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Calorie intake and suicide

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Summary

In Switzerland, calories intake was significantly related negatively to male standardized suicide mortality. On the other hand, sugar consumption was significantly related negatively to female standardized suicide mortality in autoregressive model.

Introduction

Several risk factors for suicide were investigated in previous studies, including physiological disorders, psychiatric disorders, brain functions, psychological factors and taste as well as social life factors. Concerning taste, alcohol consumption (Cohen & Potter, 1999; Gliatto & Rai, 1999; Russell & Judd, 1999) and smoking (Hawton & Vislisel, 1999) were conceived to be risk factors for suicide, though suicide risk in nurses was reported to relate negatively to extent of caffeine consumption (Hawton and Vislisel, 1999). In 27 nations of the world, alcohol consumption predicted suicide rates, but changes in alcohol consumption did not predict changes in suicide rates (Lester, 2001). In Japan, tobacco consumption was significantly related negatively to suicide mortalities in both sexes (unpublished data). Follow-up studies of Serum

cholesterol levels and suicide found that those with lower cholesterol levels do have a tiny but statistically significant increased risk of completing suicide (Lester, 2002). Individuals who have attempted suicide in the past have lower cholesterol levels, especially if they used violent methods for suicide (Lester, 2002). Although alcohol and caffeine effects on suicide have been researched till now, food intake e.g., fruits and vegetables consumption, protein intake, calories intake, butter consumption, sugar consumption or nutritious effects on suicide have not been fully clarified yet. Therefore, we investigated the relationships between suicide mortalities and food consumption in Switzerland in this study.

Methods

This study was based on the following time-series data in Switzerland for each year from 1964 to 1990: (1) male and female standardized suicide rate (OECD, 2001), (2) food consumption indicators (OECD, 2001) listed in Table 1.

As relationships of suicide mortality to food consumption indicators were analyzed using their time-series data in the present study (i.e., for 27 years, 1964-1990), it was necessary to remove the effects of autocorrelation. The multiple regression analysis on time series data was carried out by the exact maximum-likelihood method

based on autoregressive model (SPSS, Inc., 1993) using SPSS version 7.1.5 (SPSS, Inc., 1996).

The model was as follows:

At the year t ($t = 1, 2, \dots, 27$), suicide mortality, $Y(t)$, is estimated by a regression equation using value of i_{th} food consumption indicator ($i = 1, 2, \dots, 6$), $x_i(t)$:

$$Y(t) = a + \sum b_i x_i(t) + u(t),$$

where a = constant, b_i = partial regression coefficient for the i_{th} indicator, and $u(t)$ = error.

As $u(t)$ is supposed to follow first-order autoregression, it is expressed as:

$$u(t) = \rho u(t-1) + \varepsilon(t)$$

where ρ = autoregression coefficient, $u(t-1)$ = the error of previous year and $\varepsilon(t)$ = a random error.

Results

Results of the multiple regression analysis on time-series data are shown in Table

2. Two indicators significantly related to the mortalities as follows: (1) Calories intake was significantly related negatively to male standardized suicide mortality. (2) Sugar consumption was significantly related negatively to female standardized suicide mortality.

Discussion

Calories intake was significantly related negatively to male standardized suicide mortality. It was different from the result in Sweden where calorie intake was significantly related positively to female age-adjusted suicide mortality (unpublished data). On the other hand, Lester (1999) reported that body mass index scores for adults in 27 nations were not associated with either suicide or homicide rates. In the elderly mouse's study, melatonin level in low calorie feeding was twice as that in high calorie feeding (Hattori, 1996). Low calorie intake seems to prevent decrease of melatonin level although there is no exact data for human (Hattori, 1996). Tavartkiladze also reported that the high-calorie food through unknown mechanism to them reduces the formation of the melatonin in epiphysis (Tavartkiladze, 2006). The melatonin level in the serum of suicide victims are prominently lowered in comparison with that of comparable subjects that did not commit suicide (Reiter & Robinson, 1996). In the study of manic-depressive patients, the melatonin level in manic state was increased and that in depressive state was decreased, and that in manic state was twice as that in depressive state (Reiter & Robinson, 1996). As low calories intake seems to prevent decrease of melatonin which is low in depression, low calorie intake might have

a protective effect for suicide. To clarify the causality between calories intake and melatonin level, an experimental study of human is needed, which compares melatonin level between one who take low calories and the other who take high calories.

The reason why the result of Switzerland was opposite of Sweden is unclear, but it might be related with high average height of the Swiss. As taller person consumes more calories than shorter one, taller person needs more calories than shorter one. As the Swiss daily calories intake is high (above 3000 kilocalories per capita) during the study period 1964-1990 and they consume high calories, calories intake effect on suicide might have been different. Further studies concerning calories intake and sugar consumption effects on suicide in other countries will be needed.

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tryptophan, pyridoxine (vitamin B6), Ca²⁺ and high-calorie food on the synthesis and intensity of melatonin. Georgian medical news, 2006, Mar (132), 121-123.

Table 1. Six food consumption indicators (OECD, 2001)

1. Fruits and vegetables consumption, except wine per capita per year (kilogrammes)
2. Protein intake per capita per day (grammes)
3. Total calories intake per capita per day (kilocalories)
4. Butter consumption per capita per year (kilogrammes)
5. Sugar consumption per capita per year (kilogrammes)
6. Alcohol consumption per capita, aged 15 years and over per year (liters)

Table 2 Food consumption indicators (partial regression coefficient in parentheses) significantly affecting standardized suicide mortality in 1965-1994: multiple regression analysis on time-series data (autoregressive model)

sex	Food consumption indicators* (Partial regression coefficient)	AIC
Males	Calories intake (-.017*)	118.15
Females	Sugar consumption (-.105*)	70.03

* Food consumption variables were entered into the regression model and only the indicators significantly related to the mortality are shown.

* p<0.05, ** p<0.01, *** p<0.001.