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Title page

Characteristics of patients with cancer who die by suicide: coronial case series in an Australian state

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Abstract

Objective

Suicide rates are elevated in epidemiological studies, but extrapolating population level data to the individual patient cancer is difficult, and there is a dearth of studies examining how suicidality might be linked to the cancer experience. We examine the cancer-suicide correlates to explore clinical implications and future research directions.

Method

We used a novel database to examine all suicide deaths reported to the Coroners Court of Victoria between 2009-2013 in individuals with active, diagnosed cancer. Cases were classified in relation to whether cancer had been a probable, possible or unlikely influence on suicidal ideation. Socio-demographic, clinical, health service contacts and suicide method data were analysed to describe the characteristics of individuals with cancer at the time of their suicide.

Results

There were 2870 suicide deaths, and 118 cases met inclusion criteria. Clinically distinct patient subgroups emerged through a contrast between those cases where the data suggested a correlate between cancer and suicide, and those where the data did not. The former group had many more cancer related health problems than the latter group, who had a higher burden of psychiatric illness that predated their cancer diagnosis. The intent to suicide was known to most clinicians.

Conclusions

All clinicians working with cancer patients should be prepared to explore suicidal ideation. Understanding how the patient conceptualises suicidality with respect to cancer experience and mental health may be of central importance in determining whether mental health care is best provided as part of cancer care, or through a separate mental health service.

Background

The elevated suicide risk among people with cancer diagnoses implicates both socio-demographic and clinical risk factors[1]. Compared with the general population, patients with cancer who die by suicide tend to be older and male[2]. The risk of suicide is highest in the 12 months following cancer diagnosis, in those with poor prognosis disease and there are strong associations with mental illness[3,4,5], where the relationships between shared risk factors spanning psychological and physical functioning are complex[6]. A recent meta-analysis reported lower rates in Asian countries compared with Europe and the Americas[7].

These epidemiological findings offer limited guidance to the clinician sitting with a suicidal patient as they do not elucidate the ways that the experience of cancer might - and might not - impact the individual's decision to suicide. Psychological autopsies provide much more insight into the mind of the individual proximal to their suicide, but are subject to multiple methodological problems, including selection bias of informants (who may not have had much contact with the deceased who has a psychiatric problem compared to those with more straightforward medical illness), attribution bias in the search for meaning during an exercise intended to shed light on suicide, and response rates as low as 46% in some studies[8]. Cultural issues can further complicate the search for search for mental illness through informants in psychological autopsy studies[9] , and these problems led some authors to declare they should be abandoned altogether [10,11].

A better understanding of the correlates between cancer and suicide presents three methodological challenges: (1) ascertaining the sample of relevant deaths; (2) examining the correlates between the cancer and suicide from the perspective of the deceased; and (3) developing an appropriate analytical approach that might generate hypotheses for future research and clinical work. Improved understanding of the nature of cancer as a stressor in suicide has implications for improving care for those who have cancer.

This paper describes a response to each of these challenges using a novel data source, the Victorian Suicide Register (VSR) within the Coroners Court of Victoria (CCOV), Australia. Using coronial data, we aimed to examine the clinical and socio-demographic correlates of cancer and suicide, and accordingly any implications there might be for the provision of clinical care to patients with cancer. We also aimed to establish future research directions on the basis of the cancer-suicide correlates.

Methods

Study design

The study was a Coronial case series of all suicide death records with diagnosed cancer as an active problem, coded into the VSR between 2009 and 2013.We categorised these cases according to the available evidence regarding the correlates between the cancer and suicide in the Coronial material, and then described the groups using quantitative statistical techniques. As a proxy measure for the completeness of our case-finding strategy, we used population statistics for the same period in Victoria to estimate the standardized mortality ratio and compared this with registry based studies of cancer and suicide.

Data Source

In Victoria, all deaths from suspected non-natural causes (including suspected suicides) must be reported to the CCOV for investigation. The VSR project team monitors all reported deaths to identify those occurring in circumstances consistent with suicide, and add them to the VSR to be coded. Coding is undertaken with reference to whatever material was gathered for the Coroner's investigation; this usually includes forensic medical (toxicology and autopsy) reports, statements of family and friends and other witnesses, medical records and statements of treating clinicians[12].

The VSR contains binary and discrete variables capturing information across several domains: the deceased's socio-demographic profile, suicide method, history of physical and mental ill health, service utilization, interpersonal and contextual stressors experienced by the deceased, and indicators of suicidal intent including suicide notes. Additionally, the VSR contains free text fields for each domain where detailed supplementary information is recorded. The purpose of the free text fields is to capture more detailed narrative around the suicide: the experiences of the deceased in the period leading up to death, the immediate circumstances of death and, based on the evidence available, what may have contributed to the decision to suicide.

The standardized mortality ratio was calculated using data from Victorian Cancer Council[13], a state registry of cancer statistics, and from Population Australia, a population research database[14].

Case identification

All suicides between 1/1/2009 and 31/12/2013 were identified in the VSR. For each death the free text coding about physical health, interpersonal and contextual stressors was searched using terms related to cancer, including "cancer", "malignant", "carcinoma", "metastatic", "tumor", "radiotherapy", "chemotherapy", "oncologist" and "haematologist".

Inclusion criteria were that the individual had a confirmed diagnosis of cancer that was an active health problem at the time of death known to the deceased. The cancer diagnosis was established through the medical information recorded in the VSR. Autopsy reports were reviewed to substantiate the cancer diagnosis if the cancer diagnosis was stated by a non-medical informant. We included only cancer cases that were active health problems rather than in remission because we wanted to develop insights for clinicians, and clinicians are more regularly involved treatment of cancer when it is an active health problem.

Exclusion criteria included: a history of cancer either cured or in remission; the cancer diagnosis was only made post-mortem and not known to the deceased; non-melanomatous skin cancer (other than invasive SCC or BCC); or benign disease, such as neurofibromatosis. We excluded those cases where the cancer diagnosis could not be substantiated through medical records or the autopsy report.

Data Collection

For each death included in this study, information regarding the cancer and other health issues were extracted. This included the cancer type, stage, date of first diagnosis, treatment course and experience of the cancer (e.g., reports of treatment as burdensome, and worry about effect on loved ones). The mental health history included any history of diagnosed mental ill health problems including date of first diagnosis and management proximal to death, and any history of self-harm, suicidal ideation and previous suicide attempts. Contextual information extracted included family and clinician knowledge of the deceased's intent to suicide; suicide method; cancer treatment; and evidence of the deceased's engagement with right to die groups.

Determination of cancer-suicide correlate

Suicide note contents and informant reports were reviewed to examine the relevance of different stresses proximal to suicide[15,16]. The cases were classified in relation to whether cancer had been a probable, possible or unlikely influence on suicidal ideation. We categorized the correlate *probable* on the basis of explicit evidence identifying cancer as the primary reason for suicide, such as the contents of a suicide note or statements about the deceased's intent and motives from family, friends and clinicians. The correlate was categorized as *possible* if there was evidence the cancer influenced the decision to suicide but other factors were also identified. Finally, the correlate was categorized as *unlikely* if there was no evidence the cancer influenced the suicide decision. Categorization was based solely on the contents each VSR record, and we improved the validity of this approach through formal inter-rater reliability assessment based upon 10% of the data. There was 100% concordance between reviewers. Examples of data classified according to these categories are given in Table 1.

Statistical analysis

Characteristics were summarized for levels of cancer-suicide correlates using mean (SD) or number (%). Tests of association between risk indicators and known suicide intention used likelihood ratio chi-squared statistic. These are exploratory in nature and p-values are presented to highlight where differences in distribution are less likely to be random variations. Whilst there was no formal adjustment for multiple comparisons the two-sided significance level was set at 0.01. Analysis was performed using Stata v 15 statistical software (StataCorp). 2017. *Stata Statistical Software: Release 15*. College Station, TX, USA).

Ethical oversight

Victoria's State Coroner gave permission for the researchers to access VSR data. Ethics approval was obtained from the Department of Justice and Regulation Human Research Ethics Committee (JHREC), reference number CF/14/15513.

Results

A total of 2870 suicides were recorded in Victoria between 2009 – 2013, of which 278 cases were returned by our search strategy. Among these we excluded 160 cases: cancer only diagnosed post-mortem (n=3); cancer in remission (n=43); misdiagnosis (n=1); false positives (n=108) where deceased claimed to have cancer but there was no forensic or medical evidence (n=32) or case contained a relevant search term but the deceased did not have diagnosed cancer (n=76); and unable to confirm cancer diagnosis (n=5). Thus 118 cases met our inclusion criteria.

The cancer-suicide correlate was categorized as probable in 59 (50.0%), possible in 45 (38.1%) and unlikely in 14 (11.9%) cases. A summary of patient characteristics by cancer-suicide correlates is presented in Table 2. There was no evidence for any association between the cancer-suicide correlates and age, gender, presence of metastatic disease (table 2) nor tumor type or prognosis (not presented). Using population data we found the prevalence of cancer in our suicide cohort to be 5.6% (161/2870) which is 2.9 (95% CI 2.2 to 3.8) times greater than expected prevalence of cancer in the Victorian population, being 1.9% (1889/100,000) over the same five year period. In total, 13% of patients (15/118) had documented evidence of engagement with palliative care services.

Mental Illness and cancer-suicide correlates

There was evidence for an overall relationship between cancer-suicide correlates and a history of mental illness (Table 2, $p = 0.01$) with a higher risk of probable cancer-suicide correlates in patients with no history of mental illness prior to the cancer diagnosis (Table 3). Of the 27 patients with pre-existing mental illness, 73% received psychiatric treatment prior to cancer diagnosis and the prevalence was unchanged post diagnosis. All 24 patients with a diagnosis of mental illness after cancer diagnosis received psychiatric treatment.

Suicide method and engagement with Right to Die organization and cancer-suicide correlates

Cases identified with a probable cancer-suicide correlate were more likely to have used a suicide method related to their cancer treatment such as an overdose of prescribed medication linked with cancer treatment, or suicide at a location linked with cancer care, such as a hospital car park compared to those categorized as having possible or unlikely correlates (table 2). Similarly, for cases categorized as having a probable cancer-suicide correlate, 24% engaged with a RTD organization compared to 2% of those categorized as having a possible cancer-suicide correlate (Table 2).

<< Table 3 >>

Suicide intention

The prevalence of suicide intention being known to either clinicians or family and friends was not different between patients based on cancer-suicide correlate (Table 2). Overall, suicidal intentions were known to clinicians in 59.3% and to family and friends in 27.1% of cases. A history of previous attempts and suicide ideation were strongly associated with knowledge of suicide intention by both groups. For family and

friends, but not clinicians, previous self-harm was also associated with the suicide intention being known (Table 3).

Discussion

This study explores the characteristics of a small, well defined cohort of individuals with cancer who suicide. Our findings suggest there may be clinically meaningful subgroups of individuals with active cancer who suicide, and our reported SMR of 2.98 is in keeping with larger registry studies of cancer and suicide[16], suggesting our case identification strategy was valid. Using the VSR as a data source enabled us to overcome some of the non-random bias present in psychological autopsy studies.

We found that in the majority of cases (88%, n=104/118) the cancer was probably or possibly a stressor in the suicide. Age, gender, presence of metastatic disease, type of tumor type and prognosis were not associated with the cancer-suicide correlates. This contrasts with the widely reported associations between suicide and poor prognosis disease[4,18], however we chose to exclude those cases with cancer in remission.

Clinical Implications

An important finding of this study was that the intention to suicide was known to more than half of the involved clinicians. This suggests that there may be an opportunity for intervention, and highlights the importance of skilled assessment of suicidal ideation as the province of every clinician working within the cancer setting. Clinicians should be prepared for discussions about suicidality, and view these as an opportunity to gather information to plan a considered clinical response, rather than simply referring the patient for immediate psychiatric assessment. Useful discussion points include the patient's experience of pain and other negative effects of cancer and its treatment; past psychiatric illness; engagement with right to death groups; and planning regarding suicide method. Such conversations conducted with sensitivity have been shown to reduce distress and highlight important personal concerns[19,20]. Moreover, they can strengthen the patient-oncologist relationship, which has been shown to be more helpful in reducing suicidal ideation than engaging mental health services[21].

Furthermore, understanding the individual's cancer experience as it relates to thoughts of suicide is of potential utility in providing targeted care. Our findings suggest that the temporal relationship between the cancer diagnosis and mental illness may be particularly important in this respect.

Those with a probable cancer-suicide correlate were much more likely to have developed their mental illness after their cancer diagnosis, and to have other cancer-related problems such as pain, and loss of independence. In our case series, they were more likely to have engaged with euthanasia advocacy groups, or to use a method espoused by such groups, or linked to their cancer, such as an overdose of prescribed medication.

We suspect that these people therefore may have more strongly conceptualised their suicidality within a cancer context rather than a psychiatric context, and thus may be more receptive to being engaged in treatment through psychological care that is embedded in their cancer care. Indeed, improved quality of life

and a reduction in major depression has been reported in programs that embed a structured psychological intervention for patients with both good and poor prognosis cancers[22].

This stands in contrast to those people who suicided in circumstances where no probable cancer-suicide correlate was established; they were more likely to have pre-existing psychiatric illness and few cancer related problems. Their history of pre-existing mental ill health in particular suggests involvement of mental health services is a priority because this clinical context may be more meaningful for them in conceptualising and addressing their suicidality. Additionally, specialist mental health services have psychiatric resources that may not be available through cancer services.

Future research into how people with cancer conceptualise their own suicidality - whether as a response to the cancer, a result of mental ill health, or other - would further elucidate the appropriate locus of clinical care.

The low levels of Palliative Care access among those with a probable cancer-suicide correlate (13%) despite at least one third having metastatic disease (34%), and almost half (42%) having pain are in keeping with other published findings suggesting late or even absent referral to palliative care despite documented benefits for patients with cancer[23]. While early integration of palliative care has been associated with improved mood, reduced depression and improved family support, the impact upon risk of suicide has not been formally documented[24].

A specific focus on pain assessment and management must form part of a comprehensive response to poor mood and thoughts about suicide for patients with cancer. The links between pain, as well as the impact of pain management on suicide form an important focus of future research. In the meantime our findings suggest referral to a Palliative Care services as key part of the initial response to a patient with cancer, significant symptoms and suicide intention.

Study Limitations

Concerns about coroners' role in the under-reporting of suicide deaths in Australian populations [25,26,27] raise the possibility that relevant suicides of people with cancer diagnoses were missed in this study. However, the primary concern regarding under-reporting is not that Coroners misclassify deaths (ie classify a suicide as an unintentional death), but rather that they do not make explicit findings about a deceased person's intent, which makes it harder for others to determine whether a death was a suicide. This issue is mitigated to an extent in the VSR, because the VSR coders have access to the primary information sources gathered for the coroner's investigation and can use these to identify suicides in the absence of coronial findings on deceased intent using strict evidence based criteria[12]. Further to this point, our SMR was in keeping with other published work, which suggests suicide under-reporting may not have been a significant issue compromising this study.

A related limitation pertained to identifying the study cohort; in several cases the available evidence was not sufficient to confirm that the deceased had a diagnosed active cancer, and therefore relevant suicides may have been omitted from analysis. Similarly, our text-based search strategy may have missed other cases where the cancer was described in other terms (eg, space occupying lesion).

We acknowledge that cancer can also act as a secondary or contextual stressor in ways we could not directly measure, for example by exacerbating the negative effects of situational stressors. Our research

methodology and data source did not allow us to consider cancer as a stressor in this way, nor to examine the pathway from suicidal ideation to an attempt. Our study was an exploratory case series, and therefore all associations are open to most common epidemiological biases. We partially adjusted for this by reducing the significance level to 0.01.

A further limitation relates to the categorization classification of the deaths. Our research team's experience in treating people who have cancer, combined with our knowledge of the health outcome (suicide) in the cases being reviewed, may have influenced our interpretation of cancer-suicide correlates, however our categories were based solely on available information, not on clinical judgment and we controlled through formal inter-rater reliability assessment.

Notwithstanding these limitations, the novel use of an existing dataset (VSR), and the steps to ensure methodological rigor enabled us to present new insights regarding this important, albeit, uncommon aspect of cancer care.

Data Availability Statement:

The author elects not to share data on account of privacy concerns.

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Table 1. Categorization of cancer-suicide correlate

Cancer-suicide correlate	Examples of VSR text
Probable	**Suicide note**: "I've had cancer for 10 years and things have become much more difficult with pain and medication. I have made this choice to end my life with dignity". **Informant report**: "Her husband states that she had endured countless admissions and treatments for her breast cancer, and having recently come out of hospital for another round of treatment, told me that she won't go on".
Possible	**Suicide note**: "The pain is too much. My health is failing me and I'm sick of all these appointments and tablets". **Informant report**: "The deceased had cancer, heart disease and diabetes and was really worn down by it all. She wanted it to be over".
Unlikely	**Suicide note**: "You took everything from me when you walked out with our kids. This is all your fault". **Informant report**: "He had a long history of depression and alcoholism and tried to kill himself on earlier occasions. None of the psychiatric treatment he had made any difference".

Table 2 Characteristics of the group and cancer-suicide correlate

	Cancer-Suicide correlate (n = 118)			
	Probable (n = 59, 50.0%)	Possible (n = 45, 38.1%)	Unlikely (n = 14, 11.9%)	p-value
General				
Age (years)	68 (13.1)	66 (16.7)	73 (13.5)	0.30
Gender (male)	42 (71%)	40 (89%)	10 (71%)	0.08
Metastatic disease	25 (42%)	13 (29%)	2 (14%)	0.28
Born overseas	11 (19%)	5 (11%)	3 (21%)	0.49
Mental Illness [#]				
Prior to cancer diagnosis	8 (13%)	11 (24%)	8 (57%)	0.01
After cancer diagnosis	14 (24%)	8 (18%)	2 (14%)	
No mental illness	37 (63%)	26 (58%)	4 (29%)	
Treated pre-cancer	8/9 (89%)	9/12 (75%)	5/9 (56%)	0.27
Suicide				
Suicide method linked to cancer treatment	17 (29%)	3 (7%)	1 (7%)	0.007
Intention known to family or friends	11 (19%)	15 (33%)	6 (43%)	0.09
Intention known to clinicians	39 (66%)	25 (56%)	6 (43%)	0.23
Engagement with right to death organization	14 (24%)	1 (2%)	0	0.002
Patient Concerns				
Cognitive impairment	2 (3%)	4 (9%)	0	0.29
Fatigue	6 (10%)	2 (4%)	0	0.30
Loss of independence	20 (34%)	6 (13%)	0	0.005
Loss of mobility	14 (24%)	3 (7%)	0	0.01
Pain	39 (66%)	9 (20%)	2 (14%)	< 0.001
Experience of cancer treatment as burdensome	28 (48%)	5 (11%)	0	< 0.001
Carer burden	11 (17%)	2 (4%)	0	0.03
Supports				
Contact with Palliative Care	10 (17%)	5 (11%)	0	0.21

Data presented as mean (SD) or number (%);# distribution tested across 3x3 table

Table 3. Risk indicators and suicide intention

	Suicide Intention Known		
	No	Yes	p-value
Family & Friends	(n = 86)	(n = 32)	
Previous attempts	9 (10.5%)	18 (56.3%)	< 0.001
Self-Harm	1 (1.2%)	6 (18.6%)	< 0.001
Ideation	16 (18.6%)	14 (43.8%)	0.005
Clinicians	(n = 48)	(n = 70)	
Previous attempts	5 (10.4%)	22 (31.4%)	0.008
Self-Harm	2 (4.2%)	5 (7.1%)	0.50
Ideation	4 (8.3%)	26 (37.1%)	< 0.001