack of heterogeneity between the studies. If $P \leq 0.10$ (i.e., heterogeneity was significant), we calculated *I*². If $I^2 \leq 50\%$, the heterogeneity might be acceptable; otherwise, there was significant heterogeneity between studies.^[13] In all analyses, substantial heterogeneity was observed (the results of any analysis is provided); this level of heterogeneity is usually normal for descriptive meta-analyses. In the absence of heterogeneous, the fixed effects model with inverse-variance weighting was used for the analysis of studies, and in the presence of heterogeneous, the random effects model proposed by Paule and Mandel was used. To determine the role of each study in final results, sensitivity analysis was used in which no considerable effect on the overall frequency estimation of each related factor was identified after the withdrawal of articles separately. Depending on the analyzed data type (prevalence of related factors) and considering precise use of the checklist for quality control of articles, determination of publication bias and using Funnel plot were not required. All statistical analysis was performed using R software (version 3.2.6; Vienna, Austria) with Metafor package version 1.9-9

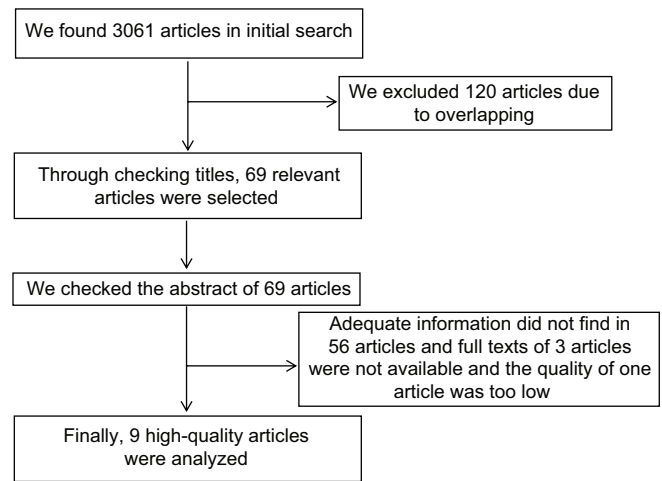


Figure 1: Stages of entering studies into systematic review and meta-analysis

Table 1: Characteristics of studies used in the meta-analysis

City or province	First author's name (year)	Mean of age	Sample size	Suicide status
Markazi	Rafiei (2009-2010)	23	2526	Successful and unsuccessful
Tehran	Memari (2006-2007)	28.7	100	Unsuccessful
Yasuj	Heidari (2014-2015)	20	370	Unknown
Isfahan	Yaraghi (2014-2015)	22	600	Unsuccessful
Bojnourd	Hojat (2015-2016)	24.2	182	Unknown
Isfahan	Mehrabi (2013-2014)	16.1	415	Unknown
Babol	Esmaeilnia (2005-2006)	22	136	Unknown
Kerman	Zohour and Aflatounian (2002-2003)	Unknown	28	Unknown
Isfahan	Moshref (2013-2014)	Unknown	64	Unknown

Results

Of all articles, nine articles^[15-36] were entered into the final analysis according to the inclusion criteria. The total number of samples was 4421 people from seven provinces of the country. Only seven studies have reported the mean age of women, and according to these studies, we estimated that equal to 22.3 years. In addition, a study presented both completed and attempted suicide,^[15] two other studies presented only attempted suicide^[16,18] and others did not mention the result of suicide attempts. Totally, four studies have reported suicide methods including taking medication, using poison, hanging, self-immolation, and self-mutilation.

Because in this case the analysis has been conducted separately for different reasons (mental, social factors and demographic variables), so nine selected articles could not provide required information to analyze all related factors simultaneously, and therefore, we entered articles providing required information for each cause into meta-analysis separately.

The results of meta-analysis of education level as the related factors of suicide

To evaluate nonacademic education, information of four studies could be used in which totally 1594 people were considered as the sample size. The frequency of nonacademic education as the related factors of suicide was estimated in an average level of 53% (95% CI: 45%–61%) [Figure 2]. There was also significant heterogeneity among studies in this case ($I^2 = 99%$, $P < 0.001$, $Q = 236.7$). Therefore, we used the random effects model proposed by Paule and Mandel to combine them. The sensitivity analysis also showed that withdrawal of the results of any study alone from the analysis had no significant effect on the overall results.

The results of meta-analysis of psychological factors as the related factors of suicide

Psychological disorders

To examine the history of psychological disorders as the related factors of suicide, six studies were used with a sample size of 430. The prevalence of this the related factors was estimated that was relatively small and equal to 14% (95% CI: 2%–26%) [Figure 3]. Further, in this analysis, a high heterogeneity could be observed ($I^2 = 99%$, $P < 0.001$, $Q = 289.1$). Hence, we used the random effects model proposed by Paule and Mandel to combine them. The sensitivity analysis showed that withdrawal of any study alone from the analysis had no significant effect on estimating the prevalence.

The results of meta-analysis of socioeconomic factors as the related factors of suicide

To evaluate the social and economic factors in these studies, only factors including family problems, marital problems, and unemployment (as an economic problem) were registered.

Family problems

To evaluate the role family problems in suicide commitment, we used five studies with the sample size of 2936. The prevalence of this related factors was also estimated that was relatively small and equal to 34% (95% CI: 19%–49%) [Figure 4]. In addition, in this analysis, a considerable heterogeneity could be observed ($I^2 = 97%$, $P < 0.001$, $Q = 128.2$). Therefore, we used the random effects model proposed by Paule and Mandel to combine them. The sensitivity analysis showed that withdrawal of any study separately from the analysis had no significant effect on estimating overall prevalence.

Marital problems

Evaluation of marital problems was feasible in five studies with the sample size of 2936. The prevalence of this cause was estimated that was relatively small and equal to 11% (95% CI: 2%–19%) [Figure 5]. Further, in this analysis, a significant heterogeneity could be

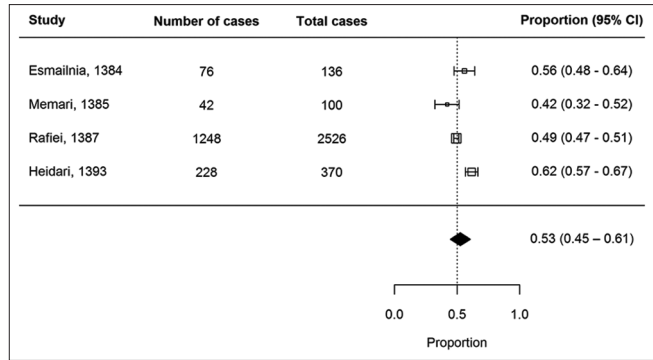


Figure 2: The meta-analysis of the frequency of nonacademic education in women attempted suicide

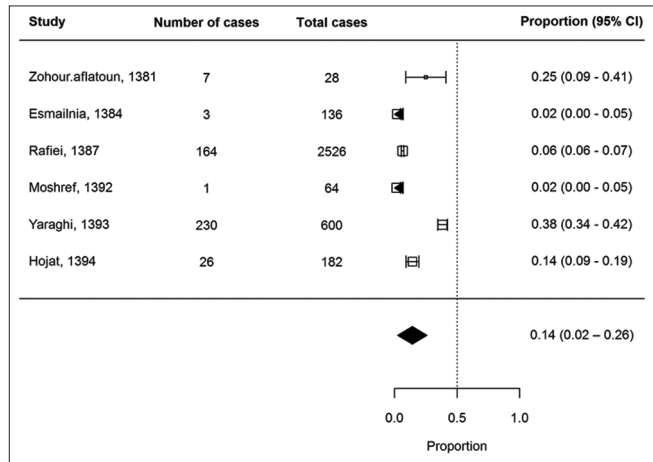


Figure 3: Meta-analysis of the prevalence of psychological disorders in women attempted suicide

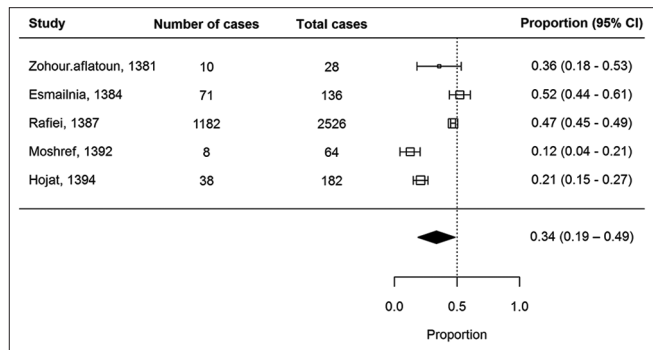


Figure 4: Meta-analysis of the prevalence of family problems among women attempted suicide

observed ($I^2 = 95%$, $P < 0.001$, $Q = 70.7$). Thus, we used the random effects model proposed by Paule and Mandel to combine them. The sensitivity analysis showed that withdrawal of any study alone from the analysis had no significant effect on estimating overall prevalence.

Urbanization

Only three studies out of nine had presented information on living in urban or rural of subjects. Therefore, overall only three studies with the sample size of 2996

people were used in the study. In these studies, on average, the frequency of urbanization, as one of the most important causes of suicide, was estimated equal to 85% (95% CI: 68%–100%) [Figure 6]. The Cochran *Q*-test indicates the existence of heterogeneity among studies ($I^2 = 100\%$, $P < 0.001$, $Q = 426.2$). Therefore, to combine them, we used the random effects model proposed by Paule and Mandel. The sensitivity analysis also showed that by withdrawal of any study alone, substantial change in the estimation of the frequency would not occur.

Unemployment

To evaluate this related factors, we used three studies with the sample size of 192. The prevalence of economic issues was estimated that was also relatively small and equal to 29% (95% CI: 0%–29%) [Figure 7]. In addition, in this analysis, a high heterogeneity could be observed ($I^2 = 95\%$, $P < 0.001$, $Q = 64.4$). Therefore, we used the random



Figure 5: Meta-analysis of the prevalence of marital problems among women attempted suicide

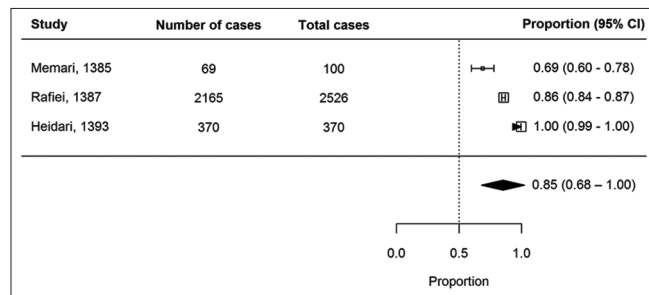


Figure 6: The frequency of urbanization in women attempted suicide

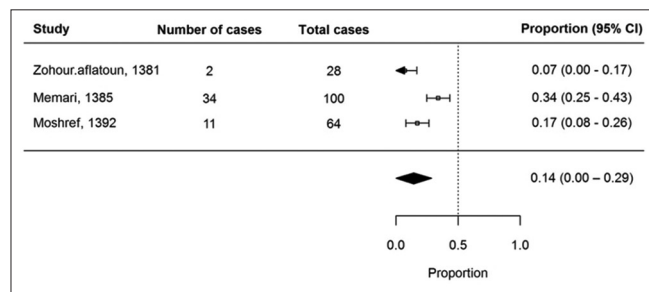


Figure 7: Meta-analysis of the prevalence of economic issues among women attempted suicide

effects model proposed by Paule and Mandel to combine them. The results of sensitivity analysis indicated that withdrawal of any study alone from the analysis had no significant effect on estimating overall prevalence.

Discussion

The results of this meta-analysis showed that the mean age of woman attempted suicide was 22.3 years that most of them were urban (the prevalence: 85%). In this regard, a study in Qazvin has reported that the maximum prevalence of suicide among women has been observed in the age group of <20 years,^[24] while a study has reported the age group of 30–39 years as the common age range of suicide.^[25] In another study also, it has been found out that 80% of people who committed suicide were female and their mean age was 22 years.^[26] In addition, Zarghami and Khalilian study has shown that the mean age of women attempting suicide was 27 years.^[27]

Further, nonacademic education (lower level of education) can be known as the most important related factors of suicide compared to any other the related factors (prevalence: 53%). In line with this study, some other studies have shown that the prevalence of suicide was higher in housewives or those with less than high-school diploma.^[27]

A systematic review (2016) also presented that young adulthood, female gender, and lower education are significant factors for suicide attempts in the Iranian population. In accordance with this study, in another research on 84,850 subjects from 17 countries, the effective factors on suicide attempts were female gender, being single, lower age, and education.^[28,29]

Family problems were known in the third place of suicide the related factors suicide in this study (prevalence: 34%). However, as it is shown in Figure 4, in Babol and Markazi provinces, the prevalence of family problems is higher compared to other provinces; therefore, taking account of family problems in these provinces, it is important. Hence, overall, this finding can move us toward this assumption that a more stable family can play an important role in reducing suicide attempts. For this purpose and for more accurate estimates, more studies around the country are required, and with the development of studies on suicidology in the country, we hope that by updating the results of this meta-analysis in the future, clearer interpretations were provided.

In accordance with this study, Hakim Shoostari *et al.* reported the important role of significant interpersonal problems in suicide attempts among single persons aged 15–25 years, but among married individuals aged <20 years, significant family problems were important.^[28]

Maybe, it can be stated that one of the social problems would be marital problems. In this regard, the results of a

meta-analysis based on five studies out of nine suggested that marital problems have a prevalence of 11% among women attempted suicide. This study can be in line with the study conducted by Janghorbani and Sharifirad,^[30] in which they showed that the frequency of completed suicides and also the prevalence of suicide attempts is higher among married people compared to people who have never married.

These findings are against this fact that marriage and family are as the protective factor against many disorders. However, whether marriage itself or other subsidiary reasons such as anatomic and physiologic are psychological problems can be the reason for the increase of suicide among married couples needs further investigations. According to some other studies, maybe, we can state that the related factors of this issue is the aggression (verbal and physical) from the husband and his relatives.^[16,31]

In line with this studies, in the studies by Maghsoudi *et al.* in Tabriz, Zarghami and Khalilian in Mazandaran, Gerehi *et al.* in Kordestan, Sadat in Kohgiluyeh, and Boyer-Ahmad and Shams Khoramabadi in Lorestan, marital problems such as violence and addiction of husband, polygamy, age difference between spouses, lack of understanding each other, and severe sensitivity against divorce are considered as the most important causes of suicide.^[27,32-34]

However, this is not merely a problem in Iran; since, throughout the world particularly in western countries, the major suicide-related factors are mental disorders, mood disorders (severe depression, anxiety, sadness, and so on), and personality disorders.^[29,42,43] However, in China, Zhang *et al.* reported that they were not associated with suicide attempts. Moreover, psychological disorders showed a prevalence of 14%. In many studies also, mental illnesses are known as the most important cause of suicide in the world.^[35-40] Therefore, considering high prevalence of depression particularly among women (depression considered as the second common disease among Iranian women^[41]), it is necessary to conduct accurate studies to examine the role of psychological disorders in suicide and given in the examination of each studies, the highest prevalence of suicide was observed in Isfahan cities (38%) and in Jiroft city of Kerman province (25%). Thus, more accurate examination seems to be required in these provinces.

Previous studies have been reported that mental disorders, mood disorders (severe depression, anxiety, sadness, and so on), and personality disorders are major risk factors for suicidality worldwide, particularly in Western countries.^[29,42,43] However, Zhang *et al.* pointed out that in China, although still important, psychiatric factors are not the main factors associated with suicide.^[44]

On the other hand, the prevalence of addiction among women attempted suicide was less, compared to other

causes (prevalence: 14%). Maybe, this is due to less prevalence of addiction to taking alcohol and opioids among women compared to men in the society.

However, many studies in the west have taken into account the role of alcohol and opioids in suicide among women and men.^[45,46] One of the high risk-behaviors of suicide women and men is taking alcohol and addiction to it that attracted the attention of investigators.^[47-49] Its role has been reported as an intermediate variable in depression and suicide attempt.^[50] Examinations conducted on American students indicated homogeneity between overtaking alcohol and suicide.^[51,52] Moreover, the history of suicide attempt was reported as a factor in suicide re-attempt among addicted people to alcohol.^[3,53,54]

In the studies in other countries, the major risk factors associated with increased risk of suicide attempts are sociofamily environment (single or remarried parent, study pressure, and academic achievement), unhealthy behaviors (smoking, alcohol drinking, and drug use), mood disorders, and stressful life events (suicide of relatives).^[55-57]

Finally, the frequency of reports on economic issues was estimated equal to 14% in three selected studies out of nine. In these studies, the highest prevalence was reported in Tehran in 2005–2006 (prevalence: 34%) and the least prevalence was reported in Jiroft of Kerman province in 2002–2003 (prevalence: 7%). The importance of socioeconomic variables is known for everyone. Famous studies in the world have confirmed the existence of relationship between socioeconomic status and suicide attempts.^[58]

The results of this meta-analysis indicated a moderate prevalence stated in suicide attempts' reports due to economic issues. The possibility of social justice and equitable distribution of wealth among vulnerable population and also policymaking to reduce the social gap between various groups in the society can be seen as ways to solve this problem. As mentioned at the beginning of this discussion, young people more than older people commit suicide and aging reduces the risk of suicide.^[30]

Moreover, it is clear that the most important economic issue among young people is unemployment which causes many social and health problems in the society.^[59] Hence, by increasing the employment, we can hope that many social problems including suicide would be decreased.

It should be noted that social reasons, which likely lead to suicide, can have a significant effect together and indeed a considerable overlap may exist between these variables. For example, economic issues can cause family conflicts, development of domestic and marital problems, and emotional issues, and finally, all these issues can increase the severity of person's mental illness that eventually leads him to suicide; therefore, recognizing what factors

associated with suicide is difficult and suicide as well as other noncommunicable diseases is a multifactorial problem.

Thereby, first, it is recommended that the authorities take it into account as a plan for a long-term intervention to resolve the problems. For example, by allocating enough funds, cohort studies can be applied to acquire more knowledge about psychological problems and suicide-related factors and to improve the planning process for preventive measures in the first and second levels of mental health in health care delivery system. Second, it is suggested that investigators evaluate relative odds for each risk factor through controlled clinical trials and compare their interaction effect. In addition, studies on more vulnerable groups or groups with more likelihood of suicide attempts are required while the population should be divided into smaller subgroups to assess and identify suicide-related factors in different populations more accurately.

This study also had limitations that should be considered. The most important limitation was lack of access to all articles and reports were not published and it can be said that almost all of meta-analysis studies are limited in this term. The second problem was to identify the cause of heterogeneity; there were no proper high = quality reports in some studies. On the other hand, due to the descriptive nature of this meta-analysis, it is difficult to identify and interpret the causal relationship, but it may be useful to be considered in future research studies.

Conclusion

The results of this meta-analysis showed that the prevalence of suicide was higher among women in urban area and family problems and lower education (nonacademic education) can be the most common social cause of suicide attempts. Therefore, through intervention and providing training programs and proper consultation which is consistent with the culture of people in each region, we can reduce the incidence of suicide in the community. In addition, due to the high prevalence of psychological factors such as depression and addiction and known relationship between suicide and psychological disorders, we recommend screening for people at risk to prevent this problem.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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