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### *Ocorrência de suicídio e variação sazonal*

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## Occurrence of suicide and seasonal variation

### Ocorrência de suicídio e variação sazonal

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#### Abstract

- Objective** To review the estimated suicide rates for the Region Metropolitan, the main socio-political center in Chile, for the period 1979-1994, and to determine whether they follow a seasonal pattern.
- Method** Data available for the period 1979-94 at the Forensic Services in Chile was analyzed using Analyses of variance.
- Results** It was register 5,386 suicides. While the "warm" months (October, November, December & January) concentrated 39.0% of cases, the so called "cold" months reported 28.7%. This contrast is made even clearer by the month-to-month analysis, showing the highest suicide rate in December (10.6%) against the lowest rate in June (7.0%). Further statistical analysis revealed these differences to be significant.
- Conclusion** The study shows that in Chile, representing as it does the Southern Hemisphere, the suicide rates tend to present a seasonal variation as has elsewhere been determined for in the North Hemisphere.

**Suicide, tendency. Seasonal affective disorder.**

#### Resumo

- Objetivo** Realizou-se revisão das taxas estimadas de suicídio na Região Metropolitana, setor sociopolítico principal do Chile, no período de 1979-94, para determinar se essas taxas seguem um padrão sazonal.
- Método** Os dados disponíveis para o período 1979-94 no Serviço Médico Legal foram analisados pela Análise de variância.
- Resultados** Foram registrados 5.386 suicídios, porém, nos meses "cálidos" (outubro, novembro, dezembro, janeiro) concentram-se os 39,0% dos casos. Nos meses frios foram consignados 28,7%. Esta observação fica mais clara pela análise mês a mês, demonstrando taxas mais altas em dezembro (10,6%) e mais baixas em junho (7,0%). Através de análises estatísticas ficou demonstrado que a diferença é significativa.

### Conclusão

Foi demonstrado que no Chile, sendo representativo do Hemisfério Sul, o índice de suicídio tem a tendência de apresentar uma variação sazonal, assim como tem sido demonstrado em numerosas publicações no Hemisfério Norte.

**Suicídio, tendência. Transtorno afetivo sazonal.**

## INTRODUCTION

During recent decades the suicide rate has increased worldwide, making this issue a topic of current interest. On the other hand, Diekstra et al.<sup>5</sup> have reported a declining tendency in Mediterranean and Latin-American countries.

In Chile, the highest suicide rates were registered in 1931, with a progressive tendency to decrease during the 40s, rise during the 50s and decrease again in the last decades. However, a great increase in the suicide rate has been registered in our country during the 90s. This can be explained, at least to some extent, by a global improvement in the quality and reliability of the information registered in the Forensic Services and National Health Bureau. During the 80s, the suicide rate was 5.59 per 100,000 inhabitants per year for the whole country, while in Santiago de Chile, national capital city and main metropolitan center, the rate is much higher, with 6.57 cases per 100,000 inhabitants<sup>16</sup>.

The relation of the occurrence of suicide to psychiatric disorders has been discussed elsewhere. Psychiatric patients have a high mortality rate as compared to the general population. This mortality is almost always related to accidents and violent causes, particularly suicide<sup>13</sup>.

In Santiago de Chile, a high rate has been described for mental diseases in the general population over 15 years old: 23.99%; mood disorders represent 9.46%<sup>17</sup>. Affective Mood Disorders represent one of the most important risk factors for suicide within the psychiatric population<sup>14</sup>.

The seasonal variation in the occurrence of suicide is a topic of increasing interest. Variations in the seasonal occurrence of suicide have been described since the early 1900s<sup>11</sup>, with peaks in summer and lows in autumn and winter as described by many authors<sup>2, 10, 21</sup>. A clear correlation has been determined as between psychiatric hospital admission and season<sup>7, 9</sup>. Eastwood & Peacocke<sup>6</sup> and Maes et al.<sup>12</sup>, were able to determine a clear correlation between the seasonal pattern in severity of depression and the occurrence of suicide and homicide,

suggesting that the severity of depression in the depressed population may explain the occurrence of suicide. In Chile, an early work during the 70s reported a higher suicide rate during spring time with the lowest rate occurring during winter time<sup>22</sup>.

A further retrospective analysis of suicide rates across the year, relating to the monthly variation in Santiago de Chile, is the concern of the present study.

## METHOD

The data were retrieved from the Annual Reviews at Instituto Medico Legal, the national forensic service. All autopsies, made for violent or suspicious causes of death, from 1979 to 1994, were included in the reviews. The criteria of definition of for suicide were both clinical and anatomic-pathological. The National Health Bureau analyzes the information available in the *Certificado Médico de Defuncion*, which is not always accurate and precise, as is discussed later in this paper.

All data were analyzed with the use of statistical software, comparing normal distribution groups so as to determine differences between years and months. A month to month analysis was carried out for the whole period and the months were then subdivided into groups according to weather changes. Again, the groups of months were compared as normal chi-square distributions, and mean differences between groups were assessed by Analyses of variance (ANOVA).

## RESULTS

The number of suicides per month in the Metropolitan Area of Santiago de Chile can be seen in Figure 1. For each month, the number and percentage of deaths by suicide has been calculated on the basis of the 5,386 deaths from the same cause in the period 1979-94. Of this number, the highest suicide rate has occurred during December (572; 10.6%), January (513; 9.5%), November (512; 9.5%) and October (504; 9.4%). We will call these *warm* months as they represent the end of spring and the beginning of summer in Chile. A clear difference occurs during May (397; 7.4%), July (392; 7.3%), April (379; 7.0%) and June (376; 7.0%), the cold months in Chile, corresponding to the end of autumn

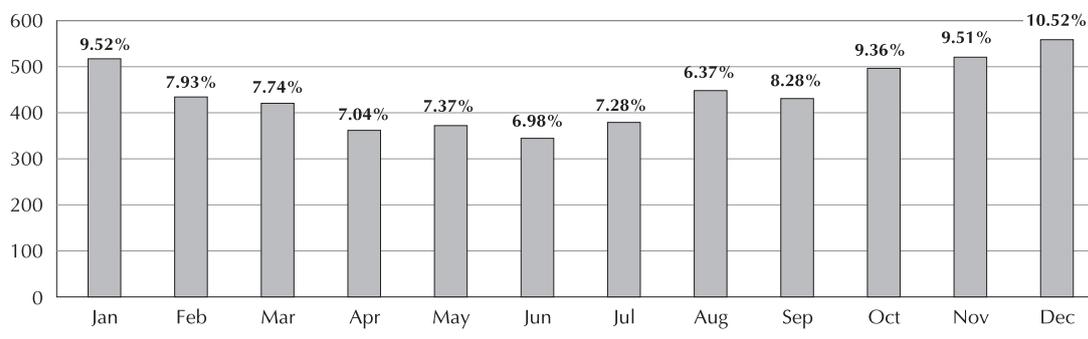


Figure 1- Number of suicides by month. Santiago, Chile. 1979 - 1994.

and the beginning of winter. May be seen in Figure 2, the suicide rate during the *cold* months is 28.7% (n=1,544) and 39.9% (n=2,101) during the warm season. According to the statistical analysis, these differences have been shown by ANOVA to be significant with a p value below 0,001.

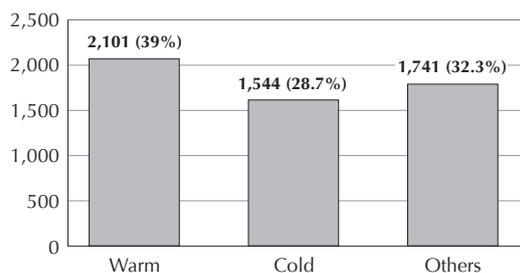


Figure 2- Seasonal variation for suicide. Santiago, Chile. 1979 - 1994. (n=5,836 cases).

In Figure 3 the number of deaths by suicide is shown for each year of the period 79-94, classified in three columns. The first represents the *cold* months, the middle column represents "others" neither (cold nor warm), and the third shows the number of suicides during the *warm* months. The highest suicide rate always occurred during the warm season, exception 1985, in which the rate was higher for "others". The lowest rates were registered during the cold season almost every year, excepting only of 1979 and 1994, in which the lowest registered rates occurred again during the so-called "others" group of months.

## DISCUSSION

The reliability of the information registered at the National Forensic Service stands out as the most

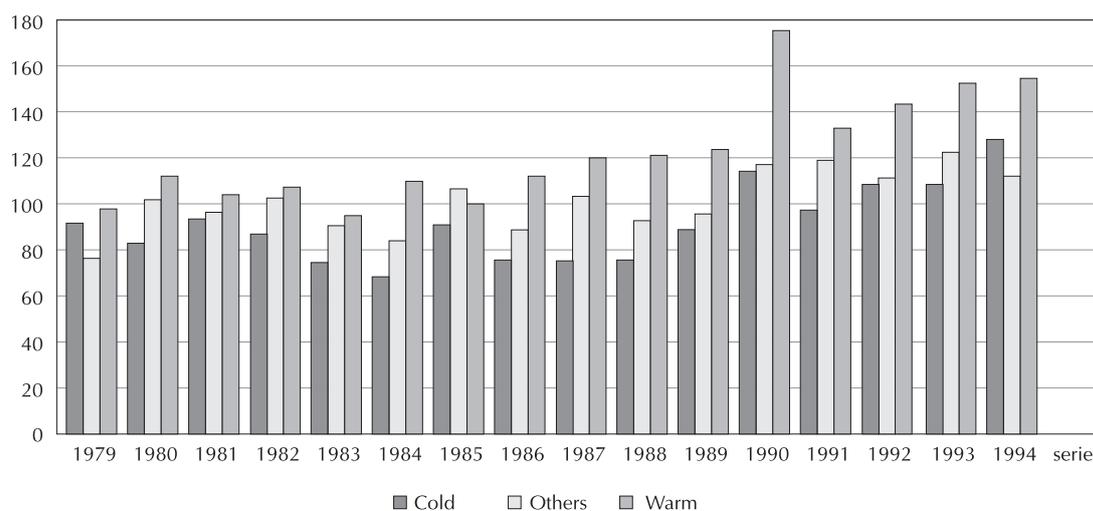


Figure 3- Seasonal variation in number of suicides by year. Santiago, Chile. 1979-94.

serious problem of this kind of study. Many suicides resemble accidents. Others are sometimes not registered as such because of a mis-certification of the cause of death, in cases in which a general practitioner considers only the final cause of death and avoids the inclusion of suicide in his report. The main problems in this field are the lack of a specific category for suicide events within the Certificado Medico de Defuncion, the legal registration form of the final cause of death when the case is reported by the physician. Another important problem is the low availability of forensic specialists when the case has to be reported by a legal medical service. Thus, the misregistration leads to an under-estimation of the suicide rate. We can not determine, however if this mis-registration actually influences the seasonal variation of the suicide rate. We must emphasize, not with standing, the fact that the strategies and quality of the information regarding the registration and further investigation of the cause of death has changed radically over the last four or five years. This change can be explained by the recent development of more efficient cues for the registration of cases and a great increase in the global coverage of forensic services through the availability of well trained specialists in this country.

A greater occurrence of suicide during spring time has been known since late 19th century. This pattern has continued to occur during this century, although with a diminishing tendency in this seasonal hallmark. This has been related to the effects of industrialization on chronobiological aspects<sup>1</sup>.

Many studies have already determined the importance of seasonality in suicide rate variation in the Northern Hemisphere<sup>6,21</sup> and a few others have focused on this in the Southern Hemisphere<sup>3</sup>. A Spanish report comparing warm to cold months between 1981 and 1985, showed higher rates for the warm season<sup>4</sup>. In Belgium, the same pattern has been demonstrated<sup>12</sup>. With reference to the Southern Hemisphere, in 1937, an Argentinean group from the city of Buenos Aires reported an increase in the occurrence of suicide in spring, as quoted by Asberg<sup>1</sup>. In 1971-72, a Chilean report agreed with these findings<sup>22</sup>. In Australia, 3,000 suicide cases in the female population were reported to have occurred during spring time in 1982<sup>15</sup>.

We must add that for 1993, the national population is estimated at 13, 173, 347 inhabitants. In Santiago, the population is 5, 569, 605, which represents 42.28% of the total number of inhabitants in Chile<sup>8</sup>.

With reference to the findings, the most important are the following:

- The long period of retrospective analysis, from 1979 to 1994, covering 5,386 cases, constitutes a very comprehensive data for our hemisphere.
- Every year the seasonal pattern is maintained, that is to say the occurrence of suicide is always greater during the warm months than during the cold ones. This points to the internal consistency of the data presented, thus excluding the effects of an overview.
- Finally, the great statistical significance of the findings presented with reference to the comparison between cold and warm months is noteworthy, both overall and in a to year analysis over the 15 years of study.

The recent interest in Mood Disorders and its relation to biological rhythms and chronobiological variations has drawn attention to seasonal influences on the incidence of suicide<sup>1,11,20</sup>. Variations in the occurrence of mood disorders by season were described as long ago as the fourth century AD<sup>18</sup>. A cyclic occurrence of depressive episodes in affective disorders in spring and autumn was reported in several studies<sup>3,7,9,23</sup>. Recently, human biometeorological research has revealed the effects of seasonality on the affective state of normal men<sup>12</sup> and on the occurrence of affective disorders, seasonal affective disorders, suicide and neurotic complaints<sup>3,6</sup>, thus relating severity of depression or specific depressive symptoms to an increase in the risk of suicide. It is also known that both hospital incomes and electro-convulsive therapy for depressive patients are higher in autumn and spring. On the other hand, hospital intakes of maniac patients increase during the summer<sup>19</sup>. Another important fact that shows the biological basis of these findings is the seasonal variation in serotonin levels in the human hypothalamus, as well as the correlation established between low 5 - HIAA levels in cerebrospinal fluid and suicide<sup>1</sup>.

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