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To cite this article: Safak Taktak, Bahadir Kumral, Ayla Unsal, Taskin Ozdes, Süheyla Aliustaoglu, Yuksel Aydin Yazici & Safa Celik (2016) Evidence for an association between suicide and religion: a 33-year retrospective autopsy analysis of suicide by hanging during the month of Ramadan in Istanbul, Australian Journal of Forensic Sciences, 48:2, 121-131, DOI: [10.1080/00450618.2015.1034775](https://doi.org/10.1080/00450618.2015.1034775)

To link to this article: <https://doi.org/10.1080/00450618.2015.1034775>



Published online: 12 May 2015.



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Evidence for an association between suicide and religion: a 33-year retrospective autopsy analysis of suicide by hanging during the month of Ramadan in Istanbul

Safak Taktak^a, Bahadır Kumral^{b*}, Ayla Unsal^c, Taskin Ozdes^d, Süheyla Aliustaoglu^e, Yuksel Aydin Yazici^c and Safa Celik^e

^aDepartment of Psychiatry, Ahi Evran University, Training Hospital, Kirsehir, Turkey; ^bFaculty of Medicine, Department of Forensic Medicine, Namık Kemal University, Tekirdag, Turkey; ^cDepartment of Nursing, Ahi Evran University, Medical School, Kirsehir, Turkey; ^dFaculty of Medicine, Department of Forensic Medicine, Abant İzzet Baysal University, Bolu, Turkey; ^eMinistry of Justice, Council of Forensic Medicine, Istanbul, Turkey

(Received 10 November 2014; accepted 17 March 2015)

This study was undertaken to examine the effect of the Islamic holy month of Ramadan on the number of suicides in order to assess whether religious faith is associated with a decreased number of suicides during that period. In this retrospective study, a total number of 82,871 autopsies have been performed in the Morgue Department of the Council of Forensic Medicine (Istanbul) of the Ministry of Justice between 1978 and 2012, 33 years. For the study purposes, the earlier start of Islamic calendar months (i.e. 10 or 11 days earlier each year) compared with the Gregorian calendar was taken into account and file details such as crime scene investigation reports, information obtained from the police, and autopsy results were assessed. Of the 4315 suicide cases, 267 were reported during Ramadan, while 4048 were recorded during other months. Of the 33 years examined, only five Ramadan months exhibited a suicide rate above the annual average and there was a significantly lower ($p = 0.042$) incidence of suicides during Ramadan. Suicide by hanging is less frequent during Ramadan compared with non-Ramadan months, probably reflecting a positive spiritual influence of this period on Muslims.

Keywords: forensic medicine; suicide; hanging; month of Ramadan

Introduction

Societal perception of suicide can significantly vary, and while suicide has not been an acceptable act in many societies throughout history, attitudes towards suicide – such as condemnation, disapproval or approval – are largely determined by the cultural values and beliefs at specific times¹.

Despite proposals regarding a lower number of unreported or undiagnosed suicides in suicide-sensitive societies due to cultural, societal or familial effects, previous studies have shown a lower rate of suicide among Muslim societies^{2–5}.

While some studies examining the link between suicide and religious faith have found inconsistent results^{6–8}, a consensus exists as to a negative correlation between religious faith and suicide risk^{6,7,9,10}. For instance, in a study by Ferrada-Noli Sundbom⁹ on adolescents, a negative association between suicide risk and religious faith was observed.

*Corresponding author. Email: drbkumral@gmail.com

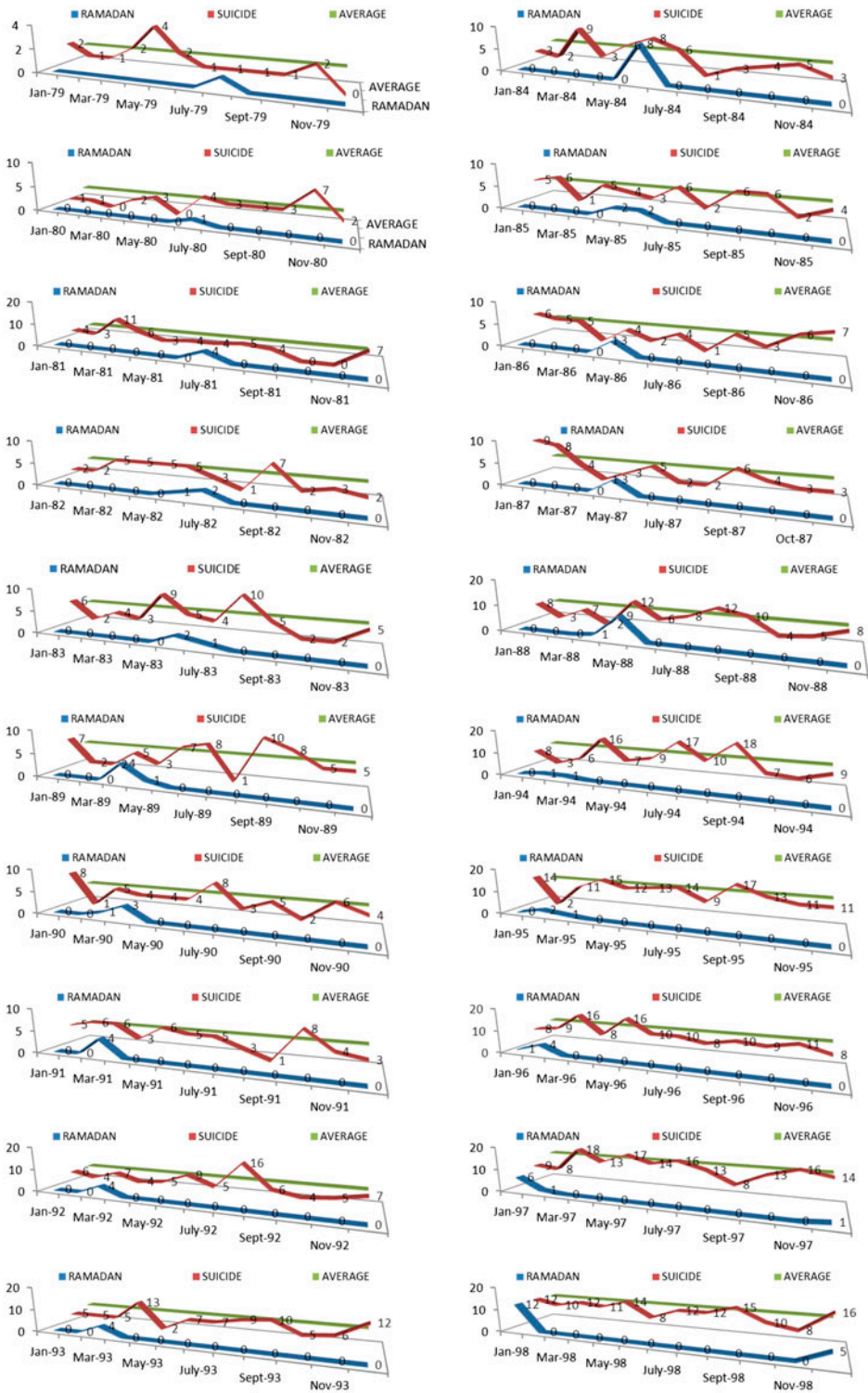


Figure 1. Suicide rates during Ramadan and non-Ramadan periods months years between 1979 and 2011.

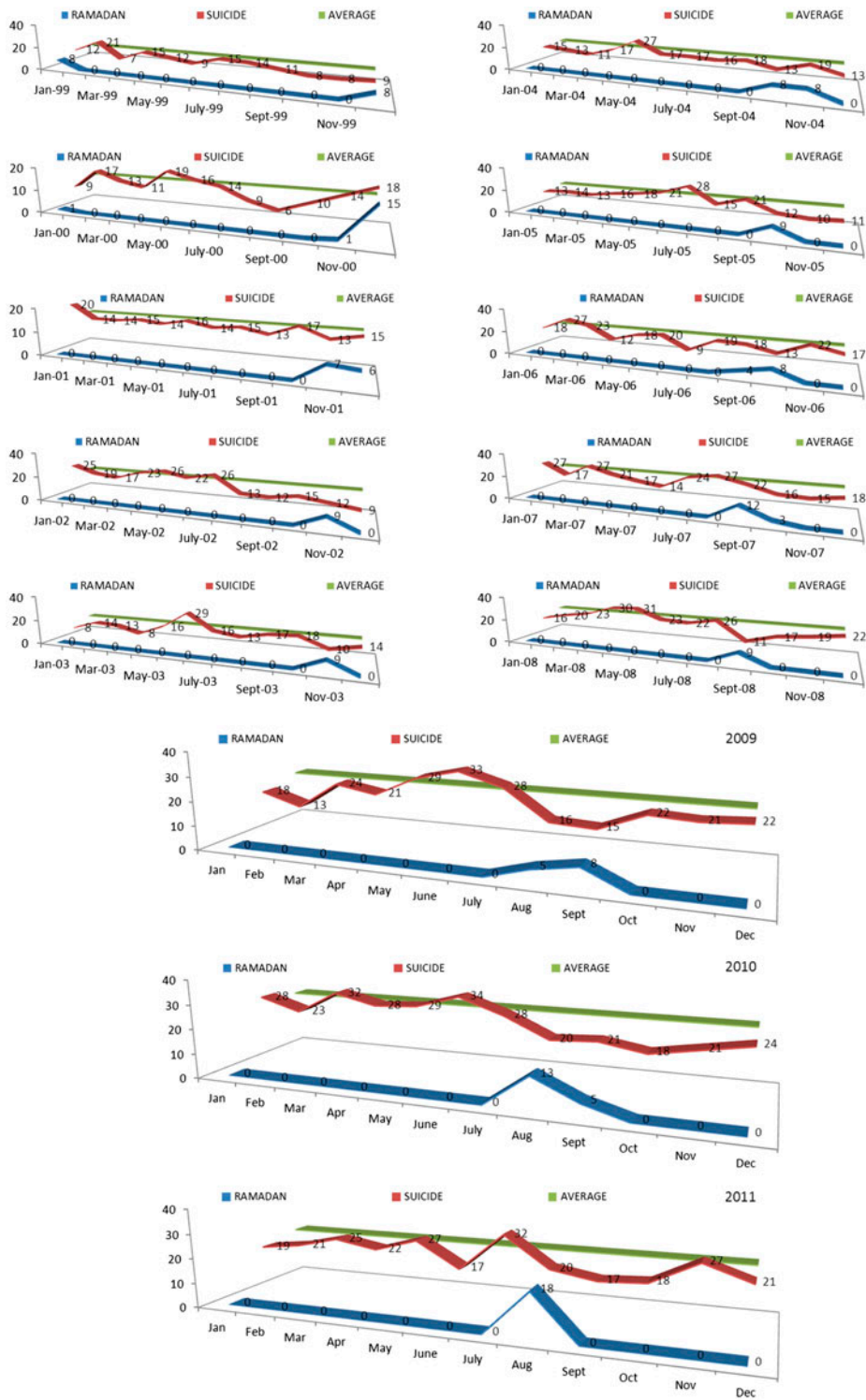


Figure 1. (Continued)

Religious people do not exhibit approval towards suicide and suicidal tendency^{11–13}. On the other hand, atheists or people without strong religious convictions have been found to be more tolerant to the idea of committing suicide, both for others and themselves¹².

Ethnic origin may also play a role in the diversity of attitudes towards suicide, and lower rates of suicide have been reported in societies where suicide is strongly condemned from a religious viewpoint. For example, Cirhinlioglu et al. found lower rates of suicide among Muslims compared with Hindus¹⁴. In another study, by Yapıcı¹⁰, involving university students, a significant negative correlation was observed between suicide risk, the practice of praying and the ‘sensing the presence’ of a god. Other studies in Muslim populations also showed negative associations between religious faith and suicide-related factors, such as suicidal plans, suicide attempts, and a wish to die¹⁵.

In a multi-national study involving 71 countries, Simpson and Conklin¹⁶ found no significant associations between the Christian faith and suicide rates, while a negative correlation between Islamic faith and suicide risk (0.55) was observed. This was explained on the basis of Islam’s stronger opposition to suicide and stronger social ties arising from collective praying practices¹⁴.

The following verse from the Quran is a very clear prohibition of suicide: ‘Do not kill [or destroy] yourselves, for verily Allah has been to you most Merciful’ (Quran 4/29).

Great importance has been placed upon Ramadan and fasting in the Quran, as several of the following ayats (verses) clearly demonstrate: ‘O you who have believed, decreed upon you is fasting as it was decreed upon those before you that you may become righteous’ (Ayat 183); ‘The month of Ramadan [is that] in which was revealed the Qur’an, a guidance for the people and clear proofs of guidance and criterion. So whoever sights [the new moon of] the month, let him fast it...’ (Ayat 185). It is clear from the ayats that fasting – one of the ‘Five Pillars of Islam’ – involves abstinence from food, drink, and sexual intercourse from just before daybreak until sunset.

The word Ramadan derives from ramda, meaning ‘burning’. In that month, sins are believed to be burned by the fire of fasting. Also, some linguists maintain that the word Ramadan is derived from ramadiyu, meaning ‘the rain’, connoting purification by washing. Therefore, Ramadan is thought to wash people from sins¹⁷. It is worth pointing out that the Hadiths exempt several groups of people from fasting, including pre-pubescent children and the mentally ill.

Turkey is a constitutionally secular country, yet more than 99% of the population are officially recorded as being Muslims^{4,18}. Although the majority of Turks do not practice the basic tenets of the religion, fasting during Ramadan is a popular religious ritual in which at least 70% of Muslims participate in one form or another.

Ramadan is a time when Muslims are expected to be calm and peaceful in daily life both mentally and physiologically. Also, Islam considers suicide as a grave sin and this conviction might play an important role in lower rates of suicide in Muslim societies¹⁸. Similarly, market research suggests alcohol sales and consumption decrease during Ramadan, which might also be associated with lower rates of crime involving alcohol-related violence.

Approximately half of all suicides in Turkey are by hanging, as shown by a number of different studies for different time periods, i.e. the percentage of suicide by hanging comprised 51.54%, 51%, 43.10%, 44.50%, 44.42%, 46.03%, 44.11%, 44.40%, 45.35%, 47.44%, 49.43%, 53.73%, 52.10%, and 51.96% of all suicide cases in the years 1991, 1992, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010 and 2011, respectively. Similarly, 52.45% of all suicide cases were suicide by hanging in the year 2011 in Istanbul¹⁹.

Cases of suicide by hanging comprise most of the hangings in Turkey, while accidental hanging represents a minority of total cases and homicidal hangings are extremely rare²⁰. The current study focused specifically on suicide by hanging alone due to fact that the great majority of the hanging cases, i.e. approximately 95%, are suicide-associated in Turkey²¹ and hanging as a means of suicide is a common, simple and effective method to terminate one's life.

Methods

Istanbul is the most populated city in Turkey, is culturally more diverse than the rest of the country and has the highest economic power. The city's population in 1979 was more than 4.5 million (crude suicide rate of 1.76 per 100,000 persons). But by 2011, this population rose to more than 13.48 million. Turkey's total population in 2011 was 74,724,269, with a crude suicide rate of 3.62 per 100,000 persons.

In this retrospective study, a total of 82,871 autopsies have been performed in the Morgue Department of the Council of Forensic Medicine (Istanbul) of the Ministry of Justice between 1978 and 2012, i.e. for 33 years. Ethical approval for the study was granted.

Of a total of 82,871 autopsy files, those younger than 15 years of age, those who were uncircumcised (circumcision is another pillar of Islam and therefore a faith signifier), and those who were non-Turkish citizens were excluded.

All files were dated using the Gregorian calendar, thus requiring the determination of Ramadan months for each Gregorian year. While Ramadan is the ninth month of the Islamic calendar each year, it involves a continuous change in terms of the dates of the Gregorian calendar. The Muslim calendar is based on the lunar cycle of 354.367 days and is therefore shorter than the Gregorian calendar by, on average, 10.8752 days. Ramadan also lasts for 29 or 30 days. Due to the difference between the two calendar systems, a continuous forward shift of months take place, resulting in approximately 33-year cycles before Ramadan resumes on the same Gregorian day. Therefore, in order to eliminate the seasonal effect on suicide and to examine a relatively longer time-period, tables and graphs have been prepared to provide numeric comparisons between fasting and non-fasting periods.

To better delineate the association between Ramadan and non-Ramadan months and the suicide rate, a separate graph was prepared for each year, whereby the vertical axis shows the number of suicides and the horizontal axis shows the months and years (Figure 1). Each number denotes the number of suicides occurring during a certain month. Each straight line on the graph shows the annual average, while the mid line signifies the unified suicide rate and the anterior line signifies suicides occurring during Ramadan only. Due to the absence of a normal distribution of the data, a non-parametric Mann-Whitney U-test was used for statistical analysis.

Results

A total of 4315 cases of suicide by hanging were determined. Table 1 depicts the suicide rates for 33-successive Ramadan and non-Ramadan months from July 26, 1979, until August 1, 2011, along with the total number of suicides and monthly average suicide rates for a given year.

As can be seen from Table 1, there were actually a total of 34 Ramadan months during this 33-year period, as 1997 encompassed two Ramadan months in one Gregorian

Table 1. The first and last days of Ramadan months, suicide rates during Ramadan and non-Ramadan periods, and the total number of hanging suicides between 1979 and 2011. Annual average and the corresponding years.

Gregorian year	Starting date	End date	Ramadan	Non-Ramadan	Total Suicide victims	Average annual	Lunar year
1979	26 July	23 Aug.	1	17	18	1.5	1399
1980	13 July	11 Aug.	1	28	29	2.41	1400
1981	03 July	31 July	4	47	51	4.25	1401
1982	23 June	21 July	3	39	42	3.5	1402
1983	12 June	11 July	3	54	57	4.75	1403
1984	01 June	29 June	8	45	53	4.41	1404
1985	21 May	19 June	4	46	50	4.16	1405
1986	10 May	08 June	3	46	49	4.08	1406
1987	29 Apr.	28 May	3	47	50	4.16	1407
1988	18 Apr.	16 May	10	75	85	7.08	1408
1989	07 Apr.	5 May	5	58	63	5.25	1409
1990	28 Mar.	25 Apr.	4	50	54	4.5	1410
1991	17 Mar.	15 Apr.	4	51	55	4.58	1411
1992	06 Mar.	03 Apr.	4	74	78	6.5	1412
1993	23 Feb.	23 Mar.	4	82	86	7.16	1413
1994	12 Feb.	12 Mar.	2	114	116	9.66	1414
1995	01 Feb	02 Mar.	3	139	142	11.83	1415
1996	21 Jan.	19 Feb.	5	118	123	10.25	1416
1997	10 Jan.	8 Feb	7	152	159	13.25	1417–
	(1997) 31	(1997) 28					1418
	Dec. (1997)	Jan (1998)					
1998	20 Dec.	18 Jan.	17	123	140	11.66	1418–
							1419
1999	09 Dec.	07 Jan	16	125	141	11.75	1419–
							1420
2000	27 Nov.	26 Dec.	15	141	156	13	1420–
							1421
2001	16 Nov.	15 Dec.	13	167	180	15	1422
2002	05 Nov.	04 Dec.	9	210	219	18.5	1423
2003	26 Oct.	24 Nov.	9	167	176	14.66	1424
2004	14 Oct.	12 Nov.	16	180	196	16.33	1425
2005	04 Oct.	02 Nov.	9	183	192	16	1426
2006	23 Sept.	22 Oct.	12	204	216	18	1427
2007	12 Sept.	11 Oct.	15	230	245	20.41	1428
2008	01 Sept.	29 Sept.	9	251	260	21.66	1429
2009	21 Aug.	19 Sept.	13	249	262	21.83	1430
2010	11 Aug.	08 Sept.	18	288	306	25.5	1431
2011	01 Aug.	29 Aug.	18	248	266	22.16	1432
General total			267	4048	4315		

year. However, since our data are presented in accordance with the Gregorian calendar, the number of suicides during Ramadan months is shown in tables and Figure 1 graphs regardless of their occurrence time-wise in the Islamic calendar. For example, for Ramadan starting on December 31, 1997, suicides occurring on the first day of Ramadan were included in 1997 statistics, while suicides occurring thereafter until the last day of Ramadan month, i.e., January 21, 1998, were included in 1998 statistics. In 1997, 1998

and 1999, Ramadan months extended into the succeeding year, resulting in a total Ramadan days of 31, 41, and 37 in years 1997, 1998, and 1999, respectively.

Of the 33 years examined, the suicide rate during Ramadan months exceeded the average suicide rates in other months only in 1984, 1988, 1998, 1999, and 2000. In 1979 and 1980, a total of 47 suicides were recorded, while the corresponding figure was 51 in 1981, with an increase in the number of suicides in the following years. May 8, 1997, (Gregorian calendar) corresponds to the start of the year 1418 according to the Islamic calendar (one year is equal to 354 or 355 days according to the Islamic calendar).

It follows that during the Gregorian year of 1997, two Islamic years (i.e. 1417 and 1418) were present and, similarly, until 2000, this overlap of Islamic years occurred four times, revealing a total suicide number of 267 during Ramadan months and 4048 during non-Ramadan months, with an overall suicide rate of 4315 in the 33-year period (Table 1).

In 1979, 1980 and 1981, an increase in suicides in the same months was observed, while there were only, respectively, one, one, and four suicides in Ramadan months. In March, September and November 1982, again an increase in suicide rates was observed that halted by the start of the Ramadan and was followed by a September wave (seven cases) and pre-winter fluctuation. Then there were a total of three suicides in June (one) and July (two) during the Ramadan period, followed by four peaks in January, May, August, and December in 1983.

The average annual suicide rate in 1984 was 4.41 per month, with eight cases during the Ramadan month in the same year. In 1985, 1986 and 1987 there were four to five peaks in the same years, with a below-average suicide rate during Ramadan. In 1987, a winter wave with nine cases was followed by a decrease to three cases in Ramadan. In April and May 1988, overlapping with the Ramadan period, there were 10 suicides (one in April and nine in May), with 12 cases in the non-Ramadan days of May, with similar peaks in similar months in 1989–1997 and lower than average rates during Ramadan months.

During the Ramadan period, starting on 10 January 1997, and lasting for 30 days, and during the Ramadan period starting 31 December 1997, and ending on 28 January 1998, the suicide rate was lower than the annual average, while the rate was above the average (17 cases) in Ramadan 1998, which lasted for 41 days. Similarly, there were 16 suicide cases during Ramadan 1999, which lasted for 37 days with above-average rates, and similarly an above-average suicide rate was detected in Ramadan 2000, which lasted only 30 days.

In 2001, suicide rates during Ramadan were slightly above the average. Between 2002 and 2011, there was an increase in the number of suicides compared with previous years, while suicide rates during Ramadan for the same period were below annual average with similar monthly fluctuations.

An analysis of the last three-year period shows that there were 24, 33, and 22 suicide cases in March, June, and October 2009, respectively, with five cases in August and eight cases in September overlapping with the Ramadan period.

In 2010 there were four peaks in January, March, June, and December, with 18 cases during Ramadan (13 cases in August and five cases in September). In the same year, there were a total of 20 suicides in August including non-Ramadan days, and 21 suicides in September. In 2011 there were 25, 27, 32, and 27 cases in March, May, July, and November, respectively with four peaks and 18 suicides in August overlapping with Ramadan.

Due to the absence of a normal distribution of the current data, non-parametric tests were used for analyses. Comparison of Ramadan versus non-Ramadan months with the Mann-Whitney U test in terms of suicide rates showed a statistically significant ($p = 0.042$) difference (Table 2).

Discussion

This study was carried out to shed some light on the question of whether Ramadan has any effect on suicide rates among Muslims living in Istanbul, i.e. the most populated city of Turkey, where 99% of the population officially belongs to the Islamic faith and 70% of the population observes some ritual in the holy month of Ramadan.

The study population consisted of individuals committing suicide older than 15 years of age (the age at which mental maturation is reached according to Muslim doctrine) and males who are circumcised as a proof of obligatory religious practice.

In a study by Taktak et al.²² examining a population consisting of completed cases of suicide in Istanbul, information collected from family members suggested that 91.9% of victims were religious despite the absence of routine religious practices, 6.5% worshipped regularly, while 1.6% demonstrated no religious faith at all.

In the present study, the suicide rate during Ramadan was above the annual average in only five of the 33 years examined (1984, 1988, 1998, 1999 and 2000), with lower rates in the remaining 28 years. The rise in the number of suicides in 1984 might have been indirectly related to the military coup in 1980, which had major social influences, or to the commonly reported increase in suicide rates during the summer months. Similarly, the increase in suicide rates in 1988 could have been related to the previously reported increase in the spring months of April and May^{23,24} or the summer months.

Indeed, several previous studies have suggested a substantial effect of seasons on suicide rates^{25,26}, consistent with findings reported at the national level in Turkey^{27,28}. Above-average suicide rates during Ramadan in 1998, 1999 and 2000 (close to the average but slightly lower in 2001) might be associated with a higher number of Ramadan days in these years. Normally, Ramadan lasts 29 or 30 days, although it lasted longer in the above-mentioned years, resulting in increased numbers of suicides during these years. Another possible contributory factor is the fact that these years represent the era before 2001, when there was a major economic collapse in Turkey.

In a study by Asirdizer et al.²⁹, socioeconomic factors were not found to have an impact on crude suicide rates in Turkey and this was explained on the basis of religious factors and close family ties. Meanwhile, Taktak et al.²² observed that 39.5% of suicide victims had a lower income than their expenditure, suggesting that economic factors cannot be easily ruled out as a contributory factor.

Our graphs demonstrate that there were at least two peaks in suicide rates, though not very substantial in spring and summer, and that there was also a peak before winter and lower rates during Ramadan each year. The initial years of the study period

Table 2. U-test for Ramadan and non-Ramadan hanging suicides.

	<i>n</i>	Mean rank	Sum of ranks	<i>U</i>	<i>p</i>
Ramadan	33	28.70	947.00	386.00	0.042
Non-Ramadan	33	38.30	1264.00		

involved lower numbers of suicides, hampering the demonstration of a seasonal association, after which this association became more evident, together with an increased number of cases.

In the study by Demirci et al.¹⁸, involving 27 cases of suicide during Ramadan in a 10-year period, a slight decrease was observed in Ramadan. In contrast, Cantürk et al.³⁰ examined the causes of death (natural, accidental, homicidal or suicidal) during Ramadan between 2003 and 2006 in two different cities and found an increased rate from 1988 until 1998. In Jordan, Daradkeh et al.³¹ examined the association between para-suicidal behaviour and pre- and post-Ramadan periods, with significant decreases during Ramadan followed by a protective effect in the following months after Ramadan. The seemingly conflicting results from these three studies might be related to a lower number of cases or shorter study duration.

In the current study, encompassing 33 years and 34 Ramadan months, with a total of 4315 suicide victims, a statistically significant difference in suicide rates was found between Ramadan and non-Ramadan periods, although the difference was only slightly significant ($p = 0.042$) (Table 2). It is plausible to suggest that since suicide is considered a sin in Islam, Muslims are probably less inclined to commit suicide during Ramadan – a period when deeper religious spirituality is experienced.

Our study represents one of the largest studies to date, examining suicide rates in a Muslim population during the Ramadan period, precluding sound comparisons with similar data reported elsewhere.

Strength and limitations

The strengths of our study include its long duration and more statistical power to demonstrate seasonal effects and inclusion of annual Ramadan cycles focusing on a predominantly Muslim (99%) population in Turkey, where 95% of all hangings are suicide-related and half of all suicide cases are suicide by hanging.

Possible limitations include lower numbers of suicides in the initial years of our study starting from 1979 and the possibility of a non-suicidal death in cases originally reported as suicidal deaths (for example 5% of all hangings in Turkey are not suicide-related).

It should also be borne in mind that suicide might have been a concealed cause of death in certain situations. Suicide is regarded as a grave sin and is mostly treated with minimal, if any, toleration by society and/or family members, leading to unreported or unclassified suicides, again somewhat limiting the value of our conclusions.

Conclusion

Undoubtedly, holy periods defined by a certain religion can influence human behaviour. However, human perception regarding such periods is probably as important as this influence. Therefore, our results suggest that a lower rate of suicide in Ramadan months compared with non-Ramadan months is probably due to the positive spiritual influence this holy period has on human behaviour in a sample Muslim population, together with the positive spiritual perception by the same population.

Further studies involving other sects of Islam or Muslims residing in other locations with people from other religious faiths may shed more light on this issue, along with other studies examining the association between causes of death and suicide.

Acknowledgement

We would like to thank Nilüfer Şahin Taktak for her kind support in data analysis of this work.

Conflict of interest

The authors declare that there is no conflict of interest.

Disclosure statement

No potential conflict of interest was reported by the authors.

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