Relationship Between Suicide and Holidays

Motoi Nishi, Hirotsugu Miyake, Hiroyuki Okamoto, Youhei Goto, and Toshirou Sakai

Employing the vital statistics from January 1, 1979 to December 31, 1994 in Hokkaido Prefecture, Japan, we investigated the relationship between suicide (ICD 9 code, E115) and days of the week. In one day 1.97 males and 0.98 females committed suicide on average. On Saturdays the number of suicides per day was the smallest. On Mondays it was the highest. When the days were classified into (1) a holiday, (2) the day before a holiday, (3) the day after a holiday (4) the day both before and after a holiday and (5) others, the rate of suicide was the lowest in the days before a holiday. In the days after a holiday, however, the rate was the highest. The same tendency was also noted when the subjects were classified into several subgroups from the viewpoint of ages, seasons or calendar years. The time relation of holidays seemed to have something to do with the intention to commit suicide.

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INTRODUCTION

There were more than 20,000 deaths due to suicide in 1996 in Japan. This number was larger than the number of deaths due to car accidents (about 14,000). The deaths due to suicide are a great social loss.

In general, our mood changes according to the day of the week; on a day immediately before a holiday, e.g., we feel relaxed. Actually, some diseases are influenced by the day of the week. It has been reported that attacks of myocardial infarction occur more frequently on Monday than on the other days. Such a change in mood might have something to do with the intention to commit suicide. Using the data in Hokkaido Prefecture, Japan, we investigated the relation between the day of the week and suicide.

MATERIALS AND METHODS

Hokkaido is the northernmost island of Japan. It has an area of 78,000km² and a population of about 5,700,000. Information (including the death date) on suicides (ICD 9 code, E115) was obtained from the vital statistics of the Hokkaido Government. There were a total of 17,234 deaths (11,507 male, 5,727 female) due to suicide during the period from January 1, 1979 to December 31, 1994.

In Japan now there are several official holidays in addition to Sundays. When an official holiday falls on a Sunday, the Monday immediately after it becomes a holiday. Since from December 29 to January 3 most people do not work, these 6 days were regarded as holidays in the present study, though they are not official holidays.

We classified the 5,844 days from January 1, 1979 to December 31, 1994 into (A) a holiday, (B) the day before a holiday, (C) the day after a holiday, (D) the day before and after a holiday (or a day sandwiched between two holidays), and (E) others. Most Saturdays were classified into group B, and most Mondays, into group C. Six males and 1 female with unknown dates of death were excluded. Chi-square values were estimated for males and females separately using the observed number and the expected number calculated from each of the average rates (the average number of deaths per day, or "total" in each of the tables).

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Department of Public Health, Sapporo Medical University.
Address for correspondence: Motoi Nishi, Department of Public Health, Sapporo Medical University, S.1, W.17, Chuo-ku, Sapporo, Hokkaido, 060-8556 Japan.

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RESULTS

Table 1 shows the number of deaths due to suicide by days of the week. The average rates were 1.97 per day for males and 0.98 for females. On Saturdays fewer suicides were observed. In the beginning of the week, by contrast, there were more suicides.

Table 2 shows the results from the viewpoint of holidays. The number of deaths due to car accidents in the same period (ICD code, E104) is shown, too. In both males and females the highest rate of suicide was found for the day after a holiday. The lowest rate was noted for the day before a holiday. The rate of deaths due to car accidents was significantly high, however, on holidays and the days before them.

Table 3 shows the numbers and the rates of suicides on the weekdays after a holiday and consecutive holidays. On the Tuesdays after holidays the rate was the highest for both males and females. It was higher than that on Mondays shown in Table 1. The rates for weekdays after consecutive holidays were 2.20 for males and 1.33 for females.

Table 4 shows the numbers of suicide per day of the subgroups classified from the viewpoint of ages, seasons (depending on the length of daytime) or calender years. The same tendency was noted. All the rates (n/day) in the days after a holiday (C) were higher than the respective "total" rates, except one (female, Aug+Sep+Oct). Most of the rates in the days before a holiday (B) were, however, lower than the respective "total" rates.

Table 1. Days of the week and suicide.

|       | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Total |
|-------|-----|-----|-----|-----|-----|-----|-----|-------|
| Male  |     |     |     |     |     |     |     |       |
| Number| 1783| 1701| 1640| 1634| 1641| 1494| 1608| 11501 |
| Rate(n/day) | 2.14* | 2.04 | 1.96 | 1.96 | 1.97 | 1.79* | 1.93 | 1.97 |
| Female |     |     |     |     |     |     |     |       |
| Number | 851 | 845 | 845 | 806 | 844 | 740 | 795 | 5726  |
| Rate(n/day) | 1.02 | 1.01 | 1.01 | 0.97 | 1.01 | 0.89* | 0.95 | 0.98 |

Sunday, n=834; Monday, Tuesday, Wednesday, Thursday, Friday and Saturday, n=835.
* P<0.01

Table 2. Holidays and deaths due to suicide and car accidents.

|       | (A) | (B) | (C) | (D) | (E) | Total |
|-------|-----|-----|-----|-----|-----|-------|
| Holiday | Before | After | Before & After | Others | n=1108 | n=873 | n=873 | n=55 | n=55 | n=2935 | n=5844 |
| Suicide |     |     |     |     |     |       |
| Male   |     |     |     |     |     |       |
| Number | 2084 | 1556 | 1876 | 105 | 5880 | 11501 |
| Rate(n/day) | 1.88* | 1.78** | 2.15** | 1.91 | 2.00 | 1.97 |
| Female |     |     |     |     |     |       |
| Number | 1031 | 792  | 927  | 49  | 2927 | 5726  |
| Rate(n/day) | 0.93# | 0.91* | 1.06* | 0.89 | 1.00 | 0.98 |
| Car accidents |     |     |     |     |     |       |
| Male   |     |     |     |     |     |       |
| Number | 1762 | 1337 | 1133 | 85  | 3942 | 8259  |
| Rate(n/day) | 1.59** | 1.53** | 1.30** | 1.55 | 1.34** | 1.41 |
| Female |     |     |     |     |     |       |
| Number | 636  | 525  | 456  | 31  | 1532 | 3180  |
| Rate(n/day) | 0.57 | 0.60* | 0.52 | 0.56 | 0.52 | 0.54 |

** P<0.01  * P<0.05  # P<0.10
Table 3. Weekdays after a holiday or consecutive holidays and suicide.

|                | Mon | Tue | Wed | Thu | Fri | Total |
|----------------|-----|-----|-----|-----|-----|-------|
| **After a holiday** |     |     |     |     |     |       |
| N of days Male | 741 | 52  | 25  | 27  | 28  | 873   |
| Number         | 1593| 116 | 54  | 56  | 57  | 1876  |
| Rate(n/day)    | 2.15** | 2.23 | 2.16 | 2.07 | 2.04 | 2.15** |
| **Female**     |     |     |     |     |     |       |
| N of days Male | 764 | 71  | 31  | 27  | 34  | 927   |
| Number         | 1.03 | 1.37** | 1.24 | 1.00 | 1.21 | 1.06* |
| Rate(n/day)    |     |     |     |     |     |       |
| **After consecutive holidays** |     |     |     |     |     |       |
| N of days Male | 26  | 52  | 5   | 3   | 5   | 91    |
| Number         | 58  | 116 | 12  | 4   | 10  | 200   |
| Rate(n/day)    | 2.23 | 2.23 | 2.40 | 1.33 | 2.00 | 2.20  |
| **Female**     |     |     |     |     |     |       |
| N of days Male | 33  | 71  | 7   | 2   | 8   | 121   |
| Number         | 1.27 | 1.37** | 1.40 | 0.67 | 1.60 | 1.33** |

** P<0.01  * P<0.05  # P<0.10

Table 4. Number of suicide per day in the subgroups classified from various viewpoints.

|                | (A) | (B) Before | (C) After | (D) Before & After | (E) Others | Total |
|----------------|-----|------------|-----------|--------------------|------------|-------|
| Ages (year) Male |     |            |           |                    |            |       |
| -29 | 0.29 | 0.31 | 0.33 | 0.38 | 0.31 | 0.31 |
| 30-59 | 1.07** | 1.07** | 1.30** | 1.07 | 1.21# | 1.18 |
| 60- | 0.51 | 0.40** | 0.52# | 0.45 | 0.48 | 0.48 |
| |     |            |           |                    |            |       |
| Female |     |            |           |                    |            |       |
| -29 | 0.12 | 0.13 | 0.14 | 0.09 | 0.13 | 0.13 |
| 30-59 | 0.42 | 0.39* | 0.46 | 0.38 | 0.45 | 0.44 |
| 60- | 0.39 | 0.39 | 0.46* | 0.42 | 0.41 | 0.41 |
| |     |            |           |                    |            |       |
| Seasons Male |     |            |           |                    |            |       |
| Feb,Mar, Apr | 2.03 | 1.68** | 2.26* | 2.15 | 2.14 | 2.07 |
| May,Jun, Jul | 2.05 | 1.98 | 2.26# | 2.00 | 2.07 | 2.08 |
| Aug, Sep, Oct | 2.02 | 1.88 | 2.12 | 2.17 | 2.03 | 2.02 |
| Nov, Dec, Jan | 1.55 | 1.60 | 1.96** | 1.57 | 1.75 | 1.71 |
| Female |     |            |           |                    |            |       |
| Feb, Mar, Apr | 0.85 | 0.85 | 1.05# | 0.77 | 0.94 | 0.93 |
| May, Jun, Jul | 1.03 | 0.88* | 1.15 | 0.67 | 1.10 | 1.06 |
| Aug, Sep, Oct | 1.01 | 1.01 | 1.03 | 0.83 | 1.07 | 1.04 |
| Nov, Dec, Jan | 0.86 | 0.88 | 1.03* | 1.10 | 0.86 | 0.89 |
| |     |            |           |                    |            |       |
| Calender years Male |     |            |           |                    |            |       |
| 1979-1982 | 1.85 | 1.78 | 1.99# | 0.83* | 1.77 | 1.81 |
| 1983-1986 | 2.33** | 2.17** | 2.76* | 2.50 | 2.63# | 2.52 |
| 1987-1990 | 1.82 | 1.58** | 2.00 | 2.15 | 1.94 | 1.87 |
| 1991-1994 | 1.54 | 1.61 | 1.87* | 1.93 | 1.66 | 1.66 |
| Female |     |            |           |                    |            |       |
| 1979-1982 | 0.84 | 0.89 | 0.96 | 0.67 | 0.96 | 0.93 |
| 1983-1986 | 1.01 | 1.03 | 1.32** | 1.38 | 1.05 | 1.08 |
| 1987-1990 | 1.02 | 0.96 | 1.03 | 1.15 | 1.03 | 1.02 |
| 1991-1994 | 0.85 | 0.75* | 0.95 | 0.29* | 0.94 | 0.89 |

** P<0.01  * P<0.05  # P<0.10
DISCUSSION

There may be some time lag between death and confirmation of it. Many hospitals are not open on holidays, and the confirmation of death might be influenced by this. However, the tendencies for suicide and death due to car accidents were clearly different from the viewpoint of days of the week. (Since the dead due to chronic diseases had usually been in a hospital until their death, it is not appropriate to employ them in order to investigate the influence of hospitals being closed on holidays.)

The rate of suicide on the Tuesdays after holidays was higher than that of Mondays. It is not the mere cycle of days of the week, but the time relationship with holidays that has an influence on the intention to commit suicide. The rate of suicide in the weekdays after consecutive holidays was higher. The subgroups classified from various viewpoints showed the same tendency. In the days after a holiday, especially after consecutive holidays, we should be careful of suicide.

It is known that there is seasonal variation in the mortality of suicide. The intention to commit suicide may be influenced by natural conditions such as the amount of daylight, temperature, etc. The present study, however, shows that artificial or social conditions have no small effects, as well.

REFERENCES

1. Health and Welfare Statistics Association. Death. J Health and Welfare Statistics 1998;45:48-60.
2. Spielberg C, Falkenhahn D, Willich SN, Wegscheider K, Voller H. Circadian, day-of-week, and seasonal variability in myocardial infarction: comparison between working and retired patients. Amer Heart J 1996;132:579-585.
3. Preti A, Miotto P. Seasonality in suicides: the influence of suicide method, gender and age on suicide distribution in Italy. Psychiatr Res 1998; 81:219-231.
4. Flisher AJ, Parry CD, Bradshaw D, Juritz JM. Seasonal variation of suicide in South Africa. Psychiatr Res 1997;66:13-22.
5. Ho TP, Chao A, Yip P. Seasonal variation in suicides re-examined: no sex difference in Hong Kong and Taiwan. Acta Psychiatr Scand. 1997;95:26-31.
6. Salib E. Elderly suicide and weather conditions: is there a link? Int J Geriatr Psychiatr 1997;12:937-941.
7. Wang YT, Wang D, Wang XY. Suicide and meteorological factors in Huhhot, Inner Mongolia. Crisis. 1997;18:115-117.