Analysis of suicide in the elderly in Italy. Risk factors and prevention of suicidal behavior

Claudio Terranova[1], Fabrizio Cardin[2], Andrea Bruttocao[2] and Carmelo Militello[2]

[1]Department of Molecular Medicine, and [2]Department of Surgical and Gastroenterological Sciences, University Hospital of Padova, Padova, Italy

ABSTRACT. The authors describe the nationwide scale of suicides among the elderly in Italy for the period 1993-2010. The data are derived from the Italian Institute for Statistics (ISTAT) and the World Health Organization (WHO). The elderly turned out to represent the highest risk category for suicide, with risk increasing with age (suicide rates, per 100,000, in men aged 75 or over and aged 65-74 were respectively 28.3 and 15.7 in 2007). The rates for men were three times higher than those for women. The north-east and north-west regions of Italy had the highest rates of suicide in the elderly. Education was inversely related to the risk of suicide. Hanging was the most frequent method of suicide in men, and precipitation in women. The reasons for suicide, as inferred from available data, were predominantly mental-physical illnesses. The risk factors emerging from our analysis are discussed from the preventive point of view, in relation to the Italian situation and a review of the literature.
(Aging Clin Exp Res 2012; 24 (Suppl. to No. 3): 20-23)

INTRODUCTION

According to the World Health Organization (WHO) (1), every year almost one million people die by their own hand. Although there is some evidence of a decline in the rates of suicide in West European countries, the phenomenon is still an important cause of death, especially in the elderly. Suicides, in Italy and worldwide, are more frequent with increasing age: 1.4 per 100,000 for people aged <25, 6.1 for those aged 25-44, 8.4 for those of 45-64, and 11.3 for those over 65, i.e., eight times higher than in the youngest class. The highest risk of suicide is thus found among the elderly (2).

Differences in suicide rates or suicidal thinking have been observed between the old and the oldest old (2). In relation to gender, the higher propensity of men under 65 to commit suicide, more than three times higher than that for women of the same age, also clearly emerges in the statistics on suicide in Italy (3).

After Germany, Italy is the second country in Europe for numbers of elderly people (i.e., those over the age of 65). The proportion of the elderly has increased over the years and is expected to continue to do so. In the Veneto region of north-east Italy, where this study was performed, the number of older adults was 975,726 in 2009; in the same year, the percentages of older adults stating that they were in good health and of elderly people aged 75 and over with at least two chronic diseases were respectively 32.5 and 68.3 (4).

As the population ages, in view of the importance of the phenomenon in the elderly (5, 6), it is important to provide a picture of suicide in Italy and to identify the most vulnerable regions and groups. The risk factors are described and possible methods of prevention of suicide are discussed.

METHODS

The data on which this study is based come from the WHO and the Italian Institute for Statistics (ISTAT). The Italian data reported by WHO consist of suicide rates (per 100,000) and the number of suicides by gender and age in 2007, distinguishing two groups of old adults (age 65-74, and age ≥75).

The ISTAT data are derived from two sources: "Deaths and causes of death" (data available from 1993 to 2009), based on forms filled in by clinicians, and "Suicide and attempted suicide" (data available from 2005 to 2010), based on forms filled by police authorities. Both sources refer only to people over 65.

The data for "Deaths and causes of death" meet the criteria and quality requirements of the WHO and the European Community, and represent the official source for more reliable analysis of suicide in Italy. The data "Suicide and attempted suicide", considered by ISTAT to be underestimated compared with those of a medical nature, were also analysed. Although aware of the limitations listed by ISTAT, the present authors still found that some of the data of this source were useful, as they were often

Key words: Suicide, elderly, risk factors for suicide.

Correspondence: Claudio Terranova, MD, Legal Medicine Unit, Department of Molecular Medicine, University Hospital of Padova, Padova, Italy.
E-mail: claudio.terranova@sanita.padova.it

more descriptive than those from medical sources (e.g., method of suicide, season, etc.). These data are examined and discussed in relation to their consistency with data from the international literature.

All reported suicides in Italy during the period 1993-2010 were analysed.

For data from the "Deaths and causes of death" source, ISTAT reported the phenomenon in relation to gender, education and age. For data from the "Suicide and attempted suicide" source, ISTAT reported possible factors correlated with suicide (physical or mental illnesses, emotional changes, economic problems), methods of suicide, and month of suicide.

Suicides were classified according to International Classification of Diseases (ICD-10) in all sources.

RESULTS

WHO results

In 2007 in Italy, the suicide rates (per 100,000) in men and women aged 65-74 were respectively 15.7 and 4.3; the total suicide rate was 9.6. The rates in men and women aged 75 or more were respectively 28.3 and 4.8; the total suicide rate was 13.5.

The numbers of suicides in men and women aged 65-74 were respectively 450 and 143, and the total 593. The numbers of suicides in men and women aged 75 or more were respectively 596 and 171, and the total 767.

ISTAT results - "Deaths and causes of death" source

The suicide rates (per 100,000) declined from 1993 to 2009 from 30.4 to 21 in men and from 8.4 to 4.3 in women. In the same period, the number of suicides in men and women declined from 1126 to 1071 in men and from 453 to 301 in women.

Education level was inversely associated with the tendency to commit suicide.

ISTAT results - "Suicide and attempted suicide" source

Results concerning the total number, gender differences, methods and reasons of suicides are listed in Table 1.

Table 1 - *Elderly suicide – 2005-2010. Source: ISTAT "Suicide and attempted suicide".*

	2005	2006	2007	2008	2009	2010	Annual mean±SD (%)
Suicide number							
Total	1054	1138	1048	974	1020	1038	1045±54
Men	778	886	795	746	800	812	802.3±46.7
Women	276	252	253	228	220	226	242.5±21.5
Reasons - Men							
Mental illness	246	272	270	214	252	242	249.6±22 (31)
Physical illness	171	200	186	178	184	190	184.8±10 (23)
Economic reasons	13	15	13	15	14	20	15±2.6 (1.8)
Emotional alterations	42	59	45	47	61	45	50±8 (6.3)
Others - not documented	306	338	281	292	289	315	304±21 (37.9)
Reasons - Women							
Mental illness	135	133	133	112	111	115	123±11 (50.7)
Physical illness	45	31	36	28	23	26	31.5±8 (39)
Economic reasons	1	0	1	3	4	1	1.7±1.5 (0.7)
Emotional alterations	9	13	7	9	14	11	10.5±2.6 (4.3)
Others - not documented	86	75	75	76	68	63	76±6 (5.3)
Methods - Men							
Hanging	292	308	307	296	306	327	306±12 (38.1)
Weapons	160	169	149	138	172	175	116±15 (20)
-Firearms	139	144	128	128	147	152	140±10 (17.5)
-Bladed weapons	21	25	21	10	16	23	19±5 (2.5)
Precipitation	147	146	133	128	147	189	148±22 (18.5)
Poisoning	17	16	16	17	11	8	14±4 (1.7)
Killed by motor vehicle or train	9	14	15	14	13	12	13±2 (1.5)
Drowning	37	41	41	43	33	40	39±4 (4.9)
Others - not identified	116	229	134	110	118	61	128±55 (17)
Methods - Women							
Hanging	53	48	48	46	49	46	48±2.5 (20)
Weapons	11	11	8	5	4	8	7.8±3 (3.2)
-Firearms	6	2	3	2	1	1	2.5±2 (1)
-Bladed weapons	5	9	5	3	3	7	5.3±2.3 (2.2)
Precipitation	108	92	96	94	89	98	96±6.5 (40)
Poisoning	11	13	8	9	12	16	11.5±2.8 (4.7)
Killed by motor vehicle or train	3	1	5	6	5	1	3.5±2 (1.44)
Drowning	30	37	26	28	23	25	28±5 (11.6)
Others - not identified	60	50	62	40	38	32	47±12 (19)

Table 2 - *Elderly suicide in Italian regions – 2005-2010. Source: ISTAT "Suicide and attempted suicide".*

	2005		2006		2007		2008		2009		2010		2005-2010
	M+W	M	M+W	M	M+W	M	M+W	M	M+W	M	M+W	M	M+W
North Italy	**479**	336	**494**	370	**446**	321	**447**	334	**386**	301	**408**	317	**2660**
North-east	143	95	156	117	125	88	148	110	129	101	153	119	854
North-west	336	241	338	253	321	233	299	224	257	200	255	198	1806
Central Italy	**317**	240	**344**	273	**321**	255	**299**	236	**352**	274	**360**	278	**1993**
Southern Italy	**160**	121	**177**	146	**161**	129	**138**	102	**166**	129	**182**	141	**984**
Sicily - Sardinia	**98**	81	**123**	97	**120**	90	**90**	74	**116**	84	**88**	69	**635**

M=men, W=women.

In the period 2005-2010, 17,682 people committed suicide, of which 6272 (35.47%) were old adults (4817 men, 76.8% of the total, and 1455 women, or 23.2%).

As regards the reasons, as documented by the police authorities, a mean of 373±31 persons committed suicide due to mental illness (36.1%) and a mean of 216±9 persons due to physical illness (20.5%). 1.3% of suicides were for economic reasons. The total number of suicides in those aged over 65 due to physical illness was 1298 out of 1920 (67.6%).

The first method was hanging (34%) followed by precipitation (23%) and firearms (14%).

The three-monthly period June, July and August accounted for 28% of suicides, and the period November, December and January 20%. There were no gender differences in relation to the period of suicide.

Results concerning suicides in Italian regions are summarized in Table 2. The regions with the highest number of suicide of older adults were in the north of Italy. In particular, 506 suicides of older adults, corresponding to 19% of the total of 2660, occurred in the Veneto Region (8% of total suicides).

DISCUSSION

Suicide is a complex act in which psychological, social, biological, cultural and environmental factors all play a role (1). Several studies have attempted to identify the risk factors for suicide, showing that causes vary according to gender and age group (7).

Italian data confirm that suicide in later life is a public health problem involving old men more frequently. Old men kill themselves almost three times more often than women of the same age. These data find a possible explanation in the methods used by men, characterized by a high degree of lethality. Men aged 75 or more (see WHO data) are at higher risk of committing suicide than men aged 65-74, and this result is consistent with a previous study (2). Women of the same age, contrary to the results of previous studies (8), are at higher risk of committing suicide compared with other age groups.

Education is inversely related to the risk of suicide, low levels being more frequently associated with suicide. The decrease in the number of suicides, also seen partially in the elderly, may also be interpreted in relation to this parameter. Improvements in the level of education observed from 1991 to 2012 in the Veneto Region (4) may support this observation.

The regions with the highest number of suicide are located in the north of Italy. The most obvious differences between north and south (excluding Sicily and Sardinia) are related to the low rate of suicide committed by men with respect to women.

Data on mental or physical illnesses as the cause most frequently related to suicide are not surprising and are consistent with the literature. Many mental illnesses such as depression (9) are statistically related to a higher risk. Physical disease as a reason for suicide in the elderly may be interpreted as a loss of autonomy of the individual in terms of personal and social capacities, with negative psychic resonance. It is noteworthy that the total number of suicides in those over 65 due to physical illness is 1298 out of 1920 cases (67.6%). The higher prevalence of disease in the elderly and the more frequent negative resonance of diseases in old men may explain these figures. Although data regarding mental or physical illnesses are not surprising, they are undoubtedly important, as the number of diseases of the elderly increases with age, as does the risk of suicide.

As regards methods, elderly men mainly commit suicide by hanging, firearms or precipitation; women more frequently use precipitation, followed by hanging and drowning. These data contribute toward explaining gender differences in terms of numbers of suicides and suicide attempts.

Data relating to the month of death may be interpreted as indicative of periods in which loneliness is particularly felt by elderly people without families or social support. This observation should be confirmed by collecting data regarding individuals' living conditions, although they are controversial in the literature.

Some data, such as marital status, substance use dis-

orders, religion, retirement and institutionalization were not available in our dataset and should be considered in future data collection for statistical analysis.

The prevention of suicide is based on identification of risk factors. The lack of preventing suicide may involve medico-legal liability (10), mostly for specialists who examine the patient and underestimate the immediate risk. Obviously, professional liability is based on demonstration of a causal link between an error on the part of the physician and the death of the patient (11, 12). Discussion of risk factors associated with the immediate risk of suicidal behavior (psychopathological alterations such as anxiety, impulsivity, signs of depression) are beyond the scope of this work. In the light of previous findings, it may be interesting to focus on multidisciplinary preventive strategies.

The most important risk factors which should be addressed are those involved in multiple mental and physical illnesses. Among mental disorders, depression has been found to be the most common predictor of suicide (13) and this risk factor should be carefully assessed and treated. General practitioners should be educated in recognizing the signs of depression which, in the elderly, may be different from those manifested at other ages. One important sign of depression and consequently of the risk of suicide is a previous attempt. In the patient's history, this is highly indicative of a real risk of suicide, as the attempted suicide/suicide ratio in the elderly is 2-3/1, but is 100/1 at other ages (14). Treatment for depression has provided good results in reducing suicide rates in the elderly (13), especially in women.

Physical illnesses with negative prognoses or interfering with a patient's capacities are important risk factors for depression or directly for suicide. A multidisciplinary approach also including cases of institutionalized patients would be useful.

Focusing on methods of suicide, the statistics regarding precipitation, drowning or the use of firearms could help both physicians and institutions to appreciate the need to limit physical access to such methods (15). Limiting access represents effective prevention, particularly in contexts where suicide is highly lethal and/or not easily substituted by other methods (15). The delay caused by limited access to the method of suicide may allow patients to get help in time (15).

CONCLUSIONS

Suicide in the elderly is a global public health problem which is expected to increase as society ages. It is of paramount importance to examine further the reasons for suicidal behavior at local level, as demonstrated by regional rate differences which may require selective interventions. The category at highest risk is that of old men aged 75 or over, and it is this category which should be carefully studied. Mental disorders such as depression or multiple physical illnesses should be addressed with a multidisciplinary approach, including education of general practitioners and the involvement of relatives, if available.

Disclosure statement

The authors have nothing to disclose.

REFERENCES

1. World Health Organization. Available at: http://www.who.int/mental_health/prevention/suicide/suicideprevent/en/index.html. Accessed September 11, 2012.
2. Erlangsen A, Bille-Brahe U, Jeune B. Differences in suicide between the old and the oldest old. J Gerontol B Psychol Sci Soc Sci 2003; 58: S314-22.
3. Italian Institute for Statistics (ISTAT). Available at: http://www.istat.it/it/archivio/suicidi. Accessed September 11, 2012.
4. Data from Agenzia Regionale Socio Sanitaria del Veneto and ISTAT. Available at: http://statistica.regione.veneto.it/Pubblicazioni/RapportoStatistico2011/index.html. Accessed September 11, 2012.
5. Biermann T, Sperling W, Bleich S, Kornhuber J, Reulbach U. Particularities of suicide in the elderly. A population-based study. Aging Clin Exp Res 2009; 21: 470-4.
6. Inelmen EM, Sergi G, Pintore G, Enzi G. An uncommon case of failed suicide in a 94-year-old woman: "masked" depression or rational decision? Aging Clin Exp Res 2008; 20: 381-3.
7. Pinto LW, Assis SG, Pires Tde O. Suicide mortality in people aged 60 and over in Brazilian municipalities between 1996 and 2007. Cien Saude Colet 2012; 17: 1963-72.
8. Coren S, Hewitt PL. Sex differences in elderly suicide rates: some predictive factors. Aging Mental Health 1999; 3: 112-8.
9. De Leo D, Spathonis K. Suicide and euthanasia in late life. Aging Clin Exp Res 2003; 15: 99-110.
10. Boscolo-Berto R, Viel G, Cecchi R, et al. Journals publishing bio-medicolegal research in Europe. Int J Legal Med 2012; 126: 129-37.
11. Di Pietra L, Gardiman M, Terranova C. Postpartum maternal death associated with undiagnosed Hodgkin's lymphoma. Med Sci Law 2012; 52: 174-7.
12. Terranova C, Sartore D, Snenghi R. Death after liposuction: case report and review of the literature. Med Sci Law 2010; 50: 161-3.
13. Wyart M, Abbar M, Courtet P. Preventing late life suicide. Minerva Psichiatr 2012; 53: 123-31.
14. O'Connell H, Chin AV, Cunningham C, Lawlor BA. Recent developments: suicide in older people. BMJ 2004; 329: 895-9.
15. Florentine JB, Crane C. Suicide prevention by limiting access to methods: a review of theory and practice. Soc Sci Med 2010; 70: 1626-32.