Suicide mortality is decreasing among cancer patients in Central Italy

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Abstract

The objective of this study was to discover whether suicide mortality among patients diagnosed with cancer during the period 1985–1999 had decreased with calendar time in comparison to the rate in the general population. 90 197 cancer patients resident in Tuscany, Central Italy and incident during the period 1985–1999 were followed up for life status to 31 December 2000. The mortality codes for suicide were considered (E950-E959). Time trends for suicide rates were assessed by using Kernel smoothing estimators, standardised mortality ratios and Poisson analysis of the observed/expected ratios. The standardised mortality ratios were 324, 224, and 185 for cancer patients diagnosed during the periods 1985–1989, 1990–1994, and 1995–1999, respectively. Tests for linear trends were borderline significant ($P = 0.053$). Suicide mortality among cancer patients in central Italy had decreased with calendar time relative to the suicide trend in the general population. Improved treatment options and better communication of diagnosis are possible explanations of this finding.
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Keywords: Suicide mortality; Cancer; Population-based study; time trend

1. Introduction

Some population-based studies have shown an increased suicide risk for cancer patients. Time since diagnosis, sex and extensive disease at diagnosis are the common determinants of this suicide mortality. Many such suicides occur soon after diagnosis and during the first year, but the suicide rate also remains higher than expected in subsequent years. Male cancer patients commit suicide more often than female, and patients with non-localised disease at diagnosis more often than patients with localised cancer [1–8].

Suicide in cancer patients is a complex phenomenon touching on ethical, sociological, medical and psychiatric issues [9]. All patients who face a life-threatening diagnosis such as cancer experience a painful emotional reaction, and a minority of them become clinically depressed [10,11]. The period soon after diagnosis and immediately following discharge from oncology and surgical wards appears to be one of highest risk, owing to the emotional impact and the difficulty of psychological adaptation without the support of the hospital environment [12,13]. Depression, hopelessness and lack of adequate antidepressant therapy are known to be associated with the desire for a hastened death in patients with advanced cancer [14,15]. Conversely, high-quality palliative care at home has been shown to be effective in lowering the suicide rates of terminally ill cancer patients to below those of the general population [16].

Cancer remains a life-threatening disease, but in recent years in Western countries the implementation of population-based screening programmes, new treatments, increased overall survival and better communication of diagnosis should have improved the likelihood of a more positive reaction to a cancer diagnosis. However, neither a study carried out in Connecticut, USA (updated in the 1960s) nor a Danish study (updated in the early 1980s) showed any decrease over time for suicide mortality among cancer patients [3,7]. The aim of the present study was to evaluate whether suicide mortality among a population of cancer patients had decreased relative to those in the general population in more recent years. A population-based observational

study was conducted on patients diagnosed with cancer during the period 1985–1999 in Tuscany, Central Italy.

2. Material and methods

A population-based cancer registry, the Tuscany Tumour Registry (RTT), has been active since 1985 in the Tuscan provinces of Florence and Prato (1 200 000 inhabitants). The RTT data meet quality standards set by the International Agency for Research on Cancer [17]. Across the same period a mortality registry (RMR) has existed for the entire region of Tuscany (3 400 000 inhabitants) [18]. The coding of causes of death has been compared between ISTAT (the Central Statistics Office providing national mortality statistics) and the RMR, and the results showed a high degree of comprehensiveness for the RMR [19].

From the RTT archives we retrieved malignancies (ICD9 140-208) incident during 1985–1999, excluding those known from death certification only (3293 cases) and non-melanoma skin cancers (8812 cases). For multiple tumours, only the first was retained. Overall, 90 197 cancer cases (47 966 men, 42 231 women) were analysed. Each patient was actively followed up to 31 December 2000; 307 patients (0.3%) were lost to follow up. The mortality codes for suicide were considered (E950-E959). Cancer sites were classified according to expected survival to obtain an approximation of the effect of the individual prognosis at diagnosis on the suicide rate. Two categories were defined and compared: cancer sites with a 5-year relative survival less or equal to 30% (pancreas, liver, oesophagus, lung, acute leukaemias, brain and stomach) and all others [20].

Kernel smoothing estimators were used to obtain estimates of the crude instantaneous suicide rate against time since diagnosis for each of the three periods of incidence considered. To obtain a satisfactory smoothing a bandwidth of 3 months was used for the first year since diagnosis and of 1 year afterwards, taking account of the decreased incidence of suicide after the first year since diagnosis.

The expected number of suicide deaths was estimated from external comparison by multiplying the age-, sex- and period of death-specific suicide mortality rates, available for the whole region of Tuscany, by the corresponding number of person years. The standardised mortality ratio (SMR) was calculated as the ratio of the observed to the expected suicide deaths.

A Poisson regression of the observed:expected ratio was fitted on to the period of diagnosis, adjusted for time since diagnosis. Period of diagnosis (5-year intervals) was considered a continuous variable. External standard rates were incorporated into the multiplicative model, with the logarithm of the expected number of suicides as the offset variable [21]. A Wald test for the

linear coefficient of period of diagnosis and a likelihood ratio test for departure from linearity were made. Analyses were performed using *STATA 8* [22].

3. Results

By the end of 2000, 57 983 out of 90 197 cancer patients had died (64.3%); among these 102 were registered as suicides. 36 persons had committed suicide by jumping from a high place, 28 by shooting, 23 by hanging, six by submersion, five by poisoning, and four by other kinds of self-injury. Time at risk for suicide after cancer diagnosis was 308526.9 person years.

Fig. 1 shows the crude instantaneous suicide rate, as estimated by Kernel smoothing, against time since diagnosis and period of diagnosis. Both the peak of suicide during the first year since diagnosis and the suicide rate after the first year had decreased progressively from 1985–1999 to 1995–1999.

Table 1 shows the external comparison with the suicide rate amongst the general population. The SMR was higher for men than for women (203 versus 157). Cancer patients 75 years old or older at diagnosis, and cancer sites with an expected 5-year relative survival less or equal to 30%, had higher SMR. The strong effect of time since diagnosis on the suicide rate was confirmed; the SMR for the first year since diagnosis was 346, while it was 124 after at least 5 years since diagnosis. Some 40% of all the cancer deaths due to suicide occurred during the first year after diagnosis.

The SMR was 324 for cancer patients diagnosed in 1985–1989, 224 for 1990–1994 and 185 for 1995–1999. Only the first 3 years since diagnosis were considered for this analysis, to take into account the differential period of follow-up for the three periods of diagnosis. Tests for linear trends by Poisson regression of the observed:
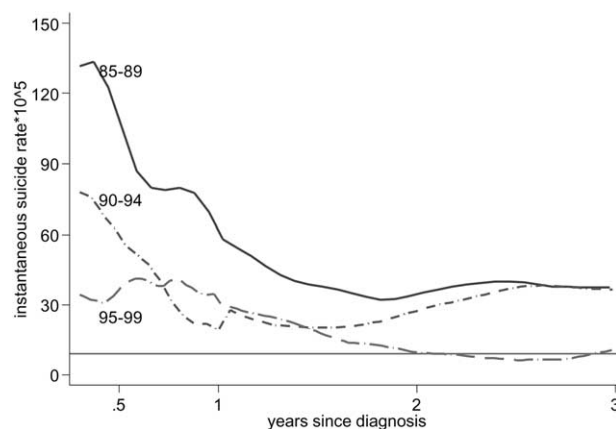

Fig. 1. Kernel smoothing estimates of the crude instantaneous suicide rate against time since diagnosis and period of incidence. The red line indicates the suicide rate in the general population during the entire period 1985–1999.

Table 1
Observed (O) versus expected (E) deaths due to suicide and stand-ardised mortality ratios (SMR) by sex, age at diagnosis, time since diagnosis, expected survival at diagnosis, and period of diagnosis

	O	E	SMR	
All cancer patients	102	53	193*	
Sex				
Male	85	42	203*	
Female	17	11	157	
Age at diagnosis (years)				
0–54	7	5	136	
55–64	19	10	182*	
65–74	35	19	180*	
75 +	41	18	231*	
Expected 5-year relative survival at diagnosis[a]				
> 30%	78	44	177*	
< = 30%	24	9	273*	
Time since diagnosis				
< 1 year	42	12	346*	
1–2 years	24	15	161*	
3–4 years	16	10	166*	
> 5 years	20	16	124	
Period of diagnosis[b]				Linear trend[c]
1985–1989	29	9	324*	P = 0.053
1990–1994	21	9	224*	
1995–1999	16	9	185*	

SMRs that do not include 100 in their 95% confidence intervals are marked with*.

[a] According to cancer site.

[b] Limited to the first three years since diagnosis.

[c] Poisson regression of observed/expected ratio on to period of diagnosis, adjusted for time since diagnosis; Wald test for the linear coefficient.

expected ratio on to period of diagnosis, adjusted for time since diagnosis, were borderline significant (Wald test = −1.93, P = 0.053); tests for departure from linearity was not statistically significant (P = 0.761).

4. Discussion

A decreasing time trend for the suicide rate in cancer patients has not, we believe, been observed before. The years of diagnosis considered in previous studies precede the mid-1980s. Since that time, successful preventative and curative oncology has grown, largely in Western countries. It seemed plausible to us that this change might have had some impact on the emotional reaction to the diagnosis of cancer. Therefore we conjectured that suicide mortality among cancer patients might have decreased relative to that of the general population in more recent years.

Age-standardized suicide rate (European standard population) by 100 000 person years were 11.9, 11.9, and 10.4 for men, and 3.7, 3.3, and 2.9 for women in 1985–1989, 1990–1994, and 1995–1999 respectively.

There may have been an overall improvement in the management of depression with the increased prescribing of selective serotonin reuptake inhibitors in general medical practice during the 1990s. The prescription of antidepressants is often accompanied by other assessments (such as asking about suicide risk, giving information to family members) and clinical interventions (counselling, support, continuous clinical review) [23–27]. These factors might explain the slight decrease in the suicide rate in the general population. It is also possible that a proportion of suicides were not reported on the death certificates, and that the under-reporting of suicide could have changed over time. However, it is implausible that differential under-reporting could explain the difference in temporal trends between cancer patients and the general population.

Our method of analysis took into consideration the temporal trend of suicide deaths in the general population, incorporating the external standard rates (age-, sex- and calendar time-specific) in the Poisson multiplicative model [21]. Although the test for linear trends was borderline significant only, the same decreasing trend was consistently observed in the analysis stratified by sex, age at diagnosis, and time since diagnosis. However, it was not present for cancer sites with low expected survival (data not shown), suggesting that successful preventative and curative treatments, more than palliative treatments, might explain these data.

The development of cancer prevention and treatment during the period under consideration is well known. The overall prognosis of cancer relative to survival has increased by 6–7 percentage points in Italy as well as in the RTT area when comparing cancer cases occurring in the period 1985–1999 with those occurring in 1995–1999 [20]; similar results are reported in Northern and Western European countries, and in the United States [29]. Significant changes in smoking habits may be presumed from the decreasing trend in lung cancer incidence among males, and improvements in hygiene and diet from the decreasing rates of gastric cancer [30]. In the RTT area, early diagnosis and organised screening are widely represented. Breast cancer screening programmes were started around the 1990s, and their impact on cancer-specific mortality and stage distribution is beginning to be appreciable [31,32]. Other screening programmes are well established, as for cervical cancer [33], or still under scrutiny, as for colorectum [34], prostate [35] and lung [36]. Early diagnosis may have contributed to the improved stage distribution at diagnosis. In fact, according to the RTT, the ratio of localized to extended disease has increased when comparing incident cases in 1985–1987 and 1997–1999 for the major cancer sites: colon-rectum (0.55 versus 0.91), stomach (0.51 versus 0.78), female breast (7.44 versus 13.24), lung (0.22 versus 0.37), melanoma (1.57 versus 3.48), prostate (0.64 versus 1.71).

We could not obtain reliable quantitative data on the development of psychosocial support and psycho-pharmacological treatments offered to cancer patients in the study area. In that area there is neither a specific unit of psycho-oncology nor a liaison psychiatry service specifically dedicated to cancer patients, although during the 1990s some well-structured palliative care services, with psychological supervision for the staff and the possibility of psychological visits for patients, had been implemented [37]. It has, however, been shown that the patterns of diagnosis communication have been moving towards a less paternalistic style in the study area [38]. Numerous education programmes for medical doctors and nurses to improve their communicative skills (particularly at the moment of diagnosis for a life-threatening disease) have been implemented in Tuscany after the introduction of the 'informed consent' principle in the Italian medical code in 1989.

Further research is needed to confirm the results of this population-based study. If we accept the idea that suicide mortality among cancer patients can be a marker of the emotional impact of receiving a cancer diagnosis, the decreasing temporal trend could indicate that our population has become progressively less frightened of cancer, particularly at the moment of diagnosis. Improved communication of diagnosis, better treatment options and increased survival may be suggested as possible explanations of this positive result.

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