

Suicide ideation in stomach cancer survivors and possible risk factors

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Abstract

Purpose Although the suicide rate of cancer survivors is higher than that of the general population, few studies have examined the potential risk factors. We assessed suicide ideation (SI) and investigated its correlates among survivors of stomach cancer, which is one of the most prevalent cancers in Korea.

Methods We surveyed 378 stage I–III stomach cancer survivors who had been disease free for at least 1 year. The survey contained demographic questions and quality of life assessments from the European Organization for Research and Treatment of Cancer QLQ-C30 and its stomach cancer-specific module, the McGill Quality of Life Questionnaire, the Brief Fatigue Inventory, and one question from the Beck Depression Inventory.

Results We found that 131/378 stomach cancer survivors (34.7 %) experienced SI. Univariate analyses showed that SI was significantly associated with income, comorbidity, smoking, and the following quality of life factors: general health status, emotional functioning, fatigue, nausea/vomiting, dyspnea, appetite loss, constipation, diarrhea, financial problems, eating

restriction, anxiety, dry mouth, trouble belching, hair loss, body image, existential well-being, and social support. Multivariate logistic regression confirmed that SI was independently associated with diarrhea (adjusted odds ratio (aOR) 2.84; 95 % confidence interval (CI) 1.44–5.62), hair loss (aOR 2.77; 95 % CI 1.04–7.36), existential well-being (aOR 6.18; 95 % CI 2.91–13.1), and usual fatigue (aOR 2.29; 95 % CI 1.30–4.06).

Conclusion Our findings reveal a high prevalence of SI among stomach cancer survivors and identify health-related quality of life issues such as diarrhea, hair loss, existential well-being, and fatigue as important risk factors of SI.

Keywords Stomach cancer survivors · Suicide ideation · Correlates · Risk factors · Quality of life

Introduction

Although patients often reacted to diagnosis of a cancer with fear in the past, they now have reason to feel hopeful, as cancer survival rates have increased steadily with the development of more effective treatments. For example, current cancer statistics [1, 2] show a marked decline in death rates for cancers of the stomach, colon, and uterus. However, the suicide rate of cancer survivors has increased ironically, and many who have experienced cancer attempt suicide or have suicidal ideation (SI) [3–5]. Among US adult survivors of childhood cancer, 12.8 % had SI or attempted suicide, with health status being a significant risk factor after taking into account other variables such as demographic characteristics [3]. An extension of this study showed that greater proportion of survivors had SI (7.8 %) compared with a sibling control group (4.6 %), and a strong relationship between suicidal thoughts and health status was again observed [4]. In adult cancer patients, the suicide ideation rates were significantly high as well. It was indicated that SI was 34.6 % in a study

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performed in Portugal, 7.8 % high in the UK, and 17.7 % in one of the US studies [4, 6–8]. Similar results were also observed in studies of Swedish [9] and Norwegian [10] cancer populations, a significantly high SI compared to the general population. This indicates that SI of cancer patients and survivors is a global concern.

Although many previous studies have analyzed the relationship between cancer patients and suicide, there are still few studies on SI and its correlates [3, 4], and most studies focused on suicidal tendency and accomplished suicide attempts, rather than SI, which could play a key role for suicide prevention. Even among handful of studies that examined SI, potential correlates were usually restricted to psychological factors such as depression [11, 12] which is generally considered as the primary cause of suicide. However, the association of physical factors and suicide might appear in a few study of different population; for instance, SI or suicide showed significant association with physical illness, pain, chronic conditions, and current physical health status [4, 6–8, 13]. A previous publication supports the association between physical factors and SI by arguing that not solely depression but also an overall physical health status can influence hastened death [7].

Nevertheless, we believe that the rates of SI in cancer survivors may be underestimated. Although the immediate medical crisis is past, the long-term effects of the disease and its treatment to the patients' physical status are serious enough to result in suicidal thoughts among survivors [3, 4].

To better understand the reasons for suicide among cancer survivors, we assumed that it is important to determine the correlates of SI and identify survivors who are at risk. In contrast to previous studies that only considered general health status and childhood cancer survivors [3–5, 9, 10], we evaluated a range of health-related factors among Korean stomach cancer survivors, specifically in order to investigate on adulthood cancer survivors' SI and as stomach cancer is one of the most prevalent cancers in Korea [14].

Methods

Subjects

For this cross-sectional study, we identified survivors of stomach cancer (ICD code, C16) through the stomach surgery database at the National Cancer Center (NCC) and the Seoul Samsung Medical Center (SMC) in South Korea. Eligible participants were survivors who received a diagnosis of stage I–III of stomach cancer between 2001 and 2002. This study was approved by the institutional review boards of NCC and SMC. Patients were excluded if they could not speak or understand Korean, or had a prior history of other cancers.

We invited eligible survivors to participate in the study by telephone and mailed a questionnaire, consent forms, and a

postage-paid return envelope to those who agreed to participate. The subjects were asked to return the informed consent form and complete the questionnaire. If the questionnaire was not returned within 1 month, a staff member sent a reminder card and made a telephone call to explain the purpose of the study and request participation. The subjects who did not wish to participate were asked for their reasons. After the questionnaires were returned, we checked for missing and incomplete information and confirmed consistency between the clinical database and the self-reported data. When inconsistencies were found, precedence was given to the clinical data.

Measures

Demographic and medical information

The participants provided demographic information (sex, age, marital status, education, religion, residence, employment status, monthly family income, comorbidity, smoking status, and alcohol consumption) and type of treatment received (surgery, radiation therapy, or chemotherapy).

Instruments

We used the Beck Depression Inventory (BDI), the European Organization for Research and Treatment of Cancer (EORTC) QLQ-C30 and its stomach cancer-specific module, the McGill Quality of Life Questionnaire (MQOL), and the Brief Fatigue Inventory (BFI) to measure the health-related variables.

Exposure and outcomes

The BDI measures the intensity of depression in psychiatric patients by evaluating 21 symptoms. Each symptom is rated on a 4-point intensity scale. The scores are added, yielding a total ranging from 0 to 63, with higher scores representing more severe depression. The Korean version of the BDI was validated in a previous study [15]. We assessed SI using question 9 of the BDI. If the participant selected “I don't have any thoughts of killing myself” as an answer, the subject was considered to have no SI. However, answers such as “I have thoughts of killing myself, but I would not carry them out,” “I would like to kill myself,” and “I would kill myself if I had the chance” were operationally defined as SI.

EORTC QLQ-C30 is a 30-item cancer-specific questionnaire for assessing the general health-related quality of life of cancer survivors. The questionnaire incorporates five functional domains (physical, role, cognitive, emotional, and social) and symptom scales [16]. Each item of the multiple-item scale is scored from 0 to 10. Higher scores representing better health-related quality of life in functional scales, and global health scale, and higher scores represent severe symptoms for symptom scales. We obtained permission from the EORTC

Study Group on QOL and performed and validated the questionnaires translated into Korean.

The MQOL subscales, designed in order to measure the quality of life at all stages of life-threatening illness, assess the

Table 1 Demographic characteristics of stomach cancer survivors according to the presence of suicidal ideation

Variable	No suicidal ideation (<i>n</i> =247)		Suicidal ideation (<i>n</i> =131)		<i>P</i> value
	<i>n</i>	%	<i>n</i>	%	
Sex					
Male	182	73.7	94	71.8	0.716
Female	65	26.3	37	28.2	
Age (years), mean (SD)	54.81 (10.68)		53.01 (10.19)		
<55	115	46.6	68	51.9	0.332
≥55	132	53.4	63	48.1	
Income (<i>n</i> =321)					
<US\$1,740	76	35.8	56	51.4	0.008
≥US\$1,740	136	64.2	53	48.6	
Employment (<i>n</i> =368)					
Yes	138	55.2	70	54.7	0.827
No	112	44.8	58	45.3	
Education (<i>n</i> =370)					
<High school graduate	96	39.8	59	45.7	0.320
≥High school graduate	145	60.2	70	54.3	
Marital status (<i>n</i> =368)					
Married	209	87.1	114	89.1	0.621
Unmarried	31	12.9	14	10.9	
Residence					
Metropolitan	83	33.6	37	28.2	0.299
Small–medium city and rural	164	66.4	94	71.8	
Religion (<i>n</i> =374)					
Christianity and Catholicism	92	37.9	40	30.5	0.174
Others	151	62.1	91	69.5	
Comorbidities					
<1	141	57.1	60	45.8	0.040
≥1	106	42.9	71	54.2	
Smoking status					
No	188	92.6	95	84.8	0.033
Yes	15	7.4	17	15.2	
Alcohol consumption					
No	163	81.1	87	79.1	0.658
Yes	38	18.9	23	20.9	
Stage of cancer					
<II	173	70.3	94	72.3	0.721
≥III	73	29.7	36	27.7	
Operation					
Subtotal gastrectomy	196	79.4	99	75.6	0.434
Total gastrectomy	51	20.6	32	24.4	
Treatment					
Chemotherapy	64	67.4	34	26.0	0.725
Radiotherapy	31	32.6	11	8.4	0.665

ability to achieve goals and find meaning in one's existence via 16-item questionnaires, and also cover issues of support. The MQOL was translated into Korean by the forward-backward translation process and was pilot tested with the original author's approval [17].

The BFI evaluates fatigue, which is one of the most common long-term effects of cancer treatment [18]. The Korean version of the BFI [19] is a one-page fatigue assessment tool that contains nine items, each measuring the severity of fatigue on a 0 to 10 scale. The first three items assess the current, worst, and usual levels of fatigue in the preceding 24 h. The other six items assess the extent to which fatigue interfered with different aspects of life, such as work or social relations, during the preceding 24 h. The global score for the BFI is calculated as the mean value of the nine items, with higher scores representing more severe fatigue.

Statistical analysis

We reported descriptive statistics for clinical, socioeconomic, and therapeutic variables. The relationships among SI and clinical variables, therapeutic variables, and health-related quality of life score were evaluated after inverse propensity score weighting because groups differed in demographic characteristics (i.e., age, sex, stage, employment status, educational attainment, marital status, smoking status, alcohol consumption, monthly family income, religion, number of comorbidities, and type of operation).

All statistical tests were two tailed and were performed using SAS 9.2 software (SAS Institute, Cary, NC, USA). We used *t* tests to compare continuous variables and chi-square tests to compare categorical variables. The variables that were significant ($P < 0.05$) in the univariate analyses were included in the multivariate analysis using a backward logistic regression model.

Results

We contacted the households of 774 survivors by telephone. Of the 774 survivors, 83 had died, 97 declined to participate for various reasons (i.e., time constraints, inability to communicate verbally or in writing, and belief that the study was an inconvenience or a violation of privacy), 165 did not return the questionnaire, 48 did not complete the questionnaire, and 3 experienced recurrence of cancer. The remaining 378 survivors participated in the study (54.7 % of the eligible patients).

Of the 378 participants who survived stomach cancer, 34.7 % had suicidal thoughts, with higher rates for those who smoked (15.2 %) or had a monthly family income of less than US\$1,740 (45.7 %). SI was significantly associated with income, comorbidities (≥ 1), and smoking status (Table 1).

Table 2 Univariate analysis of factors associated with suicidal ideation

Variable	OR	95 % CI	<i>P</i> value
Income ($n = 321$)			
\geq US\$1,740	1.89	1.18 3.02	0.0078
Comorbidities			
≥ 1	1.57	1.03 2.41	0.0369
Smoking status			
Yes	2.24	1.07 4.69	0.0317
Functional scales			
Global health status	4.48	1.35 14.85	0.0141
Physical functioning ^a			
Role functioning	3.90	0.96 15.87	0.0570
Emotional functioning	5.28	1.38 20.27	0.152
Cognitive functioning	2.87	0.47 17.39	0.2516
Social functioning	2.23	0.79 6.29	0.1298
Symptom scales			
Fatigue	2.42	1.37 4.28	0.0024
Nausea/vomiting	3.15	1.01 9.83	0.0483
Pain	2.91	0.81 10.52	0.1024
Dyspnea	2.77	1.24 6.23	0.0135
Insomnia	1.49	0.70 3.17	0.3004
Appetite loss	2.76	1.38 5.49	0.0039
Constipation	2.46	1.2 5.07	0.0143
Diarrhea	2.85	1.68 4.83	0.0001
Financial problems	2.33	1.33 4.08	0.0030
Stomach cancer symptom scales			
Dysphagia ^a			
Pain	1.42	0.31 6.46	0.6469
Reflux	1.65	0.54 5.00	0.3797
Eating restriction	5.02	1.54 16.34	0.0074
Anxiety	2.11	1.24 3.60	0.0063
Dry mouth	2.08	1.20 3.60	0.0087
Trouble belching	4.48	1.35 14.85	0.0141
Body image	2.05	1.31 3.21	0.0018
Hair loss	2.82	1.37 5.83	0.0051
McGill Quality of Life Questionnaire ^b			
Existential well-being(≤ 5)	3.67	2.16 6.25	<0.0001
Support domains(≤ 5)	2.52	1.42 4.49	0.0016
Brief Fatigue Inventory ^b			
Fatigue right now(≤ 5)	2.86	1.84 4.44	<0.0001
Usual fatigue(≤ 5)	3.14	2.03 4.88	<0.0001
Worst fatigue(≤ 5)	2.86	1.84 4.44	<0.0001

European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 (EORTC QLQ-C30) problematic group: score ≤ 33 in global quality of life and function scales; non-problematic group: score of ≥ 66

OR odds ratio, CI confidence interval

^aNo suicidal ideation in problematic group

^b ≤ 5 indicates lower well-being, fewer support domains, or more fatigue

The results of the univariate analysis evaluating the relationship between SI and functional scales showed that SI was significantly associated with global health status and emotional functioning (Table 2). In addition, SI was more common in cancer survivors who had fatigue, nausea/vomiting, dyspnea, appetite loss, constipation, diarrhea, or financial problems. When stomach cancer-specific symptoms were analyzed in further detail, we found that eating restrictions, anxiety, dry mouth, trouble belching, body image, and hair loss were associated with suicidal thoughts. Existential well-being, support domains, and fatigue were also significantly associated with SI.

To determine whether survivor health status is independently correlated with SI after controlling for sociodemographic variables, we performed multivariate logistic regression analysis (Table 3). We found that SI was more common among stomach cancer survivors with symptoms of diarrhea (adjusted odds ratio (aOR)=2.94; 95 % confidence interval (CI) 1.37–6.29) and hair loss (aOR=3.36; 95 % CI 1.13–9.94). Furthermore, the probability of having SI was significantly higher when the existential well-being score was low (aOR=5.78; 95 % CI 2.40–13.90) or the usual fatigue score was high (aOR=1.93; 95 % CI 9.26–3.70).

Discussion

We found that SI in stomach cancer survivors was strongly associated with poor health-related quality of life. In particular,

SI was correlated with diarrhea, hair loss, existential well-being, and fatigue, even several years after diagnosis and treatment.

The SI rate observed in this study (34.7 %) was higher than those observed in previous studies of pediatric cancer survivors (12.8 %) [3], the general US population (3.3 %) [20], and the general Korean population (15.2 %) [21]. However, our results are consistent with the previous studies, which resulted with significantly higher SI rates in cancer patients or survivors than those in the general population [4, 22, 23]. For example, one study reported that the prevalence of SI was 7.8 % among pediatric cancer survivors, but only 4.6 % in the control group [4]. Another US study reported that the suicide rate of cancer patients (38 per 100,000) is almost four times that of the general population (9.8 per 100,000) [22]. We believe that the incidence of SI may be even greater than the reported numbers, given that people are usually reluctant to disclose suicidal thoughts [24].

Although a number of previous studies report a high rate of SI among cancer survivors [3, 4, 10, 25], we believe that this is the first comprehensive study to investigate specific SI correlates in cancer survivors. Our findings suggest possible interventions targeted at specific risk factors. Although 65.4 % of the participants in our study had no suicidal thoughts, more than one third had considered committing suicide, indicating that SI is a serious problem.

Among all possible indicators, including depression, SI is one of the most accurate determinants of suicidal intention. Previous studies show that SI is positively correlated with actual suicide attempts [26]. A study of individuals from nine

Table 3 Model-based adjusted odds ratio (aOR) of SI by logistic regression analysis with the backward method in stomach cancer survivors

		aOR	95 % CI	P value
Symptom scales				
Diarrhea	Non-problematic group	1 (referent)		
	Problematic group	2.94	1.37–6.29	0.0023
Stomach cancer symptom scales				
Hair loss	Non-problematic group	1 (referent)		
	Problematic group	3.36	1.13–9.94	0.0311
McGill Quality of Life Questionnaire ^a				
Existential well-being (≤ 5)	Non-problematic group	1 (referent)		
	Problematic group	5.78	2.40–13.90	<0.0001
Brief Fatigue Inventory ^a				
Usual fatigue (≤ 5)	Non-problematic group	1 (referent)		
	Problematic group	1.93	9.26–3.70	0.0156

Adjusted odds ratios are from a series of logistic regression models with the covariates household monthly income, number of comorbidities, smoking, and EORTC QLQ-C30 items that were statistically significant ($P < 0.05$) in univariate analyses

European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 problematic group: score ≤ 33 in global quality of life and function scales; non-problematic group: score of ≥ 66

aOR adjusted odds ratio, CI confidence interval, EORTC QLQ-C30 European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30

^a ≤ 5 indicates lower well-being, fewer support domains, or more fatigue

different countries revealed that countries with a higher prevalence of SI also have a higher prevalence of suicide attempts [26]. Similarly, a population-based cohort study in Korean population shows that years with higher prevalence of SI were also years with higher suicide rates [27]. Thus, a comprehensive analysis of SI may help detect signs of suicidal behavior.

In line with our hypothesis, we found that SI was associated with specific health issues. The association of SI with fatigue in the present study agrees with previous studies showing that fatigue is directly and indirectly associated with suicide [28, 29]. Physical exhaustion can become mental exhaustion, leading to self-destructive behaviors. Our finding that SI is associated with diarrhea is also in accord with an earlier study showing that diarrhea is positively correlated with suicidal thoughts [30]. Severe diarrhea may create unbearable physical discomfort and distress [30], decreasing quality of life and restricting social activity. This isolation, in turn, may cause emotional distress [28, 31] including depression. This, combined with the inability to control physical functions, may lead one to consider suicide. We also found that hair loss and existential well-being are associated with SI, although no previous studies have reported direct correlations. However, we found that these variables are also correlated with depression, a known cause of SI [11, 28, 29, 32], and several studies show that depression is strongly associated with existential well-being [33–35] and hair loss [36], which can dramatically affect one's body image and cause distress. As existential well-being improves and life becomes more valuable, the SI rates could decrease.

Several effective suicide prevention strategies have been developed. They generally include screening (analysis of an individual's status), education (provide information and awareness), and training (improving one's behavior) [37–41]. We believe that these suicide prevention programs could be modified for cancer survivors. For example, our findings suggest that the management of specific health issues may be essential to SI prevention. We believe that SI can be prevented by screening high-risk survivors who have diarrhea, hair loss, fatigue, or poor existential well-being, and providing them with effective education and training.

Although our study provides several significant results, it also has several limitations. This study was not designed to be representative of all stomach cancer survivors. Our survey was conducted within only two institutes of Korea. In addition, the response rate was low (54.7 %), although it was within the range of other similar studies (e.g., 57 %, 22 %) [42, 43]. Another limitation was that we could not compare stomach cancer survivors with the general population because the SI information from the BDI is not available for the general Korean population. Furthermore, our method of detecting SI was not highly reliable (i.e., we used only question 9 of the BDI to assess SI), which may be why we observed a high rate of SI (34.7 %). Although we identified

significant risk factors, we did not investigate the reasons these factors were associated with SI. Finally, our results are limited to survivors of stomach cancer. Studies of survivors of other cancer types are needed to better understand and manage SI among cancer survivors.

Although other studies have explored SI in cancer survivors, much work remains to be done in this area. A detailed comparison study of cancer survivors versus the general population is desired for detailed analysis on SI. Furthermore, determining the SI correlates in different countries could facilitate the development of a general intervention approach as well as interventions tailored to individuals. The use of other surveys to detect SI is necessary, as is a cohort study for the detailed analysis of risk factor trends over time. We believe that identifying high-risk groups and developing an effective suicide intervention is needed to improve both prognosis and quality of life for cancer survivors.

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Conflict of interest None disclosed.

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