

# Nationwide survey of cancer center programs in Korea

Ji-Youn Kim<sup>1</sup>, Eun-Surk Yi<sup>2,\*</sup>

<sup>1</sup>Exercise Rehabilitation Convergence Institute, Gachon University, Incheon, Korea

<sup>2</sup>Department of Exercise Rehabilitation & welfare, Gachon University, Incheon, Korea

This study was conducted to investigate cancer centers established for the purpose of satisfying various needs about cancer, improving the cancer treatment environment, and subdividing services ranging from diagnosis, treatment, and rehabilitation to palliative care. To this end, the authors have surveyed programs in 17 cancer centers representing Korea, including 12 national cancer centers and five major hospitals. As a result, it was found that the most common type of lecture program was disease management, followed by health care and hospitalization, while the most common type of participation program was psychological relief, followed by physical activity. The most frequently operated type of program was found to be psychological relief, followed by physical activity and health care in the regional cancer centers, while the

most frequently operated type was disease management, followed by psychological relief and health care in the five major hospitals. The proportion of physical activity was very high in two regional cancer centers, whereas five regional cancer centers did not offer physical activity programs at all. In the five major hospitals, physical activity programs were conducted regularly at least once a month or at least once a week. In addition, further studies are required to provide professional and detailed medical services for the establishment and operation of programs for cancer patient management and the environmental aspects of the hospital.

**Keywords:** Cancer center program, Physical activity program

## INTRODUCTION


The number of cancer patients in Korea is steadily increasing, and the number of long-term survivors is also gradually increasing due to early medical screening and the advancement of treatment technology. According to a report by the National Cancer Information Center, the 5-year survival rate of cancer patients in 2009–2013 was 69.4%, an improvement of 28.2% compared to 1993–1995. In 2014, the 5-year survival rate of cancer patients in Korea was 70.3%, which was higher than the 69.0% in the United States, 62.1% in Japan and 60.0% in Canada (National Cancer Information Center, 2017). Therefore, there is a growing demand for medical services for cancer patients not only for cancer diagnosis and treatment but also survival, symptom management, patient education, psychological counseling, and physical management.

In 1996, as cancer incidence and cancer-related socio-economic costs increased, Korea began to implement national cancer management policies on a national level. The National Cancer Center and

12 regional cancer centers have been established thus far (Ministry of Health & Welfare, 2017). The functions and roles of the regional cancer centers include primary prevention (e.g., cancer prevention programs and education and publicity); secondary prevention (e.g., early screening, improvement of screening quality, improvement of screening rate, improvement of cancer treatment quality, and the training of manpower for cancer treatment); and tertiary prevention (e.g., linkage to hospice institutions, home cancer patient management and support) (National Cancer Center, 2017).

These regional cancer centers and cancer centers belonging to large hospitals are actively promoting and managing a wide range of psychological education programs to improve the quality of the life of cancer patients and educate them about cancer prevention and treatment.

The main causes of cancer are closely associated with lifestyle issues such as smoking, drinking, lack of physical activity, and stress (Beak, 2001). Accurate knowledge and intervention must precede effective cancer prevention (Mahon, 2000). In addition, a

\*Corresponding author: Eun Surk Yi  <http://orcid.org/0000-0002-9370-5231>  
Department of Exercise Rehabilitation & Welfare, Gachon University,  
191 Hambangmoe-ro, Yeonsu-gu, Incheon 21936, Korea  
Tel: +82-32-820-4442, Fax: +82-32-820-4449, E-mail: [yies@gachon.ac.kr](mailto:yies@gachon.ac.kr)  
Received: May 19, 2017 / Accepted: June 5, 2017

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

recovery environment is urgently required for the cancer patients to guard against symptoms and a variety of physical dysfunctions, stress, and psychological anxiety during treatment processes including chemotherapy and surgery.

Some previous studies reported that physical activity is closely related to cancer incidence. Mid-high intensity exercise in daily life has been reported to reduce the incidence of breast cancer by 18% (Friedenreich, 2011), colon cancer by 23% (Wolin et al., 2009), and ovarian cancer by 19% (Olsen et al., 2007). In addition, physical activity is reported to be positively associated with physical function recovery and quality of life (Schwartz et al., 2009) and psychological recovery during and after cancer treatment (Speck et al., 2010). These results indicate that physical activity plays a critical role in medical service for cancer patients.

In fact, 20%–40% of cancer patients experience physical dysfunction such as fatigue, appetite loss, mood swings, appearance changes, and defecation problems as well as psychological anxiety and depression due to practical difficulties related to personal life and occupation (Bae and Park, 2007).

However, it has been reported that knowledge and attitudes toward cancer through education have a very positive effect on cancer prevention activities (Kim et al., 2015), and participation programs such as physical activity, horticulture, music, and laughter therapy in particular have a positive effect on stress and psychological relief for patients (Kim et al., 2013; You and Chol, 2012; Zhang et al., 2012).

The national cancer centers have been in operation since 2004, relieving the concentration of cancer patients into Seoul, and their services were implemented in 12 places nationwide in 2012 to meet the needs of local residents and to improve the quality of cancer treatment. In addition, programs that meet multifaceted needs are required for patients and caregivers who want more specialized and subdivided medical care services ranging from diagnosis, treatment, and rehabilitation to palliative care.

As a result, many studies are being conducted on psychosocial aspects such as quality of life, anxiety, and depression in cancer patients; symptom management; and nursing management programs, whereas no studies have been conducted on the current status and problems of cancer center programs to meet a variety of medical service needs. In addition, few studies have been conducted on the effect of physical activity, which has a positive effect on both preventive and therapeutic processes, in the cancer programs of cancer centers.

Therefore, this study was conducted to investigate the current status of programs in cancer centers in Korea and to provide basic

data on cancer patient management and medical service by investigating the programs of 12 regional national cancer centers and the cancer centers of five major hospitals.

## MATERIALS AND METHODS

### Subjects

This study was conducted in 17 cancer centers including 12 national cancer centers and five cancer centers at five major hospitals that treat cancer patients.

### Research method

In order to survey the current status of cancer centers in Korea, the authors asked 17 cancer centers nationwide for prior consent to this study and collected information on the current status of programs via post or email. Data collection was limited to programs implemented for the year of 2016. Data collected included program name and frequency of operation.

### Data collection

Real numbers, percentages, mean, and standard deviation were analyzed using IBM SPSS Statistics ver. 20.0 (IBM Co., Armonk, NY, USA).

## RESULTS

In order to show the results of this study, the present programs were categorized as shown in Table 1. Lecture programs were divided into disease-related programs, hospitalization-related programs, and health-related programs, while the participation programs were divided into physical activity programs and psychological relief programs (Table 1).

### Total number of programs and frequency of operation

The total number of programs in 12 regional cancer centers and the cancer centers in five major hospitals in Korea was 12.69 ±

**Table 1.** Program categories

Program category
Lecture programs
Disease-related programs
Hospitalization-related programs
Health-related programs
Participation programs
Physical activity programs
Psychological relief programs

10.09 and the frequency of operation was  $261.75 \pm 317.53$  times (Table 2). There were  $7.25 \pm 7.07$  lecture programs and  $5.50 \pm 4.13$  participation programs. The frequency of operation for lecture programs was  $145.75 \pm 224.59$  times, while that of participation programs was  $148.87 \pm 138.74$  times. The most common type of lecture program was disease-related programs ( $3.44 \pm 2.39$ ), followed by health-related programs ( $2.75 \pm 3.31$ ) and hospitalization-related programs ( $1.00 \pm 1.96$ ). The most common type of participation program was psychological relief programs ( $3.93 \pm 3.06$ ), followed by physical activity programs ( $1.56 \pm 1.46$ ). Among lecture programs, disease-related programs were most frequently operated ( $67.69 \pm 104.72$  times), followed by health-related programs ( $54.62 \pm 74.28$  times) and hospitalization-related programs ( $27.69 \pm 63.30$  times), while the most frequently opened type of participation program was psychological relief programs ( $103.25 \pm 102.34$  times) followed by physical activity programs ( $45.62 \pm 62.80$  times).

As shown in Table 3, the total number of programs in the five

major hospitals was  $16.75 \pm 2.5$  per year and that in the regional cancer centers was  $11.33 \pm 11.36$  per year. Programs were held  $596.50 \pm 476.49$  times in the five major hospitals and  $150.17 \pm 145.74$  times in regional cancer centers.

The most frequently operated type of program in regional cancer centers was psychological relief programs ( $68.67 \pm 85.32$  times), followed by physical activity programs ( $30.83 \pm 61.28$  times) and health-related programs ( $21.83 \pm 20.98$  times). In the five major hospitals, the most frequently operated programs were health-related programs ( $212.00 \pm 123.86$  times), followed by psychological relief programs ( $207.00 \pm 82.77$  times) and health-related programs ( $153.00 \pm 93.66$  times).

A total of  $11.33 \pm 11.36$  programs were held per year in regional cancer centers whereas  $16.75 \pm 2.5$  programs were held in the five major hospitals (Table 3). Programs were operated  $150.17 \pm 145.74$  times in the regional cancer centers and  $596.50 \pm 476.49$  times in the five major hospitals.

The standard deviation was high in both groups, indicating a great difference in the number of programs for each cancer center. In particular, there was no significant difference in the number of programs among the five major hospitals compared to those of the regional cancer centers, indicating a great difference in the frequency of operation. This result suggests that the programs held in the five major hospitals, which were run frequently, were not one-time programs but regular and continuous programs.

### Proportion of physical activity programs

As shown in Table 4, the proportion of physical activity program to the total programs in 17 cancer centers nationwide was 15.26%, representing 730 times. Analysis results showed 47.96% of physical activity programs in the regional cancer centers with the highest frequency but 0% in the centers with the lowest fre-

**Table 2.** Total number of programs and frequency of operation

Program category	No. of programs	Frequency of operation (time)
Total programs	$12.69 \pm 10.09$	$261.75 \pm 317.53$
Lecture programs		
Disease-related programs	$3.44 \pm 2.39$	$67.69 \pm 104.72$
Hospitalization-related programs	$1.00 \pm 1.96$	$27.69 \pm 63.30$
Health-related programs	$2.75 \pm 3.31$	$54.62 \pm 74.28$
Total	$7.25 \pm 7.07$	$145.75 \pm 224.59$
Participation programs		
Physical activity programs	$1.56 \pm 1.46$	$45.62 \pm 62.80$
Psychological relief programs	$3.93 \pm 3.06$	$103.25 \pm 102.34$
Total	$5.50 \pm 4.13$	$148.87 \pm 138.74$

Values are presented as mean  $\pm$  standard deviation.

**Table 3.** Comparative analysis of national cancer centers and the 5 major hospitals

Program category	No. of programs		Frequency of operation (time)	
	Regional cancer center	5 Major hospitals	Regional cancer center	5 Major hospitals
Total present programs	$11.33 \pm 11.36$	$16.75 \pm 2.50$	$150.17 \pm 145.74$	$596.50 \pm 476.49$
Lecture programs				
Disease-related programs	$2.83 \pm 2.21$	$5.25 \pm 2.22$	$19.58 \pm 16.13$	$212.00 \pm 123.86$
Hospitalization-related programs	$1.00 \pm 2.26$	$1.00 \pm 0.82$	$9.25 \pm 15.90$	$83.00 \pm 119.61$
Health-related programs	$2.50 \pm 3.78$	$3.50 \pm 1.29$	$21.83 \pm 20.98$	$153.00 \pm 93.66$
Participating programs				
Physical activity programs	$1.41 \pm 1.56$	$2.00 \pm 1.15$	$30.83 \pm 61.28$	$90.00 \pm 49.48$
Psychological relief programs	$3.58 \pm 3.50$	$5.00 \pm 0.00$	$68.67 \pm 85.32$	$207.00 \pm 82.77$

Values are presented as mean  $\pm$  standard deviation.

**Table 4.** Proportion of physical activity programs in the national cancer centers and the 5 major hospitals

Physical activity program	No. (%)	Frequency of operation, No. of times (%)
Physical activity programs within total frequency of operation		730 (15.26)
Regional cancer centers		
Max		189/394 (47.96)
Min		0/120 (00.00)
5 Hospitals		
Max		144/492 (29.26)
Min		48/1,144 (4.19)
Frequency of physical activity program		
Regional cancer centers (n=12)		
0 time/yr	5 (41.6)	
1–10 times/yr	3 (25.0)	
11–50 times/yr	2 (16.6)	
51–100 times/yr	0 (0)	
101–150 times/yr	1 (8.3)	
150–200 times/yr	1 (8.3)	
5 Major hospitals (n=5)		
0 time/yr	0 (0)	
1–50 time/yr	3 (60)	
50–100 times/yr	0 (0)	
100–150 times/yr	2 (40)	

quency. Frequency analysis found three places with physical activity programs held 1–10 times per year, 25% of the total, and five places with these programs held 0 times, 41.6% of the total.

Physical activity programs in the five major hospitals were held 144 times per year, 29.6% of all programs, in the cancer center with the highest frequency and 48 times per year, 4.19% of all programs, in the cancer center with the lowest frequency.

The highest frequency of physical activity programs was found in the regional cancer centers, while the five major hospitals implemented physical activity programs at least 1–50 times per year.

In terms of content of physical activity programs, complex exercises such as health exercises and well-being exercises represented the greatest portion at 32%, followed by yoga (24%) and stretching (16%) (Table 5).

## DISCUSSION

The Korean government is establishing and implementing a 10-year nationwide plan to conquer cancer and support various national cancer prevention management projects. This trend has prompted the expansion of the activities and roles of cancer orga-

**Table 5.** Contents of physical activity programs

Program name	%
Health exercise (complex exercises)	32
Laughter dance	8
Walking	4
Stretching	16
Line dance	8
Yoga	24
Other dance	8

nizations (National Cancer Information Center, 2017), and changes have been made in establishing independent cancer centers and cancer hospitals in most medical institutions (Hong et al., 2016). As the survival rate of cancer patients increases, attention is focusing on the importance of patient recovery. Therefore, education programs about disease, hospitalization, pain management, and psychological well-being are becoming commonly introduced to support patient recovery.

This study surveyed current programs in a total of 17 places: 12 national cancer centers and the cancer centers of the five major hospitals nationwide. It was found that  $12.69 \pm 10.09$  programs were held, and more lecture programs ( $7.25 \pm 7.07$ ) than participation programs ( $5.50 \pm 4.13$ ) were held. The most common type of lecture program was disease-related programs ( $3.44 \pm 2.39$ ), followed by health-related programs ( $2.75 \pm 3.31$ ) and hospitalization-related programs ( $1.00 \pm 1.96$ ). These results imply that programs are more focused on the sharing of knowledge about a specific type of cancer, reduction of anxiety, and prevention of cancer. Mahon (2000) reported that health was managed better in the intervention group that received education about cancer prevention. Shin and Lee (2003) reported that pain levels were lower in the group that received education on pain compared to the control group. Li et al. (2013) reported that the intervention group that received education on exercise, diet, and anxiety reduction prior to surgery showed better quality of life as well as physical function and physical activity compared to the control group, indicating that lecture programs in cancer centers have a positive effect of the recovery, pain minimization, and quality of life of cancer patients.

The number of current programs and their frequency of operation were compared between the regional cancer centers and the five major hospitals. There were  $2.83 \pm 2.21$  programs in regional cancer centers and  $5.25 \pm 2.22$  in the five major hospitals. Programs were operated  $19.58 \pm 16.13$  times in the regional cancer centers and  $212.00 \pm 123.86$  times in the five major hospitals, indicating a substantial difference between the two. We found that

one program was started weekly or monthly in the five major hospitals. We also found that disease-related programs often included lecture programs on common cancers such as breast cancer, stomach cancer, colon cancer, and thyroid cancer.

As the cancer survival rate increases, the quality of life after cancer treatment becomes more important, and awareness of and demand for programs related to psychological relief are also increasing. The results of this study showed that psychological relief programs rated higher than physical activity programs both in terms of number of programs and frequency of operation (Table 2). In particular, there were more psychological relief programs ( $3.93 \pm 3.06$ ) than any other programs in the cancer center, and the frequency of operation of psychological relief programs was the highest after disease-related programs. The psychological aspects of cancer patients are influenced by fatigue, cognitive changes, physical changes, fear of recurrence, posttraumatic stress, caregiver distress, economic anxiety, and depression experienced after cancer treatment (Alfano and Rowland, 2006). Psychological relief programs should be able to improve these problems. Oh et al. (2012) reported that significant changes were made in depression, anxiety, and quality of life through a horticultural therapy program. Yun (2014) reported that anxiety, depression, and perceived stress decreased while quality of life and life satisfaction improved through an 8-week meditation program (two sessions per week). Therefore, it was confirmed that psychological relief programs, which have a positive effect on the psychological relaxation of cancer patients, have been actively introduced and implemented in the cancer centers. There was a difference in proportion of frequency of operation between regional cancer centers and the five major hospitals (Table 3), with regional cancer centers introducing the most psychological relief programs ( $68.67 \pm 85.32$  times), followed by physical activity programs ( $30.83 \pm 61.28$  times), and health-related programs ( $21.003 \pm 20.98$  times), whereas the five major hospitals offered the most disease-related programs ( $212.00 \pm 123.86$  times), followed by psychological relief programs ( $207.00 \pm 82.77$  times) and health-related programs ( $153.00 \pm 93.66$  times).

Physical activity has a profound effect on the patient's physical functions and quality of life. According to previous studies, it plays an important role in the maintenance of muscle mass in exercise intervention during hospitalization for patients with colon cancer (Ahn, 2011). Decreased muscle mass in cancer patients causes increased fatigue (Vashistha et al., 2016), greater side effects of chemotherapy, and increased risk of death (Jung et al., 2012). In addition, it was reported that cancer patients' participa-

tion in exercise programs had a very positive effect on pain, depression, and quality of life (Cho, 2004; Hwang, 2011; Kim et al., 2013). This study found that the proportion of physical activity programs (Table 4) was 15.26%, and the regional cancer centers held physical activity programs 183/396 times, representing 47.96% of all programs. On the other hand, the least frequent physical activity program was held 0/120 times, 0%, and 5 out of 12 places (41.6%) did not offer any physical activity program at all. On the other hand, the frequency of operation in the five major hospitals was 144/492 times, representing 29.26%, and the lowest frequency of operation was 48/1144 times, representing 4.19%. Among the five major hospitals, there was no place where no physical activity program was held. Programs were held at least 1–50 times per year in three places (60%) and 100–150 times per year in two places (40%).

Although physical activity is effective for the recovery, physical function, and psychological well-being of cancer patients, it can be confirmed that the total number of programs and frequency of operation were low. Although the number of programs and frequency of operation were higher in the five major hospitals than in regional cancer centers, the highest frequency of operation of physical activity programs (189, 47.96%) was found in the regional cancer centers. In addition, the five places that did not hold a program were regional cancer centers. These results suggested that there was a great difference in the tendencies and frequency of the programs opened in the national cancer centers.

We calculated the mean and standard deviation of the number of programs and frequency of operation in the regional cancer centers and the five major hospitals to draw conclusions. The standard deviation was high in both groups, indicating a great difference in the number of programs for different cancer centers. In particular, there was no significant difference in the standard deviation in the number of programs opened in the five major hospitals and there was no significant difference in the number of programs compared to the regional cancer centers, but there was a big difference in the frequency of operation. This result indicated that the programs opened in the five major hospitals were not one-time programs, but regular and continued programs. In addition, it is thought that the reason why the frequency of operation was high in the five major hospitals was because more cancer patients visit hospitals and more patients are hospitalized, while more people visit to care for cancer patients after surgery.

This study was conducted to investigate cancer centers established for the purpose of satisfying various needs about cancer, improving the cancer treatment environment, and subdividing ser-

vices ranging from diagnosis, treatment, and rehabilitation to palliative care. To this end, the authors have surveyed programs in 17 cancer centers representing Korea, including 12 national cancer centers and five major hospitals.

As a result, it was found that the most common type of lecture program was disease management, followed by health care and hospitalization, while the most common type of participation program was psychological relief, followed by physical activity.

The most frequently operated type of program was found to be psychological relief, followed by physical activity and health care in the regional cancer centers, while the most frequently operated type was disease management, followed by psychological relief and health care in the five major hospitals.

The proportion of physical activity was very high in two regional cancer centers, whereas five regional cancer centers did not offer physical activity programs at all. In the five major hospitals, physical activity programs were conducted regularly at least once a month or at least once a week.

This study intended to investigate programs in cancer centers representing Korea. The findings of this study are expected to be used as reference data in response to demand for cancer patient management and medical services. In addition, further studies are required to provide professional and detailed medical services for the establishment and operation of programs for cancer patient management and the environmental aspects of hospitals. The authors expect such studies to be developed into studies on the effect of rapidly developing cancer treatment management services to minimize hospitalization, increase early discharge, and reduce recurrence and mortality.

## CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

## ACKNOWLEDGMENTS

This work was supported by the Ministry of Education of the Republic of Korea and the National Research Foundation of Korea (NRF-2016S1A5B6913737).

## REFERENCES

Ahn KY. The effect of colorectal cancer exercise program in colorectal cancer patient after surgery [dissertation]. Seoul: Yonsei University;

2011.

- Alfano CM, Rowland JH. Recovery issues in cancer survivorship: a new challenge for supportive care. *Cancer J* 2006;12:432-443.
- Bae SH, Park JS. Symptom distress and spiritual well-being in patients with cancer according to illness and treatment. *J Korean Acad Fundam Nurs* 2007;14:457-465.
- Beak NS. Correct lifestyle for cancer prevention: Stress is the origin of all diseases. *Sci Technol* 2001;34:88-89.
- Cho OH. Effects of a comprehensive rehabilitation program for mastectomy patients. *J Korean Acad Nurs* 2004;34:809-819.
- Friedenreich CM. Physical activity and breast cancer: review of the epidemiologic evidence and biologic mechanisms. *Recent Results Cancer Res* 2011;188:125-139.
- Hong SY, Kim KS, Tae YS. Nationwide survey for current status of cancer centers in Korea. *Asian Oncol Nurs* 2016;16:261-269.
- Hwang KH. Effects of comprehensive rehabilitation program on fatigue, cardiopulmonary function, muscle strength, immune response and quality of life in ovarian cancer survivors [dissertation]. Seoul: The Catholic University; 2011.
- Jung HJ, Choi M, Kim SS, Kim NK, Lee KY. The effects and variances of the critical pathway of laparoscopic colon resection in colon cancer patients. *Asian Oncol Nurs* 2012;12:204-212.
- Kim YG, Lee SH, Kim YH, Eum JO, Yim YR, Ha TG, Shin CS. The influence of forest activity intervention on anxiety, depression, profile of mood states (POMS) and hope of cancer patients. *J Korean Inst For Recreat* 2015;19:65-74.
- Kim YS, Kim GC, Lee JW, Kim YH. Effects of rehabilitation program using qigong exercise for breast cancer survivors of community in B city. *J Korean Data Anal Soc* 2013;15:3263-3277.
- Li C, Carli F, Lee L, Charlebois P, Stein B, Liberman AS, Kaneva P, Augustin B, Wongyingsinn M, Gamsa A, Kim DJ, Vassiliou MC, Feldman LS. Impact of a trimodal prehabilitation program on functional recovery after colorectal cancer surgery: a pilot study. *Surg Endosc* 2013;27:1072-1082.
- Mahon SM. Principles of cancer prevention and early detection. *Clin J Oncol Nurs* 2000;4:169-176.
- Ministry of Health & Welfare. Cancer in statistics [Internet]. Sejong: Ministry of Health & Welfare; c2017 [cited 2017 Apr 20]. Available from: [http://www.cancer.go.kr/mbs/cancer/subview.jsp?id=cancer\\_040101000000](http://www.cancer.go.kr/mbs/cancer/subview.jsp?id=cancer_040101000000).
- National Cancer Center. National Cancer Control Institute [Internet]. Goyang: National Cancer Center; c2017 [cited 2017 Apr 27]. Available from: [http://www.ncc.re.kr/main.ncc?uri=manage01\\_9](http://www.ncc.re.kr/main.ncc?uri=manage01_9).
- National Cancer Information Center. Cancer statistics [Internet]. Goyang: National Cancer Information Center; c2017 [cited 2017 Apr 20]. Avail-

- able from: [http://www.cancer.go.kr/mbs/cancer/subview.jsp?id=cancer\\_040101000000](http://www.cancer.go.kr/mbs/cancer/subview.jsp?id=cancer_040101000000).
- Oh KO, Gang MH, Jung KS. Effects of horticultural therapy program on state-anxiety, fatigue and quality of life among women cancer survivors. *Asian Oncol Nurs* 2012;12:125-131.
- Olsen CM, Bain CJ, Jordan SJ, Nagle CM, Green AC, Whiteman DC, Webb PM; Australian Ovarian Cancer Study Group. Recreational physical activity and epithelial ovarian cancer: a case-control study, systematic review, and meta-analysis. *Cancer Epidemiol Biomarkers Prev* 2007;16:2321-2330.
- Schwartz AL, Winters-Stone K. Effects of a 12-month randomized controlled trial of aerobic or resistance exercise during and following cancer treatment in women. *Phys Sportsmed* 2009;37:62-67.
- Shin SB, Lee MH. The effect of cancer pain management education on the pain and the concerns of pain management in cancer patients. *Korean J Rehabil Nurs* 2003;6:90-103.
- Speck RM, Courneya KS, Mâsse LC, Duval S, Schmitz KH. An update of controlled physical activity trials in cancer survivors: a systematic review and meta-analysis. *J Cancer Surviv* 2010;4:87-100.
- Vashistha V, Singh B, Kaur S, Prokop LJ, Kaushik D. The effects of exercise on fatigue, quality of life, and psychological function for men with prostate cancer: systematic review and meta-analyses. *Eur Urol Focus* 2016;2:284-295.
- Wolin KY, Yan Y, Colditz GA, Lee IM. Physical activity and colon cancer prevention: a meta-analysis. *Br J Cancer* 2009;100:611-616.
- You ES, Choi YH. The effects of laughter therapy on pain and anxiety among patients with postmastectomy. *J East-West Nurs Res* 2012;18:47-52.
- Yun MR. Effects of maum meditation program on breast cancer survivors' psychological well-being [dissertation]. Seoul: Seoul National University; 2014.
- Zhang JM, Wang P, Yao JX, Zhao L, Davis MP, Walsh D, Yue GH. Music interventions for psychological and physical outcomes in cancer: a systematic review and meta-analysis. *Support Care Cancer* 2012;20:3043-3053.