RESEARCH COMMUNICATION

Factors Related to Cancer Information Scanning and Seeking Behavior among High School Students in Korea

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Abstract

Objective: This paper aimed to determine the relationship between cancer information scanning and seeking experience of adolescents and cancer preventive behavior, perceived cancer risk, and levels of cancer-related knowledge. Methods: The study sample comprised 1,000 second-year students from 6 high schools: the general and vocational school systems were each represented by 1 boys', 1 girls', and 1 coeducational high school. In July 2011, trained researchers visited each classroom, explained the purpose of the study, distributed questionnaires to the students who agreed to participate, instructed them to complete the survey by self-reporting, and collected the completed questionnaires. Results: The students who attended general high schools (as compared with vocational high schools), earned higher grades, consumed more vegetables, had a higher perceived cancer risk, and answered the cancer-related questions more correctly had more cancer information scanning and seeking experience. Conclusion: These results reinforce the importance of cancer prevention health education. Furthermore, the results may help in preparing a strategy that enables people to acquire accurate cancer-related information easily and quickly.

Key words: Cancer information - information seeking - information scanning - adolescent

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Introduction

Modern-day media is overflowing with health-related information: the number of health-related websites is immense, and provision of health-related information is promoted actively through the latest technologies, such as blogs, social networking services, and mobile apps. At this point in time, it is important to understand how and where people obtain health-related information in general, what information they require, and how well their needs are fulfilled. Cancer is a particularly dangerous illness, killing more Korean people than any other disease: in an average life span, one of every three people will be diagnosed with cancer. Accordingly, as various therapies for treating cancer are being developed continuously, sufficient information is required for relevant decision making. In addition, as a variety of lifestyle information related to the prevention and control of cancer is available, it is urgent to construct an environment in which the availability of necessary information is facilitated and acquisition of correct cancer information is enabled; this would help people to determine the significance of information and make good health-related decisions.

Information searches play an important role in dealing with the problem of cancer effectively, reducing stress, understanding the progression of cancer, and gaining social support (van Der Molen, 1999). Additionally, cancer information scanning and seeking behavior has been shown to increase the practicability of a cancer preventative lifestyle and improves participation in cancer screening (Shim et al., 2006). The shared decision making model has also been supported as a desirable social model for decision making associated with cancer or other chronic diseases: it is useful to decide the direction of management via mutual discussion between medical staff and patients by obtaining information about the applicable disease without complete dependence on medical staff (Woolf et al., 2005). Therefore, it is necessary to help people to get cancer information easily and to interpret it correctly.

Previous studies on cancer information include papers on cancer information scanning and seeking and the requirements of cancer patients (Carlsson, 2000; Rees and Bath, 2000; Semple and McGowan, 2002), the information scanning and seeking experience of the families of cancer patients (Fukui, 2004; James, 2007), the relationship between cancer information scanning and seeking experience and the adoption of cancer screening (Ling et al., 2006; Coughlin et al., 2007), the use of alternative therapies about which patients learned during their cancer information scanning and

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Table 1. Demographic Characteristics and Cancer Related Characteristics of Participants

Variables		n	(%)
Total		1,000	(100.0)
Gender	Male	526	(52.6)
	Female	474	(47.4)
School type	Boys' high school	370	(37.0)
	Girls' hgh school	316	(31.6)
	Co-ed hish school	314	(31.4)
School system	General high school	837	(83.7)
	Vocational high school	163	(16.3)
Economic level	Upper	73	(7.3)
	Middle-Upper	359	(35.9)
	Middle-Lower	426	(42.6)
	Lower	142	(14.2)
Record grade	1-2 grade	150	(15.0)
	3-4 grade	433	(43.3)
	5-6 grade	311	(31.1)
	7-9 grade	106	(10.6)
Smoking	Smoker	94	(9.4)
	Nonsmoker	906	(90.6)
Drinking	Drinker	157	(15.7)
	Nondrinker	843	(84.3)
Fruit intake	none	33	(3.3)
	1 time per 4-7 days	293	(29.3)
	1 time per 2-3 days	319	(31.9)
	1 time per day	239	(23.9)
	More than 2 times a day	116	(11.6)
Vegetable intake	none	27	(2.7)
	1-3 times per week	280	(28.0)
	1 meal per day	267	(26.7)
	2 meals per day	270	(27.0)
	3 meals per day	156	(15.6)
Excerise	None	158	(15.8)
	1-2 days a week	438	(43.8)
	3-4 days a week	263	(26.3)
	More than 5 days a week	141	(14.1)
Perceived health status	Healthy	576	(57.6)
	Normal	348	(34.8)
	Unhealthy	76	(7.6)
Perceived cancer risk	Low	602	(60.2)
	Moderate	286	(28.6)
	High	112	(11.2)
Mortality from cancer increases	Right	833	(83.3)
	Wrong	167	(16.7)
Most of cancer patients die	Right	543	(54.3)
	Wrong	457	(45.7)
Cancer information scanning and seeking	Yes	499	(49.9)
	No	501	(50.1)

seeking experience (Owen et al, 2003; Evans et al., 2007), the sociodemographic factors affecting cancer information scanning and seeking (Rutten et al., 2006), the practical application of cancer information by medical professionals and the requirements for this application (Lim et al., 2003), the cancer information screening and seeking experience of patients with cervical cancer, the degree of information they require, and the sources of their information (Noh et al., 2009), and the degree of cancer screening information required by common people (Kye, 2010). These studies mostly analyzed the cancer information scanning and seeking experience of and the degree of information required by health professionals or adults. It was difficult to find a study on how teenagers, who are optimal targets for health education during a significant period in which the basis of various health-related habits is being formed, came into contact with cancer-related information, how often teenagers with cancer information scanning experience practiced health behaviors, and what causes affected their cancer information searches. Therefore, this study investigated the cancer information scanning and seeking experience of teenagers, looked into the effects of cancer information scanning and seeking experience on teenagers' cancer preventative behavior, analyzed differences in teenagers' levels of cancer-related knowledge depending on cancer information scanning and seeking experience, and examined the relationship between perceived cancer risk and cancer information scanning and seeking experience. These results were predicted to reinforce the importance of cancer prevention education in health education and may aid in the preparation of a strategy to enable people to acquire accurate information on cancer easily and quickly.

Materials and Methods

Participants

A cross-sectional survey was conducted in order to understand teenagers' cancer information scanning and seeking experience and its associated cognitive and behavioral factors. The survey was completed by 1,000 students in their second year of high school. 6 high schools participated: the general and vocational school systems were each represented by 1 boys', 1 girls', and 1 coeducational high school. The survey was administered by trained researchers who visited each classroom, explained the purpose of the research, distributed questionnaires to the students who agreed to participate, instructed the participants to complete the survey by self report, and collected the completed questionnaires. The survey period was from July 7, 2011 to July 21, 2011.

Survey Questions

The survey was composed of questions categorized as assessments of cancer information scanning and seeking experience and related cognitive and behavioral factors.

1) Cancer information scanning and seeking experience

Cancer information may be actively sought by subjects or incidentally exposed in daily life. Both of these methods of information acquisition, direct contact and indirect exposure, were included in this study by asking whether the subjects had heard or sought cancer information; this was a binary choice decision in which subjects could answer "yes" or "no."

2) Cognitive factor

In order to understand the cognitive factors associated with the subjects' cancer information scanning and seeking experience, their perceived health status,

Table 2. Cancer Information Scanning and Seeking Experience Depending on Demographic and Cancer Related Characteristics

Variables	Cancer information scanning and seeking		χ^2	p*
	Yes (n=499)	No (n=501)		
Gender				
Male	249(49.9)	277(55.3)	2.91	.088
Female	250(50.1)	224(44.7)		
School system				
General high school	433(86.8)	404(80.6)	7.19	.007
Vocational high school	66(13.2)	97(19.4)		
Economic level				
Upper	41(8.2)	32(6.4)	3.93	0.27
Middle-Upper	184(36.9)	175(34.9)		
Middle-Lower	212(42.5)	214(42.7)		
Lower	62(12.4)	80(16.0)		
Record grade				
1-2 grade	84(16.8)	66(13.2)	7.48	0.04
3-4 grade	213(42.7)	220(43.9)		
5-6 grade	161(32.3)	150(29.9)		
7-9 grade	41(8.2)	65(13.0)		
Smoking				
Smoker	45(9.0)	49(9.8)	0.04	0.83
Nonsmoker	454(91.0)	452(90.2)		
Drinking				
Drinker	70(14.0)	87(17.4)	1.99	0.16
Nondrinker	429(86.0)	414(82.6)		
Fruit intake				
none	14(2.8)	19(3.8)	3.16	0.53
1 time per 4-7 days	145(29.1)	148(29.5)		
1 time per 2-3 days	151(30.3)	168(33.5)		
1 time per day	124(24.8)	115(23.0)		
More than 2 times a day	65(13.0)	51(10.2)		
Vegetable intake				
none	6(1.2)	21(4.2)	18.0	.001
1-3 times per week	124(24.8)	156(31.1)		
1 meal per day	138(27.7)	129(25.7)		
2 meals per day	139(27.9)	131(26.1)		
3 meals per day	92(18.4)	64(12.8)		
Excerise				
None	79(15.8)	79(15.8)	1.30	0.73
1-2 days a week	225(45.1)	213(42.5)		
3-4 days a week	123(24.6)	140(27.9)		
More than 5 days a week	72(14.4)	69(13.8)		
Perceived health status				
Healthy	283(56.7)	293(58.5)	0.50	0.78
Normal	175(35.1)	173(34.5)		
Unhealthy	41(8.2)	35(7.0)		
Perceived cancer risk				
Low	283(56.7)	319(63.7)	8.14	0.02
Moderate	148(29.7)	138(27.5)		
High	68(13.6)	44(8.8)		
Cancer knowledge 1: Mortality from cancer increases				
Right	434(87.0)	399(79.6)	9.96	.001
Wrong	65(13.0)	102(20.4)		
Cancer knowledge 2: Most of cancer patients die				
Right	294(58.9)	249(49.7)	7.40	.006
Wrong	205(41.1)	252(50.3)		

* p values were determined using the chi-square test adjusting

their perceived cancer risk, and their levels of cancer knowledge were estimated.

Perceived health status was analyzed on a 3-point scale that categorized participants as "healthy," "normal," or "unhealthy" after they responded on a 5-point scale (1: very unhealthy, 5: very healthy) to the question, "How healthy do you think you are?" Subjects' perceived cancer risk was analyzed on a 3-point scale that classified perceived risk as "low," "medium," or "high" after they responded on a 5-point scale (1: very low, 5: very high) to the question, "Is my probability of getting cancer in the future higher than that of other people my age?" As in previous studies (Stein et al., 2007), the questions used to ascertain subjects' levels of cancer knowledge were 2 general questions about cancer (whether mortality from cancer increases and whether most cancer patients die), and the subjects responded "yes," "no," or "I don't know." Answers were treated as correct when the answer was correct and treated as incorrect when the response was either the incorrect choice or "I don't know."

3) Behavioral factors

To identify behavioral factors of the subjects that may be associated with cancer information scanning and seeking experience, the subjects' levels of current smoking, current alcohol drinking, fruit intake, vegetable intake, and exercise were measured.

Subjects were classified as current smokers or current alcohol drinkers if they responded that they had smoked even a single cigarette or consumed any alcohol within the last 30 days, respectively. Subjects' levels of fruit intake were investigated by asking them how often, on average, they ate fruits other than fruit juice each week; the categories of answers were none, once per 4–7 days, once per 2–3 days, once per day, and twice per day or more. Subjects' levels of vegetable intake were investigated by asking them how often, on average, they ate vegetables other than kimchi each week; the categories of answers were none, 1–3 times a week, 1 meal per day, 2 meals per day, and 3 meals per day. Subjects' exercise frequency was investigated by asking them on how many days per week, on average, they walk or exercise for at least 30 min; the categories of answers were none, 1–2 days per week, 3–4 days per week, and 5 days per week or more.

Analysis

In order to understand these Korean high school students' cancer information scanning and screening experience and the associated cognitive and behavioral factors, Chi-square tests were conducted for each variable; all variables for which the results deviated significantly from a univariate model at the $p = 0.1$ significance level were included and analyzed in a multivariate logistic regression analysis using cancer information screening and seeking experience as a dependent variable. The SPSS 15.0 software package

Table 3. Multivariate Logistic Regression Analysis using the Cancer Information Scanning and Seeking Experience as a Dependent Variable*

Variables		OR	95% CI
Gender	Male	1.00	
	Female	1.23	0.95-1.60
School system	General high school	1.00	
	Vocational high school	0.62	0.43-0.87
Record grade	1-2 grade	1.00	
	3-4 grade	0.85	0.58-1.25
	5-6 grade	1.03	0.68-1.56
	7-9 grade	0.59	0.35-0.98
Vegetable intake	none	1.00	
	1-3 times per week	2.99	1.15-7.77
	1 meal per day	3.64	1.40-9.47
	2 meals per day	3.90	1.49-10.18
	3 meals per day	5.18	1.93-13.86
Perceived cancer risk	Low	1.00	
	Moderate	1.32	0.98-1.77
	High	2.05	1.33-3.15
Mortality from cancer increases	Wrong	1.00	
	Right	1.72	1.21-2.46
Most of cancer patients die	Wrong	1.00	
	Right	1.43	1.09-1.86

OR, odds ratio; CI, confidence interval * Data were adjusted for gender, school system, grades earned, vegetable intake, perceived cancer risk, and cancer knowledge was used in all analyses.

Results

Demographic and cancer-related features of subjects

1,000 subjects were included in the final analysis (526 [52.6%] male, 474 [47.4%] female). Three hundred seventy subjects (37.0%) attended boys' high schools, 316 (31.6%) attended girls' high schools, and 314 (31.4%) were students at coeducational high schools. Most of the students (837 [83.7%]) attended general high schools, and 163 (16.3%) were students of vocational high schools.

Among the subjects, 9.4% were current smokers and 15.7% were current alcohol drinkers. 3.3% of subjects normally consumed no fruit, and 11.6% of subjects reported eating fruit 2 times per day or more. 2.7% of subjects normally consumed no vegetables, and 15.6% of subjects reported eating vegetables at every meal. 15.8% of subjects responded that they did no exercise, and 14.1% of subjects responded that they exercise 5 days per week or more for at least 30 min. In terms of perceived health status, 92.4% of subjects responded that they were "normal" or "healthy," suggesting that they predominantly felt healthy. In terms of cancer knowledge, 83.3% and 54.3% of subjects answered correctly. Only 11.2% of subjects thought that their probability of developing cancer was higher than that of other people their age; 60.2% of subjects thought that their probability of developing cancer was low. About half (49.9%) of subjects had heard or found information about cancer (Table 1).

Cancer information scanning and seeking experience depending on demographic and cancer-related features

There were differences in cancer information scanning and seeking experience depending on the type of school system attended and the student's grades. Respondents who had a experience of scanning and seeking cancer information were 86.8% in general high schools, but in vocational high schools, this figure was 80.6%. Thus, students of general high schools had more cancer information scanning and screening experience ($p = .007$). Students who earned higher grades had more cancer information scanning and seeking experience, with 8.2% of students having cancer information scanning and seeking experience achieving grades of 7-9 compared with 13.0% of students having no cancer information scanning and seeking experience ($p = .044$). Certain cancer-related features, such as vegetable intake level, perceived cancer risk, and cancer knowledge also predicted differences in cancer information scanning and seeking experience. Only 1.2% of subjects who had a experience of cancer information scanning and seeking ate no vegetables, but 4.2% of subjects who had no experience consumed no vegetables, resulting in the finding that subjects who ate more vegetables had more cancer information scanning and seeking experience ($p < .001$). 56.7% of subjects who had a experience of cancer information scanning and seeking considered themselves to have a lower probability of developing cancer than others their age, but 63.7% of subjects who have no experience considered themselves to have a higher probability of developing cancer than others their age had such experience, suggesting that higher perceived cancer risk is related to a higher rate of cancer information scanning and seeking experience ($p < .017$). In terms of cancer knowledge, 87.0% and 58.9% of subjects who had a experience of cancer information scanning and seeking answered the questions correctly; 79.6% and 49.7% of subjects who had no experience of cancer information scanning and seeking answered the questions correctly, suggesting that the subjects who answered the cancer knowledge questions correctly had higher rates of cancer information scanning and seeking experience ($p < .001$, $p < .006$) (Table 2).

Factors associated with cancer information scanning and seeking experience

A multivariable logistic regression was performed using cancer information scanning and seeking experience as a dependent variable and we included all the covariates that were significant upon bivariate analysis to the multivariate logistic regression.

This analysis showed that factors associated with rates of cancer information scanning and seeking experience included type of school system attended, grades earned in school, vegetable intake, perceived cancer risk, and cancer knowledge. Students in vocational high schools had levels of cancer information scanning and seeking experience 0.62 times lower than those of students in

general high schools (OR: 0.62, 95% CI: 0.43–0.87), and students achieving grades of 7–9 had lower levels of information scanning and seeking experience than did students earning grades of 1–2 (OR: 0.59, 95% CI: 0.35–0.98). The subjects who ate more vegetables had more cancer information scanning and seeking experience (1–3 times per week: OR: 2.99, 95% CI: 1.15–7.77; 1 meal per day: OR: 3.64, 95% CI: 1.40–9.47; 2 meals per day: OR: 3.90, 95% CI: 1.49–10.18; 3 meals per day: OR: 5.18, 95% CI: 1.93–13.86), and subjects with higher levels of perceived cancer risk had more cancer information scanning and seeking experience (OR: 2.05, 95% CI: 1.33–3.15). In addition, the subjects who answered the cancer knowledge questions correctly had more cancer information scanning and seeking experience (OR: 1.72, 95% CI: 1.21–2.46; OR: 1.43, 95% CI: 1.09–1.86) (Table 3).

Discussion

This study was performed in order to describe the cancer information scanning and seeking experience of Korean high school students and understand which cognitive and behavioral factors are associated with such experience. The results indicated that the students who attended general high schools (as compared with vocational high schools), earned higher grades, ate more vegetables, had a higher perceived cancer risk, and answered the cancer knowledge questions more correctly had more cancer information scanning and seeking experience.

Overall, 49.9% of subjects had heard or found cancer information. According to a study by Rutten (2006) that analyzed the results of the Health Information National Trends Survey (HINTS), about 49% of a sample of adults over 18 years old in the United States responded that they had sought cancer information in their lifetimes. As Rutten (2006) used a survey that investigated adults, it is difficult to compare that study's results with those of this study. However, as current study included both having been exposed to cancer information indirectly and having sought it directly as "cancer information scanning and seeking experience," it seems that current study sample's cancer information scanning and seeking experience is lower than that of adults in developed countries. A survey by Kye (2010), which studied whether Korean adults over 40 years old had searched for information about cancer screening in the last year, found that only 7.8% of respondents had searched for information on cancer screening personally. The level of information search experience among Koreans is relatively low not only for cancer information but also for general health information. Although a survey on use of health information by Cho (2007) found that the rate of use of information related to health and medicine (including hospitals, diseases, and drugs) was merely 10.9%, a survey on internet utilization of adults in the US by Michael (2005) showed that 66% of respondents search for health- and exercise-related information, leading to the conclusion that use of medical and health information in the US was higher than that of adults in Korea.

The cancer information scanning and seeking experience of subjects in vocational high schools was significantly lower than that of subjects in general high schools, and the cancer information scanning and seeking experience of students who earned lower grades was significantly lower than that of subjects who earned higher grades. As academic record may reflect a student's degree of interest in surrounding information and situations, it seems that the students with relatively higher academic performance may listen to cancer information reported in public media with a higher level of interest, have more experience with searching for related information, and have better memory of these experiences. Therefore, the subjects who earned higher academic grades may have more cancer information scanning and seeking experience than do the subjects with poorer academic achievement. Previous studies revealed that teenagers who earned higher grades had higher levels of health-related behavior (Son, 2003; An & Bae, 2009) and that due to the relationship between educational level and cancer information search behavior, adults who had completed more years of education had more cancer information search experience (Kye, 2010). If differences in cancer information scanning and seeking experience according to academic results and educational level begin in the teenage years, these differences may strongly depend on educational achievement. There may be a problem of disparity in health behavior depending on educational achievement, so a strategy to raise interest in cancer information among students with relatively low grades will be needed.

Subjects who had heard or searched for cancer information personally generally ate more vegetables. The results of a survey by Shim (2006) analyzing HINTS data from the US suggested that people who had indirectly heard or directly searched for cancer information had relatively lower rates of smoking, higher rates of exercise, higher intake of fruits and vegetables, and higher rates of cancer examination. Also, a study of teenagers by An and Bae (2009) found that exposure to antismoking advertisements or antismoking-related articles reduced respondents' rate of smoking. In a study by Ahn (2010) on the relationship between adults' use of internet health information and their health behaviors, increased use of health information was accompanied by more thorough health behavior. As demonstrated above, the use of information may induce and promote healthy behavior. However, in this study, there were no significant differences in cancer information scanning and seeking experience on the basis of smoking, alcohol drinking, exercise, or fruit intake. These negative results may have been caused by our lack of consideration of the qualitative level of cancer information learned by the subjects. The study by Ahn (2010) found that when qualitative features such as the usefulness, availability,

and interactivity of learned health information were elevated, subjects' health-related behavior would also improve. In the present study, because the focus was on cancer information scanning and seeking experience, the quality of cancer information to which subjects had been exposed was not studied. Intensive study on the relationship between cancer prevention behavior and cancer information via a qualitative approach to cancer information will be needed in the future.

In terms of perceived cancer risk, 60.2% of subjects responded that their probability of being diagnosed with cancer was lower than that of others the same age, and only 11.2% of subjects responded that their probability of getting cancer was higher than others the same age. This represents an optimistic bias and means that the subjects in the current study believe that they do fewer dangerous acts and more health-protecting acts than others (Weinstein, 1984). This bias may lead to neglect of messages that urge behavioral change (Miles, 2003) and may consequently reduce health behavior (Clemow et al., 2000). Additionally, the results of this study indicated that subjects with lower perceived cancer risk had less cancer information scanning and seeking experience. Thus, there is a need for teenagers to understand cancer correctly, and they need to be provided with information such as statistical knowledge regarding cancer and methods of cancer prevention.

The subjects who answered cancer knowledge questions correctly had more cancer information scanning and seeking experience. Williams-Piehota (2008) reported a study among adult males on the interventional effects of prostatic cancer screening depending on the types of health information to which the subjects had been exposed; the results indicated that people who were more active in searching for information had higher levels of health knowledge. As this knowledge may be considered a decisive factor in the selection and execution of health behavior (Coughlin et al., 2007), health education strategies that provide correct information on cancer through in-school health education and induce students to research cancer information by themselves seem to be needed.

This cross-sectional study was performed in order to describe the cancer information scanning and seeking experience of Korean high school students and to understand the cognitive and behavioral factors associated with cancer information scanning and seeking experience. The results suggested that cancer information scanning and seeking experience was highest among students who attended general high schools (compared with vocational high schools), who earned higher grades, who ate more vegetables, who had higher perceived cancer risk, and who had more correct cancer knowledge. Although 49.9% of the subjects had cancer information scanning and seeking experience, it was suggested that the cancer information scanning and seeking experience of Korean teenagers was lower that of teenagers in developed countries because the 49.9% figure included not only experience with directly searching for information but also being passively exposed to it. Accordingly, there is a need to induce high school students to ask questions about cancer as the most deadly disease among Korean people and to search for related information. As the subjects with more cancer information scanning and seeking experience answered more knowledge questions on cancer correctly and practiced more cancer prevention behavior, they need to be provided with accurate recognition of the prevalence of and death rate due to cancer; correct information on cancer prevention methods need to be provided through school education.

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