

Identifying suicidal symptoms in prostate cancer survivors using brief self-report

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Abstract

Purpose Prostate cancer (PC) survivors are at elevated risk for completed suicide even many years post-treatment. Despite this risk, practical and efficient methods for assessing these symptoms have not been established. We sought to determine if suicidal symptoms could be effectively and efficiently identified in a cohort of PC survivors, and whether these men were receptive to emotional health interventions.

Methods Six hundred fifty-six PC survivors, an average of 5 years post-diagnosis, completed eight self-report items about suicidal symptoms and behavior in the past 7 days, and 12 months, as well as medical utilization and interest in emotional health support.

Results Between 3.6 and 17.9 % of PC survivors endorsed a single suicidal ideation item, and denied all other ideation. All survivors who endorsed serious suicidal ideation/behavior also endorsed either passive or active ideation. 58.3 % of survivors denied any suicidal symptoms within the past week, but endorsed it within the past year. Most survivors had medical provider contact within the past year and were open to receiving information about emotional health interventions.

Conclusions Suicidal ideation in PC survivors cannot be accurately evaluated using only a one-item screen, or by inquiring within a single time frame.

Implications for Cancer Survivors In both research and clinical settings, the evaluation for suicidal ideation in PC survivors should utilize multiple questions, across several time periods. It is possible to skip queries about serious ideation/behavior if passive or active ideation is denied. Once identified, medical providers should refer these men to psychosocial providers who can offer emotional support.

Keywords Suicide ideation · Prostate cancer · Cancer survivorship

Introduction

Suicide is a significant public health issue that accounts for approximately 38,000 deaths annually, and is the tenth leading cause of death in the USA [1]. Epidemiological reports consistently indicate that being diagnosed with cancer is a risk factor for suicide [2–5] even in survivors 10 or more years post-diagnosis [2, 6]. Similar to the general population, suicide risk is higher in cancer patients who are male [7, 8], and those who are older [7, 9]. Thus it is not surprising that prostate cancer (PC), typically diagnosed in older men [10], is associated with an elevated risk for suicide [7, 11, 12]. The majority of the 238,590 men diagnosed with PC in 2013 will be diagnosed with localized disease, with a 5-year relative survival rate approaching 100 % [13]. As a result, there is a large and growing population of long-term PC survivors who are at increased risk for suicide.

Suicidal symptoms are not a well understood phenomena in cancer patients and survivors. Much of the existing literature examining suicide in oncology populations has examined completed suicide attempts through the use of death records [2, 6, 14, 15], with fewer studies examining the broad range of suicidal symptoms including ideation, intention, and attempts. In studies of suicidal symptoms, the evaluation of suicidal

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urges or suicidal ideation has tended to be limited by a reliance on a single screening item [16–22], despite a general consensus that asking multiple items about suicidal symptoms in oncology populations would provide more reliable, and complete data about suicidal ideation and behaviors [23–25]. As suicidal symptoms are often conceptualized along a continuum from passive ideation, through active thoughts or urges, to suicidal planning and behavior [26, 27], the evaluation of suicide using only a single screening item can result in critical aspects of the individual's suicidal symptoms not being accurately identified. Furthermore, many screenings for suicidal symptoms inquire within a limited time frame (e.g., within the past 7 days), or use measures that focus primarily on risk for future attempts rather than suicidal symptoms experienced to date [28]. Given the episodic nature of suicidal symptoms, this may result in missing suicidal symptoms that occurred outside of this time frame, and have important implications for future suicide risk.

The need for more complete information about the PC survivor's suicidal symptoms is complicated by concerns related to patient burden when completing a comprehensive survivor assessment. As there are many domains to be evaluated in assessments of their health (e.g., physical, emotional, and social health, and general quality of life), each domain needs to be evaluated as efficiently as possible in order to insure the assessment is comprehensive without being prohibitively long. Moreover, suicide is a potentially sensitive subject area and asking too many questions may make survivors feel uncomfortable. Thus, the challenge for researchers and clinicians is finding a balanced approach that allows for inquiring about suicidal symptoms thoroughly and accurately, yet parsimoniously.

To address these issues, we set out to examine how PC survivors responded to a set of eight questions adapted from existing surveys of suicidal thoughts and behaviors, asking about a range of suicidal symptoms, across two time frames. Our goal was to evaluate the PC survivor's responses to these items so we could determine how to optimize this eight-item battery while still accurately identifying survivors with suicidal symptoms. We hypothesized that because of overlapping content of items, a more limited number of items could be used to assess their suicidal thoughts and behaviors without a loss of information. Specifically, we hypothesized that passive suicidal ideation could be assessed with one or two items, and that our results would indicate which additional passive ideation items could be eliminated from our battery. In addition, we hypothesized there would be a hierarchy of suicidal symptom items endorsed such that survivors who denied passive suicidal thoughts would deny active suicidal thoughts, and those who denied active suicidal thoughts would deny any suicidal plans or attempts. Practically, we expected that this pattern of responses would permit us to devise rules for discontinuing symptom assessment that would allow for both

brief and accurate assessment of suicidal symptoms in most individuals. We also hypothesized that items asking about suicidal symptoms in a 12-month time frame would encourage survivors to report all symptoms within the past year, and eliminate the need to include additional items asking specifically about more recent time frames (e.g., past 7 days). Finally, we also set out to document history of health care encounters within the past year, and examine how interested PC survivors with suicidal symptoms would be in receiving information about their emotional health needs, and their preferences for mode of delivery.

Methods

Participants

The participants evaluated in the current study were taken from an existing cohort of over 4,200 PC survivors treated at a single comprehensive cancer center [29]. As previously described [30], 1,000 potentially eligible men confirmed to be alive and residing in the USA were mailed letters inviting their participation in a research study. A total of 979 PC survivors did not decline participation, and were subsequently mailed a study survey which queried their demographics, medical history, and physical and emotional health. Of these survivors, 707 returned a survey. For the current study, we excluded participants if they did not complete all items inquiring about suicidal symptoms and behavior. This resulted in a final sample of 656 PC survivors which were evaluated in the current analyses. We have previously presented findings regarding prevalence and correlates of suicidal symptoms in this cohort [31].

Suicidal symptoms and behavior

The survey comprised eight items that inquired about their suicidal symptoms and behaviors (Table 1). Item #1 was adapted from the Beck Depression Inventory [32], which asked participants to select one of four statements to indicate whether they experienced any suicidal symptoms within the past week. Items #2–8 inquired about suicidal thoughts and behaviors within the prior 12 months. These seven items were adapted from their original source including changes to delivery from an interview format to paper form (Items #2 and #3), as well as placing these items on the same forced choice scale where participants were asked to indicate either “Yes, this happened to me,” or “No, this has not happened to me,” in “the past 12 months.” Specifically, Items #2 and #3 were adapted from the National Institute of Mental Health's Diagnostic Interview Schedule and described passive suicidal ideation [33]. Item #4 was adapted from the Geriatric Suicide Ideation Scale and also described passive suicidal ideation

Table 1 Frequency of suicidal symptoms and behavior items endorsed. *N*=656

Item #1: Participants asked to endorse the <i>one</i> response that best described them in the past 7 days. Response A=No ideation, B=Active ideation, C or D=Serious ideation.		
	<i>n</i>	(%)
Response A. No thoughts of killing themselves	621	(94.7 %)
Response B. Thoughts of killing themselves, but would not act on them	34	(5.2 %)
Response C. Would like to kill themselves	0	(0 %)
Response D. Would kill themselves if they had the opportunity	1	(0.1 %)
Items #2–8: Participants asked to report on symptoms that they experienced in the past 12 months (<i>yes/no to each item</i>). Items #2–4=Passive ideation, #5=Active ideation, #6–8=Serious ideation.		
	<i>n Yes</i>	(%)
2. Felt life was not worth living.	54	(8.2 %)
3. Thought it would be better if they were dead.	46	(7.0 %)
4. Wished to drift off to sleep and not wake up.	33	(5.0 %)
5. Had thoughts of ending their life.	43	(6.6 %)
6. Seriously thought about committing suicide.	10	(1.5 %)
7. Made a plan for committing suicide.	4	(0.6 %)
8. Attempted suicide.	0	(0 %)

[34]. Item #5 was adapted from the Brief Symptom Inventory [35] and Item #6, adapted from the National Survey on Drug Use and Health (NSDUH), inquired about more specific thought of completing suicide [36]. Items #7 and #8 were adapted from the National Co-morbidity Replication Study [37–39] and asked about plans for suicide and suicide attempts.

Support preferences

Participants were asked to indicate their level of interest in receiving further information regarding their emotional health from “Not at all” to “Very much.” Furthermore, they were asked to indicate their first choice for how they would most like to receive this information. Participants had the option of selecting in-person conversations with either their primary care provider, oncologist, or nurse, phone calls from either a professional counselor or another survivor, or written information in the form of either a handout or on a website.

Statistical analyses

For descriptive purposes, participant demographic and medical variables were presented and differences between survivors with, and without, any reported suicidal ideation were examined using *t* tests and chi-square tests. To describe

participants’ responses to eight suicide symptom items, we began by classifying the items as reflecting passive, serious, and active suicidal symptoms. Endorsement of any of the following items was classified as passive suicidal ideation: Items #2 (Felt life was not worth living), #3 (Thought it would be better if they were dead), and #4 (Wished to drift off to sleep and not wake up). Endorsement of choice B on Item #1 (Thoughts of killing themselves, but would not act on them) or Item #5 (Had thoughts of ending their life) indicated active suicidal ideation. Finally, endorsement of response C (Would like to kill themselves), or D (Would kill themselves if they had the opportunity) to Item #1, or Items #6 (Seriously thought about committing suicide), #7 (Made a plan for committing suicide), or #8 (Attempted suicide) were classified as serious suicidal ideation items. Case summaries of participants endorsing suicidal symptoms were prepared, and their suicidal responses were organized based on shared patterns, so that participants who endorsed the same suicidal symptoms were pooled together.

To evaluate the hypothesis that passive suicidal ideation could be assessed with fewer items, we examined the frequency by which participants endorsed the passive ideation items (Items #2–4) to see if any items provided redundant information. Next, we assessed whether the two separate time frames are necessary in a suicide assessment by reviewing whether all participants who endorsed suicidal symptoms and behavior within the prior 7 days on Item #1 also endorsed any suicidal symptoms and behavior within the past 12 months on Items #2–8. Subsequently, we examined participant response patterns to evaluate whether there was a hierarchy of suicidal ideation responses which would allow us to develop a stopping rule, so that items asking about more serious suicidal symptoms might be deferred for those survivors who denied any of the less serious symptoms. In particular, we sought to determine whether all individuals who denied any passive suicidal ideation also denied any active or serious suicidal thoughts and behavior.

Finally, we also examined the preferences that PC survivors reported for further information regarding emotional health support. Chi-square tests were utilized to evaluate whether there were differences between participants who endorsed suicidal ideation compared to those who did not on their likelihood of endorsing interest in emotional health support information, and the delivery method of this information. We classified delivery method into one of three different categories for analyses: in-person, phone call, or written information.

Results

Our sample of 656 PC survivors was an average of 67.0 years old (SD=8.0 years), and primarily non-Hispanic White

(97.4 %), married (86.6 %), and well-educated (70.1 % with at least a college degree). The men were approximately 5.0 years post-PC diagnosis (SD=1.7 years), and almost all had met with a medical provider within the past 12 months (98.3 %) [31]. A total of 84 PC survivors, 12.8 % of the sample ($N=656$), endorsed suicidal symptoms on at least one item in our survey. As previously reported [31], the prevalence of SI in this cohort is similar to previous reports in other cancer patient and survivor groups, but significantly larger than what has been reported in a comparable community sample [36, 40]. There were no statistically significant differences between those who endorsed suicidal ideation, and those who did not endorse suicidal ideation on these demographic and medical variables (Table 2).

The number of survivors endorsing each of the eight suicide items is shown in Table 1. No PC survivor in the current study reported a suicide attempt within the past year. Participants' responses to these eight items were then organized based on the pattern of responses across the items, so that participants who endorsed the same suicidal symptoms were pooled together (Table 3). Examining the pattern of responses in this table, we sought to identify redundancy among the passive suicidal ideation items. Within this study, 17.9 % of participants endorsed Item #2, Felt life was not worth living; 3.6 % endorsed Item #3, Thought it would be better if they were dead; and 4.8 % endorsed Item #4, Wished

to drift off to sleep and not wake up, while denying all other passive suicidal ideation. This suggests that none of these individual items could be eliminated without resulting in missed identification of at least some PC survivors with passive suicidal thoughts.

To examine how survivors' reports of suicidal symptoms differed across reporting periods, we compared responses of the 84 participants who endorsed at least one ideation item across two time frames of inquiry: either the past 7 days, or past 12 months. Of these 84 participants, 31 of those endorsing suicidal symptoms endorsed suicidal symptoms on items across both time frames, and 49 denied any symptoms within the past 7 days but endorsed at least one item within a time frame of the past 12 months (Fig. 1). This indicates that limiting assessment of suicidal symptoms to the prior week would have missed 58.3 % of PC survivors who had suicidal symptoms on the survey. Moreover, several of these individuals who reported no suicidality in the prior week reported serious suicidal symptoms in the prior year including 11 who reported having thoughts of ending their lives, and 3 reporting serious thoughts or plans for suicide. In addition, 4 participants denied any symptoms within the past 12 months but endorsed symptoms within the past 7 days.

We further examined participants' pattern of responses to determine if there was a hierarchy of suicidal symptoms that would allow for us to skip queries regarding more serious

Table 2 Prostate cancer survivor profile by presence/absence of suicidal ideation

	No.	Suicidal ideation, n (% or SD)	No suicidal ideation, n (% or SD)	Statistical significance	OR
Age (years)	656	65.8 (8.0)	67.2 (8.0)	0.15	0.98
Ethnicity	653			0.82	
Non-Hispanic White	622	79 (94.0 %)	543 (95.4 %)		Reference
African-American	14	2 (2.4 %)	12 (2.1 %)		1.15
Other	17	3 (3.6 %)	14 (2.5 %)		1.47
Marital status	655			0.57	
Married	567	70 (83.3 %)	497 (87.0 %)		Reference
Never married	22	4 (4.8 %)	18 (3.2 %)		1.58
Divorced/separated	44	8 (9.5 %)	36 (6.3 %)		0.71
Widowed	22	2 (2.4 %)	20 (3.5 %)		1.58
Education	655			0.81	
≤High school	64	6 (7.1 %)	58 (10.2 %)		Reference
Some college	132	16 (19.0 %)	116 (20.3 %)		1.33
College graduate	197	26 (31.0 %)	171 (29.9 %)		1.47
Post-graduate	262	36 (42.9 %)	226 (39.6 %)		1.54
Time since diagnosis (years)	656	4.8 (1.7)	5.1 (1.7)	0.22	0.92
Met with PCP or oncologist (Past 12 months)	648			0.15	
Yes	637	81 (96.4 %)	556 (98.6 %)		Reference
No	11	3 (3.6 %)	8 (1.4 %)		2.57

OR odds ratio

Table 3 Case summary of prostate cancer survivors endorsing any suicidal symptoms and behavior; *N*=84

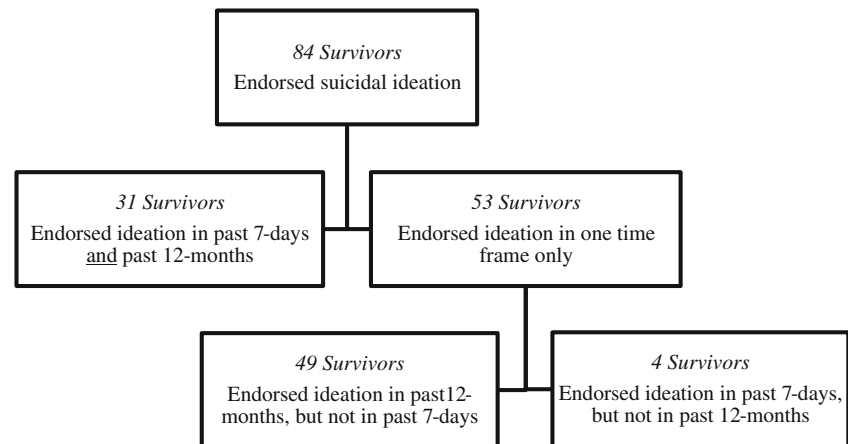
Item #1	Past 7 days		Past 12 months						<i>n</i> (%)
	Passive ideation			Active ideation	Serious ideation				
	#2	#3	#4		#6	#7	#8		
Passive ideation	✓	✓	✓	✓	✓	✓		1 (1.2 %)	
Active behavior	✓	✓	✓	✓	✓	✓		1 (1.2 %)	
Passive ideation	✓	✓	✓	✓	✓	✓		4 (4.8 %)	
Passive ideation	✓	✓		✓	✓	✓		1 (1.2 %)	
No ideation	✓	✓	✓	✓	✓	✓		2 (2.4 %)	
Passive ideation	✓	✓	✓	✓	✓	✓		7 (8.3 %)	
Passive ideation	✓	✓		✓	✓	✓		5 (6.0 %)	
Passive ideation		✓	✓	✓	✓	✓		1 (1.2 %)	
No ideation	✓	✓		✓	✓	✓		1 (1.2 %)	
No ideation	✓	✓	✓	✓	✓	✓		2 (2.4 %)	
Passive ideation			✓	✓	✓	✓		1 (1.2 %)	
Passive ideation		✓		✓	✓	✓		1 (1.2 %)	
Passive ideation	✓			✓	✓	✓		1 (1.2 %)	
Passive ideation		✓	✓		✓	✓		1 (1.2 %)	
Passive ideation	✓	✓			✓	✓		1 (1.2 %)	
No ideation	✓	✓		✓	✓	✓		2 (2.4 %)	
No ideation	✓	✓	✓		✓	✓		5 (6.0 %)	
Passive ideation				✓	✓	✓		6 (7.1 %)	
No ideation	✓			✓	✓	✓		2 (2.4 %)	
No ideation		✓	✓		✓	✓		4 (4.8 %)	
No ideation	✓	✓			✓	✓		4 (4.8 %)	
Passive ideation					✓	✓		4 (4.8 %)	
No ideation				✓	✓	✓		5 (6.0 %)	
No ideation			✓		✓	✓		4 (4.8 %)	
No ideation		✓			✓	✓		3 (3.6 %)	
No ideation	✓				✓	✓		15 (17.9 %)	
								Total=84	

Item #1: Response A=No ideation, B=Active ideation, C or D= Serious ideation; Items #2–8: Check marks indicate that the participant endorsed this item

suicidal symptoms and behavior if less severe suicidal symptoms were denied (Table 3). All PC survivors who endorsed any of the items indicative of serious suicidal ideation (Item #1 response C or D, or Items #6, #7, or #8) also endorsed at least one previous item indicative of passive or active suicidal ideation. In particular, no survivor who denied active suicidal ideation (Item #5; Had thoughts of ending their life) reported more serious suicidal ideation (Item #6), or a plan (Item #7). This indicates that if assessment of suicidal symptoms had been terminated for all individuals responding “No” to passive or active suicidal ideation items, no additional information about suicidal symptoms and behavior would have been lost. In these cases, the assessment would have been shorter and potentially less intrusive for many of the participants. Specifically, Items #6–8 would only have been administered to 43 (6.6 % of the sample), and not all 656 participants.

With respect to survivors’ interest in information about emotional health, we noted that a strong relationship with suicidal symptoms (Table 4). Specifically, among those who endorsed suicidal symptoms, 71.9 % reported some level of interest in receiving information regarding their emotional health, with 24.4 % stating that they were “Very much” interested in receiving this information. This was compared with only 39.0 % of survivors with no suicidal symptoms reporting any interest in mental health information ($p < 0.001$). The participants who endorsed suicidal symptoms were open to receiving emotional health information through a variety of methods, including in-person conversations with medical providers, phone calls from either a professional or another survivor, and written materials on a handout, or on a website. Those who endorsed suicidal symptoms were more likely to report wanting to receive emotional health information

Fig. 1 Prostate cancer survivors' endorsement of suicidal ideation in 7-day and 12-month time frames ($N=84$)



via a delivery method which involved contact with another individual, when compared to written materials ($p<0.001$).

Discussion

The majority of those diagnosed with PC become long-term survivors, who often face difficult psychological and physical adjustments following treatment. Of particular concern is that these men are at a significantly elevated risk for suicide [7, 11, 12]. However, there has been limited research investigating the different types of suicidal symptoms expressed in this population. In our sample, 12.8 % of PC survivors endorsed at least one suicidal symptom, with 1.5 % endorsing “serious thoughts of committing suicide”—significantly larger than the 0.7 % of similarly aged men (65 years or older) endorsing it in the 2010 and 2011 NSDUH samples [36, 40]. Our findings provide evidence that evaluating for suicidal symptoms and behavior using a single item, as has been done in much of the existing oncology literature, is insufficient for accurate detection of suicidal symptoms among PC survivors. Asking any

single item from our survey would have missed two-thirds of those who ultimately endorsed suicidal symptoms. Even when two questions were asked, almost a quarter of PC survivors experiencing suicidal symptoms would not have been captured.

Though we hypothesized that passive suicidal ideation could be assessed for using a subset of items included in the survey, this was not supported by the data. Our results indicate that each passive suicidal ideation item provided incremental information within this sample, and that these items should not be omitted from an evaluation of suicidal symptoms in this population. If any one of these passive ideation items were to have been eliminated, between 3 and 15 (3.6–17.9 %) suicidal PC survivors in the current sample would have been missed on screening. This suggests that the suicidal symptoms are experienced and expressed differently by different individuals, who may be reticent to endorse any specific suicide ideation item if it does not closely match their individual experience.

Though our survey questions inquired about suicidal symptoms in two time frames, we anticipated that inquiring about

Table 4 Emotional support preferences

	Number	Suicidal symptoms and behavior, n (% or SD)	No suicidal symptoms and behavior, n (% or SD)	Statistical significance
Interest in receiving emotional health information	646			<0.001
Not at all	367	23 (28.0 %)	344 (61.0 %)	
A little bit	110	16 (19.5 %)	94 (16.7 %)	
Somewhat	98	23 (28.0 %)	75 (13.3 %)	
Very much	71	20 (24.4 %)	51 (9.0 %)	
First choice for source of emotional health information	554			<0.001
In-person conversation (with PCP, oncologist, or nurse)	234	31 (41.3 %)	203 (35.1 %)	
Phone call (with professional, or another survivor)	268	19 (25.3 %)	33 (6.9 %)	
Written information (handout or website)	52	25 (33.3 %)	243 (50.7 %)	

suicidal symptoms within a broader time period (the past 12 months) could eliminate the need for a potentially redundant question within a more immediate time period (the past 7 days). However, our findings demonstrate significant value of inquiring about suicidal symptoms in the two time periods. Had we only evaluated suicidal symptoms in a “past week” time frame in this study, less than half of those who ultimately endorsed some ideation in our sample would have been identified, including several survivors with serious ideation or behaviors. While this pattern of responses may seem logically inconsistent, it may be that these individuals believed that once they had reported about symptoms present in the prior week, it was not necessary to report about the same symptoms as having occurred within the prior year. With less than 1 % of the survey respondents showing this response pattern, this could be attributed to the inevitable error in mailed surveys where respondents complete items without investigator oversight, but it also points out the need for clear instructions and consistency checks when assessing suicidal symptoms. From a clinical care context, the focus on current ideation is critical for the individual’s safety. However, information about past suicidal symptoms and behavior is crucial to understanding the survivor’s overall suicidal presentation. As suicidal symptoms can be episodic, asking about symptoms in several time periods provides a more complete picture of symptoms that may capture suicidality missed with queries about only one time frame. In our sample, three individuals (3.6 % of the participants endorsing suicidal symptoms) who reported serious suicidal symptoms within the past year would have been missed if only recent (the past 7 days) suicidal ideation was inquired about.

In order to accomplish an evaluation of suicidal ideation as comprehensively and briefly as possible, we hoped to identify a hierarchy of suicidal symptoms and behaviors that would allow us to identify PC survivors who endorse serious suicidal symptoms or active behaviors are, as well as abbreviate our screening by using a skip pattern based on the survivor’s responses to initial questions. In our sample, we found evidence of such a hierarchy, with all participants who endorsed any of the items indicating the most serious suicidal symptoms or behaviors having also endorsed at least one passive or active ideation item. Specifically, we found that if a PC survivor in the study reported having no thoughts of ending their life in the past 12 months, they similarly denied any serious ideation, suicide plans, or attempts. This would suggest that future assessments in this population may be able to eliminate inquiring about these more serious suicidal symptoms in all but a small proportion of PC survivors (6.6 %). This kind of skip logic could greatly reduce participant burden, and make assessment of suicidality more acceptable, and we hope future studies will attempt to replicate and refine the results we report here. Pending a validated screening algorithm of this kind, however we advocate that these items

continue to be included in clinical assessments of suicidality in PC survivors given the significance of serious suicide ideation and behaviors.

Though the prevalence of suicidal symptoms is cause for grave concerns, our results also indicate that there are opportunities for intervention with those PC survivors who endorsed suicidal symptoms. The overwhelming majority of the PC survivors who reported suicidal symptoms had met with a medical professional within the past year, and almost three-quarters of these men were open to receiving further information regarding their emotional health from their providers via a variety of methods. We note that PC survivors who endorsed suicidal symptoms were much more likely than those who did not endorse symptoms to want to receive emotional health information suggests that suicidal survivors recognize that they are experiencing emotional challenges, would benefit from professional support, and are open to an active opportunity to receive this help. This is promising as those who experience suicidal symptoms are often a silent patient population—very few individuals who experience suicidal symptoms will initiate a conversation about suicide with their medical staff [41]. Though over 70 % of suicidal survivors indicated they preferred personal contact, approximately one in three preferred either a written handout or to be directed to a website, indicating that alternative methods of delivery were also desired by this population. These findings showing affected PC survivors want more emotional health information should be instructive to clinicians to support their attempts to broach the topic of suicidal thoughts with their patients and provide education and referral information to their affected survivors. Health educators and researchers may similarly need to be aware that PC survivors with suicidal ideation are generally interested in having more mental health information provided to them and are open to receiving it by a variety of means.

We recognize that there are limitations to our study findings. First, our sample was limited to PC survivors from a single cancer center. Thus, our findings may not be representative of all cancer survivors, or PC survivors who are more demographically heterogeneous. It will be important to conduct similar research in other cancer populations in order to determine whether they endorse similar patterns of suicidal symptoms and behavior. Second, our study relied on self-report measures of suicidal symptoms and behavior, and did not complete a structured clinical interview evaluating for suicide, which could have provided more details about suicidal symptoms and their timing. Finally, we acknowledge that the relationship between ideation and suicide attempts is an imprecise science [42–44], and we do not have follow-up information on the changes in suicidal symptoms over time, or whether any of these participants went on to attempt or complete suicide. However, suicidal ideation is a significant symptom of distress, and in a high-risk population (such as in

older men with a chronic illness like PC), it is a notable risk factor for later suicide making it critically important that it be measured in clinical settings and research studies.

Despite these limitations, we believe that our findings present novel information regarding suicidal symptoms and behavior that serves as a crucial step in the efforts to better understand suicidal symptoms, and to ultimately reduce the risk for suicide among PC survivors. There has been recent interest in improving screening for suicide in cancer populations [20] as well as in the general hospital population [45], and it is our hope that these findings continue to increase awareness and discussion of screening for suicidal symptoms and behavior with this at-risk population. In the future, it is essential that we translate our research knowledge about screening for suicidal symptoms to clinical practice. Those who experience suicidal symptoms often do not receive proper psychiatric treatment, in part because they do not actively seek help [46], and medical providers often bear the burden of needing to seek out this sensitive, yet vital, information.

Conflict of interest Eric S. Zhou, Jim C. Hu, Philip W. Kantoff, and Christopher J. Recklitis declare that they have no conflict of interest.

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