Risk of suicide in cancer patients in Western Australia, 1981–2002

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ABSTRACT

Objective: To describe the incidence and risk of suicide in cancer patients in Western Australia from 1981 to 2002.

Design, setting and patients: Retrospective cohort study of patients diagnosed with cancer in WA from 1981 to 2002, using data from the WA Linked Database.

Main outcome measure: Age-standardised mortality ratios (SMRs).

Results: A total of 121 533 patients were diagnosed with cancer, corresponding to a total of 543 696 person-years at risk. There were 129 suicides in this group (108 in men). The SMR for suicide in cancer patients was 1.61 (95% CI, 1.36–1.92). An initial period of peak risk was seen in the first 3 months after cancer diagnosis (SMR, 5.75; 95% CI, 3.89–8.51), mainly in patients with a poor prognosis. A second peak period of risk was found to occur 12–14 months after diagnosis (SMR, 2.33; 95% CI, 1.11–4.89) in those with a good or moderate prognosis.

Conclusion: The rate of suicide in cancer patients in WA is low and represents an excess of two to three suicides per year, or 0.3% of all cancer deaths, comparable to studies in other Western countries. The risk is highest in the first 3 months after diagnosis, and a second period of increased risk 12–14 months after diagnosis may occur in response to cancer recurrence or treatment failure.

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International studies have documented that cancer is a well recognised risk factor for completed suicide. Population-based cancer registry studies in other countries have estimated an increased risk of between 1.3 and 2.6, relative to the general population.[1-11] This increase in risk has been found to vary by time since the diagnosis of cancer, being highest in the first year and declining thereafter.

The first major study in the United States,[1] from 1940 to 1973, found an increased suicide rate for men in the first 2 years after diagnosis. More recent studies in northern European countries (Sweden,[2] Norway,[10] Finland[11] and Denmark[8]) identified the same high rate in the first 3–12 months, after which it declined. Two studies recorded the highest suicide mortality rate in the first 3 months,[8,12] while a study in Japan observed the highest rate 3–5 months after diagnosis.[6] The average hospital stay for a cancer patient in Japan at that time was 56 days, so the period of 3–5 months corresponded to the time immediately after discharge from hospital.

Two studies of suicide have been conducted in Western Australia. One involved a review of all 2420 suicides identified from the coroner's records for the period 1986–1997.[13] Age, sex, Aboriginality, geographic location, psychiatric illness, alcohol and drug use, and previous suicide attempts were identified as risk factors for suicide; prior physical illness was not recorded or reported as a risk factor. The other study focused on people treated for mental health conditions in WA from 1980 to 1995.[14] While this study found high suicide rates among older people (> 60 years of age), the diagnosis of cancer was associated with a decreased risk of suicide and attempted suicide and was described as warranting further investigation. Neither of these studies specifically addressed suicide in cancer patients.

Here, we sought to describe the incidence and risk of suicide in cancer patients in WA.

METHODS

We obtained deidentified data from the WA Linked Database[15] describing all cancer cases notified to the Western Australian Cancer Registry between 1981 and 2002. For this study, all patients with cancer comprised the cohort, which was followed over time to observe cases of suicide.

Person-years at risk were calculated from the date of cancer diagnosis to the earlier of the date of death or 31 December 2002. Second primary cancers were excluded from the analysis, as were in-situ cancers and cancers diagnosed at autopsy.

Data describing suicide deaths occurring in WA between 1981 and 2002 were also obtained from the WA Linked Database. Suicides were identified by International classification of diseases, ninth revision (ICD-9) external cause of injury codes E950–E959 and ICD-10 codes X60–X84.

Mid-year population estimates for WA, stratified by calendar year, age in 5-year groups, sex, and region (metropolitan or rural), were obtained from the Australian Bureau of Statistics. From these, population rates of suicide were estimated and used to determine the expected numbers of suicides within the cohort of cancer patients.

The Western Australian Cancer Registry uses ICD-10 codes C00–C97 to record the type of cancer diagnosed. Following a method previously described in a Danish study,[8] we classified cancer types into three groups according to prognosis, based on population estimates of 5-year survival: good prognosis (> 66%), moderate prognosis (33%–66%) and poor prognosis (< 33%) (Box 1).

Person-years at risk were partitioned by calendar year, age (in 5-year groups), and time since diagnosis (in 3-month quartiles for the first 2 years, and then yearly). Expected numbers of suicides were calculated by multiplying the person-years at risk by the WA population suicide rates, and were compared with observed numbers of suicides using the standardised mortality ratio (SMR).

All analyses were performed using Stata, version 9 (StataCorp, College Station, Tex, USA).

Ethics approval for the study was obtained from the WA Department of Health's Confidentiality of Health Information Committee and the Curtin University of Technology Human Research Ethics Committee.

RESULTS

For the period 1981–2002, 121 533 cancer patients were identified in WA, corresponding to 543 696 person-years at risk. In this population, 129 suicides (108 men, 21 women) were observed, with a corresponding SMR of 1.61 (95% CI, 1.36–1.92) (Box 2).

The crude suicide rate in men was 41.2 per 100 000 person-years, and in women, 7.5 per 100 000 person-years. The observed number of suicides was 73% higher than expected in men (SMR, 1.73; 95% CI, 1.43–

1 Cancer sites grouped according to prognosis*

Good prognosis (> 66%)

Lip, breast, cervix, corpus uteri, testes, melanoma, skin, thyroid, Hodgkin's disease

Moderate prognosis (33%–66%)

Salivary glands, mouth, colon, rectum, nasal cavity, larynx, uterus, prostate, kidney, bladder, eye, brain and nervous system, endocrine glands, bone, connective tissue, non-Hodgkin's lymphoma, leukaemia, mycosis fungoides

Poor prognosis (< 33%)

Tongue, pharynx, oesophagus, stomach, small intestine, liver, gall bladder, pancreas, peritoneum, lung, pleura, ovary, metastases, multiple myeloma

* Based on 5-year relative survival in Denmark, 1991–1995.[8] ◆

2 Suicides with a first cancer,* Western Australia, 1981–2002

	Suicides			
	Observed	Expected	Person-years	SMR (95% CI)
Overall	129	79.9	543 696	1.61 (1.36–1.92)
Sex				
Male	108	62.5	262 355	1.73 (1.43–2.08)
Female	21	17.3	281 341	1.21 (0.79–1.86)
Metropolitan				
Male	79	41.2	195 945	1.92 (1.54–2.39)
Female	17	13.1	216 386	1.29 (0.80–2.08)
Rural				
Male	33	25.5	66 410	1.36 (0.94–1.95)
Female	4	4.2	64 955	0.96 (0.36–2.55)
Age (years)				
< 20	1	0.4	7 987	2.58 (0.36–18.3)
20–29	3	2.8	12 600	1.08 (0.35–3.36)
30–39	8	5.9	34 121	1.37 (0.68–2.73)
40–49	19	8.9	64 204	2.12 (1.35–3.33)
50–59	13	12.1	93 723	1.08 (0.63–1.86)
60–69	26	15.2	123 893	1.72 (1.17–2.52)
70–79	34	21.5	132 052	1.58 (1.13–2.21)
80+	25	13.2	75 116	1.89 (1.28–2.80)
Period				
1981–1984	4	2.8	16 273	1.43 (0.54–3.81)
1985–1987	13	5.9	33 349	2.19 (1.27–3.77)
1988–1990	10	8.1	51 644	1.24 (0.66–2.30)
1991–1993	24	10.6	72 137	2.26 (1.51–3.36)
1994–1996	21	12.8	98 451	1.63 (1.07–2.51)
1997–1999	37	20.6	122 884	1.80 (1.30–2.48)
2000–2002	20	19.0	148 958	1.05 (0.68–1.63)
Prognosis				
Good	26	30.2	261 704	0.86 (0.59–1.27)
Moderate	64	38.2	208 939	1.67 (1.31–2.14)
Poor	39	11.5	73 053	3.39 (2.47–4.64)

SMR = standardised mortality ratio. * Excluding non-melanoma skin cancer. ◆

2.08) and 21% higher than expected in women (SMR, 1.21; 95% CI, 0.79–1.86).

The length of time since diagnosis was significantly related to risk of suicide (Box 3 and Box 4). The risk was highest in the first 3 months after diagnosis (SMR, 5.75; 95% CI, 3.89–8.51), with a second smaller elevation in risk seen at 12–14 months (SMR, 2.33; 95% CI, 1.11–4.89).

The SMR was lowest in the good prognosis group (0.86; 95% CI, 0.59–1.27), higher in the moderate prognosis group (1.67; 95% CI, 1.31–2.14), and highest in the poor prognosis group (3.39; 95% CI, 2.47–4.64). Rates for the three cancer prognosis groups over time since diagnosis are plotted in Box 5. The highest SMR of 12.07 (95% CI, 7.15–20.38) was observed in the poor prognosis group in the first 3 months after diagnosis. The moderate prognosis group had an initial elevated SMR of 4.43 (95% CI, 2.31–8.52), which dropped and then rose again to 2.09 at 15–17 months. The good prognosis group had an initial SMR of 1.73 (95% CI, 0.43–6.91), which dropped to zero before peaking at 3.11 (95% CI, 1.00–9.63) at 15–17 months after diagnosis.

DISCUSSION

Our study represents the first population study of suicides in Australian cancer patients to date. We found a low overall suicide rate, a peak in suicide in the first few months after diagnosis and a second smaller peak at 12–14 months, and a higher suicide rate in those with a poor prognosis.

A strength of our study is that WA is an ideal state for population-based research, because all major medical services are concentrated in Perth, the capital. Perth is the most "isolated" capital city in the world (1600 km from the adjoining state), with a growing population and little migration after retirement.

There is no evidence of underreporting of suicides in cancer patients to the coroner, although this possibility cannot be fully excluded. In addition, suicide cases have a high autopsy rate, which makes the diagnoses reliable.

The elevated SMR we found in cancer patients dying by suicide (1.61) is comparable to previous population studies in other countries, that have found the SMR to be elevated in the range of 1.35–1.93.[2,7,8,10,11] However, the overall suicide rate in WA is very low and represents only 0.3% of cancer deaths.

The SMR that we found in men (1.73) is similar to the Danish study,[8] which reported an SMR of 1.68. Our SMR finding for women (1.21) must be considered inconclusive, because there were only 21 suicides. However, Björkenstam et al,[9] in their study of 2112 suicides occurring over three decades in Sweden, demonstrated that both men and women with cancer had a higher suicide rate than the general population.

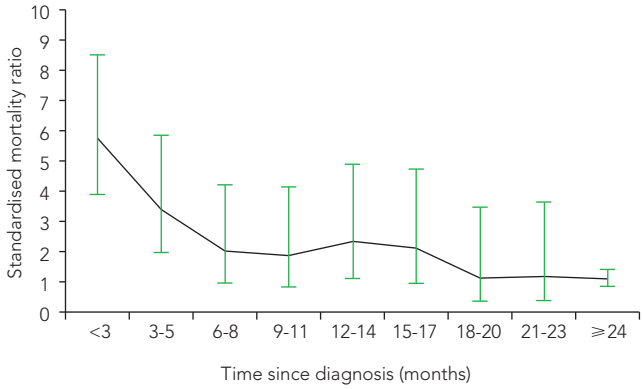
We did not find a significant difference between rural and metropolitan rates, due to the small number of rural suicides. Only one

3 Suicides by time (in 3-month quartiles) after diagnosis of a first cancer,* Western Australia, 1981–2002

Months since diagnosis	Suicides		Person-years	SMR (95% CI)
	Observed	Expected		
< 3	25	4.3	27 335	5.75 (3.89–8.51)
3–5	13	3.8	24 397	3.39 (1.97–5.85)
6–8	7	3.5	22 461	2.01 (0.96–4.21)
9–11	6	3.2	20 925	1.86 (0.83–4.14)
12–14	7	3.0	19 632	2.33 (1.11–4.89)
15–17	6	2.8	18 538	2.12 (0.95–4.73)
18–20	3	2.7	17 617	1.12 (0.36–3.47)
21–23	3	2.6	16 793	1.18 (0.38–3.64)
⩾ 24	59	54	375 998	1.09 (0.85–1.41)
Total	129	80	543 696	1.61 (1.36–1.92)

SMR = standardised mortality ratio. * Excluding non-melanoma skin cancer. ◆

4 Standardised mortality ratio for suicide over time (in 3-month quartiles) after diagnosis of a first cancer,* Western Australia, 1981–2002



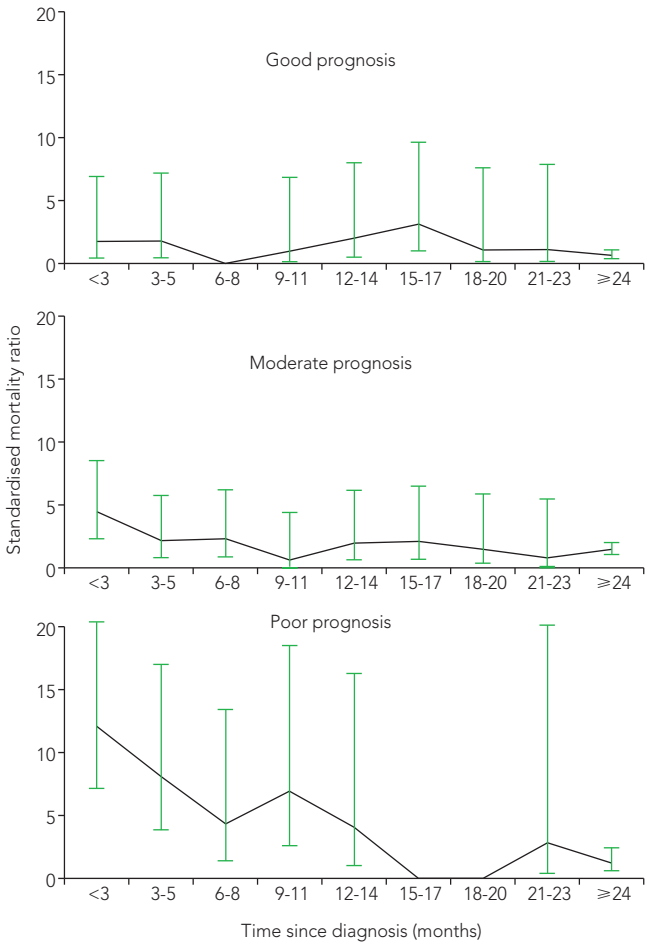
Vertical bars indicate 95% confidence intervals.
* Excluding non-melanoma skin cancer. ◆

previous study of 55 suicides in Switzerland recorded the area of residence, and its findings were inconclusive.[3]

We found little significant variation in the suicide rate across age groups, in keeping with previous studies.[1,2,5-9] There was only a small significant rise in suicide rates in the 40–49-years age group and in those aged 60 years and older. Larger studies, some of which were limited by low total numbers of suicides, have shown some variation with age; however, there is no clear trend between them.

Other population studies that have investigated the suicide rate after cancer diagnoses have all found a high SMR in the first year, but the study intervals varied from months to years.[1,2,7,8,12] Our standardised choice of 3-monthly intervals in the first 2 years after diagnosis identified (for the first time) a second peak at 12–14 months. (Box 4). We postulate that this second peak may be due to recurrence of disease, occurrence of metastases, or the failure of treatment. Two earlier studies suggested that a peak may have occurred at 8–10 months,[7,12] but this would have required further statistical analysis for confirmation. The second peak occurs a little later in our study, possibly due to improvements in cancer treatments delaying recurrence.

5 Standardised mortality ratio for suicide over time (in 3-month quartiles) after diagnosis of a first cancer,* by prognosis, Western Australia, 1981–2002



Vertical bars indicate 95% confidence intervals.
* Excluding non-melanoma skin cancer. ◆

Björkenstam et al were able to show that cancers with a low survival rate had the highest suicide rate, across 43 individual cancers (eg, pancreas, lung, breast) and groups (eg, biliary and liver, nervous system).[9] In their study of 1241 suicides in Denmark, Yousaf et al grouped cancer types into three prognostic groups based on survival at 5 years (Box 1), and demonstrated that this model was a good way to determine suicide risk.[8] Their model suited our smaller study, and our finding that the suicide rate was higher in cancer patients with a poorer prognosis is in agreement with their findings using the same model.[8]

The high suicide rate in the first 3 months was seen primarily in the poor prognosis group, and to a lesser extent in the moderate prognosis group. These patients, facing the possibility of no treatment or palliation, are at the highest initial risk of suicide, which declines over the next few months.

Hopelessness and demoralisation are common processes for patients after a diagnosis of cancer, with distress, feelings of despair and hopelessness being key features of demoralisation syndrome.[16] Hopelessness has been shown to be correlated

sion to suicidal ideation.[17] People seem able to bear depression as long as they think that the future might improve, but if they begin to feel hopeless, then the risk of suicidal behaviour rises.[18] Massie and Holland[19] identified cancer patients at the highest risk for depression as those with a history of affective disorder or alcoholism, advanced stages of cancer, poorly controlled pain, or treatment with medications or concurrent illnesses that produce depressive symptoms.

The second peak in suicide rate was seen in the moderate and good prognosis groups. Adjuvant therapy for most cancer patients lasts 6–9 months, with some delays due to surgery, further investigations and other specialist reviews. The lower initial suicide rate in these groups may be due to the support received from medical staff during active treatment, a belief in the possibility of cure, and the availability of time to adjust to the situation. Recurrence of cancer within weeks of finishing treatment may serve as a trigger for suicide.

The suicide rate in WA from 1986 to 1999 was unchanged,[13] and while this study shows no clear pattern, the rate may be declining. International studies have shown a reduction in the rate of suicide in cancer patients over the last decades of the 20th century. Yousaf et al[8] showed a declining trend in Danish cancer patients from 1971 to 1999, but not as much as seen in the general population. Hem et al[10] reported declining rates from 1960 to 1999 in Norway, as did Björkenstam et al[9] from 1965 to 1999 in Sweden, suggesting improvements in cancer treatment and survival were the main reason.

The relatively low number of suicides in cancer patients in WA (5–13 per year) is important to note. Seventy-nine of the 129 suicides would have been expected during this time, thus showing an excess of about two to three per year. However, even with relatively small numbers of cases, the impact of a suicide is widespread. Clinicians who work with suicidal people estimate that for each person who commits suicide, there will be at least six survivors strongly affected by the event.[17]

In the context of our population, our findings suggest that the most important factors in predicting risk of suicide are the prognostic status of the cancer at time of diagnosis and the impact of recurrence or treatment failure. Therefore, a recent diagnosis of cancer, particularly one of poor prognosis in a male patient, would indicate an increased suicide risk. Further research should examine the impact of treatments, and a larger population study should reinvestigate the presence of a second peak in risk.

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COMPETING INTERESTS

None identified.

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