

# Knowledge, Health Beliefs and Screening Status of Prostate Cancer among Middle-Aged and Elderly Men

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## Abstract

**Purpose:** The aim of this study was to examine and evaluate the level of prostate cancer knowledge and health beliefs among middle-aged and elderly men. **Methods:** In this descriptive study carried out in December 20, 2015 through January 20, 2016, we enrolled 147 men aged 50 - 70 years old. Data were collected by using three questionnaires including knowledge, health beliefs, and screening status of prostate cancer. **Results:** Our findings showed that only 20.4% of interviewers had experience of digital rectal examination or prostatic specific antigen test for prostate cancer screening. The prostate cancer knowledge was found to be significantly high in prostate cancer examinees compared to non-examinees. The correct answer rate of prostate cancer knowledge was only 44.7% at average. Despite of good perceived seriousness about prostate cancer, the screening rate was only 20.4% and the examinees indicated significantly high perceived sensitivity compared to non-examinees. The level of the perceived barrier was lower in men who had experience in health examination or prostate cancer examination than without experience. **Conclusion:** The significant factors including age, educational level, income and cancer insurance status need to be considered in nursing education program in order to deliver accurate knowledge about prostate cancer. Also, the effective interventions are necessary to increase sensitivity and reduce barriers of prostate cancer and screening.

## Keywords

Prostate Cancer, Knowledge, Health Beliefs, Men

## 1. Introduction

Prostate cancer is a cancer in very high incidence across the world including North

America, Oceania and Europe [1]. It is ranked as the 5th following gastric cancer, colorectal cancer, lung cancer and liver cancer among men in Korea. The incidence rate of prostate cancer tends to increase dramatically from 3.2% in 1999 to 11.6% in 2012, whereas the incidence of lung cancer and liver cancer has been shown a decreasing tendency [2]. Although the exact cause of prostate cancer has not been identified, common risk factors are age, family history, race (African American), male hormones, diabetes, obesity, westernized diet and infections [2] [3]. The most powerful factor is the age and the men over age 50 is more affected than younger men [3].

Early stage of prostate cancer has often no symptoms which tend to appear as the cancer progresses. Screening can help to find cancer at early stage when men may have a better prognosis. Moreover, prostate cancer detected by screening test can be treated most effectively. Two of the most common screening tests for prostate cancer are PSA (Prostate Specific Antigen) test and DRE (Digital Rectal Exam). PSA test is to measure the level of PSA, a protein produced by the prostate gland in blood and an elevated PSA level means higher risk of prostate cancer. Physicians have commonly used in conjunction with a DRE to screen for prostate. Because the DRE can find cancers in men with normal PSA level, several studies suggest that men have both tests. And also DRE is a relatively simple procedure to detect the growths in or enlargement of the prostate gland by using a finger [2]. Therefore, if prostate cancer is detected earlier through regular PSA test or DRE, mortality rate for prostate cancer may decline through being treated prostate cancer early.

The guideline of American Cancer Society recommends to consult with a family doctor and then decide whether to screen prostate cancer earlier, after determining potential risk and benefit of screening through getting information about uncertain parts [4]. PSA test is generally recommended to commence from the age of 50, but it is recommended to commence from the age of 45 if the person is an African American or has a first-degree relative with prostate cancer. And if there is any family member who developed prostate cancer in earlier age, screening should be started from 40. According to the guideline of Europe on Prostate Cancer, PSA test is generally recommended at the age of over 50, while at the age of over 45 if any family history [5]. In Korea, recently the efforts for earlier detection of prostate cancer by Prostate Cancer Treatment Guidelines [6] and Prostate Health Promotion Programs have been exerted.

In order to enhance the compliance rate in prostate cancer screening, the knowledge about prostate cancer and screening plays an important role [7]. Although the knowledge level is depending on cultures and cancer policies country by country, some studies have showed that the level of prostate cancer knowledge was below 60% in most countries [8] [9]. At present, prostate cancer is not included in the National Cancer Screening Program (NCSP) in Korea. Therefore, Korean men were not particularly concerned for prostate cancer. Besides, studies of prostate cancer knowledge have seldom been conducted in Korea.

Some studies showed that there was a close relationship between health behaviors and health beliefs in prostate cancer [10]. Health beliefs are a crucial factor which has

an effect on health behaviors for preventing diseases [11] and can account for both change and maintenance of health-related behaviors [12]. It is reported that the higher the perceived benefit for an earlier screening method is, the higher the participation rate is, while the higher the disability is the lower the participation rate is [13]. In particular, in U.S. with the highest incidence of prostate cancer in the world, the status about low knowledge and inappropriate health beliefs for prostate cancer in men is being consistently identified and a variety of intervention studies are proceeding to improve knowledge and health beliefs [14]. However, in Korea it was challenging to find out the literature on health beliefs for prostate cancer.

Studies conducted in Korea, including “Disease Experience of The Elderly with Prostate Cancer” [15], Symptom and Quality of Life on Patients undergoing the surgery on Prostate [16] and “Symptom of Patients receiving Prostate Hormone Therapy” [17], and the like, focused primarily on the symptom, experience, and quality of life of patients with prostate cancer. However, there was little research on the status of prostate cancer screening for early detection, the knowledge and health beliefs for prostate cancer.

Thus, this study aims to investigate screening status of prostate cancer, and to determine the degree of the knowledge and health beliefs of prostate cancer and to look at the difference of the knowledge and health beliefs targeting mid-aged and elderly men, an affected age group of prostate cancer. Through this, we intend to raise awareness for prostate cancer and prepare basic data to develop educational programs for improving knowledge and health beliefs for prostate cancer.

## **2. Methods**

### **2.1. Research Design**

This study is a descriptive study to determine knowledge and health beliefs of prostate cancer and the screening status targeting mid-aged and elderly men.

### **2.2. Research Participants**

The participants of this study were sampled using a convenience sampling method among non-probability sampling methods. The men who enrolled as subjects are fathers or their parents' brothers of students in nursing departments of K University in Changwon and D university in Daegu. Inclusion criteria for subjects were 1) men at the age of 50 – 70; 2) those who communication was possible and had no psychiatric problems; 3) those who understood the purpose of research and allowed for such participation whereas the exclusion criteria were males who were then diagnosed as prostate cancer or were being treated for prostate cancer. The sample size was verified using G power 3.1 program and ANOVA. We calculated with effect size as 0.30, level of significance as 0.05, and power ( $1 - \beta$ ) as 80. The sample size was 160 with considering dropout rate of 10% but 13 insufficient responses were excluded. Finally, 147 of men were included for final analysis.

### 2.3. Research Tool

The questionnaires were including the Knowledge of prostate cancer, Health beliefs of prostate cancer and Screening status on prostate cancer.

1) Knowledge of prostate cancer: a draft of the 19-item questionnaire was based on literature review by researchers [18]-[21]. Thereafter, the validity of the questionnaire was verified by 3 urologists, 1 professor in adult nursing and 1 nurse with more than 5 years of experience of prostate cancer unit. As a result of calculating CVI (Content Validity Index) using 4-point Likert scale for each item, a total of 18 items was finally organized after excluded 1 item with below 80% CVI. The excluded item "Surgical procedures are surely necessary for treatment of prostate cancer" might cause confusion as whether to operate depends on the patient's severity and also raising the probability of incorrect answer due to words of "surely necessary" so the item was deleted eventually. Each final item was answered as "Yes", "No", and "Do Not Know", One-point was scored to a correct answer while an incorrect answer scored to zero-point, and those scores were summed. The higher score means the more knowledge on prostate cancer. In our study, the KR-20 was found to be 0.79.

2) Health beliefs of prostate cancer: researchers prepared the draft of 14-item questionnaire as subcategories of the perceived sensitivity on the risk of one's developing prostate cancer, the perceived seriousness on thinking of how threatening the prostate cancer is, the perceived benefit on the prostate cancer screening, and the perceived barrier, referring to a previous study [20] [21] related to prostate cancer based on a health beliefs model. The validity of the tool was verified by three specialists in urology, one professor in adult nursing, and one professor in community nursing. A total of 13 items exclusive of 1 item below CVI 80% was organized finally. The excluded item was "if developing prostate cancer, he/she will die normally within 5 years" and was excluded because the life expectancy varies depending on the severity of prostate cancer. A total of 13 items was organized; the perceived sensitivity of 3 items, the perceived seriousness of 3 items, the perceived benefit of 2 items, and the perceived barrier of 5 items. Each item was scored ranging from 4 score for 'Strongly Agree to 1 score for "Strongly Disagree" and the higher score means the higher health beliefs related to the prostate cancer examination. The level of perceived barrier used reverse coded scores because the higher score means the lower health beliefs. In our study, Cronbach's  $\alpha$  value was 0.89 for the perceived sensitivity, 0.90 for the perceived seriousness, 0.87 for the perceived benefit, and 0.67 for the perceived barrier, respectively.

3) Screening status of prostate cancer: the variables were experience in hearing about the examination of prostate cancer, whether or not to have taken the examination, the place and reason, and the reason of not taking the examination, etc.

### 2.4. Data Collection Procedure

Firstly, we conducted a questionnaire preliminary survey to five males over 50 years old and then modified difficult terms into easy ones in a questionnaire. Data was collected from December 20, 2015 through January 20, 2016. We asked the students to collect

data from one male at the age of 50 - 70 among their fathers or their parents' brother, after instructing the purpose and methods of this study sufficiently to nursing students of two universities. Students were asked to distribute questionnaires to their fathers or their parents' brothers at home and make them self-reports and it took 15 - 20 minutes to complete a questionnaire. After one week of distribution, questionnaires were collected by a student representative and those students who not submitting questionnaires were urged to submit, just once more.

## 2.5. Data Analysis

The collected data was analyzed using SPSS statistical software (version 23.0). Descriptive analyses were used to describe the characteristics of the subjects and related to prostate cancer, knowledge and health beliefs of prostate cancer: frequency, percentage (%), mean and standard deviation. t-test and one-way ANOVA were used to explore difference of knowledge and health beliefs of prostate cancer according to characteristics of the subjects and prostate cancer.  $p < 0.05$  was considered statistically significant for all test.

## 2.6. Ethical Considerations

Informed consent in writing was obtained from the study subjects. The instruction statement contained the contents saying that participation is voluntary based on the willingness of the study subjects, participation can be withdrawn at any time when the subject wants to do so, the collected data will be used only for the purpose of research and the confidentiality and anonymity will be guaranteed, and the survey data will be not used for any purposes other than purposes of research.

## 3. Results

### 3.1. Screening Status of Prostate Cancer

It was found that the number of the subjects who had heard about the prostate cancer screening was 77 (52.4%), whereas 70 (47.6%) had not. Where hearing about the prostate cancer screening, the media such as newspaper, radio, TV, and the like was mentioned most frequently by 42 (53.2%), followed by 18 (22.8%) from private clinics and hospitals, 11 (13.9%) from relatives and family members' friends, and 8 (10.1%) from Internet.

It was shown that the number of those who having experience in a prostate cancer screening was 30 (20.4%), whereas the opposite was 117 (79.6%). For the timing of a recent blood test as part of prostate cancer examination, the number of those who responded as within 3 years was the highest at 9 (33.3%) while for the timing of a recent rectal examination, the number of those who answered as within 1 year was the highest at 9 (37.5%). For the reason of examination, 13 (43.3%), the highest number among the subjects, answered that "I think that I need to take an early screening for preventing prostate cancer for myself", followed by 7 (23.3%) answering that "the symptoms such

as urinary problems appeared”, 7 (23.3%) answering that “there was a recommendation by a medical staff”, 2 (6.7%) answering that “My family members had developed prostate cancer or other cancers”, 1 (3.3%) answering that ‘there was a recommendation by a family member, a relative, or a friend’ in order of mention. As for screening places, general hospitals/university hospitals were mentioned by 17 (56.7%), followed by 12 (40.0%) of professional private clinics. For the reason of not taking such screenings, 68 (29.9%), the highest number among the subjects, answered that I “think that I am healthy”, followed by 31 (26.5%) answering that “I have no interest”, 11 (9.4%) answering that “I have no time to do so”, 4 (3.4%) answering that “there is no appropriate screening institutes”, 2 (1.7%) answering that “the screening cost is burdensome”, and 1 (0.9%) answering that “I have fear on the possibility of being diagnosed as cancer” in order of mention.

### 3.2. Extent of Prostate Cancer Knowledge in Mid-Aged and Elderly Men

Result of measuring the extent of prostate cancer knowledge using an 18-item tool showed only 44.7% of correct answer rate at average. The highest correct answer rate is 74.1% and the items with high score were “In order to prevent prostate cancer, it is advisable to intake as many as fruits and vegetables while eating less meat”. It was followed by “It is more likely to develop prostate cancer if there is any family member (father, brothers) of developing prostate cancer” of 64.6%, “Prostate cancer can be curable easily if found early” of 63.3%, and “Younger men can be prone to prostate cancer compared to older men” of 61.2% in order of mention.

The lowest correct answer rate was only 14.3% and the items with lower score were “Higher figure of serum prostate-specific antigen means that someone has already gotten a cancer in prostate”. It was followed by “If the prostate cancer metastasis is identified then a hormone treatment needs to be carried out to inhibit male hormones” with 15%, “The prostate cancer is faster in progression than other cancers” with 19.7%, and “Prostatic hyperplasia escalates into prostate cancer” with 23.8% (Table 1).

### 3.3. Extent of Health Beliefs for Prostate Cancer in Mid-Aged and Elderly Men

The scores of health beliefs for prostate cancer ranged from 20 score as the lowest and to 42 score as the highest with an average of 2.51 (out of 4 score). At average scores of items for subcategories of health beliefs, the perceived sensitivity was 2.46 (0.86), the perceived seriousness was 2.68 (0.90), the perceived benefit was 2.61 (1.01) and the perceived disability was 2.39 (0.55) score, respectively.

### 3.4. Difference of the Knowledge and Health Beliefs of Prostate Cancer According to General Characteristics

Table 2 provides the difference of prostate cancer knowledge according to general characteristics, the knowledge for prostate cancer was found to be higher in the age of 50 - 60 ( $t = 3.36$ ,  $p = 0.001$ ) and having cancer insurance ( $t = 2.96$ ,  $p = 0.004$ ) than the age of

**Table 1.** Screening practice of prostate cancer.

Item	Correct answer	%
1) In order to prevent prostate cancer, it is advisable to intake as many as fruits and vegetables while eating less meat.	O	74.1
2) Men who have a father or brother with prostate cancer are more likely to develop it.	O	64.6
3) Prostate cancer is curable easily if it is detected early.	O	63.3
4) The younger men are prone to prostate cancer compared to the older.	X	61.2
5) Prostate cancer is rapidly on an upward tendency in our country.	O	59.9
6) The onset of prostate cancer is associated closely with intake of animal fat.	O	57.1
7) The most common symptom of prostate cancer is dysuria.	O	56.5
8) In most cases, there is no symptom at the initial stage of prostate cancer.	O	48.3
9) Prostate is where to produce sperm in the male genital organ.	X	46.3
10) PSA is an examination of early diagnosing prostate cancer early.	O	46.3
11) Generally, prostate cancer screenings are conducted commencing from the age of 50.	O	42.9
12) Any prostate cancer treatment has no effect on sexual function.	X	41.5
13) DRE is an examination method of palpating prostate cancer by inserting a finger into the anus.	O	38.8
14) If prostate cancer metastasizes into bones, then the back pain occurs.	O	30.6
15) BPH advances to prostate cancer.	X	23.8
16) Prostate cancer has fast progression compared to other cancers.	O	19.7
17) If the metastasis of prostate cancer is confirmed, then a hormone treatment shall be conducted to inhibit male hormones.	O	15.0
18) Higher figure of serum prostate-specific antigen means to have already gotten a cancer in prostate.	X	14.3
Total		44.7

61 - 70 and without cancer insurance, respectively. In addition, the difference was shown due to educational level and monthly earnings and as result of conducting Scheffe post hoc test. The specific difference of groups in the prostate cancer knowledge was found to be higher in the highest education level than other education level ( $F = 4.16$ ,  $p = 0.007$ ) and also higher in more than 3.01 million won of monthly earning than less than 2.00 million ( $F = 7.90$ ,  $p < 0.001$ ).

On the difference of health beliefs for prostate cancer according to general characteristics, the perceived sensitivity was found to be significantly higher in the age of 50s - 60s ( $t = 3.02$ ,  $p = 0.003$ ), not married ( $t = 2.30$ ,  $p = 0.023$ ), and not smoking ( $t = 2.49$ ,  $p = 0.014$ ) than where at the age of 61 - 70, married, and smoker, respectively. The perceived benefit was found to be significantly higher men who drinking than not drinking. The difference of groups in education level showed significantly higher perceived benefit in men who had an academic career of 2-year college as a result of Scheffe post hoc test ( $F = 3.06$ ,  $p = 0.030$ ). The perceived barrier also showed the difference in religion and monthly earnings and it was found to be higher in Catholic and no religion than Christianity ( $F = 4.82$ ,  $p = 0.003$ ), and higher in the group of more than 4.01 million won of

Table 2. Differences of knowledge and health beliefs of prostate cancer according to general characteristics.

Characteristics	Categories	Knowledge			Perceived sensitivity			Perceived seriousness			Perceived benefit			Perceived barrier		
		M (SD)	Fort	P	M (SD)	Fort	P	M (SD)	Fort	P	M (SD)	Fort	P	M (SD)	Fort	P
Age (years)	50 - 60	8.84 (3.81)	3.36	0.001	5.67 (1.96)	3.02	0.003	9.07 (2.20)	1.07	0.285	6.38 (1.55)	0.78	0.432	12.21 (2.75)	1.20	0.232
	61 - 70	6.62 (3.89)			6.77 (2.37)			9.47 (2.07)			6.16 (1.60)			11.64 (2.79)		
Religion	Christian a	6.86 (4.44)	1.46	0.227	6.05 (2.85)	2.21	0.089	9.04 (2.53)	2.14	0.098	6.02 (2.03)	3.02	0.032	10.59 (3.22)	4.82	0.003
	Catholic b	8.40 (3.56)			8.68 (1.69)			8.37 (2.04)			5.78 (1.51)			12.56 (2.72)		
	Buddhist c	8.51 (3.80)			8.21 (1.91)			9.48 (1.95)			6.58 (1.28)			12.21 (2.15)		b, d > a
	None d	8.37 (3.92)			5.37 (1.93)			9.45 (1.95)			6.72 (1.21)			12.00 (2.53)		
Education	Middle school a	6.66 (4.72)	4.16	0.007	6.66 (2.74)	0.74	0.530	9.11 (2.21)	0.63	0.594	6.16 (1.88)	3.06	0.030	13.22 (3.76)	2.30	0.080
	High school b	7.55 (3.73)			6.07 (2.13)			9.04 (2.21)			6.35 (1.53)		d > c	11.87 (2.38)		
	College c	7.31 (3.51)			5.63 (2.12)			9.77 (2.38)			5.50 (1.62)			11.00 (3.14)		
	University d	9.76 (3.79)			6.02 (2.04)			9.23 (1.92)			6.71 (1.33)			12.00 (2.77)		
Marital status	Married	8.07 (4.02)	0.46	0.644	5.96 (2.14)	2.30	0.023	9.21 (2.13)	-0.00	0.995	6.35 (1.52)	1.48	0.140	12.00 (2.74)	0.08	0.994
	Others	7.44 (3.28)			7.66 (2.23)			9.22 (2.58)			5.55 (2.12)			12.00 (3.42)		
Monthly income (10,000 won)	≤200 a	6.00 (3.95)	7.90	<0.001	6.38 (2.95)	0.37	0.768	9.66 (2.51)	0.798	0.497	5.89 (1.84)	1.55	0.202	10.89 (3.08)	3.68	0.014
	201 - 300 b	7.63 (3.66)			5.90 (2.13)			9.00 (2.23)			6.27 (1.53)			12.00 (2.88)		
	301 - 400 c	9.15 (3.47)			5.96 (1.63)			9.15 (1.79)			6.62 (1.45)			12.46 (2.50)		d > a
	≥401 d	9.96 (3.74)			6.00 (1.60)			9.03 (1.90)			6.65 (1.31)			12.90 (2.16)		
Smoking	Yes	8.15 (3.62)	0.23	0.817	6.73 (2.26)	2.49	0.014	9.71 (1.93)	1.85	0.065	6.68 (1.34)	1.97	0.050	11.91 (2.54)	-0.27	0.782
	No	7.99 (3.62)			5.77 (2.09)			9.00 (2.22)			6.13 (1.64)			12.04 (2.88)		
Drinking	Yes	8.35 (4.08)	1.03	0.304	8.31 (2.11)	1.49	0.137	9.31 (1.95)	0.59	0.551	6.65 (1.42)	2.21	0.028	12.35 (2.57)	1.64	0.102
	No	7.67 (3.84)			5.77 (2.23)			9.10 (2.37)			6.00 (1.69)			11.60 (2.59)		
Private cancer insurance	Yes	8.66 (3.82)	2.96	0.004	8.01 (2.27)	0.412	0.681	9.23 (2.21)	0.13	0.869	6.44 (1.55)	1.66	0.098	12.12 (2.79)	0.79	0.427
	No	6.59 (3.97)			6.18 (1.95)			9.18 (2.04)			5.97 (1.57)			11.72 (2.73)		

monthly earning ( $F = 4.82, p = 0.003$ ) than below 2.00 million won ( $F = 3.68, p = 0.014$ ), respectively (Table 2).

### 3.5. Difference of the Knowledge and Health Beliefs of Prostate Cancer According to Characteristics Related to Prostate Cancer

The level of knowledge of prostate cancer was found to be significantly higher in the group that is having experience in taking the prostate cancer examination than the men who did not have it ( $t = 2.01, p = 0.046$ ). For the difference of health beliefs for prostate cancer according to the characteristics related to prostate cancer, firstly, the perceived sensitivity was shown to be significantly higher in the men who have family history in prostate cancer than men who have no family history ( $t = 3.46, p = 0.001$ ). The men who having experience in being hospitalized in urology was shown to be significantly higher than no experience of hospitalization ( $t = 2.81, p = 0.006$ ). The men who having experience in taking the prostate cancer examination were shown to be significantly higher than no examination ( $t = 4.37, p < 0.001$ ). The perceived barrier was also significantly higher in men who have an experience in being hospitalized in urology than the men who have no hospitalization ( $t = 2.15, p = 0.033$ ). On the other hand, there were no significant differences in perceived benefit and seriousness according to characteristics related to prostate cancer (Table 3).

## 4. Discussion

Recently incidence of prostate cancer has rapidly increased among Korean men. Although there are little studies targeting the public among studies related to prostate cancer, our study is meaningful in having suggested basic materials for preventing prostate cancer by determining the knowledge, health beliefs, and screening status for prostate cancer in mid-aged and elderly men who do not contract prostate cancer.

Out of a total of 147 study subjects, 30 (20.4%) had taken prostate cancer screening whereas 117 (79.6%) had not. It is similar to the previous studies that showed the re-

**Table 3.** Differences of Knowledge and Health Beliefs of Prostate cancer according characteristics of prostate cancer.

Characteristics	Categories	Knowledge			Perceived sensitivity			Perceived seriousness			Perceived benefit			Perceived barrier		
		M (SD)	F	t	p	M (SD)	F	t	p	M (SD)	F	t	p	M (SD)	F	t
History of Prostate ca.	Yes	9.76 (3.53)	1.65	0.101	8.00 (2.23)	3.46	0.001	9.46 (1.98)	0.42	0.671	6.46 (1.05)	0.37	0.710	11.30 (2.49)	-0.95	0.343
	No	7.87 (3.98)			5.88 (2.09)			9.19 (2.17)			6.29 (1.61)			12.07 (2.80)		
Experience of visit to urology	Yes	8.60 (5.29)	0.45	0.647	7.90 (2.02)	2.81	0.006	9.00 (1.88)	-0.33	0.742	6.90 (0.87)	0.07	0.217	10.20 (2.85)	2.15	0.033
	No	8.00 (3.88)			5.93 (2.13)			9.23 (2.18)			6.26 (1.60)			12.13 (2.73)		
Experience of health exam. Within the last	Yes	8.20 (2.00)	0.533	0.595	6.06 (2.37)	-0.01	0.986	9.33 (2.35)	0.70	0.481	6.07 (1.77)	1.86	0.065	12.33 (2.90)	1.52	0.130
	No	7.85 (3.44)			6.07 (1.96)			9.08 (1.92)			6.55 (1.28)			11.64 (2.59)		
Experience of prostate ca. screening	Yes	9.33 (4.08)	2.01	0.046	7.53 (2.51)	4.37	<0.001	9.06 (2.46)	-0.42	0.669	6.33 (1.66)	0.10	0.916	11.70 (2.66)	-0.67	0.499
	No	7.70 (3.89)			5.69 (1.92)			9.25 (2.08)			6.29 (1.55)			12.08 (2.80)		

sults. The study targeting men at the age of 50 - 70 in Iran reported about 87.2% with no DRE and 95.6% with no PSA test [8]. However, the study of USA men reported that 45.8% of African-American men and 74.8% of US white men have taken PSA test [22] [23]. There was a difference in examination rate among countries. It was considered to be due to the fact that in western countries the examination or treatment methods have already been generalized and developed since westerners were more prone to prostate cancer than easterners. For an international comparison in relative survival rates for main cancers, it was reported that Korea has higher survival rates in stomach cancer, colon cancer, liver cancer, and the like, which were included in the National Cancer Program, whereas the survival rate for prostate cancer was lower [2]. Therefore, the interest and promotion about prostate cancer on population will be necessary at the nation-wide level.

For the reason of not taking prostate cancer screenings in this study, “I think that I am healthy” was the highest as 58.1% of the respondents, followed by responses such as “no interest” (26.5%), “no time” (9.4%), and “no reliable screening institutes” (3.4%). Similarly, Park [24] reported that “because there is no special symptom and I am healthy” showed the highest rate, followed by “cannot afford it economically”, “have no time available”, and “difficult to receive the examination process” in order of mention. For the last 10 years, the reasons of not taking a national cancer screening were also reported like “because I am healthy”, “no time available”, and “difficulty in taking the examination process” [25]. These results mean that Korean men are not willing to take screenings until a special symptom occurs. And it causes risky outcomes because most cases of symptoms of prostate cancer appears when it metastasizes. In contrast, the reasons of non-screening in foreign countries were shown to be unfamiliarity with time, cost, pain and discomfort at the time of screening and a fear of diagnosis for disease [26].

At the timing of screening in prostate cancer examinees, it passed one year since last screening in 33% - 48% of 30 examinees. In Korea, men over the age of 50 are recommended to take an annual prostate cancer examination [6] but it is known that many of them actually fail to abide by such recommendation criteria on the examination timing. The reasons of conducting screenings were found to be “because of thinking of having to take earlier screenings to prevent prostate cancer for oneself” responded by 43.3% among the subjects, “because of occurrence of urination problem symptoms” by 23.3%, and “because of a medical staff’s recommendation” by 23.3%, while Kroger-Javis [27] reported 37% by a doctor’s recommendation, 29% by knowing its importance for oneself, and 19% by a wife’s recommendation. An [28] also emphasized that it was necessary to make an effort to induce the subjects to participate voluntarily in taking cancer screenings through the effort to improve perception of men by health professionals.

In this study, it was indicated that 52.4% of the total subjects responded that they had heard about the prostate cancer screening and the subjects obtained the most information through the mass media (newspaper, radio, TV). The study of Kroger-Javis [27]

targeting US men indicated that 83% among them responded that they had enough information about the prostate cancer examination while they contacted such information most frequently through health professionals, showing the difference from this study. The half of subjects in this study heard about the screening information but the actual screening ratio was less than 20%, it can be presumed that information through the mass media cannot be of much help to perform screening test. In particular, the knowledge should be delivered in an effective and exact manner through skilled specialists because it is the most basic element to improve correct recognition about cancer [20] [29]. Therefore, qualified and effective method including health information should be applied by health care professionals [27].

Knowledge level of prostate cancer is not high with 44.7% of the correct answer rates in this study. In Iran revealed that their knowledge about the prostate cancer was below 7 score (poor) 21.6%, 7 - 9 score (fair) 65.5%, and 10 - 12 score (good) 12.7% [8] while Kroger-Javis [27] reported that only 25% of mid-aged and elderly men in US responded that they did not know well about the knowledge of prostate cancer. These results indicate the significant difference of level of knowledge by country. The mortality of prostate cancer is increasing in low-income countries, whereas its incidence is increasing in high-income countries [1]. This is thought that the prostate cancer knowledge will be also affected by a national management system for cancer. In this study, items showing a correct answer ratio above 60% were associated with the knowledge about “the risky factors of prostate cancer” such as old-age, family history, meat diet. While below 50% of correct answer ratio were associated with the items are distinctive contents of prostate cancer including function of prostate, screening examination method, initial symptoms, progression symptoms, treatment. Therefore, when planning an intervention approach to improve the prostate cancer knowledge, it is necessary to make persistent effort to improve the knowledge of the people with consideration for level of basis for knowledge for each country.

In this study, the prostate cancer knowledge was found to be significantly high in prostate cancer examinees compared to non-examinees. Namely, it means that if they have the knowledge for prostate cancer, they may perform the prostate cancer examination. As can be seen in the results, the subjects of this study took early screenings mentioned “in order to prevent prostate cancer for oneself” as a reason of screening. Plowden [29] also reported that the knowledge for prostate cancer and early screening was an important factor in decision-making for taking an early screening. Furthermore, it was indicated that the knowledge was higher in 50s than 60s and also the knowledge score was shown the highest at the high education group. Winterich *et al.* [20] also reported that the lower educational level shows the lower level of knowledge for prostate cancer screenings, which has been discussed as attributed to lack of understanding. Therefore, we should make efforts to develop a communicative method or a simple and systematic training program to enhance the understanding in consideration of old-aged or low-educated men.

Additionally, knowledge about prostate cancer was significantly higher in men with

monthly earnings was higher and a cancer insurance in this study. On the other hand, a study reported the opposite result that cancer screening intention was higher among poor person with low-income and without health insurance [29]. The reason of different results between studies may be caused different age groups. Therefore, planning a method to enhance the screening of prostate cancer must be prepared in consideration of age group.

Health beliefs are known as factors that has an effect on cancer screening behaviors especially as well as enhances health-promoting behaviors in a variety of diseases [13] [26]. Despite of good perceived seriousness about prostate cancer, the screening rate was only 20.4% in the result of this study. As a similar result, it was found that for non-examinees of liver cancer screenings in Korea the examination ratio of early screenings was shown to be low compared with high level of perceived seriousness [24]. In this study, 58.1% of non-examinees responded “because I think that I am healthy” as a reason of not taking screenings. It is considered to be because they are recognizing the seriousness but thinking that they never have prostate cancer. In other words, this is because their perceived sensitivity about the disease is low. Meanwhile, Ghodsbin *et al.* [8] reported that the perceived benefit among prostate cancer health beliefs was the highest whereas the perceived seriousness was the lowest, while Capik and Gozurn [26] reported that the perceived benefit was the highest followed by perceived seriousness, barrier, and sensitivity. These different results by studies are considered because different race, culture, social conditions of each country.

This study showed that the examinees indicated significantly high perceived sensitivity compared to non-examinees. It was consistent in the result of Kim [30]’s study that low perceived sensitivity on diseases was presented as a main reason for not taking the screenings. Moreover, the perceived sensitivity was significantly higher in 50s age group, smokers, being married and having a family history, and having experience of hospitalization in urology. In other words, the men who are non-smokers, not married, without family history and 60s are more likely to overlook the importance of early screenings. Because they may that they will have low probability of developing prostate cancer. Therefore, it is necessary to promote persistently prostate cancer prevention training and promotion programs for men. Also it should be centered on the contents with risky factors of prostate cancer, screening methods and symptoms of disease in order to enhance the sensitivity about the disease.

The perceived barrier scores used by reverse coding. In items asking the perceived barrier, 57% agreed that “a prostate cancer screening is painful and uncomfortable” and also, 57.3% agreed that “a screening makes me feel shame and shyness”. Moreover, it is shown that the perceived barrier was higher in men having experience of hospitalization in urology than men who has no experience. Although there was no statistical difference, the level of the perceived barrier was also higher in men who having experience in health examination or prostate cancer examination then without experiences. That is, higher level of the perceived barrier maybe induced by the factors such as shame, pain and discomfort related to the exam. As noted in a previous literature, reducing

these barrier factors can influence examination behaviors for prostate cancer screenings [13]. Thus, a strategy shall be established to form a positive attitude toward screenings and enhance screening intention by educating the exact procedure and purpose of a prostate cancer examination [24]. Furthermore, multilateral efforts shall be exerted together to address environmental obstacles such as lack of time, cost, and information [31].

Through the results of this study, it could be determined the screening status of prostate cancer with the strengths and weaknesses of the knowledge and health beliefs for prostate cancer in Korean men. Our finding suggests that effective interventions are necessary to enhance the prostate cancer knowledge and the importance of early screenings by increasing sensitivity of the disease in mid-aged and elderly males. Additionally, systematic information through health care professionals' not indiscriminate information on the mass media shall be provided to men. As previously shown in this study, a training program should be organized with the distinctive contents of prostate cancer including screening examination methods, initial symptoms, and progression symptoms with lower score of knowledge.

## 5. Conclusions and Implications

Result of measuring the extent of prostate cancer knowledge of mid-aged and elderly men using an 18-item tool showed 44.7% of correct answer rate at average. In this study, items showing a correct answer ratio above 60% were associated with the knowledge about "the risk factors of prostate cancer", such as old age, family history, meat diet and "the advantages of earlier detection". Whereas items showing a correct answer ratio below 50% were associated with function of prostate, screening examination method, initial symptoms, progression symptoms and treatment. Mostly, the items with distinctive contents about prostate cancer showed low knowledge scores. Therefore, persistent support is required to improve the prostate cancer knowledge by educational intervention. It should be compendious to provide knowledge including types of screening examination, initial symptoms and progression symptoms of prostate cancer.

In the average scores of the subcategories in health beliefs, the perceived severity was the highest and followed by the perceived benefit, sensitivity, and barrier. The prostate cancer screening rate was higher among the participants with high prostate cancer knowledge and the perceived sensitivity. While "I think that it is necessary to prevent prostate cancer for myself" was the most frequent response as a reason of taking a prostate cancer screening and "I think I am healthy" was the most frequent response as a reason of not taking it. Therefore, it will be necessary to deliver the exact knowledge about prostate cancer to men for improving the prostate cancer screening rate, and also make them have recognition for preventing prostate cancer for themselves and establish training plans which can enhance the sensitivity for prostate cancer.

We found that the prostate cancer knowledge was significantly high in prostate cancer examinees compared to non-examinees. Also, prostate cancer knowledge was higher in age of 50s, the highest education, the highest monthly income, and having a can-

cer insurance group. Therefore, our finding suggests that the significant factors including age, educational level, income and cancer insurance status need to be considered in nursing education program in order to deliver accurate knowledge about prostate cancer.

Limitations of this study include the following. First, convenience sampling method was used for easy availability of study participants and therefore this study may have sampling bias. Second, our study population included Korean men who were living in an urban area, so the results may not be applicable to other populations. Thus large-scale surveys using representative samples are required for further studies.

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