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Routine screening for suicidal intention in patients with cancer†

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Abstract

***Objectives*: Suicide rates are elevated in individuals with cancer, although suicidal intention is not typically assessed in cancer centers. We evaluated in a large comprehensive cancer center the utility of an electronic Distress Assessment and Response Tool (DART), in which suicidal intention is assessed with a single item.**

***Methods*: Patients attending cancer clinics completed DART as part of routine care. DART includes measures of physical symptoms, depression, anxiety, social difficulties, and practical concerns. Medical variables were obtained from the Princess Margaret Cancer Registry, the data warehouse of cancer patient statistics. A Generalized Estimating Equation (GEE) model was used to assess factors associated with suicidal intention.**

***Results*: Between September 2009 and March 2012, 4822/5461 patients (88.3%) who completed DART consented to the use of their data for research. Amongst the latter, 280 (5.9%) of the 4775 patients who answered the question reported suicidal ideation, which was related to physical and psychological distress, and social difficulties ($ps < 0.0001$). Amongst those with ideation who responded to the intention question, 20/186 (10.8%) reported suicidal intention. Of respondents with more severe suicidal ideation, 12/49 (24.5%) reported suicidal intention. Using a GEE model, suicidal intention in those with ideation was significantly associated with male sex, difficulty making treatment decisions, and with everyday living concerns.**

***Conclusions*: Suicidal ideation is reported on an electronic distress screening tool (DART) by almost 6% of cancer patients, of whom almost 11% report suicidal intention and 33% decline to indicate intention. DART demonstrated utility in identifying patients who may be at highest risk of completed suicide and who require urgent clinical assessment.**

Introduction

Suicide accounts globally for approximately one million deaths annually and up to 1.5% of all deaths [1,2]. Risk factors for completed suicide in the general population include: male sex; marital separation, divorce or widowhood; unemployment; a history of psychiatric illness or substance abuse; and physical illness [3,4]. Studies show that suicide rates in patients with cancer are 1.5–12 times higher than in the general population [5–10]. Other cancer-specific risk factors for suicide include uncontrolled pain, and cancer that has been recently diagnosed or that has a poor prognosis [10,11].

Suicidal ideation, which refers to thoughts of taking one's own life, with or without a specific plan, is reported by more than 2% of the general population [12,13] and by almost 8% of cancer outpatients [14]. In patients with cancer, endorsement of the single suicidal ideation item on the Patient Health Questionnaire-9 (PHQ-9) [15] concerning 'thoughts that you would be better off dead, or of hurting yourself' was found to be associated with emotional distress, substantial pain, and advanced age [14]. However, in the follow-up interviews with those who endorsed such ideation, 30% denied having thoughts of death or suicide, and only 33% clearly endorsed suicidal intention [16].

There is a growing consensus among most national cancer control agencies in Australia, Canada, the UK, and the USA that distress screening should be part of standard cancer care [17]. Guidelines for implementing distress screening can be found in the Canadian Partnership Against Cancer publication, the Cancer Journey Portfolio [18]. However, the assessment of suicidal intention is not included in most screening tools in cancer treatment centers [19], even though research in non-cancer populations demonstrates that suicidal intention may predict completed suicide and that suicide prevention interventions may be effective when

individuals at high risk are identified [20,21]. Such assessment may help to protect patients with cancer from a premature and avoidable death and thereby to avoid the legacy of loss, shame, and guilt that may be experienced by the families and medical caregivers of those who commit suicide [22,23].

The primary aim of this study was to evaluate in a large, mixed population of patients with cancer the utility of screening for suicidal intention using a single-item question. The secondary aim was to identify factors associated with suicidal intention.

Methods

Data were obtained from the Distress Assessment and Response Tool (DART), a comprehensive distress screening program developed at the Princess Margaret Cancer Centre in Toronto, Canada. DART is comprised of an electronic survey containing validated measures of physical, emotional, social, and practical concerns, linked to clinical response and intervention algorithms, tailored to the patient's identified level of distress. The current study was approved by the University Health Network Research Ethics Board (REB). Patients are asked at the end of the DART survey to provide consent for their data to be used for research purposes. Subsequent REB approval was obtained to link retrospective medical chart review data to the DART data.

Procedures

Specially trained volunteers assist patients in completing the DART survey, as part of routine clinical care on touch-screen computers in the oncology clinic waiting rooms. Individuals are encouraged to complete the screening approximately every 3 months throughout their treatment course, although the timing may vary, based on scheduling of clinic appointments. DART reports of the identified distress are generated in the clinics to help guide the conversation between patients and clinicians. The DART program includes staff training for secondary assessment of distress by clinic staff and an integrated clinical response provided by volunteers, nursing/oncology teams, and specialized psychosocial oncology services, triaged to the level of distress.

Participants

DART was introduced sequentially in tumor sites and clinics/units across the Princess Margaret to patients with sufficient English literacy to complete the survey questionnaires. Because the Princess Margaret is a dedicated cancer treatment facility, data from the Princess Margaret Cancer Registry, the data warehouse of cancer patient statistics, show that less than 8% of outpatients attending our center have not yet been given a diagnosis of cancer. Participating clinics and units included chemotherapy daycare, endocrine, gastrointestinal, gynecological, head and neck, melanoma, multiple myeloma, sarcoma, genitourinary, lung, radiation review, and two general inpatient units. A total of 5461 patients completed DART at least once between October 2009 and March 2012, and 4822 (88.3%) of these patients provided research consent.

DART measures

Validated screening measures used in the DART survey include the following: the Edmonton Symptom Assessment System (ESAS) [24–26]; the Patient Health Questionnaire-9 (PHQ-9) [15] and the Generalized Anxiety Disorder (GAD-7) [27,28]; the Social Difficulties Inventory (SDI-21) [29,30]; and the informational and spiritual domains of the Canadian Problem Checklist (CPC) [31].

The PHQ-9 is a 9-item scale that is concordant with the DSM-IV criteria for major depression [32], with responses to questions ranging from 0 'not at all' to 3 'nearly every day' for each item (total range 0–27) and cut-offs of <10, 10–20, and >20 to indicate mild, moderate, and severe levels of depression, respectively. The GAD-7 is a 7-item scale for generalized anxiety disorder, scored on the same scale as the PHQ-9 (total range 0–21) with cut-offs of 5–9, 10–14, and 15–21 indicating mild, moderate, and severe anxiety, respectively [27,28].

One PHQ-9 item taps suicidal ideation: 'Over the last 2 weeks, how often have you been bothered by thoughts that you would be better off dead, or of hurting yourself in some way?' An intelligent programing algorithm in DART prompts patients who endorse any level of suicidal ideation with an additional question about suicidal intention: 'Is there a chance you would do something to end your life?' Response alternatives are 'yes' or 'no.' Patients who do not answer the questions are prompted with: 'Are you sure you want to continue? To continue, click on next again.' They must respond to this prompt before they can proceed.

The ESAS comprises a rating of nine symptoms commonly experienced by patients with cancer: pain, tiredness, nausea, depression, anxiety, drowsiness, appetite, well-being, and shortness of breath. The severity of each symptom at the time of assessment is rated on a numerical scale from 0 'symptom is absent' to 10 'worst possible severity' [24–26].

The SDI-21 comprises 21 items that tap social problems and needs. Each item is rated from 0 'no difficulty' to 3 'very much difficulty.' There are three validated subscales: Everyday Living (e.g., independence and personal care), Money Matters (e.g., finances and future plans), and Self and Others (e.g., communication and support). A summed score of ≥ 10 across any of these subscales indicates significant social difficulties [29,30].

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DART also includes the Informational Problems (e.g., understanding the illness and making treatment decisions) and Spiritual Problems (e.g., meaning/purpose in life and faith) domains from the CPC [31]. Other patient-reported variables include current living situation (alone; with spouse or family; with friends or others), personal and family history of depression or anxiety, supportive care services received, and desire for referral for supportive care services. Items are answered using a yes/no format.

Additional characteristics were extracted from medical records, including: sex, date of birth, primary disease site and morphology, multiple cancer diagnoses (yes/no), recurrence (yes/no), metastatic disease (yes/no), and date of diagnosis/first contact.

Statistical analysis

Descriptive statistics reported include the prevalence of suicidal ideation and suicidal intention. We used chi-square or Fisher's Exact tests, and *t* tests or Wilcoxon two-sample tests to compare patients with and without suicidal ideation, and with and without suicidal intention. Missing data were handled by listwise deletion.

We used a Generalized Estimating Equation (GEE) model to identify factors associated with suicidal intention [33]. GEE estimates population averaged-effects between explanatory variables and the outcome. This approach is appropriate for analyzing rare events within the context of sparse longitudinal data, as it controls for within-subjects correlations between repeated measurements in the estimation of effects. Bivariate analyses compared characteristics between patients who reported suicidal intention and those who did not. Variables that differed were entered simultaneously into the GEE model (entry criteria $p < 0.10$). All analyses were conducted using SAS 9.2 (SAS Institute Inc., Cary, NC, USA).

Results

Respondent characteristics and screening rates

Of the 4822 DART respondents who consented to research, 4775 (99%) answered the suicidal ideation question and were included in these analyses. Patient ages ranged from 18 to 97 years; 41.3% were male (Table 1).

The number of repeated DART assessments completed ranged from 1 to 6 (mean 1.77, SD 0.94). The average time between the first and second assessments was 186.3 days (SD 96.7; median 168 days). Of the 4822 respondents, 1499 (31.1%) completed DART the second time, 471 (9.8%) the third time, and 128 (2.7%) the fourth time. No participants reported suicidal ideation at the fifth or sixth assessments. Patients who completed DART only once were more likely to be younger, less likely to be living with friends or others, and to have higher distress ($ps < 0.001$), compared with those who completed DART more than once.

Prevalence of suicidal ideation and intention

At the first assessment, 280/4775 (5.9%) patients endorsed suicidal ideation. Of the 280 patients who reported suicidal ideation, 20 (7.1%) reported suicidal intention, 166 (59.3%) reported no suicidal intention, and 94 (33.6%) did not answer the intention question. Of those who responded to the intention question, 20/186 (10.8%) endorsed suicidal intention. Of the 186 patients who responded to the intention question, 49 (26.3%) reported severe suicidal ideation based on a score on that item of 2 or 3, indicating suicidal thoughts more than half of the days or nearly every day. Of those with severe suicidal ideation, 12/49 (24.5%) reported suicidal intention.

Table 1 compares the baseline sociodemographic, clinical, and psychological characteristics of patients who did and did not report suicidal ideation. Patients who reported ideation had received their cancer diagnoses more recently, were less likely to have had a cancer recurrence, and were more likely to live with friends or others. They were also more likely to report a personal or family history of depression, and to be receiving current supportive care and desire referral for psychiatric care. They reported more difficulties in understanding their illness and/or treatment; talking with the healthcare team; making treatment decisions; and knowing about available resources. Finally, they reported significantly more social difficulties, anxiety, depression, and physical distress than those who did not endorse suicidal ideation.

Table 2 compares baseline sociodemographic, clinical, and psychological characteristics of patients with suicidal ideation who responded to the suicidal intention item, to those who did not endorse intention, and those who did not respond to the intention question. Patients who reported suicidal intention were more likely to be male, to have financial problems, and to have difficulty understanding their illness, making treatment decisions, communicating with the healthcare team, and managing everyday living.

The majority of patients (241/280, 86%) with suicidal ideation scored above the cut-off on at least one of the DART measures. Seventy percent (14/20) of those who reported suicidal intention scored above the threshold for moderate depression (PHQ-9 ≥ 10), 44.4% (8/18) scored above the threshold for clinically significant generalized anxiety (GAD-7 $\geq$ 10), and 95% (19/20) scored above the SDI cut-off for significant social difficulties (SDI >10). Only one of the 18 respondents who reported suicidal intention scored below cut-off on all three measures (two respondents had missing GAD-7 data).

The participants ($n = 94$) who chose not to answer the suicidal intent question did not report significantly more

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Table 1. Baseline characteristics of patients who endorsed suicidal ideation compared with those who did not ($n = 4775$)

	Suicidal ideation ($n = 280$; 5.9%)		No suicidal ideation ($n = 4495$; 94.1%)			
	Mean/N	SD/%	Mean/N	SD/%	*t* test/chi-square	*p* value
Age (years)	56.84	13.85	57.45	14.64	0.67	0.501
Sex (male)	125	44.64%	1847	41.09%	1.37	0.241
Living situation					10.32	0.006
Alone	52	18.71%	734	16.43%		
With spouse or family	197	70.86%	3463	77.52%		
With friends or others	29	10.43%	270	6.04%		
Type of cancer[a]					17.11	0.072
Breast	3	1.20%	121	3.03%		
Head and neck	24	9.56%	308	7.71%		
Pancreatic	8	3.19%	109	2.73%		
Other gastrointestinal	39	15.54%	495	12.38%		
Genitourinary (prostate, kidney, and bladder)	28	11.16%	405	10.13%		
Gynecological	55	21.91%	1,021	25.54%		
Lung	16	6.37%	169	4.23%		
Hematological	27	10.76%	323	8.08%		
Sarcoma	20	7.97%	387	9.68%		
Melanoma	20	7.97%	509	12.73%		
Other	11	4.38%	150	3.75%		
Multiple cancers[b]	13	5.18%	262	6.55%	0.738	0.39
Metastasis (yes)[c]	32	17.88%	405	14.44%	1.59	0.21
Recurrence (yes)[d]	20	7.97%	548	13.71%	6.72	0.01
Time since diagnosis (years)[e]	3.64	4.45	4.38	5.38	2.48	0.014
SDI total	19.90	11.61	6.74	7.90	−24.63	<0.0001
Everyday living	6.38	4.39	2.38	3.39	−18.52	<0.0001
Money matters	3.77	3.65	1.26	2.22	−17.14	<0.0001
Self and others	5.32	3.51	1.39	2.05	−17.96	<0.0001
SDI ≥10	231	82.50%	1389	30.90%	313.06	<0.0001
ESAS total	35.46	17.16	15.71	14.72	−21.36	<0.0001
Anxiety	4.76	2.83	1.98	2.44	−18.32	<0.0001
Appetite	3.58	2.73	1.91	2.61	−10.4	<0.0001
Depression	4.81	2.84	1.32	2.11	−20.27	<0.0001
Drowsiness	3.73	3.04	1.49	2.23	−12.14	<0.0001
Nausea	1.70	2.51	0.59	1.56	−7.19	<0.0001
Pain	3.68	3.13	1.72	2.39	−10.31	<0.0001
Shortness of breath	3.19	2.87	1.39	2.20	−10.29	<0.0001
Tiredness	5.30	2.83	2.88	2.77	−14.13	<0.0001
Well-being	4.83	2.57	2.45	2.52	−15.24	<0.0001
PHQ-9 total[f]	12.66	5.96	3.84	4.36	−31.63	<0.0001
PHQ <10	82	30.04%	3930	88.79%	1038.59	<0.0001
PHQ 10–20	129	47.25%	469	10.60%		
PHQ >20	62	22.71%	27	0.61%		
Depression criteria met	153	54.64%	221	4.92%	902.84	<0.0001
History of depression	135	48.21%	832	18.51%	144.01	<0.0001
Family history of depression	113	40.36%	1265	28.14%	19.16	<0.0001
Current supportive care	66	24.81%	395	9.57%	61.86	<0.0001
Desire for psychiatric referral	89	32.25%	391	8.75%	157.73	<0.0001
GAD-7 total	10.35	5.82	3	4.02	−28.44	<0.0001
GAD 5–9	85	39.35%	562	63.00%	62.20	<0.0001
GAD 10–14	57	26.39%	213	23.88%		
GAD 15–21	74	34.26%	117	13.12%		
Difficulties with (from CPC)						
Informational domains						
Understanding the illness and/or treatment	111	39.64%	846	18.82%	71.31	<0.0001
Talking with the healthcare team	57	20.36%	376	8.36%	45.97	<0.0001
Making treatment decisions	71	25.36%	540	12.01%	42.06	<0.0001
Knowing about available resources	86	30.71%	583	12.97%	68.89	<0.0001
Spiritual domains						
Faith	48	17.14%	210	4.67%	80.2	<0.0001
Meaning/purpose in life	87	31.07%	267	5.94%	242.53	<0.0001

SDI, Social Difficulties Inventory; ESAS, Edmonton Symptom Assessment System; PHQ-9, Patient Health Questionnaire; GAD-7, Generalized Anxiety Disorder; CPC, Canadian Problem Checklist. % accounted for missing data.

[a]Cancer type based on 4248 patients.

[b]Multiple cancers based on 4248 patients.

[c]Metastasis based on 2983 patients.

[d]Recurrence based on 4248 patients.

[e]Time since diagnosis based on 4081 patients.

[f]PHQ-9 total was calculated without the suicidal ideation item but the percentages falling within the cut-off ranges were based on all items. Pancreatic cancer was extracted from other gastrointestinal cancers because of the high prevalence of distress reported in this type of cancer [10].

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Table 2. Characteristics of patients with suicidal ideation who reported suicidal intention ($N = 20$) compared with those who did not ($N = 166$) and those who did not answer the intention question ($N = 94$)

	Suicidal intention ($n = 20$, 7.4%)		No suicidal intention ($n = 166$, 59.3%)		No response ($n = 94$, 33.6%)		Comparison between suicidal intention versus no intention		Comparison among all groups	
	Mean/N	SD/%	Mean/N	SD/%	Mean/N	SD/%	Test statistics	*p*	Test statistics	*p*
Age	57.05	13.96	56.87	12.81	56.74	15.65	−0.060	0.954	0.01	0.907
Sex (male)	14	70.00%	68	40.96%	43	45.74%	4.32	0.014	6.16	0.046
Living situation							0.279	0.870	7.96	0.105
Alone	3	15.00%	28	16.87%	21	22.83%				
With spouse or family	16	80.00%	125	75.30%	56	60.87%				
With friends or others	1	5.00%	13	7.83%	15	16.30%				
Type of cancer[a]							8.31	0.537	52.52	0.0001
Breast	0	0.00%	2	1.32%	1	1.23%				
Head and neck	1	5.88%	16	10.53%	7	8.64%				
Pancreatic	2	11.76%	5	3.29%	5	6.17%				
Other gastrointestinal	3	17.65%	31	20.39%	21	25.93%				
Genitourinary (prostate, kidney, bladder)	3	17.65%	20	13.16%	2	2.47%				
Gynecological	3	17.65%	31	20.39%	8	9.88%				
Lung	1	5.88%	12	7.89%	3	3.70%				
Hematological	1	5.88%	22	14.47%	19	23.46%				
Sarcoma	2	11.76%	4	2.63%	1	1.23%				
Melanoma	1	5.88%	3	1.97%	1	1.23%				
Other	0	0.00%	8	5.62%	13	16.05%				
Multiple cancers[b]	1	5.88%	7	4.61%	5	6.85%	0.055	0.814	2.26	0.322
Metastasis (Yes)[c]	3	21.43%	24	21%	9	13.43%	1.72	0.390	0.62	0.735
Recurrence (Yes)[d]	1	11.11%	19	12%	9	10.84%	0.617	0.855	0.05	0.975
Time since diagnosis (years)[e]	2.94	3.47	3.90	5.40	3.63	4.36	3.20	0.202	3.20	0.202
SDI total	24.41	15.46	19.91	10.92	18.94	11.86	−1.17	0.258	1.98	0.372
Everyday living	8.20	5.47	6.36	4.40	6.03	4.04	−1.72	0.088	2.72	0.257
Money matters	5.37	4.25	3.48	3.43	3.93	3.83	−2.21	0.028	3.79	0.150
Self and others	6.26	4.31	5.53	3.41	4.74	3.47	−0.860	0.393	4.53	0.104
SDI ≥ 10	19	95.00%	135	81.33%			2.34	0.207		
ESAS total	33.90	14.57	36.75	17.51	33.40	16.99	0.700	0.485	2.82	0.245
Anxiety	4.70	2.94	4.79	2.72	4.71	3.02	0.140	0.891	0.09	0.955
Appetite	2.90	2.43	3.84	2.82	3.28	2.59	1.26	0.210	3.30	0.192
Depression	4.88	3.87	4.97	2.65	4.52	2.83	0.050	0.957	2.12	0.346
Drowsiness	2.82	3.32	4.03	2.95	3.55	3.09	1.550	0.123	2.75	0.253
Nausea	1.45	2.04	1.80	2.70	1.56	2.26	0.400	0.689	0.03	0.983
Pain	3.29	3.46	3.58	2.98	3.66	3.26	0.370	0.714	0.54	0.763
Shortness of breath	4.06	2.93	3.30	2.94	3.03	2.76	−1.04	0.302	0.86	0.651
Tiredness	4.48	2.71	5.51	2.72	5.04	3.02	1.17	0.248	2.38	0.304
Well-being	4.65	3.02	5.13	2.42	4.48	2.60	0.740	0.458	2.60	0.272
PHQ-9 total[f]	14.30	7.09	12.93	5.90	13.22	6.14	−0.960	0.338	3.22	0.200
PHQ <10	6	30.00%	46	28.40%	30	32.97%	3.48	0.176	5.05	0.282

(Continues)

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Table 2. *(Continued)*

	Suicidal intention (*n* = 20, 7.4%)		No suicidal intention (*n* = 166, 59.3%)		No response (*n* = 94, 33.6%)		Comparison between suicidal intention versus no intention		Comparison among all groups	
	Mean/N	SD/%	Mean/N	SD/%	Mean/N	SD/%	Test statistics	*p*	Test statistics	*p*
PHQ 10–20	6	30.00%	79	48.77%	44	48.35%				
PHQ >20	8	40.00%	37	22.84%	17	18.68%				
Depression criteria met	13	65.00%	92	55.42%	48	51.06%	0.666	0.414	1.39	0.499
History of depression	11	55.00%	74	44.58%	50	53.19%	0.781	0.377	2.18	0.336
Family history of depression	10	50.00%	66	39.76%	37	39.36%	0.775	0.379	0.84	0.658
Current supportive care	6	30.00%	41	24.70%	19	23.75%	0.266	0.606	0.34	0.845
Desire for psychiatric referral	9	45.00%	49	30.06%	31	33.33	1.84	0.175	1.90	0.388
GAD-7 total	10.78	7.05	10.31	5.75	10.34	5.76	–0.320	0.751	0.01	2.000
GAD 5–9	5	38.46%	53	39.85%	27	38.57%	0.223	0.446	0.27	0.991
GAD 10–14	1	7.69%	35	26.32%	21	30.00%				
GAD 15–21	7	53.85%	45	33.83%	22	31.43%				
Difficulties with (from CPC)										
Informational domains										
Understanding the illness and/or treatment	11	55.00%	54	32.53%	46	48.94%	3.96	0.047	8.87	0.012
Talking with the healthcare team	6	30.00%	24	14.46%	27	28.72%	3.19	0.074	8.77	0.013
Making treatment decisions	9	45.00%	31	18.67%	31	32.98%	7.33	0.007	10.88	0.004
Knowing about available resources	7	35.00%	49	29.52%	30	31.91%	0.255	0.614	0.35	0.840
Spiritual domains										
Faith	3	15.00%	26	15.66%	19	20.21%	0.006	0.939	0.94	0.624
Meaning/purpose in life	7	35.00%	48	28.92%	32	34.04%	0.317	0.573	0.89	0.640

SDI, Social Difficulties Inventory; ESAS, Edmonton Symptom Assessment System; PHQ-9, Patient Health Questionnaire; GAD-7, Generalized Anxiety Disorder; CPC, Canadian Problem Checklist.

% accounted for missing data.

[a]Cancer type based on 257 patients.

[b]Multiple cancers based on 246 patients.

[c]Metastasis based on 195 patients.

[d]Recurrence based on 257 patients.

[e]Time since diagnosis based on 179 patients.

[f]PHQ-9 total was calculated without the suicidal ideation item but the percentages falling within the cut-off ranges were based on all items.

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distress than those who did respond to this question ($n = 186$). However, they were more often diagnosed with gynecological cancers, melanoma, and sarcoma ($p < 0.0001$), more likely to live alone ($p = 0.029$), and to report more difficulty in understanding their illness and/or treatment ($p = 0.024$), communicating with their healthcare teams ($p = 0.013$), and making treatment decisions ($p = 0.037$). The 94 non-respondents did not differ significantly from the 20 individuals with suicidal intention on distress variables. However, there were fewer males in the non-respondents group than in the intention group.

The GEE model was used to analyze all available data on patients who endorsed suicidal intention at any time point. This included 31 endorsements of suicidal intention versus 244 with no intention across the first four assessments. Significant correlates of suicidal intention were entered into the GEE model (entry criteria $p < 0.10$). Results indicated that being male and having difficulties with everyday living and treatment decisions were associated with suicidal intention (Table 3). The results remained significant when each non-significant correlate was removed in a backward stepwise fashion.

Discussion

We found that when a single item to assess suicidal intention in those with suicidal ideation was incorporated into routine distress screening in a comprehensive cancer center, 7% of those with such ideation reported suicidal intention. Approximately 6% of the total sample reported some suicidal ideation, which was severe in 1.6%. Of those with severe suicidal ideation, almost 25% reported suicidal intention. These findings suggest that assessing suicidal ideation alone is an inefficient means to detect suicidal intention, because more than 90% of those with some ideation and more than 75% of those with severe ideation did not report suicidal intention. Further, although depression is a well-recognized risk factor for suicide [1], it should be noted that 30% of those with ideation or intention did not score above the cut-off on the PHQ-9.

We found that suicidal ideation was associated with physical and psychological distress, elevated concerns across a broad array of social and practical domains, and the desire for psychosocial help. Our findings regarding the frequency and correlates of suicidal ideation in patients with cancer are comparable with those reported in previous studies [16,20,34,35]. In the present study, those with suicidal ideation and intention were more likely than those with ideation alone to be male and to report more difficulties with making treatment decisions and with everyday living, such as personal care, independence, mobility, and recreation. These findings are consistent with the widely reported preponderance of completed suicide in men [8,36], and with the association of physical disability with the desire for hastened death in patients with metastatic cancer [37].

Several practical and clinical concerns arise in the process of screening for suicide risk. Most importantly, it is essential that there be a rapid response to the endorsement of suicidal intention. When the suicidal intent question is either endorsed or not answered on the DART screen, an alert is automatically flagged for the oncology team and an on-call psychiatrist is available for same day assessment. When the inclusion of the suicidal intent item was first proposed, some oncology teams expressed reservations because of the liability implications. For this reason, legal counsel was sought, which advised that identified suicidal ideation imposes the same clinical responsibility as any other urgent clinical data, but that having a screening program in place, linked to an established standardized operating procedure for suicidality, reduces the overall medico-legal liability for physicians and institutions.

Potential clinician and patient burden from lengthy screening tools is another practical consideration. Although attention is usually drawn to the burden on patients and staff that result from completion of distress screening measures [38], the addition of a suicidal intent question actually reduced the emergency on-call alert rate in our distress screening program from 6% to less than 0.05%, representing a significant reduction in clinical

Table 3. Generalized estimating equation model for factors associated with suicidal intention based on the first four DART screening assessments ($n = 255$)[a]

Parameter	Estimate	Standard error	95% Confidence limits		Z	Pr ≥ |Z|
Sex (female)	−1.41	0.523	−2.43	−0.384	−2.69	0.007
SDI everyday living	0.129	0.006	0.117	0.140	22.65	<0.0001
SDI money matters	0.058	0.056	−0.051	0.168	1.04	0.298
Difficulties with (from CPC)						
Understanding the illness and/or treatment	0.289	0.475	−0.643	1.22	0.61	0.544
Making treatment decisions	0.971	0.380	0.226	1.72	2.55	0.011
Talking with the healthcare team	0.722	0.544	−0.345	1.79	1.33	0.185

DART, Distress Assessment and Response Tool; SDI, Social Difficulties Inventory; CPC, Canadian Problem Checklist. QIC (Quasi-Akaike Information Criteria) statistics = 175.72.
[a]20 of the 275 repeated responses with missing data were deleted by listwise deletion.

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team burden from false positive alerts. The intelligent programming approach used in DART significantly reduced the burden, because 94% (4542/4822) of patients were not prompted to answer the suicidal intent question, because they did not report suicidal ideation.

The limitations of this study relate to the generalizability of its findings. DART is a clinical tool that was introduced sequentially in different clinics, and therefore, the number of patients who completed DART in each tumor site varied depending on the timing of implementation. DART was not completed by individuals with limited English literacy, and data on socioeconomic status were not collected. Almost one third of those with suicidal ideation omitted the suicidal intent question, which deserves further investigation because there were shared psychosocial characteristics between patients endorsing suicidal intention and non-respondents. There was a high attrition of longitudinal screens, likely because of multiple factors. Some patients were screened only once because they completed their initial diagnostic investigations and/or treatment and were referred back to their local communities, or attend the Princess Margaret only once annually in the survivorship phase of their disease. Some patients may decline multiple completions of DART, and some fill out the ESAS-only paper version because of high clinic volumes and difficulty accessing the computer in sufficient time. Also, our computerized algorithm only prompted those patients who reported suicidal ideation to respond to the suicidal intent question. Therefore, the occurrence of suicidal intention without ideation could not be determined (although this circumstance seems unlikely). Future work should assess the frequency or intensity of suicidal intention, specific suicidal plans, and the associations between intention and actual suicide attempts or completed suicides. The persistence or trajectory of suicidal ideation and intention, and how these variables might be related to changes in patients' medical and psychosocial status over time, should also be explored.

Suicidal ideation in patients with cancer is a marker for distress of various kinds but does not necessarily represent the literal wish to end life. In that regard, our previous work demonstrated that elevated scores on a measure of the desire for hastened death in patients with metastatic cancer sometimes represents contemplation of an alternative or future 'Plan B' as an attempt at cognitive mastery, or as a form of death acceptance, both of which differ from the wish to die [39]. Although screening for suicidality can be a sensitive issue for patients with cancer and for their clinicians, the present study suggests that it is feasible in the large majority of cancer patients to identify suicidal intention with a single item screen, and to flag for assessment those who do not respond to this item after endorsing suicidal ideation. Such inquiry concerning suicidal intention may direct clinical attention to those with greater need and who may require more urgent assessment and intervention. This approach is an efficient way to incorporate suicide risk assessment into routine distress screening programs which are increasingly being adopted as part of standard care in comprehensive cancer treatment centers [40].

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Conflict of interest

No conflicts of interest declared.

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