Pain and Menopause Symptoms of Breast Cancer Patients with Adjuvant Hormonal Therapy in Korea: Secondary Analysis

Myungsun Yi[1], Eunkyung Hwang[2]

[1]College of Nursing, Research Institute of Nursing Science, Seoul National University, [2]Breast Care Center, Seoul National University Hospital, Seoul, South Korea

Corresponding author: Myungsun Yi, DNS, RN

College of Nursing, Seoul National University, Seoul, South Korea

Tel: 82-2-740-8829; Fax: 82-2-765-4103

E-mail: donam@snu.ac.kr

Received: March 24, 2017, Accepted: July 10, 2017

ABSTRACT

Objective: The purpose of this study was to describe the prevalence and levels of pain and menopause symptoms of breast cancer patients with adjuvant hormonal therapy (HT). **Methods:** A cross-sectional survey design was used. Secondary analysis was used from the primary data collected in 2013 from a total of 110 breast cancer patients receiving HT for more than 3 months, using questionnaires of the Korean version of brief pain inventory and the menopause rating scale. **Results:** Mean age of the participants was 53.56. Most (88.2%) of the participants reported to have pain and almost (95.5%) of them reported to have menopause symptoms. More pain was reported in participants with aromatase inhibitor (AI) than those with tamoxifen. Adherence to HT showed a significant difference according to the rate of feeling increased pain (P = 0.001). Among the menopause symptoms, fatigue was the most common symptom (97.3%). Sweating/flush was significantly higher in tamoxifen group (P < 0.005), and joint and muscle complaints were higher in AI group (P < 005). **Conclusions:** The results of the study show that the prevalence and levels of pain and menopause symptoms among breast cancer patients receiving HT were high. Thus, oncology professionals need to provide appropriate interventions to relieve pain and menopause symptom to improve adherence to HT.

Key words: Antineoplastic protocols, breast neoplasms, menopause, pain, questionnaires

Introduction

Breast cancer is the most common cancer among women in the world, with 14.1 million newly diagnosed cases in 2012.[1] At the same time, survival rates of breast cancer have increased mainly due to the advanced treatment modalities in addition to the early detection of breast cancer. For

Cite this article as: Yi M, Hwang E. Pain and menopause symptoms of breast cancer patients with adjuvant hormonal therapy in Korea: Secondary analysis. Asia Pac J Oncol Nurs 2018;5:262-9.

example, the 5-year survival rate of breast cancer diagnosed between 2010 and 2014 was 92.0% in Korea.[2] Among treatment modalities, adjuvant hormonal therapy (HT) became one of the important treatments of breast cancer, especially for hormone-receptor-positive breast cancer, because of its effect in reduction of recurrence and mortality of breast cancer.[3,4] These oral therapies include selective estrogen receptor modulators (SERM), such as tamoxifen, and aromatase inhibitors (AI), and these are typically prescribed for 5 years or more. Thus, adherence to HT is an important issue because its discontinuation has significant impact on survival. For example, early discontinuation of HT was associated with a 26% increase in all-cause mortality, and nonadherence was associated with a 49% increase in all-cause mortality of those who discontinued.[5]

Nevertheless, early discontinuation and nonadherence to HT are reported to be high.[6-11] One study[12] indicated that only 49% of patients were fully adherent with HT for the 4–5 years' follow-up period among women with Stage I-III breast cancer. Thus, oncology professionals need to pay special attention to the adherence to HT to be successful in the prevention of recurrence of breast cancer and to decrease mortality. However, much less is known about factors influencing nonadherence with hormonal agents.

Treatment-associated toxicities are often considered to be a major barrier to the adherence to HT. In a survey of 622 postmenopausal women with breast cancer, 30% discontinued HT and 84% of them discontinued it because of side effects.[13] The most common side effects of these hormonal agents include fatigue, hot flashes, vaginal dryness, and mood swings. Among breast cancer patients getting SERM, 50% complained hot flash and 72% sleep disorder,[14] increased menopause symptoms,[14,15] and sexuality disorder and depression.[14,16] On the other hand, among those getting AIs, 50% suffered from AI-induced arthralgia and these symptoms caused sleep disorder, depression, and lowered activities of daily living or quality of life,[17,18] and in the end, 20%–50% of the patients discontinued medication. Therefore, managing these side effects is critical issue for oncology professionals to help maintain HT. However, it is not well known about their symptoms including pain among breast cancer patients with HT.

In the previous study on quality of life of breast cancer patients with HT,[19] the correlation between pain and menopausal symptoms was identified to be 0.523, and the menopause symptoms were the most important factor affecting their quality of life. However, more specific analysis was needed in terms of the specific pain areas and menopause symptoms.

The purpose of this secondary analysis study was to identify prevalence and levels of pain and menopause symptoms and to identify differences in painful areas and specific menopause symptoms among three types of HT: tamoxifen, AI, and tamoxifen and zoladex. Ultimately, the results of the study will help support breast cancer patients with HT to successfully maintain their medication by effectively managing pain and other menopause symptoms.

Methods

Study design

This was a secondary analysis study using primary data from the study conducted by Hwang and Yi,[19] using cross-sectional design to measure pain, menopause symptoms, and quality of life among breast cancer patients with HT.

Sample

Primary data came from a total of 110 breast cancer patients with HT for more than 3 months after breast surgery with no other cancer or recurrence from a hospital located in Seoul, Korea, during 2013.

Instrument

Sociodemographic and illness-related characteristics were obtained from patient records, and pain and menopause symptoms were collected by self-reported questionnaires.

Pain

Pain was measured by Korean version of brief pain inventory (BPI).[20,21] BPI is 11-point rating scales. It consists of two dimensions: life interference and severity. Total score of life interference is 0–70 and that of severity is 0–40. Participants were asked to separately rate how their pain interferes with their enjoyment of life, activity, walking, mood, sleep, work, and relations with others in the dimension of life interference. Each scale is bounded by 0 = does not interfere and 10 = interferes completely. Severity contains bodily pain diagram and current pain medications and percent relief achieved. Each scale is bounded by 0 = no pain and 10 = pain as bad as you can imagine. The severity scores from 1 to 4 indicate mild pain, 5–6 moderate pain, and 7–10 severe pain.[22] Cronbach's α of the original instrument was 0.86 and it was 0.91 in this study.

Menopause symptoms

Menopause symptoms were measured by menopause rating scale (MRS).[23] It contains three dimensions, such as somato-vegetative, psychological, and urogenital symptoms, with a list of 11 symptoms or complaints to be chosen among 5 categories: no symptom, mild, moderate, marked, and severe. The subscale score for each dimension is based on adding up

the scores of each item, and the total score is the sum of these three subscale scores. The total score of MRS ranges between 0 (asymptomatic) and 44 (highest degree of symptoms). The scale is also able to measure an improvement in patients starting with "no/little complaints" (total score = 0–4), "mild" (5–8), "moderate" (9–15), and "severe" (16+points) before therapy (= baseline). Cronbach's α in Korean postmenopausal women was 0.861.[24] Cronbach's α of the instrument in this study was 0.87. More specifically, Cronbach's α of the dimension of somato-vegetative symptoms was 0.69, that of psychological symptoms 0.89, and that of urogenital symptoms 0.78. We used MRS Korean version at http://www.menopause-rating-scale.info/languages.htm.

Statistical analysis

Data were analyzed with mean, standard deviation (SD), Chi-square test, *t*-test, ANOVA, Pearson correlation coefficient, and Cronbach's α, using Statistical Package for the Social Sciences (SPSS) version 17.0 for Windows (SPSS Inc., 2009) program.

Ethical considerations

Approval from the institutional review board (IRB No. H-1301-112-460) of the hospital was obtained before the primary study was conducted to protect the research participants' human rights.

Results

General characteristics of the participants

As shown in the previous study,[19] 110 breast cancer patients receiving HT participated. Their age ranged from 38 to 69 with mean = 53.56. High school graduates were 57%, 93% were married, 78% reported to be middle level of economic status, and 74% did not have a job.

In terms of the illness-related characteristics, mean years since diagnosis were 3.56, with 52% between 1 and 5 years. Fifty one percent reported to have cancer stage 0 or 1 while 36% reported to have stage II. Forty percent had mastectomy while 59% had breast-conserving surgery. Sixty two percent had chemotherapy and radiation therapy, respectively. In terms of the HT agents, 39% reported to have tamoxifen, 47% AI, 12% tamoxifen and zoladex, and 2% others. Moreover, 91% reported to have menopause which means no menstruation for more than 1 year. Fourteen percent reported to have pain medications while 41% reported to have slight or severe pain increase since HT. Sixty one percent reported to have normal body weight while 36% reported to be overweight or obese. Only 8% reported to be nonadherent with HT.

Further analysis revealed that the percentage of voluntary discontinuing HT was higher in AI group (15.8%) than tamoxifen group (2.8%), but it was not statistically significant. However, adherence to HT showed a significant difference according to the rate of feeling increased pain after HT (*P* =0.001).

Pain

Most (88.2%) of the participants reported to have pain. In terms of the pain severity, 40% reported to have middle or severe pain. As shown in Table 1, the mean score of pain was 28.83 ± 24.03 with 17.98 ± 16.64 in the dimension of life interference and 10.27 ± 7.50 in severity. Life interference was further divided into mild, moderate, and severe[22] and 68 (61.8%) reported to have mild life interference.

Pain was significantly different by age (*P* = 0.006), economic status (*P* = 0.012), and occupation (*P* = 0.020) [Table 2]. Higher age group reported more pain than the others. The participants with low economic status and those without occupation reported more pain than the others. However, these differences were not significant in post hoc analyses (Scheffé adjusted).

As shown in Table 3, there were no significant differences in pain according to the illness-related characteristics, such as stage of cancer, type of surgery, experiences of chemotherapy and radiation therapy as well as menopause and adherence. However, pain was significantly different by the type of HT (*P* = 0.015). The participants with AI reported to have higher pain than

Table 1: Scores of pain and menopause symptom (*n*=110)				
Variables	**Mean±SD**	**Possible range**	**Actual range**	***n*(%)**
Pain	28.83±24.03	0-110	0-110	
Life interference	17.98±16.64	0-70	0-61	
None	3.93±6.35			15 (13.6)
Mild	14.47±12.54			68 (61.8)
Moderate	31.73±16.67			22 (20.0)
Severe	47.40±15.57			5 (4.5)
Severity	10.27±7.50	0-40	0-28	
Menopause symptoms	18.32±8.93	0-44	0-41	
Somato-vegetative symptoms	6.72±4.05	0-16	0-16	
Sweating/flush	1.82±1.24			90 (81.8)*
Cardiac complaints	1.15±1.02			76 (69.1)*
Sleeping disorders	1.85±1.33			87 (79.1)*
Joint & muscle complaints	1.99±1.34			91 (82.7)*
Psychological symptoms	6.78±3.98	0-16	0-16	
Depressed	1.56±1.22			86 (78.2)*
Irritable	1.61±1.15			90 (81.8)*
Anxious	1.57±1.22			85 (77.3)*
Exhausted	2.04±0.99			107 (97.3)*
Urogenital symptoms	4.82±2.83	0-12	0-12	
Sexual problems	1.76±1.33			84 (76.4)*
Urinary complaints	1.35±1.13			79 (71.8)*
Vaginal dryness	1.62±1.41			79 (71.8)*
SD: Standard deviation, *Multiple response				

Table 2: Pain and menopause symptoms by sociodemographic characteristics (n=110)

Characteristics	Category	Pain (mean±SD)	F/t (P)	Menopause symptom (mean±SD)	F/t (P)
Age (year)	<50	21.72±22.64	5.33 (0.006)	20.66±8.69	1.67 (0.192)
	50-59	26.59±21.29		16.93±7.75	
	>59	41.26±27.43		18.69±11.18	
Education	Less than middle school	39.40±24.53	2.68 (0.074)	18.80±9.76	0.806 (0.450)
	High school	31.79±24.36		19.38±9.22	
	Greater than college	22.24±22.23		16.85±8.71	
Economic status	High	32.01±31.21	4.67 (0.012)	18.78±5.19	1.87 (0.159)
	Middle	25.59±21.47		17.51±9.69	
	Low	46.14±28.91		22.57±6.76	
Marital status	Married	29.11±23.55	0.095 (0.909)	18.55±8.90	0.93 (0.398)
	Others	33.14±34.31		16.57±11.31	
Occupation	Yes	20.14±18.15	5.6 (0.020)	16.68±8.15	1.3 (0.255)
	No	32.53±25.43		18.96±9.35	
Religion	Catholic	37.42±89.98	1.98 (0.123)	20.47±9.04	0.775 (0.511)
	Protestant	29.46±21.26		16.61±9.47	
	Buddhist	24.86±19.22		18.32±9.63	
	Others	20.78±17.56		19.47±7.93	

SD: Standard deviation

Table 3: Pain and menopause symptoms by illness-related characteristics (n=110)

Characteristics	Categories	Pain (mean±SD)	F/t (P) Scheffé	Menopause symptom (mean±SD)	F/t (P)
Time since diagnosis (year)	≤1	29.32±24.51	0.084 (0.919)	20.56±7.66	1.136 (0.325)
	>1-≤5	29.42±25.03		17.33±9.01	
	>5	27.21±22.23		18.32±9.75	
Stage of cancer**	0 or I	25.71±24.47	1.072 (0.346)	19.12±9.43	0.204 (0.816)
	II	33.26±25.01		17.89±8.31	
	III	30.61±22.90		18.15±10.01	
Type of surgery	Mastectomy	34.37±24.84	1.427 (0.239)	18.13±9.74	0.897 (0.446)
	Breast-conserving surgery	25.01±22.87		18.45±8.4	
Chemotherapy	Yes	30.85±23.67	1.257 (0.265)	18.28±9.12	0.003 (0.954)
	No	25.57±24.53		18.38±8.76	
Radiation therapy	Yes	26.25±25.21	2.083 (0.152)	17.97±8.92	0.268 (0.606)
	No	26.25±25.20		17.97±8.92	
Herceptin	Yes	32.78±21.91	0.132 (0.877)	18.44±8.04	0.046 (0.955)
	No	28.50±24.41		18.28±9.12	
Hormonal therapy	Tamoxifen	25.32±20.36	4.395 (0.015)	18.44±8.43	0.099 (0.905)
	Aromatase inhibitor	35.25±26.39		18.33±9.59	
	Tamoxifen + zoladex	15.92±20.01		19.54±8.11	
Menopause**	Yes	29.30±23.72	0.004 (0.951)	18.24±9.01	0.896 (0.346)
	No	28.77±32.17		21.22±9.23	
Pain medication**	Yes	51.27±26.12	8.317 (0.000)	21.67±9.31	2.334 (0.102)
	No	25.39±22.43		18.29±8.82	
Pain increase after hormonal therapy	None	23.39±23.19[a]	5.510 (0.005) a, b < b, c	17.39±8.37	2.236 (0.099)
	Slight	30.39±18.39[b]		17.57±9.04	
	Severe	43.30±28.74[c]		22.20±9.81	
Body mass index	Underweight	1.25±3.30	1.392 (0.232)	14.02±10.36	0.940 (0.599)
	Normal weight	29.98±26.70		19.38±8.53	
	Overweight	30.92±19.42		16.68±10.54	
	Obese	29.81±21.43		16.91±7.32	
Compliance	Yes	28.48±23.70	0.347 (0.557)	18.13±8.99	0.578 (0.449)
	No	34.14±33.39		20.86±11.25	

**Missing value excluded. SD: Standard deviation

the others. In addition, pain was significantly different by pain medication ($P = 0.001$) and pain increase after HT ($P = 0.005$). The participants who reported to have pain medication had higher scores of pain than the others,

and those with severe pain increase had higher pain score than the others.

Table 4 shows painful areas of the participants. The most painful area was upper extremity around their operated site (36.1%), followed by operation site itself (28.7%), knee (28.9%), waist (11.1%), and foot and ankle (11.1%). Further analysis revealed that 62.5% of the participants with AI complained increased pain whereas 40% of the participants with tamoxifen did. Moreover, this difference was statistically significant ($P = 0.001$) and especially knee pain increased significantly in AI group ($\chi^2 = 12.14$. $P = 0.016$).

Menopause symptoms

Almost (95.5%) of the participants reported to have menopause symptoms and 60.0% of them reported to have severe degree symptoms. As shown in Table 1, the mean score of menopause symptoms was 18.32 ± 8.93 and 6.72 ± 4.05 in the dimension of somato-vegetative

symptoms, 6.78 ± 3.98 in psychological symptoms, and 4.82 ± 2.83 in urogenital symptoms. Among the menopause symptoms, "exhausted" was the most common symptom (97.3%) and its mean score was 2.04, which was the most severe symptom, followed by "joint and muscle complaints" (mean = 1.99), "sleep disorders" (mean = 1.85), and "sweating/flush" (mean = 1.82) as shown in Table 2, the total score of menopause symptoms had no differences according to sociodemographic and illness-related characteristics. When we investigated the menopause symptoms in detail with age and the type of HT [Table 5], sweating/flush, irritation, and exhaustion were significantly highest in the 40s ($P < 0.05$); on the other hand joint, muscle complaint was significantly highest in the 60s ($P < 0.05$). At the same time, sweating/flush was significantly higher in tamoxifen group ($P < 0.005$), and joint and muscle complaints were significantly higher in AI group ($P < 005$).

This study has a few limitations. Data sources came from one hospital in Korea as well as insufficient power

Table 4: Painful area by hormonal therapy (n=110)

Painful area	Tamoxifen (n=43), n (%)	Aromatase inhibitor (n=52), n (%)	Tamoxifen + zoladex (n=13), n (%)
Upper extremity of operated side	14 (32.6)	17 (32.7)	7 (53.8)
Operated area	11 (25.6)	16 (31.0)	4 (30.8)
Neck	0	2 (3.8)	0
Shoulder	4 (9.3)	5 (9.6)	1 (7.7)
Elbow	0	3 (5.8)	0
Hand/wrist	2 (4.7)	4 (7.7)	2 (15.4)
Waist	5 (11.6)	4 (7.7)	3 (23.1)
Coccyx	1 (2.3)	1 (2.0)	0
Pelvis	3 (7.0)	4 (7.7)	2 (15.4)
Knee	4 (9.3)	16 (31.0)	0
Thigh	3 (7.0)	1 (2.0)	0
Foot/ankle	4 (9.3)	7 (13.5)	1 (7.7)

Table 5: Detailed menopause symptoms by the age and type of hormonal therapy (n=110)

Variables	Age (year, mean±SD)			F/t (P) Scheffé	Hormonal therapy (mean±SD)			F/t (P) Scheffé
	<50	50-59	>60		Tamoxifen (n=43)	Aromatase inhibitor (n=52)	Tamoxifen + zoladex (n=13)	
Sweating/flush	2.69±1.04[a]	1.65±1.10[b]	1.19±1.27[c]	13.30 (0.00) a>b, c	2.12±1.07[a]	1.44±1.30[b]	2.54±1.20[c]	6.40 (0.002) a, c>a, b
Cardiac complaints	1.31±1.11	1.06±0.96	1.19±1.10	0.60 (0.553)	1.23±1.07	1.17±1.04	1.00±0.82	0.26 (0.775)
Sleeping disorders	2.28±1.22	1.61±1.22	1.92±1.55	2.49 (0.088)	1.88±1.20	1.77±1.42	2.15±1.14	0.44 (0.647)
Joint and muscle complaints	1.59±1.32[a]	1.94±1.30[b]	2.50±1.36[c]	3.33 (0.039) a, b<c	1.58±1.30[a]	2.44±1.29[b]	1.69±1.25[c]	5.71 (0.004)
Depressed	1.86±1.33	1.28±1.05	1.85±1.32	3.17 (0.46)	1.44±1.20	1.60±1.24	1.92±1.26	0.78 (0.459)
Irritable	2.07±1.19[a]	1.28±0.88[b]	1.81±1.42[c]	5.30 (.006) a, c>b, c	1.63±1.05	1.50±1.20	2.08±1.32	1.30 (0.277)
Anxious	1.93±1.39	1.35±0.99	1.65±1.41	2.22 (0.114)	1.51±1.03	1.56±1.27	2.08±1.50	1.15 (0.320)
Exhausted	2.38±0.98[a]	1.80±0.90[b]	2.15±1.12[c]	3.61 (0.030)	2.00±0.98	2.04±0.99	2.31±1.11	0.49 (0.615)
Sexual problems	1.76±1.30	1.91±1.38	1.46±1.30	0.97 (0.380)	1.77±1.20	1.85±1.41	1.46±1.51	0.43 (0.651)
Urinary complaints	1.14±1.27	1.43±1.04	1.42±1.21	0.67 (0.514)	1.53±1.16	1.35±1.10	0.77±1.17	2.28 (0.107)
Vaginal dryness	1.59±1.32[a]	1.94±1.30[b]	2.50±1.36[c]	3.33 (0.039) a, b<c	1.70±1.34	1.62±1.44	1.54±1.66	0.08 (0.927)

SD: Standard deviation

(=0.65) resulted from insufficient sample size would limit the generalizability of the results.

Discussion

Adherence to adjuvant HT is important for breast cancer patients due to its effect on reduction of recurrence and mortality of breast cancer. However, adherence rates to HT are relatively low, and one of the barriers to the adherence is the toxicities of hormonal agents. This study analyzed to identify detailed pain characteristics and menopause symptoms of breast cancer patients with HT in Korea.

Most (88.2%) of the participants experienced pain and 40% reported to have middle or severe pain in the study. Moreover, 41.3% of the participants complained that their pain increased after HT. The most painful area was upper extremity or operated area, and it was similar to the previous study[25] reporting that 20%–60% of breast cancer patients suffered from chronic pain around the operated area. Yet, it is interesting to note that their pain site was not only located in the operated area but also throughout the whole body, such as musculoskeletal pains of the knee, foot, ankle, and shoulder.

This study showed that more pain was reported in participants with AI than those with other HT ($P = 0.004$). Patients with AI reported more musculoskeletal pain when compared to the other HTs. Specifically, there was a significant difference in knee pain between participants with AI and the others. These results are similar to the other studies that 46.3% felt that their pain increased when they got AI, musculoskeletal pain appeared to more than 50%.[17,18] They are also similar to the previous studies, indicating that musculoskeletal pain in the wrist, hand, foot, ankle, elbow, and knee is typical in patients with AI.[26,27] This study indicated that adherence to HT was correlated with the rate of feeling increased pain ($P = 0.001$). Considering that pain is correlated to the nonadherence, oncology professionals need to pay more attention to patients receiving AI, who are expected to increase in the future, because it is recommended to incorporate AI as adjuvant treatment strategy due to lowering risk of breast cancer recurrence compared with 5 years of tamoxifen alone.[28]

This study shows that older participants reported more pain than younger patients did ($P < 0.05$). This result can be explained with the fact that, the older they were, the more they had osteoporosis or basic musculoskeletal problems, and these symptoms might increase pain more after HT.[29] Thus, osteoporosis or musculoskeletal problem must be assessed, especially in elder patients when they start HT, and oncology professionals need to monitor their pain continuously throughout their HT. In this study, the participants with low economic status had higher pain compared with the other groups. This is thought to be related with lower accessibility and availability of using medical systems. Hence, more concern and supports must be given to them. Moreover, lower running cost and preventive methods must be developed for them.

In this study, 95.5% of the participants reported to have menopause symptoms and more than 60% reported to have severe degree symptoms. The mean score of menopause symptoms was 18.32 (SD = 8.93). This score is higher than in normal women (7.2–10.4),[23,30] and it was even higher when compared to the patients with chemotherapy (13.05).[15] These results demonstrate that oncology professionals should pay special attention to the menopausal symptoms by regularly assessing and intervening to relieve these symptoms of breast cancer patients with HT.

Among menopause symptoms, "exhausted" was the most common symptom in the study. It is similar to the result of the previous study that fatigue was major affecting factor of their quality of life.[31] Hot flash was significantly highest in the 40s, and this result can be explained with the fact that hot flash is typical symptom of early menopause symptoms. At the same time, hot flash was significantly higher in tamoxifen group, and joint and muscle complaints were significantly higher in AI group. These results were consistent with the other studies that hot flash appeared more frequently and strongly in tamoxifen group[32,33] and that the patient's pain increased significantly when they received AI.[17,18] These results suggest that menopause symptoms should be weighed when considering to incorporate AI and tamoxifen at some point during HT. In terms of age, psychological menopause symptoms or somato-vegetative symptoms were higher when they are younger. Thus, age needs to be considered when assessing and intervening menopause symptoms.

This study shows that nonadherence rate is 7.5% among 110 participants with mean years of 3.56 since diagnosis. This rate is much lower than those of many previous studies in Western countries.[4-12] More studies, including cross-cultural studies, should be conducted to verify and to identify factors influencing adherence to HT.

In conclusion, pain and menopause symptoms are prevalent among breast cancer patients receiving HT. Especially, patients receiving AI reported more pain and pain was correlated with the adherence. Moreover, menopause symptoms were different by age and type of HT. Thus, careful tailored interventions are needed to relieve pain and menopause symptoms to improve adherence to HT. Ultimately, such interventions may have impact on survival of breast cancer. The results of the study may also help in deciding the optimal timing and duration of hormonal agents.

Conclusion

Long duration HT is one of the important systemic adjuvant therapies for breast cancer to help reduce recurrence and mortality of breast cancer. The results of the study show that the prevalence and levels of pain and menopause symptoms among breast cancer patients receiving HT were very high. Moreover, adherence to HT showed a significant difference according to the rate of feeling increased pain. Sweating/flush was significantly higher in tamoxifen group, and joint and muscle complaints were higher in AI group. Therefore, tailored interventions that relieve pain and menopausal symptoms of breast cancer patients with HT are needed.

There are several limitations to this study. First, convenience sample was utilized, resulting in limited generalizability of the results. Another limitation may be the inability to capture a direct correlation between pain and adherence and between menopause symptoms and adherence to HT. Further investigations are needed to identify effective interventions to help patients adhere to the full course of adjuvant HT.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Ferlay J, Soerjomataram I, Dikshit R, Eser S, Mathers C, Rebelo M, *et al.* Cancer incidence and mortality worldwide: Sources, methods and major patterns in GLOBOCAN 2012. Int J Cancer 2015;136:E359-86.
2. National Cancer Information Center. National Cancer Center; 2016. Available from: http://www.cancer.go.kr/mbs/cancer/subview.jsp?id=cancer_040302000000. [Last retrieved on 2017 May 23].
3. Winer EP, Hudis C, Burstein HJ, Wolff AC, Pritchard KI, Ingle JN, *et al.* American Society of Clinical Oncology technology assessment on the use of aromatase inhibitors as adjuvant therapy for postmenopausal women with hormone receptor-positive breast cancer: Status report 2004. J Clin Oncol 2005;23:619-29.
4. Early Breast Cancer Trialists' Collaborative Group (EBCTCG). Effects of chemotherapy and hormonal therapy for early breast cancer on recurrence and 15-year survival: An overview of the randomised trials. Lancet 2005;365:1687-717.
5. Hershman DL, Shao T, Kushi LH, Buono D, Tsai WY, Fehrenbacher L, *et al.* Early discontinuation and non-adherence to adjuvant hormonal therapy are associated with increased mortality in women with breast cancer. Breast Cancer Res Treat 2011;126:529-37.
6. Chlebowski RT, Geller ML. Adherence to endocrine therapy for breast cancer. Oncology 2006;71:1-9.
7. Partridge AH, LaFountain A, Mayer E, Taylor BS, Winer E, Asnis-Alibozek A. Adherence to initial adjuvant anastrozole therapy among women with early-stage breast cancer. J Clin Oncol 2008;26:556-62.
8. Lash TL, Fox MP, Westrup JL, Fink AK, Silliman RA. Adherence to tamoxifen over the five-year course. Breast Cancer Res Treat 2006;99:215-20.
9. Barron TI, Connolly R, Bennett K, Feely J, Kennedy MJ. Early discontinuation of tamoxifen: A lesson for oncologists. Cancer 2007;109:832-9.
10. Kimmick G, Anderson R, Camacho F, Bhosle M, Hwang W, Balkrishnan R. Adjuvant hormonal therapy use among insured, low-income women with breast cancer. J Clin Oncol 2009;27:3445-51.
11. Ziller V, Kalder M, Albert US, Holzhauer W, Ziller M, Wagner U, *et al.* Adherence to adjuvant endocrine therapy in postmenopausal women with breast cancer. Ann Oncol 2009;20:431-6.
12. Hershman DL, Kushi LH, Shao T, Buono D, Kershenbaum A, Tsai WY, *et al.* Early discontinuation and nonadherence to adjuvant hormonal therapy in a cohort of 8,769 early-stage breast cancer patients. J Clin Oncol 2010;28:4120-8.
13. Salgado B, Zivian M. Aromatase inhibitors: Side effects reported by 622 women. In: San Antonio breast cancer symposium: 2007. Breast Cancer Res Treat 2007;106 Suppl 1:S168.
14. Fenlon DR, Corner JL, Haviland J. Menopausal hot flushes after breast cancer. Eur J Cancer Care (Engl) 2009;18:140-8.
15. Dorjgochoo T, Gu K, Kallianpur A, Zheng Y, Zheng W, Chen Z, *et al.* Menopausal symptoms among breast cancer patients 6 months after diagnosis: A report from the Shanghai Breast Cancer Survival Study. Menopause 2009;16:1205-12.
16. Boehm DU, Lebrecht A, Eckhardt T, Albrich S, Schmidt M, Siggelkow W, *et al.* Quality of life and adjuvant tamoxifen treatment in breast cancer patients. Eur J Cancer Care (Engl) 2009;18:500-6.
17. Moxley G. Rheumatic disorders and functional disability with aromatase inhibitor therapy. Clin Breast Cancer 2010;10:144-7.
18. Oberguggenberger A, Hubalek M, Sztankay M, Meraner V, Beer B, Oberacher H, *et al.* Is the toxicity of adjuvant aromatase inhibitor therapy underestimated? Complementary information from patient-reported outcomes (PROs). Breast Cancer Res Treat 2011;128:553-61.
19. Hwang E, Yi M. Factors influencing quality of life in patients with breast cancer on hormone therapy. J Korean Acad Nurs 2014;44:108-17.
20. Cleeland CS, Ryan KM. Pain assessment: Global use of the Brief Pain Inventory. Ann Acad Med Singapore 1994;23:129-38.
21. Yun YH, Mendoza TR, Heo DS, Yoo T, Heo BY, Park HA, *et al.* Development of a cancer pain assessment tool in Korea: A validation study of a Korean version of the brief pain inventory. Oncology 2004;66:439-44.
22. Serlin RC, Mendoza TR, Nakamura Y, Edwards KR, Cleeland CS. When is cancer pain mild, moderate or severe? Grading pain severity by its interference with function. Pain 1995;61:277-84.
23. Heinemann K, Ruebig A, Potthoff P, Schneider HP, Strelow F, Heinemann LA, *et al.* The Menopause Rating Scale (MRS) scale: A methodological review. Health Qual Life Outcomes 2004;2:45.
24. Lee MS, Kim JH, Park MS, Yang J, Ko YH, Ko SD, *et al.* Factors influencing the severity of menopause symptoms in Korean post-menopausal women. J Korean Med Sci 2010;25:758-65.
25. Park JH, Lee WH, Chung HS. Incidence and risk factors of

breast cancer lymphoedema. J Clin Nurs 2008;17:1450-9.

26. Mao JJ, Bruner DW, Stricker C, Farrar JT, Xie SX, Bowman MA, *et al.* Feasibility trial of electroacupuncture for aromatase inhibitor – Related arthralgia in breast cancer survivors. Integr Cancer Ther 2009;8:123-9.

27. Garreau JR, Delamelena T, Walts D, Karamlou K, Johnson N. Side effects of aromatase inhibitors versus tamoxifen: The patients' perspective. Am J Surg 2006;192:496-8.

28. Burstein HJ, Prestrud AA, Seidenfeld J, Anderson H, Buchholz TA, Davidson NE, *et al.* American Society of Clinical Oncology clinical practice guideline: Update on adjuvant endocrine therapy for women with hormone receptor-positive breast cancer. J Clin Oncol 2010;28:3784-96.

29. Muslimani AA, Spiro TP, Chaudhry AA, Taylor HC, Jaiyesimi I, Daw HA. Aromatase inhibitor-related musculoskeletal symptoms: Is preventing osteoporosis the key to eliminating these symptoms? Clin Breast Cancer 2009;9:34-8.

30. Heinemann LA, Potthoff P, Schneider HP. International versions of the Menopause Rating Scale (MRS). Health Qual Life Outcomes 2003;1:28.

31. Byun HS, Kim GD. Impacts of fatigue, pain, anxiety, and depression on the quality of life in patients with breast cancer. Asian Oncol Nurs 2012;12:27-34.

32. Couzi RJ, Helzlsouer KJ, Fetting JH. Prevalence of menopausal symptoms among women with a history of breast cancer and attitudes toward estrogen replacement therapy. J Clin Oncol 1995;13:2737-44.

33. McPhail G, Smith LN. Acute menopause symptoms during adjuvant systemic treatment for breast cancer: A case-control study. Cancer Nurs 2000;23:430-43.