

## Attempted and completed suicide in older subjects: results from the WHO/EURO Multicentre study of suicidal behaviour

Diego De Leo<sup>1,2,3†</sup>, Walter Padoani<sup>1</sup>, Paolo Scocco<sup>1</sup>, David Lie<sup>2,3</sup>, Unni Bille-Brahe<sup>4†</sup>, Ella Arensman<sup>5</sup>, Heidi Hjelmeland<sup>6</sup>, Paolo Crepet<sup>7</sup>, Christian Haring<sup>8</sup>, Keith Hawton<sup>9</sup>, Jouko Lonnqvist<sup>10</sup>, Konrad Michel<sup>11</sup>, Xavier Pommereau<sup>12</sup>, Imanol Querejeta<sup>13</sup>, Jean Phillippe<sup>14</sup>, Ellinor Salander-Renberg<sup>15</sup>, Armin Schmidtke<sup>16†</sup>, Susanne Fricke<sup>16</sup>, Bettina Weinacker<sup>16</sup>, Beata Tamesvary<sup>17</sup>, Danuta Wasserman<sup>18</sup> and Sampaio Faria<sup>19</sup>

<sup>1</sup>WHO Collaborating Centre on Suicide Prevention, Department of Neurological and Psychiatric Sciences, University of Padua, Italy

<sup>2</sup>Australian Institute for Suicide Research and Prevention, Griffith University, Brisbane, Qld, Australia

<sup>3</sup>Integrated Mental Health Services, Gold Coast, Qld, Australia

<sup>4</sup>Centre for Suicidological Research, Denmark

<sup>5</sup>Vrije Universiteit Amsterdam, The Netherlands

<sup>6</sup>Norwegian University of Science and Technology, Trondheim, Norway

<sup>7</sup>Via della Gensola 38, Rome, Italy

<sup>8</sup>Landesnervenkrankenhaus, Hall, Switzerland

<sup>9</sup>University of Oxford, Oxford, UK

<sup>10</sup>National Public Health Institute, Finland

<sup>11</sup>Psychiatrische Universitätsklinik, Bern, Switzerland

<sup>12</sup>Centre Hospitalier Regional de Bordeaux, Bordeaux, France

<sup>13</sup>Hospital de Guipuzcoa, San Sebastian, Spain

<sup>14</sup>INSERM, Le Vesinet, France

<sup>15</sup>Umea University, Umea, Sweden

<sup>16</sup>University of Würzburg, Würzburg, Germany

<sup>17</sup>Medical University, Szeged, Hungary

<sup>18</sup>Centre for Suicide Research and Prevention, Stockholm, Sweden

<sup>19</sup>Regional WHO Office, Copenhagen, Denmark

### SUMMARY

**Objective** The authors present an analysis of findings for the 65 years and over age group from the WHO/EURO Multicentre Study of Suicidal Behaviour (1989–93).

**Methods** Multinational data on non-fatal suicidal behaviour is derived from 1518 subjects in 16 European centres. Local district data on suicide were available from 10 of the collaborating centres.

**Results** Stockholm (Sweden), Pontoise (France) and Oxford (UK) had the highest suicide attempts rates. In most centres, the majority of elderly who attempted suicide were widow(er)s, often living alone, who used predominantly voluntary drug ingestion. Non-fatal suicidal behaviour decreased with increasing age, whereas suicide rates rose. The ratio between fatal and non-fatal behaviours was 1:2, that for males/females almost 1:1. In the years considered, substantial stability in suicide and attempted suicide rates was observed. As their age increased, suicidal subjects displayed only a limited tendency to repeat self-destructive acts. Moreover, there was little correlation between attempted suicide and suicide rates, which carries

\* Correspondence to: Prof. Diego De Leo, Australian Institute for Suicide Research and Prevention, Griffith University, Mt. Gravatt Campus, Brisbane 4111, Qld, Australia. Fax: 00 617 387 53840.

† Steering Group WHO/EURO Multicentre Study on Parasuicide.

different clinical implications for non-fatal suicidal behaviour in the elderly compared with younger subjects in the same WHO/EURO study. Copyright © 2001 John Wiley & Sons, Ltd.

KEY WORDS — attempted suicide; correlation suicide/attempted suicide; elderly population; gender ratio; suicide; WHO/EURO Multicentre Study of Suicidal Behaviour

## INTRODUCTION

This paper has three purposes: (1) to present findings for attempted suicide in subjects 65 years and over from a large European study of suicidal behaviour, (2) to discuss correlations between some of the socio-demographic and clinical data, and (3) to speculate as to possible clinical implications arising from these. The data derive from the WHO/EURO Multicentre Study of Suicidal Behaviour which began in 1989 and is still in progress (Platt *et al.*, 1992; Schmidtke *et al.*, 1996; Bille-Brahe *et al.*, 1997). The study arose as a European response to rising suicide and attempted suicide rates, whose reduction was a WHO target for the region (WHO, 1992).

There is some evidence that the study of suicidal acts in the elderly may be of particular relevance in realising this goal. Attempted and completed suicide incidence rates exhibit opposing tendencies with respect to age: whilst the incidence of suicide rises as age increases, attempted suicide tends to decrease with age reaching lowest levels among the elderly (De Leo and Diekstra, 1990). The ratio between attempts and completions in elderly people has been approximated as 4:1 versus somewhere between 8:1 and 15:1 for the population in general and 200:1 for the young (McIntosh, 1992).

As with all age groups there are problems in ascertaining the true extent of self-destructive acts. Many cases of attempted suicide go unobserved as they are not reported to health authorities. Others are of dubious interpretation, such as suspected intentional overdoses in people with cognitive impairment or cases related to passive self-destructive forms of behaviour, such as refusing food or medical care, whose import is extremely difficult to gauge.

Comparison of suicide and attempted suicide rates according to age suggests that manipulative or demonstrative self-destructive behaviours occur less often in the elderly than in older age groups: those engaging in such acts seem determined to die as a result. This is also suggested by their choice of more lethal methods (Frierson, 1991), the content of suicide notes (Miller, 1979), psychiatric evaluations (Lonnqvist and Ach te, 1985), and the higher rate of completed suicides following one or more previous attempts, compared with younger groups (Gardner *et al.*, 1964).

These observations have led some to assert that elderly attempted suicide may very often be classified as failed suicide especially in men (Busse and Pfeiffer, 1969). Moreover, Kreitman (1976) and Nowers (1993) stressed that the affinity between suicide and attempted suicide is far more marked in this age group than in the younger populace. Lindesay (1986) and Draper (1996) strongly emphasised this observation, suggesting that the study of non-fatal suicidal behaviour in the elderly might allow a clearer understanding of suicide and its prevention than in other age groups.

## METHOD

### *Instruments and data sources*

This study is based on data collected by 16 centres from 13 European countries participating in the WHO/EURO Multicentre Study of Suicidal Behaviour, in the years 1989–1993: Odense (Denmark); Padua and Emilia (Italy); Sor-Trondelag (Norway); Helsinki (Finland); Stockholm and Umea (Sweden); Oxford (UK); Leiden (The Netherlands); Pontoise and Bordeaux (France); W rzburg (Germany); Bern (Switzerland); Innsbruck (Austria); Guipuzcoa (Spain); Szeged (Hungary).

In this study, attempted suicide was defined as ‘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’ (this definition is actually the one of ‘parasuicide’ (WHO, 1986) and in fact the initial title of the study was ‘WHO/EURO Multicentre Study on Parasuicide’). Within this paper ‘attempted suicide’, ‘suicide attempts’ and ‘non-fatal suicidal behaviour’ will be used in an interchangeable way.

Information relating to non-fatal episodes was collected using a standard monitoring form that recorded socio-demographic variables, specific clinical characteristics, psychiatric diagnosis and any referrals to health facilities following the episode. Data were obtained from admissions to health facilities or from

other sources assessing attempted suicides in the same catchment area (e.g. general practitioners, private doctors, residential institutions, etc.). For a complete description of sources, see Schmidtke *et al.* (1996).

It was presumed that attempted suicides were registered in all health facilities in which suicidal subjects could be received (and/or registered) by health professionals. As some centres were unable to monitor health facilities 7 days a week, day and night, 'estimation factors' were calculated (Platt *et al.*, 1992; Schmidtke *et al.*, 1996). Suicide data for each centre were taken from official health statistics for the district.

Unfortunately, not all 16 centres were able to collaborate for a full 5 years of data collection, largely for reasons of lack of renewed annual funding. For some analyses, therefore, not all centres are considered and these details are indicated where relevant.

### *Statistical analysis*

Suicide and attempted suicide rates per 100,000 of total population, 65 years and over were calculated, and then rates determined for each gender and 5-year age group. Such rates could not be computed for other socio-demographic variables as relevant data were unavailable for the general reference population as a whole.

Within the data, repeat attempters were identified and considered once only. A distinction was made between 'first ever' (subjects who attempted suicide for the first time ever within the study period) and 'repeaters' (subjects who reported at least one other attempted suicide at the start of the study or who had multiple attempts within the study period).

Increases and decreases in rates for each centre were calculated by considering percentage differences between rates for the last available year and rates for the first year of observation. Since the available data were particularly heterogeneous, we restricted calculations for all centres to a mean rate over the total period of data collection, for both suicides and attempted suicides, rather than e.g. each year.

To assess global trends for suicide and attempted suicide over the 5-year period, the total number of cases was divided by the sum of the total study population (i.e. combined populations of individual reference groups) and the first year's data compared with the last.

Eight centres provided complete attempted suicide data for the 5-year period (Würzburg, Umea, Padua, Odense, Stockholm, Sor-Trondelag, Oxford and Helsinki) and six centres (Würzburg, Umea, Padua, Odense, Stockholm and Bern) had complete suicide data for those 5 years. Trends for suicide and attempted

suicide, and analysis of data across age groups were conducted for these combinations of centres only.

Similarly, to correlate non-fatal episodes with suicides only the five centres with 5 years' complete data for both suicides and attempted suicides (Würzburg, Umea, Padua, Odense, Stockholm) were used.

Year rates, for total sample and by gender, were used (by calculating Pearson's auto-correlation coefficients) to look for any relationship between time and rates of suicide/attempted suicide. Pearson's correlation coefficients (*R*) were also computed to assess the strength of relationship between suicide and attempted suicide rates during the 5 years of study. Hierarchical cluster analysis (classificatory analysis) was conducted to evaluate uniformity amongst centres.

### *Socio-demographic and clinical characteristics*

The socio-demographic and clinical data relate to 1518 suicidal subjects in 15 out of 16 centres (these data and those relating to absolute suicide attempts for 1993 are missing for Pontoise). Generally, such data were available for 1989–1993 but Leiden, Emilia and Innsbruck provided data for 1989–1992, Szeged and Guipuzcoa for 1989–1991, Bern for the years 1989, 1990 and 1993 and Bordeaux for 1989 only.

As stated previously, six centres had 5 years of official suicide statistics but for other analyses, suicide data were also available from four (Szeged and Innsbruck 1989–1992, Oxford and Helsinki 1989–1991). Many of the variables have missing data, but at relatively low levels: suicidal method (2%), marital status (18%), household composition (16%), referral to health facility (23%), past history of suicidal behaviour (28%) with one case of unrecorded gender. Incomplete data were more significant an issue for educational and religious belief (50%) and professional qualification (64%). Data concerning these variables will not be commented upon further.

Psychiatric diagnosis was only recorded in Padua, Würzburg, Sor-Trondelag, Innsbruck and Emilia (638 subjects, 42% of total sample). As noted earlier, incompleteness of data is not so much related to differences in methodology or accuracy of collection, as to lack of funding renewal for some centres who were then unable to continue collaboration for this part of the WHO/EURO Study.

## RESULTS

### *Age and gender*

A total of 1734 suicidal events were considered related to the actions of 1518 subjects over 65 (gender

details were unavailable for one subject): 35.5% males ( $n = 538$ ) and 64.5% females ( $n = 979$ ). Women committed 65.1% ( $n = 1129$ ) of attempted suicides and men 34.9% ( $n = 604$ ) with an F/M ratio = 1.9. An event/person ratio of 1.1 emerged, with 1.1 for males and 1.2 for females. The mean age of the total attempted suicide sample was  $74.7 \pm 6.9$  years. There were no significant differences in terms of gender ( $74.7 \pm 6.9$  for the males and  $74.6 \pm 6.9$  for the females). No statistical differences emerged between the individual centres for mean age. The centre with the highest mean age was Würzburg ( $77.0 \pm 7.1$ ); the 'youngest' centre was Sor-Trondelag ( $72.3 \pm 5.4$ ).

*Incidence of non-fatal suicidal behaviour*

The mean attempted suicide rate for the over 65-year-old population was 61.4/100,000 inhabitants in the total sample, 57.7/100,000 for males and 64/100,000 for females (Table 1). The ratio between these rates for both sexes slightly favours women (F/M = 1.1).

Stockholm was the centre with the highest attempted suicide rate, in both the total sample (116.9) and by gender (101.1 for males and 127.6 for females). Guipuzcoa reported the lowest attempted

Table 1 Mean suicide and parasuicide rates (per 100,000) in the elderly of 15 European centres, 1989–1993

Rates	Males	Females	Total	F/M
Suicide	49.48	19.29	29.28	0.39
Parasuicide	57.73	64.02	61.43	1.11
Parasuicide/Suicide	1.17	3.32	2.09	

suicide rates both for the total sample (32.3) and for the female sample (26.6), while the lowest incidence of suicide attempts among males was reported for Umea (30.6) (Fig. 1).

Attempted suicide rates decreased across the 5 years both in the total sample (fall of -4.9%) and among females (drop of -9.3%), while there was a slight increase for males (+3.1%). The rates/years auto-correlation series was not statistically significant.

Attempted suicide rates decreased in 11 centres. The greatest fall was reported in Pontoise (-85.7%), followed by Umea (-35%) and Bern (-34.2%). Conversely, increases were reported in Würzburg (+42.1%), Leiden (+40.8%), Sor-Trondelag (+23.4%) and Emilia (+15.1%).

Nine out of 15 centres reported a decrease for males, with the highest rates in Guipuzcoa

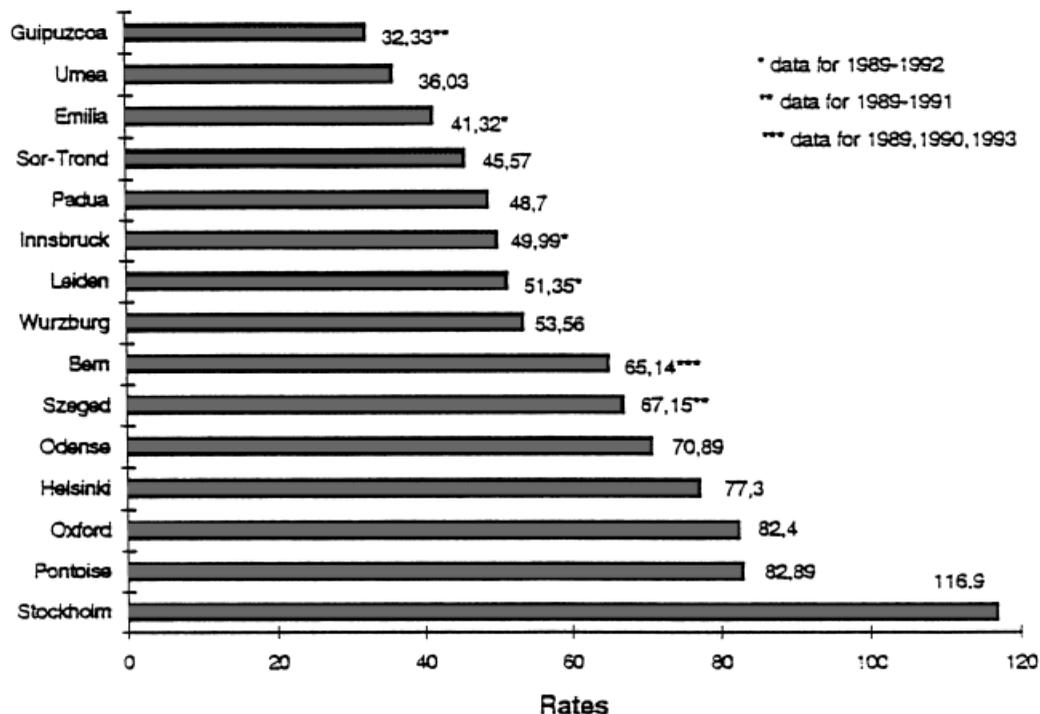


Figure 1. Elderly suicide attempt rates in 15 European centres, 1989–1993

(−68.1%), Oxford (−24.1%) and Bern (−23%). The highest increase was observed in Sor-Trondelag (+588%), with a rise in incidence from 6.0 in 1989 to 41.3 in 1993, in Helsinki (+27.1%) and in Emilia (+19.5%). In nine centres there was a decrease in female suicide attempts, particularly in Pontoise (−85.7%), Helsinki (−68.9%) and Innsbruck (−45%), in six centres, female suicide attempts proved to be on the increase from 1989 to 1993, with the highest increases emerging in Guipuzcoa (+150.0%), Würzburg (+62.5%) and Leiden (+68.8%). It should be noted that in most cases big differences in percentage resided in small numbers fluctuation.

### Incidence of suicide

In the 10 centres providing suicide rates for the period 1989–1993, the population aged 65 and over showed a mean suicide rate of 29.3 for the total sample, 49.5 for males and 19.3 for females (ratio F/M = 0.39) (Table 1). Bern reported the highest mean incidence (45.6), followed by Odense (42.9), while Oxford (9.2) and Umea (15.8) recorded the lowest rates (Fig. 2).

Bern (83.0) and Szeged (78.0) reported the highest rates of male suicides, followed by Helsinki (64.9) and Innsbruck (63.8), while Oxford (11.7) and Umea (24.3) exhibited the lowest rates. As for the female population, Odense had the highest suicide rate (31.4), followed by Szeged (27.7) and Bern (25.0). Oxford (7.4) and Umea (9.2) maintained the lowest rates of all centres, in terms of the total sample and males (Table 2).

Table 2. Mean suicide rates (per 100,000) by gender in the elderly of 10 European centres, 1989–1993

Centres	Males	Female
Umea	24.25	9.15
Padua	24.59	11.31
Innsbruck <sup>a</sup>	63.83	23.15
Würzburg	40.08	16.11
Bern	<b>82.99</b>	25.04
Szeged <sup>a</sup>	78.02	27.67
Odense	5.9	<b>31.44</b>
Helsinki <sup>b</sup>	64.86	18.12
Oxford <sup>b</sup>	<b>11.71</b>	<b>7.44</b>
Stockholm	44.55	23.46

<sup>a</sup>Data for 1989–1992.

<sup>b</sup>Data for 1989–1991.

<sup>c</sup>Lowest and highest rates gives in bold letters.

Suicide rates showed a total decrease of −14.6% (−25.3% in males and −1.4% in females) and no significant decrease emerged on computation of the rates/years auto-correlation series.

The highest increase was reported in Umea (+290.9%) and Innsbruck (+27.3%), while the greatest decrease emerged in Bern (−56.0%), Stockholm (−51.6%) and Oxford (−42.7%). In males, the highest decreases were observed in Bern (−70.0%), Padua (−53.8%) and Oxford (−47.2%); only Umea (+198.2%) and Würzburg (+63.0%) reported an increase in suicide incidence. In the female population, Szeged (−62.4%) and Stockholm (−56.8%) reported the highest decrease, while the highest increase in the phenomenon was recorded in Padua (+180.4%) and Innsbruck (+40.0%).

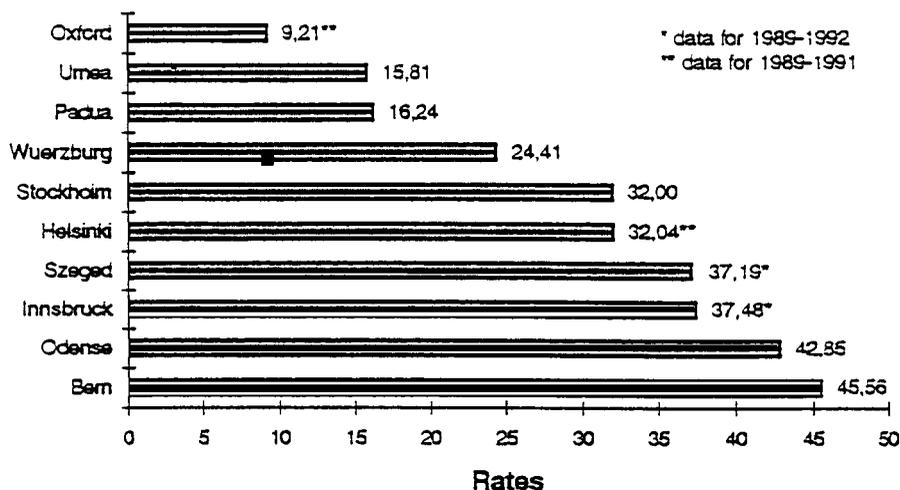


Figure 2. Elderly suicide rates from 10 European centres, 1989–1993

The correlation between suicide and suicide attempt rates (five centres only) was not statistically significant in the total and female samples. In males, however, a significant inverse correlation was observed ( $R = -0.96$ ;  $p < 0.01$ ).

Considering each centre separately, there was no significant correlation between suicide and attempted suicide. The only exception was the female population of Umea ( $R = -0.94$ ;  $p < 0.05$ ). The attempted suicide/suicide ratio was 2.09 for the whole sample, 1.17 in males and 3.32 in females (Table 1).

*Distribution by age group*

Just under one-third (29.4%) of the sample was aged between 65 and 69, and one-quarter (24.3%) between 70 and 74. Hence, the suicide attempts among the elderly appeared, in at least 50% of cases, to have been committed by the 'young old'. Only a few suicide attempts were reported among the subjects aged 85 years and over (<10%). Taking account of repeaters, the percentage rose to 55.9% in the 65–74 age group. The largest group was concentrated in the 65–69 age band in 10 of the 15 centres and in the 70–74-year-old age group in three centres. There was a significant difference in frequency distribution among the various centres ( $\chi^2 = 91.4$ ;  $df = 70$ ;  $p < 0.05$ ).

The attempted suicide rate for the eight centres providing complete data over the entire study period was highest in the 70–74-year-old age group for both the total and male samples (67.0 and 61.0/100,000,

respectively). In the 65–69-year-old age group there was a preponderance of women (82.7/100,000).

The trend in intersex differences was not, however, statistically significant (Fig. 3). While rates for women always remained higher, rates for men and women converge in the 70–74 and 75–79 age groups (F/M ratio 1.18 and 1.15, respectively).

*Marital status*

The majority of the sample was composed of widow(er)s (44.9%) followed by married (37.3%), divorced or separated subjects (9%), never married (7.9%) and cohabiting subjects (0.9%).

Marital status distribution appeared to differ significantly among the various centres ( $\chi^2 = 94.18$ ;  $df = 30$ ;  $p = .000$ ). In 10 centres, there was a high proportion of widow(er)s. In five (Bordeaux, Innsbruck, Guipuzcoa, Bern and Sor-Trondelag), married subjects were more highly represented. The number of divorcees was high in Stockholm (19.5%) and Leiden (17.5%).

A significant difference emerged in marital status distribution in terms of gender ( $\chi^2 = 67.85$ ;  $df = 6$ ;  $p = .000$ ). Among the females, there was marked prevalence of widows (53.1%), followed by married (30.1%), never married (8.1%) and divorced/separated subjects (totalling 8.1%). The male attempters were often married (49.7%), followed by widowers (30.6%), divorced/separated men (11.4%) and never married (7.5%).

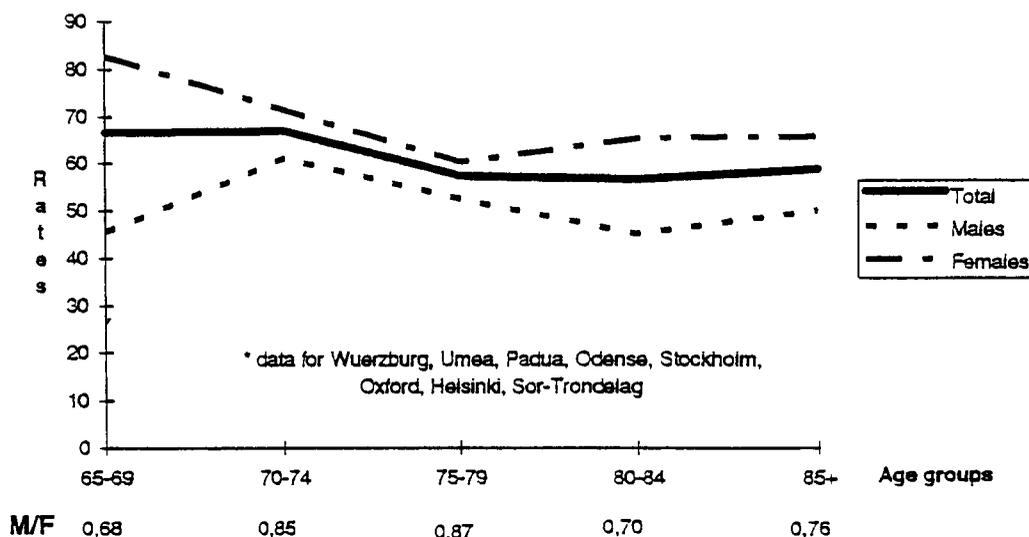


Figure 3. Parasuicide rates by age groups in the elderly, 1989–1993\*

### *Household composition*

The sample exhibited a predominance of subjects who lived alone (40.9%). The exceptions were Emilia, Padua, Innsbruck, Guipuzcoa and Bern, where the majority of subjects lived with their respective partner. In the sample as a whole, 31.2% of subjects lived with their partner only. A large percentage of the Padua sample (22.4%) lived in institutions. The differences between the centres proved to have marked statistical significance ( $\chi^2 = 60.39$ ;  $df = 14$ ;  $p < .000$ ). On distinction by gender, the largest group was composed of women living alone, while the majority of males lived with their wives ( $\chi^2 = 33.49$ ;  $df = 1$ ;  $p < 0.000$ ).

### *Differences and uniformity among centres*

Given the marked differences in attempted suicide rates and the majority of the socio-demographic variables considered, classificatory (hierarchical cluster) analysis was performed in order to aggregate the centres into groups which were as uniform as possible in terms of the above characteristics. Only the variables represented in all centres were examined.

Classificatory analysis indicated the presence of two main groups. The first, composed of Würzburg and the southern European centres (Emilia, Padova, Guipuzcoa), was characterised by lower suicide attempt rates ( $M = 43.9/100,000$ ) and marked predominance of Catholics ( $M = 84.2\%$ ).

Widow(er)s ( $M = 51.5\%$ ), married subjects ( $M = 40.7\%$ ), subjects living with a partner or with their family ( $M = 59.9\%$ ) and low schooling level ( $M = 82.2\%$ ) also prevailed.

The second group, composed of Bern, Szeged and the northern European centres (Odense, Helsinki, Umea, Leiden, Stockholm, Sor-Trondelag) was, instead, characterised by higher attempted suicide rates ( $M = 66.3/100,000$ ) and by a prevalence of Protestants ( $M = 76.7\%$ ).

The majority of subjects were widowed ( $M = 43.2\%$ ) and married ( $M = 37.5\%$ ), but there was a significant number of separated and divorced subjects ( $M = 11\%$ ); for the most part, these subjects lived alone ( $M = 48.2\%$ ) and had a low schooling level ( $M = 68.2\%$ ), although the percentage of subjects with a moderate ( $M = 17.2\%$ ) and high educational level ( $M = 14.6\%$ ) was higher than in the previous group.

The centres of Innsbruck and Bordeaux, however, assumed an isolated position. Although they shared many characteristics of the southern (prevalence of Catholics and subjects living in the family) or northern centres (high attempted suicide rate ( $M = 66.4/$

100,000)), they differed from the other two groups in terms of predominance of married subjects ( $M = 58.05\%$ ) and mean schooling level ( $M = 72.6\%$ ), with a significant number of subjects who were still professionally active ( $M = 17.3\%$ ).

### *Attempted suicide method*

On comparison of the various centres, a high prevalence (57.2% of all suicide attempts) of drug overdoses emerged (especially benzodiazepines and hypnotics). The second method, in most centres, in order of frequency, was self-injury with sharp objects (especially wrist cutting) (11.2%), followed by poisoning with non-steroid anti-inflammatory agents (6.4%) and other unspecified drugs (5.5%). The exception was Guipuzcoa, where the most widely adopted method for the 16 reported cases proved to be jumping from high places (29.4%), with a similar incidence of drug overdoses and use of sharp objects (23.5%). Interestingly, the third most frequently used method in Umea and Würzburg was hanging, strangling and suffocation. In Szeged, the second most common (and very frequently adopted) method (24.1%) was poisoning with chemicals such as pesticides, solvents, etc. The differences between the centres appeared to be statistically significant ( $\chi^2 = 72.23$ ;  $df = 14$ ;  $p < 0.000$ ).

On distinction by gender, women more frequently used overdose with benzodiazepines and hypnotics than men ( $F = 63.3\%$  vs  $M = 45.5\%$ ). By contrast, a slightly higher percentage of men than women injured themselves with sharp objects (13.8% vs 9.8%). Overdose with other drugs was the third method for men (7.5% vs 4.5%) and the fourth for women (who appeared to prefer non-steroid anti-inflammatory agents). Hanging was also more widely adopted by men (6.6%) than women (2.3%). Gender differences were statistically significant ( $\chi^2 = 85.42$ ;  $df = 1$ ;  $p < 0.000$ ). In the sample as a whole, 15% used more than one method (18% of males and 14% of females). The most commonly adopted method used in association was overdose with anti-inflammatory drugs and painkillers (25.3%) or with other types of drugs (22.3%).

On further subdivision of suicidal methods into two additional categories, according to level of violence (hard and soft), where 'soft' methods include voluntary ingestion of drugs or superficial self-injury with sharp or blunt objects, and hard ones include all other methods, less violent methods were adopted in 89.1% of cases. Significant gender differences emerged, with males adopting 'hard' methods (16.1%) more

frequently than women (8.1%) ( $\chi^2 = 21.98$ ;  $df = 1$ ;  $p < 0.000$ ). The over-75 age group also exhibited a higher prevalence of hard methods than the younger groups.

#### *Previous suicide attempts*

In the sample as a whole, 66.4% of subjects had never attempted suicide prior to the index event. In 11.9% of those who repeated suicide attempt, the penultimate event had occurred during the previous year. The mean age of the repeaters ( $72.7 \pm 6.2$ ) was lower than the 'first ever' ( $74.8 \pm 6.9\%$ ) ( $t = 3.7$ ;  $p < 0.000$ ).

#### *Psychiatric diagnosis*

Six centres (Emilia, Padua, Würzburg, Stockholm, Sor-Trondelag, Innsbruck) provided data on psychiatric diagnosis formulated according to ICD-9 criteria (638 subjects) (WHO, 1977). In 247 subjects (38.7% of the total sample; 31.6% males, 68.4% females), a psychiatric disorder meeting ICD-9 diagnostic criteria was present.

The most frequently observed diagnosis was manic-depressive psychosis, depressive type (17.8% of cases), followed by neurotic depression (15.8%), depressive disorders not classified elsewhere (10.1%), manic-depressive psychosis, manic type (9.3%), anxiety states (9.3%), adjustment disorders (8%), organic psychotic states (5.6%), personality disorders (3.6%), schizophrenia (3.2%), alcohol or substance abuse or dependency disorders (2.8%) and acute reaction to stressful events (2%). Where various subcategories were combined, two-thirds of diagnoses (69.9%) proved to be mood disorders, of the neurotic type in 25.9% of cases. There did not appear to be any major gender-related differences. It should be stressed that these diagnoses were formulated in the clinic and could not be checked or more closely examined afterward.

#### *Referral to health facilities*

Hospital admission was recommended in the majority of cases (64.3%). Marked differences emerged, however, when the centres were considered individually, probably owing to differences in the various local health situations ( $\chi^2 = 472.90$ ;  $df = 36$ ;  $p < 0.000$ ). In Leiden and Oxford, for example, the percentage of cases with no referral to health facilities was higher than the number of hospital admissions (which were rather low compared with the other centres).

## DISCUSSION

WHO/EURO study offers a unique example of a multinational, but regional effort to accumulate data on attempted suicide (and to a lesser extent, suicide). This focus on its findings in respect of older subjects can be explored in terms of significant demographic and clinical correlates of suicidal behaviour, trends for attempted and completed suicide across Europe in the 1989–93 period and attempted suicide and its relationship to suicide.

#### *Correlates of suicidal behaviour*

Non-fatal suicidal behaviour is a phenomenon more common among the young and this study confirms a fact that has been well known for some time. In the pool of 22,665 cases of attempted suicide recorded between 1989 and 1993, elderly subjects accounted for 9% of all episodes (the 15–34 age group accounted for 50%). Considering the centres and all ages globally, non-fatal suicidal behaviour was four times less frequent among elderly women than young women, while the elderly/young ratio in males was 1 to 3 (Schmidtke *et al.*, 1996).

The various collaborating centres did, however, report very different rates. Stockholm had an overall incidence of elderly suicide attempts 3.6 times higher than the Spanish centre of Guipuzcoa, which was lowest in ranking. The difference was even more marked between these two centres for females, where the ratio was 4.8:1.

The ratio between number of recorded suicidal events and persons was lower in elderly subjects than in the total sample described by Schmidtke *et al.* (1996): 1.14 vs 1.29, without noticeable gender differences.

An interesting pattern emerges for non-fatal suicidal behaviour as a function of gender and increasing age. While in the sample considered as a whole (15 years of age and upwards), the F/M ratio was 1.5 (Schmidtke *et al.*, 1996), male and female suicide attempt rates among elderly Europeans tend to level up albeit with a slight female bias (= 1.1). Thus, as age increases, the difference in suicide attempt rates between the sexes tends to converge considerably. Unlike the attempted suicide phenomenon, completed suicides by elderly males are twofold those of females and the male/female ratio increases with age.

The subjects in our sample most frequently employed voluntary poisoning by drugs and self-injury with sharp objects. Male individuals more frequently adopted more lethal means. Suicidal method

also differed significantly between the various centres, e.g. peculiar features in Guipuzcoa (where jumping was most frequently used) and Szeged (where the second most common method was poisoning with chemicals such as pesticides and herbicides). Unfortunately, lack of data precludes similar considerations being addressed to methods employed in completed suicide.

In terms of diagnosis, although there were missing data and most of the available data were collected after routine consultation in hospital, there was evidence of a preponderance of depressive disorders (two-thirds of all diagnoses) with a relatively low number of personality, substance abuse and schizophrenia-spectrum illnesses.

#### *Suicidal behaviour and temporal trends*

Over the 5-year study period, attempted suicide rates in Europe remained practically constant with only a slight fall in older groups as a whole (-4.9%). In the WHO/EURO study, 10 countries were able to provide local data for suicide and a slight fall in rates was observed.

#### *Attempted suicide and its relationship to suicide*

The attempted suicide/suicide ratio was 2:1 for the 10 centres presenting local figures for suicide but attempted suicide as a behaviour was not particularly linked to completed suicide and some centres recorded very important differences. Stockholm, for example, reported the highest suicide rate with a ratio of 3.6:1 between the two. Bern, on the other hand, presented very similar attempted suicide to suicide rates (1.4:1) with a 1:1 ratio in males. Oxford, by contrast, had a ratio of 9:1 with one of the highest ranking for suicide attempts and one of the lowest positions for completed suicide.

As previously stated, there was no significant correlation between attempted suicide and suicide in the total sample where both phenomena were recorded across the full 5 years and none for each centre separately with the exception of females in Umea.

#### *Implications for prevention of suicide*

The group of suicide attempters aged 75 years and over exhibited a greater tendency towards the use of more violent methods compared with younger age bands, providing some support to the notion that with advancing age, non-fatal suicidal behaviour is increasingly likely to assume connotations of failed suicide. However, our inability to demonstrate widespread cor-

relation between the two phenomena does not suggest this and an inverse correlation for males in the group of five centres (Würzburg, Umea, Padua, Odense and Stockholm) may indicate that the group of attempters is not overlapping to a great degree with those who complete suicide.

Moreover, as their age increased, suicide attempters displayed only a limited tendency to repeat self-destructive acts over the 5 years. This makes it unclear what role specific interventions might play if older patients with suicidal behaviour were selected out.

However, in generalising the above considerations much caution has to be adopted. First of all, the examination of the correlation between fatal and non-fatal suicidal behaviour has been performed on a limited number of centres (five out of 16, approximately one-third of the collaborating centres). Secondly, hidden suicide behaviour (rather frequent in the elderly) was not investigated. Hypothetically, it could be that a number of deaths might have been recorded as 'undetermined' (or due to other causes) instead of suicide (De Leo and Carollo, 1996), thus influencing the resulting lack of association between suicide attempt and suicide. Lack of completeness in data collection within centres may also have affected some of the results.

#### *Limitations of the study*

A large mass of data from different national centres allows for the abstraction of patterns which are probably common to the species, whilst differences between sites underline the impact of cultural factors. A disappointing aspect, however, in terms of our ability to look at cultural influences, was inconstant participation (due to funding problems) which limited the availability of educational and occupational data.

Religious affiliation (with 50% of data absent) is another missed target of the study as it could have provided more insight into the relationship between religion and suicidal behaviour, especially in terms of intensity of belief, church attendance (with its important community-networking aspects) and the importance of the practice of prayer. This is particularly so, as elderly Europeans are religiously observant to a greater degree than their descendants and assessing the purported protective effects of religiosity would have been of especial relevance for this older sample.

Regarding assessment of suicidal behaviour within the various countries, there are obviously variations in coverage, reliability and definition (Lonnqvist and

Achté, 1985), with the phenomenon of under-reporting further complicating epidemiological assessment. Certain features, in particular, strongly influence data collection among the elderly, namely the high frequency of chronic disease states and prescribed drugs, the higher incidence of accidents, the influence of insurance benefits, the social status of the person and, more recently, increasing issues surrounding euthanasia and assisted suicide. Despite these considerations, we feel the reported trends can still be considered valid.

## CONCLUSIONS

In spite of the heterogeneity recorded by various centres, this study confirms that there is a lower suicide attempt tendency among the elderly compared with the young. Among elderly Europeans, the female/male attempted suicide ratio tends to level out, although a slight female bias remains. While attempted suicide rates were almost the same for men and women, the number of suicides committed by elderly European males was almost twofold.

The period during which this work was undertaken testified to essentially stable attempted suicide rates and a slight fall in suicide rates in the elderly European population, without any significant correlation between the two trends over those years. With advancing age, suicidal behaviour appears to be more determined and only a limited tendency to repeat self-destructive acts emerged from our sample.

Regarding the assumption that attempts in the elderly can be treated conceptually as failed suicides, the paper appears to demonstrate (some caution is needed) that there is not a direct correlation between non-fatal and fatal suicidal behaviour in the elderly. Furthermore, in contrast to the finding by Hawton *et al.* (1998) (in the context of the same WHO/EURO study) of a direct correlation between fatal and non-fatal suicidal behaviour in young males, the reverse appears to be true for elderly male subjects. This may be relevant for the prediction of suicidal behaviour in this age group in that the two phenomena correlate inversely.

In addition, even if it is probably true that studying suicide attempts in older people would provide more insight into suicidal behaviour in this age band, the low repetition rate observed in the elderly limits the impact of specific intervention for this group. This lower repetition rate does not allow them to be considered as a high-risk group in the same way as younger subjects.

## KEY POINTS

- This WHO initiative produced a relevant amount of data on suicidal behaviour in older adults from several European countries, offering some trans-cultural insight on differences recorded in the centres participating to the study.
- With advancing age, in Europe, suicide attempt rates tend to be similar for men and women, whilst suicide rates in males are nearly twofold those of females. During the 5-year period of the study, there was a substantial stability in trends of attempted suicide and a slight decline in those of suicide.
- The study confirmed on a larger scale what was known from smaller previous reports: that both first attempts and repetitions are much rarer in elderly subjects. Thus, prevention of suicide based on high-risk groups defined by suicide attempts in their history may result of more limited value.
- Contrarily to previously reported data, no correlation was found between fatal and non-fatal suicidal behaviour. This seems to further underline the difficulties implicit in suicide prevention with older adults.

Increasing our understanding of suicidal behaviours has specific challenges at different stages across the lifespan. In some ways, this process is most difficult for the elderly, due to reduced access to both the behaviours themselves (less attempts, less repeats, masked intent) and an increasing attitudinal divide between them and their youth. If this paper illustrates the limitations of non-fatal suicidal behaviour as a focus of this undertaking, it should not diminish our perseverance, as our efforts are, in some ways, part of a process that seeks to reconcile the young with the old.

## REFERENCES

- Bille-Brahe U, Kerkhof A, De Leo D *et al.* 1997. A repetition-prediction study on European parasuicide populations. A summary of the first report from Part II of the WHO/EURO Multicentre Study on Parasuicide in cooperation with the EC Concerted Action on Attempted Suicide. *Acta Psychiatr Scand* **95**: 81–86.
- Busse EW, Pfeiffer E. 1969. *Behaviour and Adaptation in Late Life*. Little Brown & Co: Boston.
- De Leo D, Carollo G. 1996. Relationship between suicide and undetermined causes of death among the elderly—analysis of Italian data from 1951 to 1988. *Omega* **33**: 215–231.
- De Leo D, Diekstra RFW. 1990. *Depression and Suicide in Late Life*. Hogrefe & Huber Publishers: Toronto/Bern.

- Draper B. 1996. Attempted suicide in old age. *Int J Geriatr Psychiatry* **11**: 577–587.
- Frierson RL. 1991. Suicide attempts by the old and the very old. *Arch Intern Med* **151**: 141–144.
- Gardner EA, Bohn A, Mack M. 1964. Suicide and psychiatric care in the ageing. *Arch Gen Psychiatry* **10**: 547–553.
- Hawton K, Arensman E, Wasserman D *et al.* 1998. Relation between attempted suicide and suicide rates among young people in Europe. *J Epidemiol Community Health* **52**: 191–194.
- Kreitman N. 1976. Age and parasuicide (attempted suicide). *Psychol Med* **6**: 113–121.
- Lindesay J. 1986. Trends in self-poisoning in the elderly 1974–1983. *Int J Geriatr Psychiatry* **1**: 37–43.
- Lonnqvist J, Achte K. 1985. Follow-up study on the attempted suicides among the elderly in Helsinki in 1973–1979. *Crisis* **6**: 10–17.
- McIntosh JL. 1992. Suicide of the elderly. In *Suicide: Guidelines for Assessment, Management and Treatment*. Bongar B (ed.) Oxford University Press: New York.
- Miller M. 1979. *Suicide After Sixty*. Springer: New York.
- Nowers M. 1993. Deliberate self-harm in the elderly: a survey on one London Borough. *Int J Geriatr Psychiatry* **8**: 609–614.
- Platt S, Bille-Brahe U, Kerkhof A *et al.* 1992. Parasuicide in Europe: the WHO/EURO Multicentre Study on Parasuicide. Introduction and preliminary analysis for 1989. *Acta Psychiatr Scand* **85**: 97–104.
- Schmidtke A, Bille-Brahe U, De Leo D *et al.* 1996. Attempted suicide in Europe: rates, trends and sociodemographic characteristics of suicide attempters during the period 1989–1992. Results of the WHO/EURO Multicentre Study on Parasuicide. *Acta Psychiatr Scand* **93**: 237–338.
- WHO. 1977. *Manual of the International Statistical Classification of Diseases, Injuries and Causes of Death*, 9th revision. WHO: Geneva.
- WHO. 1986. *Working Group on Prevention Practices in Suicide and Attempted Suicide*. York, 22–26th September 1986 ICP/PSF 017(s) 6526V.
- WHO. 1992. *Health-for-all Targets. The Health Policy for Europe. Summary of the Updated Edition*. EUR ICP/HSC 013. World Health Organisation: Copenhagen.

Copyright of International Journal of Geriatric Psychiatry is the property of John Wiley & Sons Inc. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.

Copyright of International Journal of Geriatric Psychiatry is the property of John Wiley & Sons, Inc. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.