



The Association between Completed Suicides and Season of the Year in an Iranian Population

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Abstract

Background: The main objective of the present study was to determine the association between completed suicides and season of the year in Iran during 2006-2010.

Methods: Data on completed suicides were collected by questionnaires field out by the family members of the victims in Legal Medicine Centers throughout the country over the period from 2006 to 2010. The maximum number of completed suicides (380) was observed in August, while the minimum number (231) was reported in February.

Results: Season-wise, completed suicides were most prevalent in summer (1040), whereas least prevalent in winter (726). Mean (SD) age of individuals having committed suicide was 31.5 (14.6) years. This value did not change significantly in different seasons ($P=0.051$); nor, was a statistically significant difference observed in the educational level and the reason for suicide across different seasons of the year. Self-immolation and toxic poisoning were found to be significantly less common in autumn and winter ($P<0.05$), respectively. The number of completed suicides was higher in warm seasons

Conclusion: Season of the year had significant relationships with gender as well the method of suicide, while no significant association was observed for age, level of education, and reason for suicide.

Keywords: Suicide, Seasonality, Iran

Introduction

Suicide is believed to be as one the most important social and mental health problems in many countries, especially western European countries; it is, therefore, of high priority in both primary and secondary healthcare activities (1). Existence of a variety of definitions and categorizations for suicide implies that there are numerous risk factors causing to suicide attempt (2-3). Different authors have emphasized the role of gender, age, religion, marital status, job, race, as well as physical and mental health as the primary factors affecting suicide (4). WHO estimated that 87700 of the deaths that occurred throughout the world in 2002 were due to the suicide (5). In addition, it

was estimated that a vast majority of these deaths occurred in developing, low income countries (6). However, it is believed that suicide is preventable provided that its etiology is well understood in the target society (7).

On top of the abovementioned risk factors of suicide, i.e. age, gender, etc., seasonality is also believed to be a major factor influencing the rate of suicide, which was first reported by Morselli (8). He observed that the rate of suicide peaked in summer. He also believed that this peak co-occurred with the summer pick observed for mental disorders. More recent studies on the seasonality of suicide have shown contradictory results. Al-

though the studies conducted in Finland (9), Ireland (10), and Italy (11) have reported distinct peak suicide rates in summer, this pattern has been noticeably less distinct or even absent in the studies conducted in England and Wales (12), Australia and New Zealand (13), Singapore (14), and Switzerland (15).

In addition, the method applied for suicide is thought to have a seasonal pattern (16-18). In this case, although distinct seasonal patterns have been observed for violent methods, non-violent methods of suicide have shown no seasonal variation (19-21).

The main objective of the present study was to explore the association between completed suicides and season of the year for an Iranian population between 2006 and 2010.

Materials and Methods

The present work was a longitudinal study conducted on completed suicides that were referred to the Iranian Legal Medicine Centers throughout the country between 2006 and 2010. We only included the cases whose family approved that suicide was the cause of death. Autopsy tests were also performed to further approve the cause of death. However, when the autopsy tests indicated reasons for death other than suicide, the cases were excluded from the study. The sampling method used in the present study was census, so all of the completed cases of suicide during the study period were included. It is noteworthy that the present study was approved by the ethical committee of the Iranian Legal Medicine Organization. In addition, informed consent was signed by the family members of the victims.

Data on completed suicides were collected by questionnaires which were field out by the family members of the victims in Legal Medicine Centers throughout the country during 2006-2010. The data were then analyzed using SPSS software. Chi-square test was performed to compare the frequencies in different categories. Analysis of variance (ANOVA) was also used to compare means in different groups or seasons. Finally, to comply

with ethical criteria, the data are reported anonymously.

Results

A total number of 15822 completed suicides were recorded over the entire study period (2006-2010) in all of the Legal Medicine Centers in Iran. This number was 3523 in 2010, 2969 in 2009, 3339 in 2008, 2994 in 2007, and 2997 in 2006. Fig. 1 illustrates the absolute frequency of completed suicides over 2006-2010 in different seasons of the year.

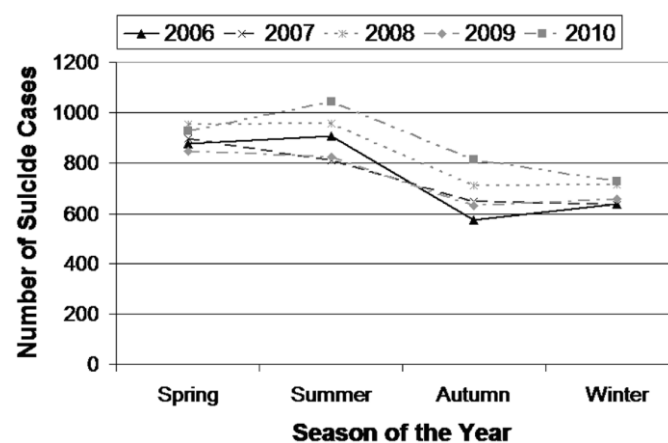


Fig. 1: The absolute frequency of completed suicides over 2006-2010 in different seasons of the year

Fig. 2 depicts the overall absolute frequency of completed suicides over 2006-2010 in different months of the year. Of the total cases of completed suicide, 70.5% were men while 29.5% were women. This implies that the frequency of suicide among men was 2.39 times as high as that in women. Furthermore, the frequency of completed suicides in men was higher in winter (72.7%) than in other seasons (69.8% in spring, 69.5% in summer, and 70.4% in autumn) ($P=0.01$). Mean (SD) age of individuals having committed suicide was 31.5 (14.6) years.

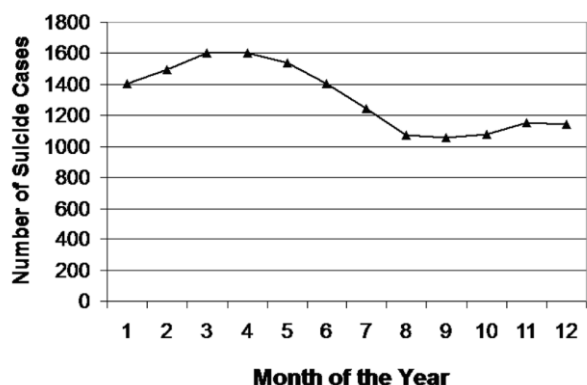


Fig. 2: The overall absolute frequency of completed suicides over 2006-2010 in different months of the year

This value did not change significantly in different seasons ($P=0.051$). Similarly, no statistically significant difference was observed in the level of education and the reason for suicide across different seasons of the year ($P>0.05$). The relative frequency of different methods used for suicide in different seasons of the year is presented in Table 1. As presented in the table, significant differences were observed for two methods, i.e. toxic poisoning and self-immolation, in different seasons of the year ($P=0.032$).

Table 1: The relative frequency of different methods of committing suicide in different seasons of the year

Season	Type of suicide					
	Hanging (%)	Self-immolation (%)	Drug poisoning (%)	Toxic poisoning (%)	Firearms (%)	Others (%)
Spring	53.5	16.8	6.9	11.0	7.5	4.3
Summer	51.1	16.2	8.3	11.9	7.6	4.8
Autumn	52.2	15.7	7.2	11.6	7.8	5.6
Winter	52.9	17.0	7.5	10.1	8.0	4.4
Total	52.4	16.4	7.5	11.2	7.7	4.7

Discussion

The present study was carried out aiming to explore the association between completed suicides and season of the year in an Iranian population between 2006 and 2010. The highest number of completed suicides recorded by the present study occurred in warm seasons (June-July), while the lowest number was observed in warm seasons (November to January). The difference between the two seasons was found to be statistically significant. As mentioned earlier, the existing evidence in the literature on the seasonality of suicide is not conclusive. For example, Kim et al. conducted a similar study in South Korea and found increased number of completed suicides in summer and spring, compared to those found in winter and autumn (22). The authors also found a 1.4-percent increase (CI=1-1.7%) in the rate of sui-

cide by each degree increase in the atmospheric temperatures. These findings have also been supported by a number of studies (9-11). On the other hand, other studies have found considerably less distinct or even no seasonal pattern for suicide (12-15).

This contradiction is believed to be due to various reasons. Firstly, this variety may be caused by the alteration of seasonality over time even in the same country (23). For example, an early British study exploring the seasonality of suicide between 1958 and 1974 found a distinct pattern with the peak rate in summer (24). However, a more recent study conducted in England by Yip et al. explored the same pattern during 1982-1996, but found significantly less distinct seasonal trend (12). Secondly, Casey et al. believe that the contradiction might be due to different methodologies and study designs applied (23). In some studies, the

seasonality of suicide has been explored as a single variable, disregarding the effect of confounding variables such as gender, age, etc., while the effect of such variables should be controlled for if the seasonality of suicide has to be well evaluated.

We also found a statistically significant relationship between gender and season of the year for suicide. The frequency of completed suicides in men was higher in winter compared to other seasons ($P=0.01$). This relationship was also observed in the previous studies (22). However, we failed to distinguish the effect of suicide in people with different age groups, different educational level, and different reasons for suicide, which were previously observed by prior studies (22).

Finally, we also found a significant relationship between season of the year and the method applied for suicide. Our study revealed that self-immolation was significantly less frequent in autumn compared to other seasons. In addition, toxic poisoning was found to be significantly less frequent in winter. This effect was not previously observed by other studies. Seasonality of suicide methods is even more contradictory and the results are considerably more heterogeneous compared to suicide seasonality itself. Suicide methods are roughly categorized as non-violent, poisoning mostly, and violent methods, other than poisoning (25). It is generally believed that seasonality exists for the violent methods, while it is absent for non-violent methods (16-21). However, the results are even contradictory regarding seasonality according to this categorization. For example, in a study conducted in Finland, no seasonality was observed for firearm suicide, though it is considered as one of the most common violent methods of suicide (26). This suggests the inappropriateness of this categorization for the purpose of assessing the suicide seasonality. Instead, it is suggested to stress the role of seasonal context, in which a specific method has been used (25).

The importance of the results of this study can be mentioned with respect to the fact that precise knowledge of a distinct seasonal pattern for suicide can guide managers, policy-makers, and providers of health services to improve the interventions when people are at the highest risk

of suicide (23). However, the limitation of our study was failure to distinguish the relationship between season of the year and level of education and reason for suicide, which were reported by previous studies in this field.

The main objective of the present study was to explore the association between completed suicides in an Iranian population and season of the year. According to the results from the present study, the highest number of completed suicides occurred in warm seasons (June-July), while the lowest number was observed in cold seasons (November to January). Gender had a significant relationship with the season of the year, whereas no statistically significant relationships were observed between season of the year and age, level of education, and reason for suicide. Finally, the methods used for suicide significantly varied by season; self-immolation and toxic poisoning were significantly less common in autumn and winter, respectively, with hanging being the most frequently used method in all seasons.

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.

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