

# Public attitudes toward cancer and cancer patients: a national survey in Korea

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## Abstract

**Background:** Regardless of improved survival rate, negative images and myths about cancer still abound. Cancer stigma may reduce patients' life opportunities resulting in social isolation, decreased level of emotional well-being, and poor health outcomes. This study was aimed to evaluate public attitudes toward cancer and cancer patients and people's willingness to disclose cancer diagnosis in South Korea.

**Methods:** A cross-sectional survey was conducted in August and September 2009. A nationally representative sample of 1011 men and women with no history of cancer was recruited. A set of 12 questions grouped into three domains (impossibility of recovery, cancer stereotypes, and discrimination) was used to assess public attitudes toward cancer.

**Results:** It was found 58.5% of study participants agreed that it is impossible to treat cancer regardless of highly developed medical science, 71.8% agreed that cancer patients would not be able to make contributions to society, and 23.5% agreed that they would avoid working with persons who have cancer. The proportions of people who said that they would not disclose a cancer diagnosis to family, friends or neighbors, or coworkers were 30.2%, 47.0%, and 50.7%, respectively. Negative attitudes toward cancer were strongly associated with lower willingness to disclose a cancer diagnosis.

**Conclusions:** Negative attitudes, stereotypes, and discriminating attitudes toward cancer and people affected by the disease were very common in spite of clinical progress and improved survivorship.

**Impact:** Our findings emphasize the need for health policy and social changes to provide a more supportive environment for cancer survivors.

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**Keywords:** public attitudes; disparities; survivorship; social support; disclosure

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## Introduction

Cancer is a greatly feared illness, and until recently, a cancer diagnosis was generally perceived as a type of death sentence. [1–3] Even with widespread information about all the aspects of the disease and the advanced medical technologies that are currently available, negative images and myths about cancer still abound. [4–6] People with cancer are still routinely referred to as victims, [7] and patients often conceal cancer diagnoses to avoid loss of health insurance [8,9] or employment, [10–12] as well as to avoid

relationship problems. [13,14] Furthermore, cancer survivors still experience problems returning to work and often struggle interpersonally with coworkers after treatment. [10–12,15]

The physical burden of cancer is thus compounded by social attitudes that may result in negative emotions toward the disease and social avoidance of cancer survivors. [1,15] These negative attitudes may further reduce patients' life opportunities and lead them to social rejection and isolation resulting in less social support, decreased level of emotional well-being, and poor health outcomes. [14,16–18]

In Korea, the five-year survival rate for all cancers has increased from 41.2% in 1993–1995 to 57.1% in 2003–2007, and there are 670 000 cancer survivors. [19] Increased cancer rates, early detection of cancer, and wide availability of advanced cancer treatments are also expected to result in an increased number of Koreans surviving cancer. [19] Yet, there still seems to be little social support for cancer patients in Korea. According to the nationwide cohort study, cancer diagnosis adversely affects the employment status in Korea. About 47% of cancer patients lost their jobs within the first year after a diagnosis of cancer. [20,21] Only 30.5% were reemployed, and the mean time of reemployment was significantly longer with cancer patients (46.3 months) than the general population (30.6 months). These trends were the same across age and cancer sites. Moreover, in Korea, the suicide rate among cancer patients was two times higher than the suicide rate among the general population.

Although there may be various factors associated with the high rate of job loss and of suicide among cancer patients, this may also reflect unfavorable cultural milieu toward cancer and cancer patients in Korea. The objective of this study is therefore to evaluate public attitudes toward cancer and cancer patients in Korea, including the willingness to disclose a cancer diagnosis to family members, friends and neighbors, and coworkers.

## Methods

### Study population

Data were collected as part of the National Clinical Research Coordination Center Survey (NCRCCS), conducted by the Korea Centers for Disease Control and Prevention (KCDC) and the National Cancer Center. The NCRCCS was a cross-sectional survey conducted in August and September 2009 that used a proportional quota sampling design parameterized by geographic area, age, and gender group to select a representative sample of the noninstitutionalized Korean population. The survey recruited 1200 men and women ages 18 years and older, of whom 1023 (85.3%) agreed to participate and had a face-to-face interview. Given our focus on public attitudes toward cancer, we hypothesized that the attitudes of survey participants who reported being told by a doctor that they had cancer or a malignancy ( $N = 12$ ) would be different from other participants. People with cancer were excluded from the analysis, and the final sample included 1011 participants. This study was approved by the Korean National Cancer Center Institutional Review Board. All participants signed a written informed consent.

### Data collection

Trained interviewers conducted the NCRCCS at participants' homes using a structured questionnaire.

The survey was composed of three parts: understanding of clinical research, attitudes toward cancer clinical trials, and attitudes toward cancer. We used the data from the attitudes toward cancer component.

As there were no valid instruments for assessing public attitudes toward cancer in Korean, the Korean National Cancer Center developed a questionnaire ahead of the NCRCCS. First, a group of experts (two oncologists, two social scientists, two general physicians, and one epidemiologist) reviewed the previous qualitative and quantitative literature and pooled questions (items) related to public attitudes, perception, or stigmatization related to cancer. Then, the expert group conducted a semistructured interview with seven cancer patients and six people without cancer and asked about their attitudes toward cancer and cancer patients. Most of the cancer patients felt uncomfortable telling others that they had cancer because people treated them differently once they found out that they had cancer. They also reported that they had difficulties in working, dating, and interacting with other people after cancer. People without cancer reported that they felt sympathy for people who had cancer, but they often avoided interacting with them in their neighborhood or community without a specific reason. They also said that they thought that there was no cure for cancer, and cancer patients could not contribute much to society and they become a social burden. They also mentioned that they would not disclose to people in their neighborhood or work place if they had cancer.

The final instrument contained 12 questions to assess public attitudes toward cancer and cancer patients, categorized into three domains: (i) impossibility of recovery, (ii) cancer stereotypes, and (iii) discrimination. To assess the impossibility of recovery, we asked four questions on the likelihood of a cure, impossibility of recovery, impossibility of social activities, and impaired ability to perform tasks at work. Regarding stereotypes, we asked four questions on the recognition of cancer patients, sexual intimacy of cancer patients, vulnerability of cancer patients, and social contribution of cancer patients. Finally, attitudes specifically related to social discrimination were assessed by four questions on whether participants felt uncomfortable when they were with cancer patients, whether they tended to avoid interactions with cancer patients, whether they would avoid marrying someone whose family members had cancer, and whether they would avoid working with people who had cancer.

Response choices were 'strongly disagree', 'disagree', 'agree', or 'strongly agree'. Each response was assigned a numeric score (strongly disagree = 1, disagree = 2, agree = 3, strongly agree = 4), and the scores for all questions on each domain were averaged for each participant. Participants were considered to have a negative attitude if their average score was equal to or above the median sample score (2.51, 2.53, and 2.16 for impossibility of recovery, stereotype, and discrimination, respectively). Internal consistency of

the items in our questionnaire was satisfactory in our study sample. Cronbach's  $\alpha$  for all items was 0.79, and the Cronbach's  $\alpha$  for the impossibility of recovery, cancer stereotypes, and discrimination scale were 0.68, 0.60, and 0.71, respectively.

Willingness to disclose a cancer diagnosis was measured through asking individuals whether they would tell their families, neighbors or friends, and coworkers a cancer diagnosis if they had cancer. Response choices were also assigned a numeric score (strongly disagree = 1, disagree = 2, agree = 3, strongly agree = 4), higher categories represent less willingness to disclose a cancer diagnosis.

Additional sociodemographic factors, which were found to be associated with public attitudes toward cancer or other stigmatized disease or condition in previous studies, were obtained from the NCRCCS and included in the analysis. They are gender, age, living area, marital status, cancer diagnosis of an immediate family member, education, income, occupation, insurance status, smoking, alcohol consumption, and religion. [2,10,20–26]

### Statistical analysis

Descriptive statistics were used to summarize attitudes toward cancer and the willingness to disclose a cancer diagnosis. Multivariable logistic regression was used to model the probability of having negative attitudes toward cancer (impossibility of recovery, stereotype, and discrimination). Adjusted proportions of having negative attitudes toward cancer were computed using marginal standardization, and relative risks were calculated on the basis of the adjusted proportions. 95% confidence intervals were calculated using the delta method. There were three people who denied to answer their religion, five people who denied to answer their monthly family income, and one person who did not answer the question on possible discrimination on marriage with people who have cancer (in total, <0.5% of the sample). Given the small proportion of the missing data, we used casewise deletion of participants with missing data for each analysis. All statistical analyses were performed using *svy* commands in Stata 11.0 (StataCorp LP, College Station, Texas, USA) to incorporate sampling weights and the complex survey design.

## Results

### Population characteristics

The average age (SE) of study participants was 43.2 (0.4) years, 48.9% of participants were male, and 34.3% of participants had at least one family member with cancer (Table 1). In terms of education, 14.2% of participants had less than middle school education, 45.8% had a high school education, 38.6% were college or university graduates, and 1.3% had a higher than graduate school education.

In terms of occupational groups, we divided them into three groups: white-collar, blue-collar, and unemployed or retired. White-collar workers were salaried professionals or educated workers who performed semiprofessional office, administrative, and sales-coordination tasks. Blue-collar workers were workers in the industry or who did physical work rather than office work. In total, 17.3% of the participants were white-collar workers, 51.0% were blue-collar workers, and 31.6% of people were unemployed or retired. The median income for a Korean family is about US\$3000, and the proportion of participants with monthly family income below US \$3000 was 39.0%.

**Table 1.** Characteristics of study participants

Characteristic	Proportion (SE*)
Gender	
Male	48.9 (1.6)
Female	51.1 (1.6)
Age (yr)	
<30	20.8 (1.3)
30–39	22.4 (1.3)
40–49	22.4 (1.3)
50–64	26.4 (1.4)
≥65	7.9 (0.8)
Family history of cancer	
Yes	34.3 (1.5)
No	65.7 (1.5)
Marital status	
Married	71.0 (1.4)
Divorced/separated/widowed	5.1 (0.7)
Single	23.9 (1.3)
Education	
Less than middle school	14.2 (1.1)
High school	45.8 (1.6)
College/university	38.6 (1.5)
Higher than graduate school	1.3 (0.3)
Occupation	
White-collar	17.3 (1.2)
Blue-collar	51.0 (1.6)
Unemployed/retired	31.6 (1.5)
Monthly family income (US dollars)	
<\$3000	39.0 (1.5)
≥\$3000	60.1 (1.5)
Living area <sup>a</sup>	
Seoul (capital city)	21.9 (1.3)
Metropolitan	25.1 (1.4)
Rural	52.9 (1.6)
Insurance type	
National health insurance	95.7 (0.6)
Medical aid	4.3 (0.6)
Smoking status	
Yes	28.1 (1.4)
No	71.9 (1.4)
Drinking status	
Yes	66.9 (1.5)
No	33.1 (1.5)
Religion	
Yes	51.6 (1.6)
No	48.4 (1.6)

\*SE, standard error.

<sup>a</sup>Living areas were classified according to the size of the city. 'Seoul' is the largest city in Korea which includes over 1 000 000 people. 'Metropolitan' areas include suburban areas of Seoul and the top six largest cities in Korea (100 000–300 000) after Seoul, and 'rural' areas are small cities or counties with a total population of less than 100 000.

## Attitudes toward cancer and cancer patients

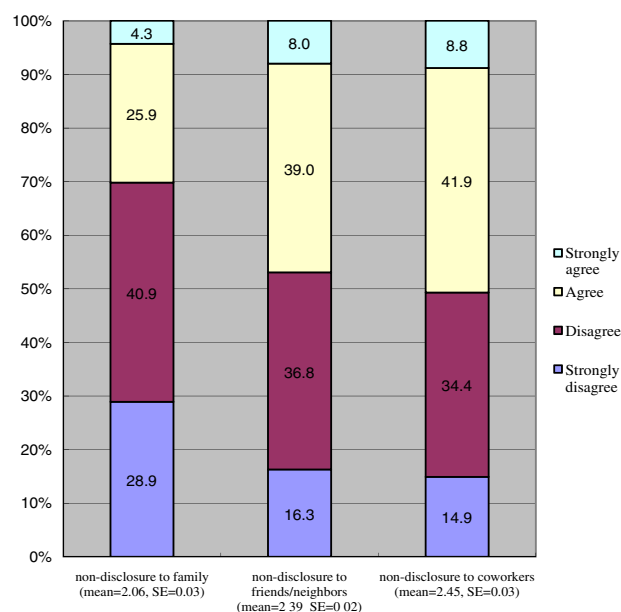
The percentage of participants who agreed or strongly agreed that it is impossible to treat cancer regardless of highly developed medical science was 58.4% (Table 2). Similarly, 55.8% of participants agreed or strongly agreed that it is very difficult to regain one's health after a cancer diagnosis, 42.6% of participants agreed or strongly agreed that people with cancer would not be socially active after diagnosis, and 56.1% of participants agreed or strongly agreed that the working ability of cancer patients would be reduced even after successful treatment.

With respect to stereotypes, 35.2% of participants agreed or strongly agreed that cancer patients could be easily recognized by looking at them, 50.7% agreed or strongly agreed that cancer patients would have a difficult time being sexually intimate, 56.6% agreed or strongly agreed that cancer patients deserve to be protected in the society, and 71.8% agreed or strongly agreed that cancer patients would not be able to make contributions to society (Table 2), the item with the highest mean (2.90, SE 0.02) among all 12 questions.

With respect to discrimination against cancer patients, 42.3% of participants agreed or strongly agreed that they felt uncomfortable when they were with cancer patients, 27.6% that they tended to avoid interacting with neighbors who had cancer, 48.1% said that they would avoid marrying people with family members who have cancer, and 23.5% said that they would avoid working with persons who have cancer (Table 2).

## Willingness to disclose a cancer diagnosis

A relatively large proportion of participants that agreed or strongly agreed that they would not disclose a cancer diagnosis to family (30.2%), friends or neighbors (47.0%), or coworkers (50.7%) (Figure 1). The differences in the



**Figure 1.** Willingness to disclose cancer diagnosis. 'Higher categories in each bar graph represent a lower willingness to disclose cancer diagnosis. 'Strongly agree = 4, agree = 3, disagree = 2, strongly disagree = 1'. Thus, a higher mean indicates a higher stigma

proportion of participants who would not disclose a cancer diagnosis to their friend or neighbors, or coworkers compared to their family members were statistically significant ( $p < 0.001$ ).

## Factors associated with negative attitudes toward cancer

Table 3 reports the proportion of participants with negative attitudes toward cancer (impossibility of recovery, stereotype, and discrimination) through participant characteristics and the factors associated with having negative attitudes. Older age was progressively associated with a higher likelihood of each of the three negative attitudes toward cancer and cancer patients.

**Table 2.** Attitudes toward cancer and cancer patients

	Strongly disagree	Disagree	Agree	Strongly agree	Mean (SE) <sup>a</sup>
<b>Impossibility of recovery</b>					
It is impossible to treat cancer regardless of highly developed medical science.	7.7 (8.3)	33.8 (1.5)	43.6 (1.5)	14.8 (1.1)	2.66 (0.03)
It is very difficult to be healthy again once a person is diagnosed with cancer.	8.4 (0.9)	35.8 (1.5)	44.6 (1.5)	11.2 (1.0)	2.59 (0.02)
Cancer patients would not be socially active once diagnosed with cancer.	16.5 (1.2)	40.9 (1.5)	38.7 (1.5)	3.9 (0.6)	2.30 (0.02)
The ability of cancer patients to perform tasks at the workplace may decrease even after successful cancer treatment.	12.4 (1.0)	31.6 (1.4)	49.0 (1.5)	7.1 (0.8)	2.51 (0.02)
<b>Stereotypes of cancer patients</b>					
Cancer patients are easily recognized through their looks.	21.7 (1.3)	43.1 (1.5)	30.6 (1.4)	4.6 (0.6)	2.18 (0.03)
Cancer patients would have a difficult time having sexual intimacy.	10.2 (0.9)	39.1 (1.5)	40.1 (1.5)	10.6 (1.0)	2.51 (0.03)
Cancer patients deserve to be protected in society.	14.8 (1.1)	28.7 (1.4)	46.8 (1.5)	9.8 (0.9)	2.52 (0.03)
Cancer patients would not be able to make contributions to society.	2.7 (0.5)	25.5 (1.3)	50.4 (1.6)	21.4 (1.2)	2.90 (0.02)
<b>Discrimination against cancer patients</b>					
I feel uncomfortable when I am with cancer patients.	22.6 (1.3)	35.0 (1.5)	36.7 (1.5)	5.6 (0.7)	2.25 (0.03)
I tend to avoid interacting with neighbors who have cancer.	31.3 (1.4)	41.1 (1.5)	24.8 (1.3)	2.8 (0.5)	1.99 (0.02)
I would avoid marrying people whose family members have cancer.	14.5 (1.1)	37.5 (1.5)	36.1 (1.5)	12.0 (1.0)	2.46 (0.03)
I would avoid working with people who have cancer.	31.3 (1.4)	45.4 (1.6)	21.6 (1.3)	1.9 (0.4)	1.94 (0.02)

<sup>a</sup>For the calculation of the mean following each category is assigned in each of the following values: 'strongly disagree = 1, disagree = 2, agree = 3, strongly agree = 4.' Thus, a higher mean indicates a higher stigma.



**Table 3.** Factors associated with public attitudes toward cancer (unadjusted)

Characteristic	Impossibility of recovery		Stereotype		Discrimination	
	% (SE)	RR (95%CI)	% (SE)	RR (95%CI)	% (SE)	RR (95%CI)
Gender						
Male	61.0 (2.1)	1.00 (Reference)	62.4 (2.2)	1.00 (Reference)	52.1 (2.2)	1.00 (Reference)
Female	60.1 (2.1)	0.99 (0.89, 1.09)	62.2 (2.1)	1.00 (0.91, 1.10)	54.4 (2.2)	1.04 (0.93, 1.17)
Age (yr)						
<30	53.4 (3.4)	1.00 (Reference)	51.4 (3.5)	1.00 (Reference)	45.2 (3.4)	1.00 (Reference)
30–39	58.4 (3.3)	1.09 (0.93, 1.29)	68.2 (3.1)	1.33 (1.13, 1.56)**	48.4 (3.3)	1.07 (0.88, 1.31)
40–49	62.5 (3.2)	1.17 (1.00, 1.37)*	61.2 (3.2)	1.19 (1.01, 1.41)*	56.7 (3.3)	1.25 (1.04, 1.51)*
50–64	64.2 (2.9)	1.20 (1.03, 1.40)*	65.3 (2.9)*	1.27 (1.08, 1.49)*	58.7 (3.0)	1.30 (1.09, 1.55)**
≥65	67.3 (5.3)	1.26 (1.03, 1.54)*	67.4 (5.3)	1.31 (1.07, 1.60)*	60.3 (5.5)*	1.33 (1.06, 1.68)*
Family history of cancer						
Yes	59.7 (2.6)	1.00 (Reference)	61.6 (2.6)	1.00 (Reference)	51.1 (2.7)	1.00 (Reference)
No	60.9 (1.8)	1.02 (0.92, 1.13)	62.6 (1.9)	1.02 (0.92, 1.12)	54.4 (1.9)	1.06 (0.94, 1.20)
Marital status						
Married	63.2 (1.7)	1.00 (Reference)	64.8 (1.8)	1.00 (Reference)	55.9 (1.8)	1.00 (Reference)
Divorced/separated/widowed	65.9 (6.7)	1.04 (0.85, 1.28)	63.9 (6.8)	0.99 (0.80, 1.22)	64.6 (6.8)	1.16 (0.93, 1.43)
Single	52.7 (3.2)	0.83 (0.73, 0.95)**	55.6 (3.2)	0.86 (0.76, 0.97)*	43.7 (3.2)	0.78 (0.67, 0.91)**
Education						
Less than middle school	67.6 (3.9)	1.00 (Reference)	65.9 (3.9)	1.00 (Reference)	58.9 (4.1)	1.00 (Reference)
High school	60.4 (2.2)	0.89 (0.78, 1.02)	61.0 (2.3)	0.93 (0.81, 1.06)	52.7 (2.3)	0.89 (0.76, 1.05)
College/university	57.8 (2.5)	0.86 (0.74, 0.98)*	62.4 (2.4)	0.95 (0.82, 1.09)	51.9 (2.5)	0.88 (0.75, 1.04)
Higher than graduate school	71.5 (12.3)	1.06 (0.74, 1.51)	68.7 (13.0)	1.04 (0.71, 1.54)	59.5 (13.8)	1.01 (0.63, 1.62)
Occupation						
White-collar workers	56.0 (3.7)	1.00 (Reference)	63.5 (3.6)	1.00 (Reference)	52.1 (3.7)	1.00 (Reference)
Blue-collar workers	65.0 (2.1)	1.16 (1.00, 1.34)*	64.1 (2.1)	1.01 (0.89, 1.15)	55.3 (2.2)	1.06 (0.90, 1.25)
Unemployed/retired	55.8 (2.7)	1.00 (0.85, 1.17)	58.7 (2.7)	0.92 (0.80, 1.07)	50.7 (2.8)	0.97 (0.82, 1.16)
Monthly family income (US dollars)						
<\$3000	60.1 (2.4)	1.00 (Reference)	63.7 (2.4)	1.00 (Reference)	49.9 (2.5)	1.00 (Reference)
>\$3000	60.7 (1.9)	1.01 (0.91, 1.12)	61.6 (2.0)	0.97 (0.88, 1.07)	55.5 (2.0)	1.11 (0.99, 1.25)
Living area <sup>a</sup>						
Seoul (capital city)	59.1 (3.3)	1.00 (Reference)	62.5 (3.3)	1.00 (Reference)	57.9 (3.3)	1.00 (Reference)
Metropolitan	68.8 (2.7)	1.16 (1.02, 1.33)*	69.3 (2.8)	1.11 (0.97, 1.26)	64.8 (3.0)	1.09 (0.94, 1.25)
Rural	57.1 (2.1)	0.97 (0.85, 1.10)	58.8 (2.1)	0.94 (0.83, 1.07)	45.8 (2.1)	0.77 (0.67, 0.88)**
Insurance type						
National health insurance	60.6 (1.5)	1.00 (Reference)	62.9 (1.5)	1.00 (Reference)	53.4 (1.6)	1.00 (Reference)
Medical aid	57.8 (7.6)	0.95 (0.73, 1.24)	52.4 (7.7)	0.83 (0.62, 1.11)	50.5 (7.8)	0.95 (0.70, 1.28)
Smoking status						
Yes	62.9 (2.83)	1.00 (Reference)	63.6 (2.8)	1.00 (Reference)	49.0 (2.9)	1.00 (Reference)
No	59.6 (1.77)	0.95 (0.85, 1.05)	61.7 (1.8)	0.97 (0.87, 1.08)	55.0 (1.8)	1.12 (0.98, 1.28)
Drinking status						
Yes	59.2 (1.83)	1.00 (Reference)	62.6 (1.8)	1.00 (Reference)	51.7 (1.9)	1.00 (Reference)
No	63.3 (2.60)	1.07 (0.97, 1.18)	61.7 (2.7)	0.99 (0.89, 1.09)	56.6 (2.7)	1.09 (0.97, 1.23)
Religion						
Yes	59.8 (2.1)	1.00 (Reference)	62.9 (2.1)	1.00 (Reference)	54.1 (2.2)	1.00 (Reference)
No	61.2 (2.1)	1.02 (0.93, 1.13)	61.6 (2.2)	0.98 (0.89, 1.08)	52.5 (2.2)	0.97 (0.87, 1.09)

SE, standard error; RR, relative risk.

\* $p < 0.05$ ;\*\* $p < 0.001$ .

<sup>a</sup>Living areas were classified according to the size of the city. 'Seoul' is the largest city in Korea which includes over 1 000 000 people. 'Metropolitan' areas include suburban areas of Seoul and the top six largest cities in Korea (100 000–3,000 000) after Seoul, and 'Rural' areas are small cities or counties with a total population of less than 100 000.

Compared to participants younger than 30 years old, people 65 years of age or older were 26%, 31%, and 33% more likely to have negative attitudes with respect to impossibility of recovery, stereotype, and discrimination, respectively ( $p < 0.05$  for each attitude). Married participants were more likely to have negative attitudes toward cancer compared to single participants. In relation to socio-economic status, the proportion of participants with negative attitudes toward cancer decreased as the education level

increased, with blue-collar workers being more likely to have negative attitudes toward cancer compared to white-collar workers, but they were not statistically significant. Participants living in the Metropolitan area were also more likely to consider that cancer was impossible to recover from compared to participants living in Seoul (relative risk (RR) 1.16, 95% CI 1.02, 1.33).

In the adjusted multivariate analyses for all the sociodemographic and behavior factors, age and

living area were still associated with some negative attitudes toward cancer (Table 4). Compared to participants younger than 30 years, those who were 30–39, 40–49, 50–64, and 65 years of age or older were 13%, 19%, 31% and 34% more likely to hold stereotypical views of cancer patients. People living in the rural area were 24% less likely to have discrimination against cancer survivors than people living in Seoul (RR 0.76, 95% CI 0.66, 0.88), adjusting all other factors.

### Association between attitudes toward cancer and the disclosure of cancer diagnosis

Table 5 presents the association of the attitudes toward cancer and the willingness to disclose a cancer diagnosis. In multivariate analyses, participants with negative attitudes toward cancer were less willing to disclose a cancer diagnosis to their family, friends or neighbors, and coworkers compared to participants with positive attitudes. In addition, the unwillingness to disclose a

**Table 4.** Factors associated with public attitudes toward cancer (adjusted)

Characteristics	Impossible of recovery		Stereotype		Discrimination	
	% (SE)	RR	% (SE)	RR	% (SE)	RR
		(95%CI)		(95%CI)		(95%CI)
Gender						
Male	59.6 (2.54)	1.00 (Reference)	60.9 (2.60)	1.00 (Reference)	54.0 (2.52)	1.00 (Reference)
Female	61.8 (2.44)	1.04 (0.93, 1.16)	64.5 (2.43)	1.06 (0.95, 1.18)	53.0 (2.54)	0.98 (0.86, 1.12)
Age(yr)						
<30	60.6 (4.91)	1.00 (Reference)	51.2 (5.49)	1.00 (Reference)	52.1 (5.42)	1.00 (Reference)
30–39	58.8 (3.41)	0.97 (0.80, 1.18)	58.0 (3.31)	1.13 (0.89, 1.44)*	47.6 (3.43)	0.91 (0.71, 1.17)
40–49	60.4 (3.57)	1.00 (0.82, 1.21)	61.1 (3.56)	1.19 (0.94, 1.52)	54.5 (3.64)	1.05 (0.82, 1.33)
50–64	62.3 (3.48)	1.03 (0.85, 1.25)	67.3 (3.41)	1.31 (1.04, 1.66)*	57.2 (3.52)	1.10 (0.87, 1.39)
≥65	63.0 (6.55)	1.04 (0.80, 1.35)	68.5 (6.15)	1.34 (1.02, 1.76)	58.7 (6.70)	1.13 (0.83, 1.52)
Family history of cancer						
Yes	60.1 (2.62)	1.00 (Reference)	62.0 (2.61)	1.00 (Reference)	51.2 (2.66)	1.00 (Reference)
No	61.1 (1.84)	1.02 (0.92, 1.13)	63.1 (1.86)	1.02 (0.92, 1.13)	54.7 (1.88)	1.07 (0.95, 1.21)
Marital status						
Married	62.5 (2.04)	1.00 (Reference)	62.8 (2.14)	1.00 (Reference)	55.4 (2.14)	1.00 (Reference)
Divorced/separated/widowed	63.8 (7.32)	1.02 (0.81, 1.29)	59.2 (7.50)	0.94 (0.73, 1.22)	65.4 (7.11)	1.18 (0.94, 1.48)
Single	55.2 (4.76)	0.88 (0.74, 1.06)	63.4 (4.61)	1.01 (0.86, 1.18)	45.1 (4.96)	0.81 (0.65, 1.02)
Education						
Less than middle school	66.2 (5.07)	1.00 (Reference)	63.1 (5.12)	1.00 (Reference)	55.4 (5.14)	1.00 (Reference)
High school	59.0 (2.37)	0.89 (0.75, 1.06)	61.5 (2.36)	0.97 (0.82, 1.16)	50.9 (2.38)	0.92 (0.75, 1.13)
College/university	60.3 (2.68)	0.91 (0.77, 1.08)	63.9 (2.69)	1.01 (0.85, 1.21)	55.5 (2.65)	1.00 (0.82, 1.23)
Higher than graduate school	75.2 (11.52)	1.14 (0.81, 1.59)	68.6 (13.16)	1.09 (0.72, 1.64)	60.9 (12.55)	1.10 (0.71, 1.71)
Occupation						
White-collar workers	57.2 (4.05)	1.00 (Reference)	64.3 (3.84)	1.00 (Reference)	55.6 (3.96)	1.00 (Reference)
Blue-collar workers	64.9 (2.19)	1.13 (0.97, 1.32)	63.9 (2.19)	0.99 (0.87, 1.14)	54.9 (2.24)	0.99 (0.84, 1.16)
Unemployed/retired	56.0 (2.99)	0.98 (0.82, 1.16)	60.0 (3.01)	0.93 (0.80, 1.09)	50.0 (3.01)	0.90 (0.75, 1.08)
Monthly Family Income(US dollars)						
<\$3000	60.3 (2.60)	1.00 (Reference)	65.3 (2.47)	1.00 (Reference)	51.2 (2.65)	1.00 (Reference)
>\$3000	61.0 (2.01)	1.01 (0.91, 1.13)	61.4 (2.07)	0.94 (0.85, 1.04)	55.0 (2.06)	1.07 (0.95, 1.22)
Living area <sup>a</sup>						
Seoul (capital city)	59.8 (3.40)	1.00 (Reference)	63.9 (3.32)	1.00 (Reference)	59.1 (3.34)	1.00 (Reference)
Metropolitan	69.5 (2.67)	1.61 (0.93, 2.81)	70.4 (2.78)	1.10 (0.97, 1.25)	66.2 (2.97)	1.12 (0.97, 1.29)
Rural	56.9 (2.11)	0.95 (0.83, 1.09)	58.6 (2.17)	0.92 (0.81, 1.04)	45.0 (2.13)	0.76 (0.66, 0.88)
Insurance type						
National health insurance	60.6 (1.51)	1.00 (Reference)	62.9 (1.53)	1.00 (Reference)	53.2 (1.54)	1.00 (Reference)
Medical aid	63.8 (7.49)	1.05 (0.83, 1.33)	58.7 (7.97)	0.93 (0.71, 1.22)	58.7 (7.94)	1.10 (0.84, 1.45)
Smoking status						
Yes	64.2 (3.26)	1.00 (Reference)	65.1 (3.27)	1.00 (Reference)	49.6 (3.44)	1.00 (Reference)
No	59.3 (1.91)	0.92 (0.82, 1.04)	61.8 (1.95)	0.95 (0.85, 1.07)	55.0 (1.94)	1.11 (0.95, 1.29)
Drinking status						
Yes	59.5 (1.89)	1.00 (Reference)	63.6 (1.90)	1.00 (Reference)	52.8 (1.94)	1.00 (Reference)
No	63.4 (2.84)	1.07 (0.96, 1.19)	61.0 (2.88)	0.96 (0.86, 1.07)	54.8 (2.88)	1.04 (0.92, 1.18)
Religion						
Yes	59.0 (2.15)	1.00 (Reference)	63.0 (2.14)	1.00 (Reference)	52.5 (2.18)	1.00 (Reference)
No	62.6 (2.16)	1.06 (0.96, 1.17)	62.5 (2.21)	0.99 (0.90, 1.09)	54.5 (2.26)	1.04 (0.93, 1.16)

SE, standard error; RR, relative risk.

\* $p < 0.05$ ;

\*\* $p < 0.001$ .

<sup>a</sup>Living areas were classified according to the size of the city. 'Seoul' is the largest city in Korea which includes over 1 000 000 people. 'Metropolitan' areas include suburban areas of Seoul and the top six largest cities in Korea (100 000–300 000) after Seoul, and 'Rural' areas are small cities or counties with a total population of less than 100 000.

**Table 5.** Association between attitudes on cancer and the disclosure of cancer diagnosis<sup>a</sup>

Non disclosure to	Family		Friends/Neighbors		Coworkers	
	% (SE)	RR	% (SE)	RR	% (SE)	RR
		(95%CI)		(95%CI)		(95%CI)
Impossibility of recovery						
Positive attitudes	22.3 (2.08)	1.00 (Reference)	37.8 (2.42)	1.00 (Reference)	40.5 (2.46)	1.00 (Reference)
Negative attitudes	35.0 (1.89)	1.57 (1.27, 1.94)*	53.6 (2.02)	1.42 (1.23, 1.64)**	57.0 (2.01)	1.41 (1.23, 1.62)*
Stereotype						
Positive attitudes	22.3 (1.64)	1.00 (Reference)	40.0 (1.94)	1.00 (Reference)	43.2 (1.95)	1.00 (Reference)
Negative attitudes	43.3 (2.53)	1.94 (1.62, 2.33)**	60.1 (2.56)	1.50 (1.32, 1.71)**	63.1 (2.53)	1.46 (1.30, 1.64)**
Discrimination						
Positive attitudes	20.0 (1.85)	1.00 (Reference)	36.0 (2.21)	1.00 (Reference)	37.0 (2.23)	1.00 (Reference)
Negative attitudes	38.8 (2.06)	1.94 (1.57, 2.39)**	57.3 (2.14)	1.59 (1.38, 1.83)**	62.3 (2.10)	1.68 (1.47, 1.93)**

SE, standard error; RR, relative risk.

\* $p < 0.05$ ;\*\* $p < 0.001$ .<sup>a</sup>All proportions were adjusted for gender, age, marital status, education, income, occupation status, health insurance, living area, smoking and drinking status, family history of cancer, and religion.

cancer diagnosis increased with the distance of relationships (Table 5).

## Discussion

Regardless of highly developed medical science and increased survivorship, [19,27] majority of the study participants had negative attitudes toward cancer and held stereotypical views on people with cancer. They believed that cancer was an untreatable disease and considered cancer survivors as physically and socially impaired personas. People who were older and who lived in the capital city were more likely to have negative attitudes than people who were younger and who lived in rural areas. With respect to the willingness to disclose a cancer diagnosis, a relatively large portion of people said that they would not disclose a cancer diagnosis to their family, friends, neighbors, and coworkers. Moreover, people who had negative attitudes toward cancer had a much lower willingness to disclose cancer diagnosis compared to people who had positive attitudes.

In our study, more than half of the participants held negative stereotypical and discriminant views of people with cancer. This is similar to findings from studies performed on ethnic minorities in Western countries where the society is generally open about cancer. [28] For example, African American and Hispanic cancer patients reported lacking social support, being ostracized, and feeling hurt, lonely, and socially isolated because of cancer. [8,15] In another study in Britain, researchers found that cancer stigma in immigrant and minority women was associated with distress impacting cancer screening behaviors, and it often resulted in the worse cancer mortality outcomes. [29] In those studies, lower education and lower socio-economic status measures such as monthly income and living area were associated with negative attitudes or with experiences of discrimination. However, we found no association between income or education and negative attitudes, and living in a rural area was associated with positive attitudes in our study. In our study, age was a single strong factor which was associated with public attitudes

toward cancer, and we think that this might be associated with other cultural or environmental factors rather than socio-economic status. It would be interesting to conduct similar studies with Korean or other minorities in the USA with high socio-economic status.

As late as the 1970s, a cancer diagnosis was often construed as a death sentence. [30]

It was common a practice to avoid revealing and discussing a diagnosis of cancer, and people seldom discussed it publicly. [30] Over the past 30 years, however, a generation of medical progress has brought a sea of change in opinions about cancer. [29] There is now more openness about cancer and increased social and systemic support for cancer survivors including cancer advocacy groups, rehabilitation programs, and supportive work environments. [1,29] Yet, people still have concerns about disclosing a diagnosis of cancer for occupational and social reasons. In a recent qualitative study of young cancer survivors in the U.S., researchers found that the disclosure of a cancer diagnosis was limited to immediate family members as survivors feared they might be treated differently, excluded by peers, or stigmatized. [24] Similarly, our data demonstrate that people tend to avoid or interact with persons who have cancer, and it supports the findings of previous studies in Korea that a large number of cancer patients experienced difficulties returning to work after cancer treatment. [10,12,15] In addition, although survivors are able to return to work, they have to cope with changes in functional abilities, with the attitudes of their employer and coworkers, and with difficulties and problems with emotional or practical support and job flexibility. [10,11] In this study, we found that people who had negative attitudes toward cancer reported a lower willingness to disclose a cancer diagnosis. Cancer stigma results in the perception of cancer patients as being different and results in the alienation of cancer patients. [1,14,15,17,31] It also results in people anticipating not being as likely to disclose a cancer diagnosis to other people. According to previous studies, cancer patients disclosed their cancer diagnosis when they expected positive support from

their social networks, including information, acts of affection, and provision of assistance. [9,32–34] Therefore, the lower willingness to disclose cancer diagnosis in our study would reflect an unsupportive social environment for cancer survivors. Previous research has established that disclosing diagnosis and treatment information to members of their social network helped cancer survivors cope through influencing their perceptions of their condition, encouraging them to engage in more health promoting behaviors, and facilitating interactions with others. [5] To provide comprehensive cancer care, we may need to foster systemic and legal changes to reduce or eliminate discrimination against cancer survivors. In addition, more efforts on cancer prevention and screening education, and other advocacy activities would be required to improve public understanding of the disease.

Our study had several limitations. It is possible that study participants would report more positive attitudes toward cancer and openness in disclosing cancer diagnosis because of social desirability, which would result in an underestimate of negative attitudes toward cancer. It is also possible that people who responded to the survey had more positive attitudes toward cancer and are therefore more likely to disclose their cancer diagnosis than nonrespondents. In addition, the results of the study might be culture-specific for Korea, and the findings may not be generalizable to other countries with a similar level of clinical excellence. Despite these limitations, our nationally representative sample provided a unique opportunity to explore people's attitudes and openness toward cancer in Korea.

In summary, our findings indicate that negative attitudes, stereotypes, and discriminating attitudes toward cancer and people affected by the disease were very common regardless of highly developed medical technology and improved survivorship. Lower willingness to disclose a cancer diagnosis to neighbors and co-workers, even after adjustment for sociodemographic factors, emphasizes the need for health policy and social changes to provide a more supportive environment for cancer survivors. Future research needs to examine factors associated with cancer stigma. Importantly, negative stereotypes and discrimination against cancer survivors emphasize the need for a systematic approach to the cancer advocacy. Medical societies and health professionals should pay more attention to social environments that cancer survivors would face after treatment along with providing the best care.

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