

## Relation between attempted suicide and suicide rates among young people in Europe

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### Abstract

**Study objective**—To determine if there are associations between rates of suicide and attempted suicide in 15–24 year olds in different countries in Europe.

**Design**—Attempted suicide rates were based on data collected in centres in Europe between 1989 and 1992 as part of the WHO/EURO Multicentre Study of Parasuicide. Comparison was made with both national suicide rates and local suicide rates for the areas in which the attempted suicide monitoring centres are based.

**Setting**—15 centres in 13 European countries.

**Patients**—Young people aged 15–24 years who had taken overdoses or deliberately injured themselves and been identified in health care facilities.

**Main results**—There were positive correlations (Spearman rank order) between rates of attempted suicide and suicide rates in both sexes. The correlations only reached statistical significance for male subjects: regional suicide rates,  $r = 0.65$ ,  $p < 0.02$ ; national suicide rates,  $r = 0.55$ ,  $p < 0.02$ .

**Conclusions**—Rates of attempted suicide and suicide in the young covary. The recent increase in attempted suicide rates in young male subjects in several European countries could herald a further increase in suicide rates.

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Suicidal behaviour is increasingly becoming a phenomenon associated with young people. Findings from the current WHO/EURO Multicentre Study of Parasuicide indicate that while there are pronounced differences between attempted suicide rates in different centres, in most of the 16 participating centres in 13 European countries the highest rates are in 15–24 year old female young adults.<sup>1–3</sup> Rates are also relatively high in young male subjects, although peak rates are more usually in the 25–34 year age group. There is evidence from some countries that attempted suicide rates in young people have increased since the mid 1980s.<sup>4,5</sup> There has also been a considerable narrowing of the female to male ratio of rates in the young, the usual marked female excess becoming steadily less pronounced, largely because of a disproportionate increase in male rates.<sup>2,5</sup>

In contrast with attempted suicide, suicide rates are generally higher in male subjects than female subjects, and the highest rates of suicide are usually found in older age groups.<sup>6</sup> There have, however, been important changes in this pattern in recent years, many countries having experienced a noticeable rise in suicide rates in young male subjects. Suicide has become a leading cause of death in the young, and in some countries (for example, Sweden) it is now the most common cause of death in 15–24 year olds. In other countries (for example, England and Wales) it is second only to road traffic accidents.

While there are considerable differences between attempted suicide and suicide in terms of the characteristics of the people involved and their motives, the two phenomena are also strongly linked. Thus, people who attempt suicide are at high risk of eventual suicide and nearly half of those who kill themselves have a history of previous attempts.<sup>7</sup> What is not known is the extent to which rates of suicide and attempted suicide are correlated, especially at the international level. In this paper we examine the statistical relation between attempted suicide and suicide rates in 15–24 year olds across European countries. The data on attempted suicide were derived from the epidemiological part of the WHO/EURO Multicentre Study of Parasuicide.<sup>1,2,3,8,9</sup>

### Method

#### ATTEMPTED SUICIDE DATA

The epidemiological part of the WHO/EURO Multicentre Study of Parasuicide started in 1989. The data for this study were collected in 15 research centres in 13 European countries (table 1). In most of the centres the monitoring study is ongoing. The results reported here concern the first four years of the study, 1989–1992.

In each of the participating centres data are collected on suicide attempts by residents of the centre's catchment area aged 15 years and over, who are treated by health care services in the area. A standard registration form is used to obtain information on demographic variables and characteristics of the suicide attempt. In some centres, the registration of suicide attempts has been incomplete because of non-response and missing information, and therefore the number of actual suicide attempts was estimated by means of extrapolation from the available information.<sup>3</sup> In each participating centre the monitoring study of attempted suicide was approved by a local ethics committee.

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participating centres is given  
in the appendix.

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Table 1 Average attempted suicide and suicide rates per 100 000 population (regional and national) in female subjects in age groups 15–24, 15–19, and 20–24 years

Centre	Country	Attempted suicide rates 15–24	Attempted suicide rates 15–19	Attempted suicide rates 20–24	Suicide rates regional 15–24	Suicide rates national 15–24	Suicide rates regional 15–19	Suicide rates national 15–19	Suicide rates regional 20–24	Suicide rates national 20–24
Cergy-Pontoise	France	766	893	652	—†	4	—†	—‡	—†	—‡
Oxford	United Kingdom	629	795	528	2	2	2	1	2	3
Helsinki	Finland	347	311	368	18	8	2	5	20	11
Szeged	Hungary	323	503	222	48	6	36	5	55	8
Stockholm	Sweden	299 (261)*	308 (267)*	289 (255)*	9	7	3	5	14	7
Bern	Switzerland	267	266	267	8	7	9	4	8	9
Sor-Trondelag	Norway	235	250	289	—†	6	—†	7	—†	5
Umea	Sweden	220 (261)*	227 (267)*	216 (255)*	0	7	0	5	0	7
Wurzburg	Germany	208	336	139	7	4	7	3	6	5
Odense	Denmark	191	192	187	2	4	0	2	4	5
Innsbruck	Austria	187	241	147	5	7	3	5	5	8
Leiden	the Netherlands	172	188	162	3	5	—†	4	—†	9
Emilia-Romagna	Italy	151 (151)*	158	146	2	2	—†	—‡	—†	—†
Padova	Italy	150 (151)*	181	123	3	2	3	—‡	3	—‡
Guipuzcoa	Spain	99	125	71	—†	2	—†	1	—†	2

\* For countries where two centres participated, average attempted suicide rates were computed to make a comparison with the national suicide rates (for Italy only for the age group 15–24 years); † no regional suicide data were available for three centres for 15–24 year olds and for five centres for 15–19 and 20–24 year olds; ‡ for two countries no national suicide data were available.

Attempted suicide was defined according to the proposed ICD-10 definition: “An act with non-fatal outcome, in which an individual deliberately initiates a non-habitual behaviour that, without intervention from others, will cause self-harm, or deliberately ingests a substance in excess of the prescribed or generally recognised therapeutic dosage, and which is aimed at realising changes which the subject desired via the actual or expected physical consequences”.

On the basis of the monitoring data over a period of only four years it is difficult to examine trends. Therefore, average attempted suicide rates were computed for the period 1989–1992, for female and male subjects separately, in the age groups 15–24, 15–19, and 20–24 years. For most centres average attempted suicide rates were computed on the basis of the four year data. Exceptions (and the years on which average annual rates could be based) were Bern (1989–1990), Cergy-Pontoise (1989–1991), and Guipuzcoa (1989–1991).

#### SUICIDE STATISTICS

Regional and national suicide rates were computed on the basis of data provided by the centres and by using national statistics.<sup>10–11</sup> For most centres average regional and national suicide rates were computed for male and female subjects on the basis of four year data (1989–1992). No regional suicide data were available for all three age groups (15–24, 15–19, and 20–24 years) for two centres, Cergy-Pontoise and Guipuzcoa. No regional suicide data were available in five year age bands (15–19 and 20–24 years) for five centres, Cergy-Pontoise, Sor-Trondelag, Leiden, Emilia-Romagna, and Guipuzcoa. No national suicide data in five year age bands were available for three centres, Cergy-Pontoise (France), Padova and Emilia-Romagna (Italy).

#### STATISTICAL ANALYSIS

Correlations between attempted suicide and suicide rates were calculated by means of Spearman rank order correlation coefficients. In two countries, Italy and Sweden, two

research centres were participating. Therefore, the rank order correlations between attempted suicide rates and national suicide rates were based on average attempted suicide rates of the two centres. For the centres Padova and Emilia-Romagna rank order correlations could only be calculated for the age group 15–24 years.

## Results

### ATTEMPTED SUICIDE AND SUICIDE RATES IN FEMALE SUBJECTS

The attempted suicide and suicide rates for female subjects in the age groups 15–24, 15–19, and 20–24 years are shown in table 1, with the centres ranked according to the attempted suicide rates in the age group 15–24 years. The highest female attempted suicide rate in the age group 15–24 years was found in Cergy-Pontoise (766 per 100 000), and the lowest in Guipuzcoa (99 per 100 000), with more than a sevenfold difference between them. For the age groups 15–19 years and 20–24 years, in 12 of the 15 centres the highest attempted suicide rates were found among those aged 15–19 years.

With regard to suicide rates in female subjects (table 1), extremely high regional rates for 15–24 year olds and for the 15–19 and 20–24 year age bands were found in Szeged, but these were not representative of the national Hungarian suicide rates. Relatively high regional rates were also found in 15–24 year olds in Helsinki, Finland having the highest national rate. The highest national rates in 15–19 year olds were in Norway and the highest in 20–24 year olds were in Finland.

### ATTEMPTED SUICIDE AND SUICIDE RATES FOR MALE SUBJECTS

The attempted suicide rates in male subjects were lower than those for female subjects, except for Helsinki where male rates were lower than those of females in the age group 15–19 years (tables 1 and 2). The highest male attempted suicide rate in the age group 15–24 years was found in Helsinki (372 per 100 000), and the lowest rate in Emilia-Romagna (54 per

Table 2 Average attempted suicide and suicide rates per 100 000 population (regional and national) in male subjects in age groups 15–24, 15–19, and 20–24 years

Centre	Country	Attempted suicide rates 15–24	Attempted suicide rates 15–19	Attempted suicide rates 20–24	Suicide rates regional 15–24	Suicide rates national 15–24	Suicide rates regional 15–19	Suicide rates national 15–19	Suicide rates regional 20–24	Suicide rates national 20–24
Helsinki	Finland	372	254	447	42	45	25	32	36	57
Cergy-Pontoise	France	337	283	386	—†	14	—†	—‡	—†	—‡
Oxford	United Kingdom	314	307	319	11	11	5	5	16	16
Szeged	Hungary	253	200	293	44	22	50	14	39	30
Odense	Denmark	176	94	251	11	13	4	7	17	19
Sor-Trondelag	Norway	169	110	224	—†	26	—†	18	—†	33
Bern	Switzerland	153	76	207	29	25	23	14	33	34
Stockholm	Sweden	148 (129)*	92 (79)*	200 (175)*	12	16	6	9	17	21
Umea	Sweden	114 (129)*	67 (79)*	151 (175)*	15	16	0	9	22	21
Wurzburg	Germany	113	93	125	9	15	15	10	6	18
Innsbruck	Austria	105	61	137	22	26	15	17	27	32
Leiden	the Netherlands	101	46	118	11	11	—†	8	—†	25
Guipuzcoa	Spain	62	30	96	—†	7	—†	1	—†	7
Padova	Italy	55 (55)*	19	81	1	6	4	—‡	0	—‡
Emilia-Romagna	Italy	54 (55)*	37	69	6	6	—†	—‡	—†	—‡

\*For countries where two centres participated, average attempted suicide rates were computed to make a comparison with the national suicide rates (for Italy only for the age group 15–24 years); †no regional suicide data were available for three centres for 15–24 year olds and for five centres for 15–19 and 20–24 year olds; ‡for two countries no national suicide data were available.

100 000), which represents more than a sixfold difference. In contrast with the findings for female subjects in all but three centres, the highest male attempted suicide rates were found in the age group 20–24 years in all centres.

The suicide rates among male subjects in all centres were much higher than those for female subjects (tables 1 and 2). Relatively high regional suicide rates in 15–24 year olds were found in Szeged and Helsinki, and high national rates in Finland, Norway, Switzerland, and Austria. The highest regional rates in both 15–19 and 20–24 year olds were found in Szeged, Helsinki, and Bern, while national rates were high in 15–19 year olds in Finland and Norway and in 20–24 year olds in Finland, Switzerland, and Norway.

#### CORRELATIONS BETWEEN ATTEMPTED SUICIDE AND SUICIDE RATES

The rank order correlation coefficients between attempted suicide and suicide rates by sex and different age groups are presented in table 3. They were all positive. Overall, the strongest correlations between rates of attempted suicide and suicide, both regionally and nationally, were found among male subjects. There was a significant correlation between attempted suicide rates and both regional and national suicide rates in male subjects in the age group 15–24 years, and a trend that did not reach statistical significance with regional suicide rates in the age group 20–24 years. In fact the correlation coefficients with regional rates for 15–24 year olds and 20–24 year olds were very similar, the latter not reaching statistical significance because the

number of centres for which there were five year data was fewer (all centres for the 15–24 year age group but only 10 centres for the five year age bands).

The correlations between attempted suicide rates and suicide rates for female subjects were all positive but non-significant and were lower than those for male subjects in all three age groups at both national and regional levels.

#### Discussion

Across the countries of Europe there are positive correlations between rates of attempted suicide and those of suicide in 15–24 year olds of both sexes, but these are more pronounced and only statistically significant in male subjects. There is some indication that the correlation is strongest where data for suicide are from the local areas in which the centres monitoring attempted suicide are based. It is less strong when the correlation is with national suicide rates, although absence of local suicide data for some centres limits this conclusion. Correlations were stronger in both sexes in the 15–24 year age group than when examined in five year age bands, but this was probably because data were available for all centres for the former analyses but only for 10 centres for the latter.

There are considerable differences in the ways in which suicides are registered in the European countries included in this study, with a strong likelihood that misclassification of suicide to other categories of death (for example, undetermined or accidental) is especially noticeable in the young. As this study was based on official suicide statistics we cannot say how inclusion of “hidden suicides”, if these

Table 3 Rank order correlations (Spearman) between attempted suicide and suicide rates by sex and age group

	Attempted suicide rate female subjects 15–24	Attempted suicide rate male subjects 15–24	Attempted suicide rate female subjects 15–19	Attempted suicide rate male subjects 15–19	Attempted suicide rate female subjects 20–24	Attempted suicide rate male subjects 20–24
Regional suicide rate	0.41‡	0.65†‡	0.36¶	0.37¶	0.27¶	0.57*¶
National suicide rate	0.22§	0.55†§	0.11‡	0.29‡	0.15‡	0.37‡

\*  $p < 0.09$  (trend); †  $p < 0.02$ ; ‡ the correlation is based on the data from 12 centres; § the correlation is based on the data from all (15) centres; ¶ the correlation is based on the data from 10 centres.

## KEY POINTS

- Rates of attempted suicide and suicide in 15–24 year olds tend to correlate with each other across countries.
- The correlations are much stronger in male subjects than female subjects.
- Changes in attempted suicide rates in the young (especially males) may be accompanied by changes in suicide rates.

could be identified, might have affected the findings.

Why should the association between suicide and attempted suicide in 15–24 year olds be stronger in male than female subjects? The findings must be interpreted against a background of generally much higher rates of attempted suicide in young female subjects than male subjects and the reverse for suicide. One reason is that the motivation, especially suicidal intent, involved in suicide attempts by young male subjects may show some differences from that of young female subjects, with the behaviour by male subjects being more clearly related to suicide in the sense of showing higher suicidal intent.<sup>12</sup> On the other hand, such acts by female subjects often involve lower suicidal intent and are more usually associated with motives such as communication of despair and influencing others. A second reason is that the risk of suicide after attempted suicide in the young is much greater in male subjects than female subjects.<sup>13 14</sup>

An important potential implication of the findings is that any changes in attempted suicide rates in the young, especially in male subjects, may be accompanied by changes in suicide rates. This is of particular concern in view of the recently reported increase in rates of attempted suicide in the young in some countries.<sup>4 5</sup> Confirmation of this will require examination of trends over time in individual centres and countries. This was not possible with the current data because the findings were only for four years, but will become feasible as the data for more years become available.

In conclusion, this study has shown that there is a relation between rates of suicide and attempted suicide in young male subjects in the countries of Europe. This association is much less pronounced in female subjects.

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## Appendix

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