

Influence of Endocrine Symptoms on Quality of Life related to Lower Urinary Tract Symptoms in Breast Cancer Survivors

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Abstract

The purpose of this study was to identify endocrine symptoms, quality of life (QoL) related to lower urinary tract symptoms (LUTS) and influencing factors QoL related to LUTS in breast cancer survivors. Settings and Design: This study is a cross-sectional descriptive survey to identify the level of endocrine symptoms on QoL related to LUTS in breast cancer survivors. In this study, 240 breast cancer survivors who visited an outpatient clinic of a tertiary teaching hospital in Seoul, South Korea. Endocrine symptoms were measured by the Functional Assessment of Chronic Illness Therapy-endocrine symptom subscale. QoL related to LUTS was measured by King's Health Questionnaire.

Statistical analysis used: Data were analyzed using descriptive statistics, Pearson correlation coefficient and stepwise multiple regression. QoL related to LUTS was the highest regarding general health perceptions (GHP), while it was the lowest for social limitation (SL). Between the endocrine symptoms and QoL, there was a positive correlation. Models including the variable (endocrine symptoms, job) explained 40.0% of the QoL related to LUTS. Endocrine symptoms was the most influential factor. Therefore, there is a need to continuously assess the endocrine symptoms and QoL related to LUTS that may occur in the course of treatment during nursing assessment of breast cancer survivors. The nursing intervention should be developed to minimize the decrease of QoL or change in urination habits that may occur in the course of treatment of breast cancer survivor.

Keywords: Breast Cancer, Endocrine Symptoms, Lower Urinary Tract Symptoms (LUTS), Quality of Life (QoL)

INTRODUCTION

Breast cancer survivor means a person who live in a state treatment is completed or are receiving treatment after being diagnosed with breast cancer [1]. A 5 - year survival rate after

diagnosis of breast cancer is higher in South Korea (91.5%) than in United States (89.4%), Canada (88%), Japan (89.1%) [2] and breast cancer survivor has continued to increase. Breast cancer survivors will experience the pain caused by various physical and psychological complications due to receive radiation therapy, chemotherapy and hormonal therapy for a long time repeatedly after surgery [3].

External genital and lower urinary tract of women is affected by both the female hormone because it arises from a common structure called urogenital sinus. Estrogen receptors are located around the urethra sphincter, venous plexus around the urethra, trigon of bladder, and most of the pelvic floor muscles [4]. Reduction in female hormone results in a reduction of pelvic muscle tone, loss of elasticity due to improper urinary collagen production, reduction of α -adrenergic activity, decrease in urethral pressure due to a decrease of the blood flow within the urethra and increases the LUTS [5]. On the other hand, breast cancer survivors will experience a premature menopause [6], acute ovarian failure [7], and changes in hormone secretion due to cancer treatment, which causes hot flashes, night sweats, urinary tract atrophy, sexual dysfunction, palpitations, vaginal dryness, infertility, sleep disturbances. Therefore, the interest in QoL related to LUTS and endocrine symptoms caused by treatment of breast cancer survivors is required.

LUTS does not life-threatening itself. However, it gives a sense of embarrassment and humiliation caused by symptoms in an individual and leads to a shrinking of social activities, loss of self-esteem, increased burden of symptoms, decreased QoL [8]. In a previous study it had reduced health-related QoL in coping, sleep, and emotional area with an increase in the number of nocturia [9]. Overactive bladder syndrome also has an adverse effect on health-related QoL. In particular, it showed negative results in the area of the coping, sleep/energy, general health, incontinence severity measures [10]. Other also, most of the studies [11] was to compare the QoL as a result indicators after the surgical treatment or drug treatment

of urinary incontinence. However, because research identified quality of the related LUTS to target breast cancer survivor with endocrine symptoms is still insufficient, it is difficult to know whether any trends indicating.

In natural menopause due to normal aging, the body gradually adapted for the reduction of estrogen, but breast cancer survivors may feel more often and worse the endocrine symptoms, such as hot flashes, sleep disturbances, vaginal dryness, dyspareunia compared to normal postmenopausal women because of the toxic effect of anticancer agent to reduce the follicle cells in a short time [7,12]. This is thought to have a negative impact on QoL related to LUTS. Therefore, the purpose of this study was to determine the level of endocrine symptoms and QoL related to LUTS and was to determine the effects of endocrine symptoms on QoL related to LUTS of breast cancer survivors with urinary symptoms.

METHODS AND RESEARCH MATERIALS

Design

This study is a cross-sectional descriptive survey to identify the level of endocrine symptoms on QoL related to LUTS in breast cancer survivors.

Participants and data collection

This study was approved by the institutional review board at the university. The participants are breast cancer patients who visited the outpatient of a teaching hospital in Seoul and among them, 240 people were sampled for convenience. In order to improve the completeness of the questionnaire and to reduce the dropout rate, the subjects of this study were 18 ~ 69 year - old adults with current incontinence symptoms. Those who are receiving treatment for urinary tract disease, those with mental illness or difficulty in communication, or those who refuse to participate in the study are excluded. When calculated by using the G * power 3.1.7 program for the number of subjects required to ensure the statistical power of regression analysis, 189 people was calculated. Calculation basis is as follows: two-sided effect size of 0.15, 0.05 significance level, statistical power of 0.95, and the number of predictors 13. Accordingly, this study meets the required number of subjects.

INSTRUMENTS

Endocrine symptoms

Endocrine symptoms were measured by the Functional Assessment of Chronic Illness Therapy (FACIT) -Endocrine symptom [13] developed by FACIT. We have received permission to use the tool from the FACIT, and scoring of questionnaires followed the instructions of the authorities. This instrument includes 19 items that are rated on a 5-point

scale. Each item is made to respond from zero (not at all) to four points (strongly agree). A high score in the survey indicates a high degree of endocrine symptoms. In the study of Fallowfield [13], the internal validity was .65-.87 and the test-retest reliability was .93. In this study, Cronbach's alpha was .94.

QoL related to LUTS

QoL related to LUTS was measured using the Korean version of the King's Health Questionnaire (KHQ) developed by Kelleher et al. [14]. The Korean version verified the reliability and validity of the stress urinary incontinence patients by Oh et al. [15]. This tool is not limited to use for academic purposes, and is a questionnaire that can assess the severity of urination symptoms and assess the impact of LUTS on QoL. This tool is a total of 21 questions and consists of 9 KHQ sub-domains(overall health perceptions, and incontinence severity areas). The three items in the interpersonal restriction area were measured by the Likert type 5-point scale(0: not applicable to 4: very agree), and the other areas were measured by the 4-point scale(1: not at all to 4:very agree). Scoring of questionnaires followed the instructions of the authorities. A high score in the survey indicates a high degree of QoL related to LUTS. The reliability of this tool was Cronbach's alpha of .72-.89 [14] at the time of development and in this study, Cronbach's alpha was .89.

DATA ANALYSIS

Collected data were analyzed using SPSS WIN 21.0 (SPSS Inc., Chicago, IL, USA). General characteristics of participants, endocrine symptoms and QoL related to LUTS were confirmed the frequency, percentage, means and standard deviations. Correlation was confirmed by Pearson correlation coefficient. Factors affecting the QoL related to LUTS was analyzed by stepwise multiple regression.

ETHICAL CONSIDERATION AND DATA COLLECTION

After approval of the Ethics Review Committee for ethical consideration of the subjects, the research was conducted. The data collection period was from March to May 2016.

The researcher identified breast cancer survivors who met the inclusion criteria for breast cancer survivors visiting the outpatient clinic and explained the purpose of the study and the autonomy and confidentiality of participation in the study to breast cancer survivors. Then the researcher was given written consent to participate in the study. The questionnaire was distributed by the researcher to the subject. The questionnaire completed by the researchers was collected directly. All subjects who participated in the questionnaire provided a certain return piece.

RESULTS

General characteristics of participants

The mean age of participants was 53.0 years and participants were all women. Among the participants, 84.2% had a spouse and 77.5% were not working. BMI was 59.2% less than 23kg/m². 83.8% were postmenopausal and 95.4% had a delivery experience and 20.0% had a gynecologic surgical experience. The cancer staging, stage I was 37.1% and stage II was 45.8% stage III was 17.1%. 72.5% were more than three years progress period after surgery. Participants that the current chemotherapy, radiation therapy, hormone therapy were 4.2%, 4.6%, 38.8% respectively (Table 1).

Table 1: General characteristics of subjects (N=240)

Characteristics	n(%) or M±SD(range)
Age (yrs)	53.0 ± 6.2 (34 ~ 68)
Spouse	
Yes	202 (84.2)
No	38 (15.8)
Job	
Yes	54 (22.5)
No	186 (77.5)
Body mass index (kg/m ²)	
<23	142 (59.2)
≥23	98 (40.8)
Menopause	
Yes	201 (83.8)
No	39 (16.2)
Delivery experience	
Yes	229 (95.4)
No	11 (4.6)
History of gynecology surgery	
Yes	48 (20.0)
No	192 (80.0)
Cancer stage	
I	89 (37.1)
II	110 (45.8)
III	41 (17.1)
Duration after operation (yrs)	
<3	66 (27.5)
≥3	174 (72.5)
Current treatment	
Chemotherapy	

Yes	10 (4.2)
No	230 (95.8)
Radiation therapy	
Yes	11 (4.6)
No	229 (95.4)
Hormone therapy	
Yes	93 (38.8)
No	147 (61.2)

Level of QoL related to LUTS and endocrine symptom

Among KHQ-QoL domain impact on life (IL) was higher by 45.97 points out of 100 points and GHP was higher by 42.40 points and SL was lower by 19.81 points. Incontinence severity measures (SM) was 17.83 points. Endocrine symptom was 38.11 points out of 76 points (Table 2).

Table 2: Level of endocrine symptoms and QoL related to LUTS (N=240)

Variables	M ± SD
KHQ domain	
General health perceptions (GHP)	42.40 ± 19.32
Impact on life (IL)	45.97 ± 21.40
Role limitation (RL)	26.67 ± 25.68
Physical limitation (PL)	28.33 ± 26.28
Social limitation (SL)	19.81 ± 24.85
Personal relationships (PR)	21.22 ± 25.32
Emotion (EM)	21.44 ± 27.27
Sleep/energy (SE)	22.85 ± 21.29
Incontinence severity measures (SM)	17.83 ± 19.14
Endocrine symptom	38.11 ± 11.94

QoL=Quality of life, LUTS=Lower Urinary Tract Symptoms

Correlation among endocrine symptoms and QoL related to LUTS

Between endocrine symptoms and KHQ domain except IL, there was the moderate positive correlation ($r=0.53$, $p<.001$). Between endocrine symptoms and IL there was a weak correlation (Table 3).

Table 3: Correlation among endocrine symptoms and QoL related to LUTS

(N=240)	
KHQ domain	Endocrine symptoms
General health perceptions (GHP)	.43 (<.001)
Impact on life (IL)	.13 (.049)
Role limitation (RL)	.52 (<.001)
Physical limitation (PL)	.53 (<.001)
Social limitation (SL)	.52 (<.001)
Personal relationships (PR)	.46 (<.001)
Emotion (EM)	.52 (<.001)
Sleep/energy (SE)	.49 (<.001)
Incontinence severity measures (SM)	.47 (<.001)

QoL=Quality of life, LUTS=Lower Urinary Tract Symptoms

Values are Pearson correlation coefficient (p value)

Factors affecting the QoL related to LUTS

Among the general characteristics, characteristics other than age were converted into dummy variables, and they were input as independent variables together with age and endocrine symptoms, and quality of life related to lower urinary tract symptom was analyzed as a dependent variable. The explanatory variables were independent because the correlation coefficient between independent variables was less than 0.80. The Durbin Watson statistic was 2.146, which was close to 2, so there was no problem of autocorrelation. As a result of checking multicollinearity problem, the tolerance was 0.923 ~ 0.977, 0.1 or more, and the variation inflation factor was 1.023 ~ 1.084, which was not more than the reference value of 10. It is confirmed that there is no problem of multi collinearity. The assumptions of linearity, normality, and homoscedasticity were also satisfied as a result of the tests to meet the assumption of residuals. The regression model was statistically significant ($F = 53.94$, $p <.001$), and endocrine symptoms and job were confirmed as influential factors. The severity of endocrine symptoms and the absence of job were associated with lower QOL related to LUTS. Endocrine symptoms were the most important influencing factors, and 40% predicted the QOL associated with LUTS of breast cancer survivors with and without job (Table 4).

Table 4: Factors influencing QoL related to LUTS

(N=240)					
KHQ all item	B	SE	Standardized β	t	p
Intercept	2.38	5.81	0	0.41	.682
Endocrine symptoms (FACT-ES subscale scores)	0.67	0.09	.60	11.81	<.001
Job (reference: no)	-	1.48	-.12	-2.26	.024
Age (years)	0.19	0.10	.10	1.94	.053

$R^2 = .41$ Adjusted $R^2 = .40$ $F(p) = 53.94 (<.001)$

QoL=Quality of life, LUTS=Lower Urinary Tract Symptoms

KHQ=King's Health Questionnaires, SE=Standard Error

DISCUSSION

This study was identify the level of endocrine symptoms and QoL related to LUTS and then was identify the correlation between endocrine symptoms and QoL related to LUTS and the effects of endocrine symptoms on QoL related to LUTS of breast cancer survivors with urinary symptoms.

In analyzing the scores for each area, impact on life (IL) was the highest a decrease in QoL to 45.97 out of 100 points. LUTS, such as storage symptom, voiding symptom post micturition symptom is a problem that affects the QoL of the subjects rather than issues that critically affect the life, person experiencing the symptoms are feeling discomfort due to this and hampered in their daily lives [16]. If there is severe LUTS have fear in everyday activities of cooking, cleaning, laundry, exercise or physical activity, etc., as well as avoiding going out for a place that easily go to the bathroom. In addition, it is also passive for interpersonal relationships such as husband or friends and it makes avoiding interpersonal relationships [17]. Iglesias et al. [18] reported that 42% of women with LUTS had social limitations and negative feelings due to LUTS, and 21% of women with LUTS reported that LUTS had a negative impact on daily life. Park and Kim [19], who compared women with LUTS and women without symptoms, showed no significant difference in daily work problems and social activity avoidance. However, there was a significant difference between drinking restriction, physical activity limitation, and interpersonal difficulty, so that LUTS had a negative effect on daily life. Thus, lower urinary tract symptoms may interfere with the daily life of women, which may lead to depression of self-esteem, depression, alienation, and pressure to conceal symptoms [20].

Thus LUTS are limited to normal daily life and has a negative effect on the QoL [21].

The results of this study, incontinence severity measure (SM) (17.83) and social limitation (SL) (19.81) were lower score.

This is interpreted to have little effect on the SL and SM of LUTS because the age of the subjects is relatively young with an average 53.0 and health state is relatively good with a general health perceptions (GHP) 42.40 points. However, if severe LUTS, increasing SL and SM would increase the QoL decreased. Thus they are reluctant to go out or to go to a crowded place. Mental psychological atrophy eventually is to experience a social withdrawal results in that even reluctantly relationships. In addition, frequent access toilet or urinary incontinence may be further exacerbated by social withdrawal hindering even work activity [22]. In study of 990 people men and women with overactive bladder symptoms, Coyne et al. [10] reported a great decline in most QoL related to sleep and reported a small decline in most QoL related to social action of LUTS.

In this study, level of endocrine symptoms of breast cancer survivors was 38.11 points out of 76 points. In a previous study that has identified the health-related QoL in postmenopausal women with breast cancer who completed hormone therapy, level of the endocrine symptoms was 62.2 points [23]. Level of endocrine symptoms of the study was the low level compared to our study. Brennan et al. [24] understand the QoL to target 68 breast cancer survivors to compensate for personalized survivorship care plan survival for a standardized management track and as a result, the endocrine symptoms were severe with 60.3 points. This also was a high level when compared to the results of this study. The reason for the lower endocrine symptom in this study than the previous study is that the age range of the subjects ranged from 34 to 68 years, ranging from relatively young to middle aged. In addition, although there were many subjects who experienced menopause and childbirth, there was no history of OBGY (obstetrics and gynecology) surgery, and there were more subjects who did not receive chemotherapy, radiation therapy, hormone therapy, because there were many subjects who had I and II breast cancer stage. Therefore, the endocrine symptom score of our study seems to be lower than that of Yagata et al. [23] and Brennan et al. [24], which had breast cancer stage III or higher and had more chemotherapy or hormone therapy. On the other hand, studies comparing endocrine symptoms in breast cancer survivors and healthy middle-aged women have shown that breast cancer survivors experience more endocrine symptoms than healthy middle-aged women. This is similar to the results of Jo and Lee [25], in which patients with artificial menopause had higher endocrine symptoms than healthy menopausal women who were naturally menopausal. Therefore, breast cancer survivors may have severe endocrine symptoms due to chemotherapy or hormone therapy, so proper nursing care will be needed to manage endocrine symptoms.

Factors affecting QoL related to LUTS of breast cancer survivors were endocrine symptoms and job. Endocrine symptoms are more severe and if the jobless person, the higher burden of QoL related to LUTS. Endocrine symptoms were the most important influencing factors, and 40%

predicted the QoL associated with LUTS of breast cancer survivors with and without job. Chemotherapy and hormone therapy to perform for the treatment to breast cancer survivors results in ovarian failure and endocrine symptoms by reducing the estrogen and progesterone hormone due to ovarian toxicity [26]. Such endocrine symptoms can lead to urogenital atrophy, such as redness of the vaginal mucous membranes, loss of elasticity, loss of wrinkles, changing the configuration of the cell, an increase in acidity within the vagina by giving the effect on urogenital [27]. And reduction of estrogen reduces the maximal urethral closure pressure and may cause or exacerbate incontinence [28].

Although there is no previous study, it is difficult to directly compare with the results of this study. However, In a study by Kim et al. [29], the comparison of endocrine symptoms experienced by healthy middle-aged women and survivors of breast cancer indicates that physical symptoms are the most difficult among endocrine symptoms in healthy middle-aged women. On the other hand, breast cancer survivors were the most inconvenient symptoms of genitourinary symptoms among the endocrine symptoms. These results can be seen in a study in which 50-75% of breast cancer survivors reported experiencing more than one genitourinary symptom [30]. Because endocrine symptoms and urogenital symptoms in breast cancer survivors are related to each other, endocrine symptoms of breast cancer survivors may be associated with lower QoL related to LUTS. In addition, the QoL of breast cancer survivors was measured using the Korean version of Functional Assessment of Cancer Therapy-Breast Cancer Version 4 (FACT-B) developed by FACIT. As a result, the quality of life decreased with the severity of endocrine symptoms [31]. However, as a result of this, it is not enough to explain the relationship between the QoL related to LUTS and the endocrine symptoms experienced by breast cancer survivors, so further researches to support this need to be made. The results of this study showed that the severity of endocrine symptoms is associated with lower quality of life related to lower urinary tract symptoms. The results of this study showed that the severity of endocrine symptoms is associated with lower quality of life related to lower urinary tract symptoms. In addition, we found that endocrine symptoms and quality of life related to lower urinary tract symptoms were related to each other. Therefore nurses have an interest in endocrine symptoms and LUTS due to treatment when the nursing breast cancer survivor and the nurse will need to monitor the impact on QoL. In this study job of breast cancer survivors were identified as influencing factors on QoL related to LUTS. The person with job was higher QoL related to LUTS than the person without a job. It is guessed capable of job activity because good overall health and LUTS in subjects who have a job. However, Park and Kim [19] have reported conflicting results by job of women in local community does not affect the QoL.

In this study, we could not control the effect of treatment by including the subject who is currently receiving cancer

adjuvant therapy. Because the detailed information about menopause could not be obtained in advance, it was unclear whether menopause was natural menopause or premature menopause due to breast cancer. Therefore, it is necessary to pay attention to interpretation of the results of this study. In addition, there were limitations in the in-depth comparison of the results of this study because of the lack of previous studies on the endocrine symptoms of breast cancer survivors and the quality of life associated with lower urinary tract symptoms. Therefore, it is necessary to investigate the effects of various characteristics and endocrine symptoms of breast cancer survivors on the QoL related to LUTS through later repetitive studies.

CONCLUSION

In this study, we identify the impact of endocrine symptoms on QoL related to LUTS of breast cancer survivors. Most of the 240 breast cancer survivors were more moderate endocrine symptoms and in the QoL related to LUTS, GHP is the highest QoL decreases. Decrease in QoL related to LUTS is the highest in GHP and IL and is the lowest in SM and SL. The main factors affecting the QoL related to LUTS was found to be endocrine symptoms and job. And these two factors were as explanatory power of 40% for the QoL related to LUTS. Therefore in order to improve the QoL related to LUTS for breast cancer survivors it is necessary to intensively manage the items that is indicated highly reduced for the QoL among QoL items related to LUTS. It would require effort to prepare an intervention scheme to regulate the endocrine symptoms because endocrine symptoms were the main factors affecting the QoL related to LUTS. Ultimately personalized intervention studies will be needed for disease and treatment characteristics of breast cancer survivors through the study to compare and analyze broken down by details of endocrine symptoms and the QoL related to LUTS.

REFERENCES

- [1] Card, I., 1994, "What cancer survivors need to know about health insurance", A publication of the National Coalition for Cancer Survivorship (NCCS), Silver Spring, Maryland, USA.
- [2] National Cancer Information Center, "National Cancer Registry statistics 2013", Cancer Registry statistics, Ministry of Health & Welfare. Retrieved December 23, 2015, from <http://www.cancer.go.kr>
- [3] L. M. Hess and K. C. Insel, "Chemotherapy related change in cognitive function: A conceptual model", *Oncology Nursing Forum*, Vol.34, No.5, pp.971-980, 2007.
- [4] D. Robinson and L. Cardozo, "Estrogens and the lower urinary tract", *Neurourology and Urodynamics*, Vol.30, No.5, pp.754-757. 2011.
- [5] A. Hextall and L. Cardozo, "The role of estrogen supplementation in lower urinary tract dysfunction", *International Urogynecology Journal and Pelvic Floor Dysfunction*, Vol.12, No.4, pp.258-261, 2001.
- [6] C. T. Stricker, "Endocrine effects of breast cancer treatment", *Seminars in Oncology Nursing*, Vol.23, No.1, pp.55-70. 2007.
- [7] A. Partridge, S. Gelber, R. D. Gelber, M. Castiglione-Gertsch, A. Goldhirsch and E. Winer, "Age of menopause among women who remain premenopausal following treatment for early breast cancer: long-term results from International Breast Cancer Study Group Trials V and VI", *European Journal of Cancer*, Vol.43, No.11, pp.1646-1653, 2007.
- [8] R. Karoli, S. Bhat, J. Fatima and A. Priya, "A study of bladder dysfunction in women with type 2 diabetes mellitus", *Indian Journal of Endocrinology and Metabolism*, Vol.18, No.4, pp.552-557, 2014. <http://dx.doi.org/10.4103/2230-8210.137518>
- [9] K. Coyne, D. Revicki, T. Hunt, R. Corey, W. Stewart, J. Bentkover, H. Kurth and P. Abrams, "Psychometric validation of an overactive bladder symptom and health-related quality of life questionnaire: the OAB-q", *Quality of Life Research*, Vol.11, No.6, pp.563-574, 2002.
- [10] Y. Wang, K. Xu, H. Hu, X. Zhang, X. Wang, Y. Na and X. Kang, "Prevalence, risk factors, and impact on health related quality of life of overactive bladder in China", *Neurourology and Urodynamics*, Vol.30, No.8, pp.1448-1455, 2011. <http://dx.doi.org/10.1002/nau.21072>.
- [11] T. Mitsui, N. Shimoda, K. Morita, H. Tanaka, K. Moriya and K. Nonomura, "Lower urinary tract symptoms and their impact on quality of life after successful renal transplantation", *International Journal of Urology*, Vol.16, No.4, pp.388-392, 2009. <http://dx.doi.org/10.1111/j.1442-2042.2009.02252.x>.
- [12] K. M. Winters-Stone, L. Nail, J. A. Bennett and A. Schwartz, "Bone Health and Falls: Fracture Risk in Breast Cancer Survivors With Chemotherapy-Induced Amenorrhea", *Oncology Nursing Forum*, Vol.36, No.3, pp.315-325, 2009. <http://dx.doi.org/10.1007/s10549-011-1444-z>.
- [13] L. J. Fallowfield, S. K. Leaity, A. Howell, S. Benson, and D. Cella, "Assessment of quality of life in women undergoing hormonal therapy for breast cancer: validation of an endocrine symptom subscale for the FACT-B," *Breast Cancer Research and Treatment*, vol.55, no.2, pp.189-199, 1999.
- [14] C. J. Kelleher, L. D. Cardozo, V. Khullar and S. Salvatore, "A new questionnaire to assess the quality of life of urinary incontinent women", *British Journal of*

- Obstetrics and Gynaecology, Vol.104, No.12, pp.1374-1379, 1997.
<http://dx.doi.org/10.1111/j.1471-0528.1997.tb11006.x>
- [15] S. J. Oh, K. S. Lee, W. H. Park, J. Rho, W. C. Kang and J. C. Kim et al., "Psychometric properties of the Korean version of the King's Health Questionnaire in women with stress urinary incontinence", *International Neurourology Journal*, Vol.9, No.2, pp.115-123, 2005.
- [16] K. Aikawa, O. Yamaguchi, T. Oguro, K. Ishibashi, T. Yanagida, M. Nomiya, N. Haga, T. Yoshiyasu and T. Kobayashi, "New classification for men with lower urinary tract symptoms: cluster analysis using the International Prostate Symptom Score", *British Journal of Urology International*, Vol.110, No.3, pp.408-412, 2012.
<http://dx.doi.org/10.1111/j.1464-410X.2011.10771.x>
- [17] K. H. Kim, "A study on correlation between urinary incontinence & lower urinary tract symptom and daily life of middle-aged & elderly women in urban city", *Korean Academic Society of Womens Health*, Vol.4, No.1, pp.115-147, 2003.
- [18] F. J. Gavira Iglesias, J. M. Caridad y Ocerín, J. Pérez del Molino Martín, E. Valderrama Gama, M. López Pérez, M. Romero López, M. V. Pavón Aranguren and J. B. Guerrero Muñoz, "Prevalence and psychosocial impact of urinary incontinence in older people of a Spanish rural population", *The journals of gerontology. Series A, Biological sciences and medical sciences*, Vol.55, No.4, pp.207-214, 2000.
- [19] S. M. Park and J. Y. Kim, "The effects of lower urinary tract symptoms on depression and quality of life among women in urban areas", *Journal of Korean Academy of Community Health Nursing*, Vol.20, No.4, pp.522-530, 2009.
- [20] N. H. Fultz and A. R. Herzog, "Self-reported social and emotional impact of urinary incontinence", *Journal of the American Geriatrics Society*, Vol.49, No.7, pp.892-899, 2001.
- [21] C. Robertson, C. L. Link, E. Onel, C. M. Keech, R. Hobbs, R. Fourcade, L. Kiemeny, C. Lee, P. Boyle and J. B. McKinlay, "The impact of lower urinary tract symptoms and comorbidities on quality of life: the BACH and UREPIK studies", *BJU International*, Vol.99, No.2, pp.347-354, 2007.
- [22] K. S. Coyne, C. C. Sexton, D. E. Irwin, Z. S. Kopp, C. J. Kelleher and I. Milsom, "The impact of overactive bladder, incontinence and other lower urinary tract symptoms on quality of life, work productivity, sexuality and emotional well-being in men and women: results from the EPIC study", *BJU International*, Vol.101, No.11, pp.1388-1395, 2008.
<http://dx.doi.org/10.1111/j.1464-410X.2008.07601.x>
- [23] H. Yagata, H. Ohtsu, Y. Komoike, S. Saji, H. Takei, T. Nakamura, Y. Ohashi, T. Iwase and K. Shimozuma, "Joint symptoms and health-related quality of life in postmenopausal women with breast cancer who completed 5 years of anastrozole", *Support Care Cancer*, Vol.24, No.2, pp.683-689, 2016.
<http://dx.doi.org/10.1007/s00520-015-2830-6>
- [24] M. E. Brennan, P. Butow, A. J. Spillane and F. Boyle, "Patient-reported quality of life, unmet needs and care coordination outcomes: Moving toward targeted breast cancer survivorship care planning", *Asia Pacific Journal Clinical Oncology*, Vol.12, No.2, pp.323-331, 2016. <http://dx.doi.org/10.1111/ajco.12254>
- [25] H. S. Jo and K. J. Lee, "A comparative study on climacteric symptoms of natural menopausal women and artificial menopausal women", *Journal of Korean Academy of Nursing*, Vol.31, No.4, pp.692-702, 2001.
<https://dx.doi.org/10.4040/jkan.2001.31.4.692>
- [26] N. Biglia, G. Moggio, E. Peano, P. Sgandurra, R. Ponzzone, R. E. Nappi and P. Sismondi, "Effects of surgical and adjuvant therapies for breast cancer on sexuality, cognitive functions, and body weight", *The Journal of Sexual Medicine*, Vol.7, No.5, pp.1891-1900, 2010. <http://dx.doi.org/10.1111/j.1743-6109.2010.01725.x>
- [27] K. Ford, M. Sowers, M. Crutchfield, A. Wilson and M. Jannausch, "A longitudinal study of the predictors of prevalence and severity of symptoms commonly associated with menopause", *Menopause*, Vol.12, No.3, pp.308-317, 2005.
- [28] T. Rechberger and P. Skorupski, "The controversies regarding the role of estrogens in urogynecology", *Folia Histochemica et Cytobiologica*, 45 Suppl 1, S17-21, 2007.
- [29] G. D. Kim, B. Y. Chung, K. H. Kim, H. S. Byun and E. H. Choi, "Comparison of climacteric symptoms and cognitive impairment in breast cancer survivors and healthy women", *Asian Oncology Nursing*, Vol.13, No.1, pp.11-17, 2013.
- [30] M. Trinkaus, S. Chin, W. Wolfman, C. Simmons, and M. Clemons, "Should urogenital atrophy in breast cancer survivors be treated with topical estrogens?," *The Oncologist*, vol.13 no.3, pp.222-231, 2005.
<http://dx.doi.org/10.1634/theoncologist.2007-0234>
- [31] G. D. Kim, "Impact of climacteric symptoms and fatigue on the quality of life in breast cancer survivors: the mediating effect of cognitive dysfunction", *Asian Oncology Nursing*, Vol.14, No.2, pp.58-65, 2014.