

# Comparison of Satisfaction with Cancer Screening at Mobile Van and Static Sites: National Cancer Screening Program in Korea

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**Objectives:** Our objectives were to evaluate participant satisfaction in the National Cancer Screening Program (NCSP) and to examine differences in satisfaction between mobile vans and static sites.

**Methods:** A total of 243 967 participants who were screened by NCSP between January and May 2007 were eligible for the study. Of these, 3416 samples were randomly chosen and stratified by the type of cancer screened and screening unit. A telephone survey was conducted in July 2007, and 1672 participants (48.9%) were responded. The questionnaire included participant satisfaction with screening, screening service use and demographic data. Five multiple regression models were used to determine the relation between screening location (mobile van or static site) and each of five satisfaction measures (information transfer, staff interpersonal skills, privacy protection, physical surroundings and general satisfaction).

**Results:** Of the participants, 764 (45.7%) were screened at a mobile van and 908 (54.3%) at a static site. Relatively high scores were reported for all satisfaction measures, but satisfaction with screening at a mobile van was lower than that at a static site. Even after adjusting for potential confounders, screening at a mobile van was significantly associated with lower satisfaction for information transfer ( $P = 0.005$ ), staff interpersonal skills ( $P = 0.025$ ), privacy protection ( $P = 0.019$ ), physical surroundings ( $P < 0.001$ ) and general satisfaction ( $P < 0.001$ ).

**Conclusions:** Improving the satisfaction with and quality of mobile screening services is important to increase compliance and achieve the aims of the NCSP. Therefore, further efforts such as quality assurance or continuous monitoring are required.

*Key words:* epidemiol-prevention – epidemiology/public health – psycho-oncology

## INTRODUCTION

Cancer is a leading cause of death worldwide and is the leading cause of death in Korea since 1983. Approximately 130 000 Koreans develop cancer annually, and in 2006, there were an estimated 66 000 cancer deaths. Reducing the cancer burden at the national level is becoming a critical issue because of Korea's rapidly aging population, which is likely to cause a major increase in the cancer burden (1).

Since the Korean Government embarked on the National Cancer Screening Program (NCSP) in 1999, it has continued to expand its target population and target cancers (2).

Between 1999 and 2001, the NCSP provided recipients of Medical Aid which is a public assistance scheme to secure the minimum livelihood of low-income households and help their self-help through providing medical services. In 2002, beneficiaries of National Health Insurance (NHI), which covers whole population as a compulsory social insurance system, within the lower 20% income bracket were eligible for the program. In 2003, NCSP expanded its target population to the lower 30% and added a liver cancer screening service, with colorectal screening added in 2004. Currently, NCSP provides Medical Aid recipients and NHI beneficiaries within the lower 50% income bracket with free screening services for gastric, liver, colorectal, breast and cervical cancer. The NCSP Guidelines are provided in Table 1.

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The goals of the NCSP are to reduce mortality from cancer and to mitigate the intensity and severity of treatment, thereby reducing morbidity and healthcare costs. However, the success of cancer-screening programs is critically dependent on patient adherence to screening guidelines, which unfortunately remains disappointing (3). For a screening program to significantly affect mortality, at least 70% of the target population should be screened, and participants must return for screening at regular intervals (4). According to the National Cancer Center in Korea, compliance with the NCSP is still very low, despite increasing progressively from 12.9% in 2002 to 23.5% in 2007.

Therefore, the NCSP provides a mobile screening service in areas in which existing screening activities cannot effectively reach the population at risk, with the purpose of achieving greater coverage in these areas. The mobile screening program can reach a number of rural populations, detect higher prevalence and be organized to have direct contact with the target population (5). The mobile screening service is helpful for target populations who are not able to access medical institutions to obtain appropriate screening, and it may contribute to improving compliance with the screening program.

Low compliance rates with cancer screening have been associated with patient- and physician-related factors (6), so the reasons for non-compliance are various. However, a participant's degree of satisfaction with the screening program may influence future attendance (7–10). Although the relative contribution of each factor to a participant's decision to re-attend is not clear, studies have found that participants who fail to return found their first screening unsatisfactory, whereas satisfied participants are more likely to use the service again and to refer others (11–14). Satisfaction is particularly important when targeting asymptomatic individuals because they have no obvious reason to seek the services of the screening

**Table 1.** Recommendations based on the National Cancer Screening Program (NCSP), Korea<sup>a</sup>

Cancer	Target population	Frequency	Test or procedure
Gastric	≥40 years old (adults)	Every 2 years	Upper gastrointestinal series or upper endoscopy
Liver	≥40 years old (high-risk groups) <sup>b</sup>	Every 6 months	Serum $\alpha$ -fetoprotein test and abdominal ultrasonography
Colorectal	≥50 years old (adults)	Every 1 year	Fecal occult blood test: (if positive) double contrast barium enema or colonoscopy
Breast	≥40 years old (women)	Every 2 years	Mammography and clinical breast examination
Cervical	≥30 years old (women) <sup>c</sup>	Every 2 years	Papanicolaou test

<sup>a</sup>All procedures except upper endoscopy and colonoscopy can be performed at both mobile vans and static sites.

<sup>b</sup>Adults ≥40 years old with HbsAg, anti-HCV positivity or liver cirrhosis.

<sup>c</sup>Cervical cancer screening in NCSP targets only Medical Aid recipients.

program. Moreover, levels of satisfaction are also an important indicator of quality of care, and feedback from participants can be used to modify program operation (4).

To increase the compliance rate of the NCSP, issues related to the improvement of satisfaction with and quality of screening services have been addressed. The mobile screening service, which is for the benefit of people with poor accessibility to medical services, has more problems with the quality of and satisfaction with the service. The physical space in the vans that are used is limited; they often do not have waiting or changing rooms, and there is little privacy to ask questions or discuss sensitive issues (15–18). As far as we are aware, there have been no published analyses of participant satisfaction with mobile screening services and the NCSP.

We hypothesized that satisfaction with mobile van screening would differ from that at a static site (hospital based). Our purpose was to evaluate the satisfaction of participants who were screened by the NCSP and to examine differences in satisfaction according to screening location. We expect that this research will emphasize the importance of satisfaction for client retention and compliance.

## PATIENTS AND METHODS

### DATA COLLECTION

In July 2007, we conducted a population-based, nationwide telephone survey of participants who were screened by the NCSP between January and May 2007 to evaluate satisfaction with the screening service. A sample of 243 967 participants was randomly chosen and stratified according to the type of cancer (gastric, liver, colorectal, breast or cervical) and the type of screening unit (general hospital, hospital or clinic). In total, 3416 calls were attempted, and 1672 participants (48.9%) agreed to answer the survey. This research was approved by the Institutional Review Board Committee.

### DEPENDENT VARIABLES: SATISFACTION MEASURES

The questionnaire included five dimensions of participant satisfaction with the screening experience: information transfer between staff and client (4,19–23), staff interpersonal skills (7,10,19–22,24,25), privacy protection (8,24,26) and physical surroundings (4,20,22,24); general satisfaction; screening services use; and demographic data. The dependent variables were five measures of satisfaction, which included a mean score for each of the above. Table 2 lists the 15 items and 5 dimensions of participant satisfaction in the final questionnaire. The responses were coded on a scale of 1–4, where 4 was the highest level of satisfaction possible.

To develop a valid survey instrument, we reviewed many related articles and well-known, standardized instruments (e.g. the Consumer Assessment of Healthcare Providers and Systems Hospital Survey breast screening program

**Table 2.** Fifteen items and five dimensions of participant satisfaction

Dimension	Item
Information transfer	Q. Did the staff tell you all you wanted to know about preparation for the screening?
	Q. Did the staff tell you all you wanted to know about what was done at the service?
	Q. Did the staff tell you all you wanted to know about any pain or discomfort from the screening?
	Q. Did you fully understand the report of your results?
Staff interpersonal skills	Q. Did you feel free to ask the staff questions all you wanted to know?
	Q. Did the medical staff treat you with respect and good manners?
	Q. Did the reception staff treat you with respect and good manners?
Privacy protection	Q. Did the staff consider you carefully to ensure that you had enough privacy?
Physical surroundings	Q. Did you feel that the waiting room was pleasant?
	Q. Did you feel that the examination room was pleasant?
	Q. Did you feel that the changing room was pleasant?
General satisfaction	Q. Were you satisfied with the screening services?
	Q. Would you have the screening services done again by this institution?
	Q. Would you recommend the screening service to others?
	Q. Did you trust the screening results?

satisfaction questionnaire developed by Cockburn et al.) and conducted focus groups and cognitive interviews.

The reliability of the five dimensions of participant satisfaction was assessed by calculating Cronbach's coefficient  $\alpha$ . All were  $>0.60$ , indicating internal consistency.

#### INDEPENDENT VARIABLES: SCREENING LOCATION

We hypothesized that satisfaction with screening at a mobile van would differ from that at a static site, so the core independent variable was screening location. Participants' demographic and screening-service-use characteristics, which included gender, age, educational status, residence location, type of health insurance, perceived health status, type of cancer screened, screening results and previous screening experience outside the NCSP, were also surveyed.

#### STATISTICAL ANALYSES

We used the *t*-test to determine whether the mean score of each satisfaction measure differed according to screening location (mobile van or static site). We then used five multiple regression models to determine the relationship between screening location and each of the five satisfaction measures. Each model controlled for gender, age,

educational status, residence location, type of health insurance, perceived health status, type of cancer screened, screening results and previous screening experience outside the NCSP. Introducing the control variables as a block in the regressions facilitated partitioning of variance to assess the amount of independent association of screening location and cancer screening satisfaction. All analyses were performed using SAS version 9.1 software.

## RESULTS

### DESCRIPTIVE AND BIVARIATE RESULTS

Of the 1672 respondents, 764 (45.7%) were screened at a mobile van and 908 (54.3%) at a static site. Table 3 shows the socio-demographic and screening characteristics of all respondents broken down by screening location. The distributions of all characteristics except gender differed significantly between participants screened at mobile vans and static sites. Participants who had lower educational status, lived in non-metropolitan areas and were Medical Aid recipients were more likely to access screening services at a mobile van.

The mean scores of all satisfaction measures were  $>2.8$  out of 4, which indicates relatively high levels of satisfaction (Table 4). The score for information transfer satisfaction was the lowest among the five measures. The satisfaction scores for screening at a mobile van were lower than those at a static site for all measures, but the difference for staff interpersonal skills was not statistically significant.

### MULTIVARIATE RESULTS

Multivariate regression revealed statistically significant associations between screening location and all five satisfaction measures (Table 5). After adjusting for the potential confounders of gender, age, educational status, residence location, type of health insurance, perceived health status, type of cancer screened, screening results and previous screening experience outside the NCSP, satisfaction scores were more likely to be lower for all measures if the participants were screened at a mobile van. Screening at a mobile van was significantly associated with lower satisfaction scores for information transfer ( $P = 0.005$ ), staff interpersonal skills ( $P = 0.025$ ), privacy protection ( $P = 0.019$ ), physical surroundings ( $P < 0.001$ ) and general satisfaction ( $P < 0.001$ ).

Moreover, participants who were older, had lower educational status and reported better health were more likely to be satisfied with their screening experience. The satisfaction of female participants and those who did not have previous screening experience outside the NCSP was higher for all satisfaction measures except information transfer.

Number of subjects included in each analysis was different between statistical models, since the questionnaires were distinctively designed according to each type of cancer. For example, those who had abdominal ultrasonography or fecal

**Table 3.** Socio-demographic and screening characteristics of participants

Screening location	Mobile van		Static site		Total		<i>P</i> value
	No	(%)	No	(%)	No	(%)	
Gender							
Male	181	(23.7)	223	(24.6)	404	(24.2)	0.680
Female	583	(76.3)	685	(75.4)	1268	(75.8)	
Age (years)							
40–49	95	(12.4)	153	(16.9)	248	(14.8)	0.037
50–59	386	(50.5)	427	(47.0)	813	(48.6)	
60–69	283	(37.0)	328	(36.1)	611	(36.5)	
Education <sup>a</sup> (years)							
<6	143	(19.6)	141	(16.0)	284	(17.6)	<0.001
6–9	316	(43.3)	322	(36.6)	638	(39.6)	
9–12	158	(21.6)	202	(23.0)	360	(22.4)	
≥12	113	(15.5)	215	(24.4)	328	(20.4)	
Residence location <sup>b</sup>							
Metropolitan	73	(9.6)	302	(33.3)	375	(22.4)	<0.001
Non-metropolitan	691	(90.5)	606	(66.7)	1297	(77.6)	
Health insurance							
National Health Insurance	625	(81.8)	776	(85.5)	1401	(83.8)	0.043
Medical Aid	139	(18.2)	132	(14.5)	271	(16.2)	
Type of cancer screened							
Stomach	231	(30.2)	201	(22.1)	432	(25.8)	<0.001
Liver	83	(10.9)	129	(14.2)	212	(12.7)	
Colorectum	161	(21.1)	264	(29.1)	425	(25.4)	
Breast	185	(24.2)	238	(26.2)	423	(25.3)	
Cervix of uteri	104	(13.6)	76	(8.4)	180	(10.8)	
Screening results <sup>c</sup>							
Normal	743	(97.4)	866	(95.4)	1609	(96.3)	0.031
Abnormal	20	(2.6)	42	(4.6)	62	(3.7)	
Previous screening experience outside the NCSP							
Yes	104	(13.6)	182	(20.0)	286	(17.1)	<0.001
No	660	(86.4)	726	(80.0)	1386	(82.9)	
Total	764	(45.7)	908	(54.3)	1672	(100.0)	

<sup>a</sup>Education includes 62 missing values.

<sup>b</sup>Metropolitan areas (≥1 million persons), non-metropolitan areas (≤1 million persons).

<sup>c</sup>Screening results includes one missing value.

occult blood test did not have to change their clothes, so they did not have to answer a question about a changing room.

## DISCUSSION

The scores for all satisfaction measures were >2.8 out of 4, indicating that relatively high levels of satisfaction were reported for all measures, although those for information

transfer were lowest. Satisfaction scores for screening at a mobile van were significantly lower than those for static sites for all measures, even after adjusting for the potential confounders of gender, age, educational status, residence location, type of health insurance, perceived health status, type of cancer screened, screening results and previous screening experience outside the NCSP.

Mobile screening vans have limited space and poor facilities compared with static screening sites. Therefore, it might be expected that participants would have been less satisfied with the screening services at the mobile vans for several reasons, such as privacy protection and physical surroundings. However, it was striking that other measures, especially information transfer and staff interpersonal skills, also had significantly lower satisfaction ratings in screening at a mobile van compared with a static site.

Because space is limited at a mobile van, there is not enough place to consult with doctors or ask questions that they want to know. Since reservation system is nearly not used in a mobile screening in Korea, people visited for screening may spend time for waiting which is usually longer than that at a static site, and they may do not have enough time to meet a doctor and get information. Lack of space and time at the mobile screening might cause low satisfaction with information transfer and staff interpersonal skills.

Additional space for consultation even outside the van or scheduling system of getting an appointment can make people ask private or sensitive questions comfortably, therefore improve satisfaction with the mobile screening. Moreover, introduction of reservation system for mobile screening may shorten the waiting times and allow doctors to spend more times on consultation for each participant.

The increase in the compliance rate for the cancer-screening program might have resulted from the provision of accessible and acceptable screening services such as mobile screening, as well as from increased knowledge and awareness of cancer in the target population as a result of health education. Although the relationship between the increase in the compliance rate and the introduction of mobile screening services is unclear, the mobile service is helpful for target populations who have poor accessibility to screening services and may also contribute to improved compliance with the screening program (4).

However, compliance with the NCSP is still much lower than that in other developed countries and should be increased for the program to be successful. According to previous studies, participant satisfaction with the screening program is an important indicator of quality of care and may influence future attendance, so dissatisfaction with the screening experience may lead to non-compliance (4,7–14). To increase the compliance rate for the NCSP, the satisfaction with and quality of screening services urgently need to be improved.

The mobile service in the NCSP was approved to address accessibility issues and improve compliance by targeting populations that are not easily able to access medical

**Table 4.** Comparison of mean satisfaction scores for each screening location

Screening location	Total		Mobile van		Static site		<i>t</i>	<i>P</i> value
	Mean	(SD)	Mean	(SD)	Mean	(SD)		
Information transfer ( <i>n</i> = 1660)	2.88	(0.83)	2.82	(0.83)	2.93	(0.82)	-2.86	0.004
Staff interpersonal skills ( <i>n</i> = 1655)	3.45	(0.69)	3.42	(0.68)	3.48	(0.69)	-1.66	0.098
Privacy protection ( <i>n</i> = 1250)	3.54	(0.68)	3.50	(0.68)	3.59	(0.67)	-2.39	0.017
Physical surroundings ( <i>n</i> = 1281)	3.39	(0.64)	3.27	(0.69)	3.50	(0.58)	-6.49	<0.001
General satisfaction ( <i>n</i> = 1655)	3.01	(0.72)	2.94	(0.72)	3.07	(0.72)	-3.65	<0.001

**Table 5.** Multiple regression results for screening location for each satisfaction measure<sup>a</sup>

Satisfaction measure	$\beta$ coefficient	SE	<i>P</i> value
Information transfer ( <i>n</i> = 1659)	-0.1177	0.04	0.005
Staff interpersonal skills ( <i>n</i> = 1654)	-0.0793	0.04	0.025
Privacy protection ( <i>n</i> = 1249)	-0.0956	0.04	0.019
Physical surroundings ( <i>n</i> = 1280)	-0.2450	0.04	<0.001
General satisfaction ( <i>n</i> = 1654)	-0.1930	0.04	<0.001

<sup>a</sup>Each regression model controlled for: gender, age, educational status, residence location, type of health insurance, perceived health status, type of cancer screened, screening results and previous screening experience outside the NCSP.

institutions for screening. Therefore, participants who are screened at a mobile van should receive services of equal quality to those who are screened at a static site. The NCSP aims to reduce cancer mortality and mitigate the intensity and severity of treatment through the provision of free screening services for low-income individuals who are unlikely to obtain screening services that require out-of-pocket payments. Thus, the NCSP should ensure that the service reaches recipients in all areas. Accordingly, the role of mobile screening is very important in achieving the aims of the NCSP.

To ensure the effectiveness of mobile screening and to achieve the aims of the NCSP, attention must be directed toward improving the quality of and satisfaction with mobile screening services. There is no standardized guideline or systematic review process to assure the quality of the program; therefore, further efforts such as quality assurance or continuous monitoring need to be made to ensure improvement. The Korean Government plans to introduce a quality assurance program for the NCSP, called the Quality Evaluation of Cancer Screening Units, as well as a pilot program to assess the effect of mobile screening services and to improve the program.

It is important to note the limitations of this study. First, we focused specifically on the relationship between the screening location and participant satisfaction and did not directly assess other aspects of service satisfaction that might indirectly affect participant satisfaction. Despite the extensive and elaborate development of the survey instrument,

satisfaction is such a subjective and relative concept that factors other than those that we considered may have affected participant satisfaction.

A second limitation is the fact that low response rate of the survey may cause some bias. According to previous studies of patient satisfaction-related factors, more satisfied patients were more likely to respond than those who were less satisfied, so satisfaction would be overestimated overall (27). Therefore, we should be careful to interpret and generalize findings of this study.

Finally, participants responded the survey after getting the results of screening, and it might affect their satisfaction with the screening. We controlled screening results by adjusting it as a confounder variable in the multiple regression analyses, but not only screening results but also accuracy of screening might influence the satisfaction. Unfortunately, there is not enough data to evaluate accuracy of mobile screening such as sensitivity or specificity in Korea.

Despite some limitations of the study, our findings are still meaningful because, to our knowledge, this is the first attempt to measure participant satisfaction with the NCSP using a reliable and valid survey method to measure satisfaction, which has the potential to be used on an ongoing basis. The questionnaire also reflects the multidimensional nature of satisfaction. Abundant previous research has examined satisfaction with health service use, including cancer screening. However, most studies have focused on breast and cervical cancer screening and single centers or small field studies. We conducted a nationwide survey and considered all five types of cancer that can be screened by the NCSP.

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**Conflict of interest statement**

None declared.

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