Original Research Article

Quality of life of patients treated for prostate cancer in a Nigerian hospital

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Abstract

Purpose: Prostate cancer is the commonest cancer affecting men with high mortality profile. Known interventions improve quality of life. The study aim at assessing the quality of life, identify the prevailing treatment pattern and common hormonal treatment side effects among the patients and to test the validity of the EORTC QLQ-C30 and QLQ-PR25 modules in a Nigerian setting.

Methods: The study was conducted at the Urology Clinic, University of Benin Teaching Hospital. Patients who met the inclusion criteria were approached and consenting patients were directed to respond to the self-administered EORTC QLQ-C30 and QLQ-PR25 questionnaires. Patients' demographic and clinical characteristics were profiled. Responses to items on the questionnaire were fed into Microsoft Excel software package and analyzed using SPSS and Graph-pad for descriptive and inferential statistics.

Results: A 92 % response rate was recorded, the reliability of the instrument yielded a Cronbach's Alpha of 0.817. The Mean score for the respective sub-scales were all above their midpoint. The highest and lowest translated percentage scores were 89.0% and 54.0 % for Physical Functioning and Sexual Activity respectively. Prostatectomy resulted in a significant reduction in sexual functioning and activity for most of the patients. Over half of the patients were observed to have undergone prostatectomy and were also managed with drugs as adjunctive treatment. However, patients were managed on drugs alone.

Conclusion: The EORTC QLQ-C30 and QLQ-PR25 modules are valid in this study setting. The QoL were on a high level in all domains to varying extent. Prostatectomy was the prevailing pattern of managing prostate cancer patients. The most disturbing hormonal treatment symptoms were reports of feeling less masculine, followed by pedal edema.

Keywords: Prostate cancer, quality of life, EORTC QLQ-C30, QLQ-PR25

Introduction

Prostate cancer (PCa) is the commonest cancer affecting men with high mortality rate. Known interventions (pharmacological and non-pharmacological) exist to improve quality of life of patients.1Patients with newly diagnosed early stage prostate cancer or benign prostatic hyperplasia (BPH) face a difficult choice of different treatment options with curative intention [1].

The incidence and mortality rates of prostate cancer vary worldwide. Studies have shown that it accounts for 33 % of all newly diagnosed malignancies among men in United States, it is the second most common cause of cancer death in men [2]. The incidence among men > 65 years is expected to increase 4-fold worldwide between the years 2000 and 2050, representing an increase from 12.4 % of the population in 2000 to 19.6 % in 2030 [3-6]. In Nigeria, the average (mean) age of Nigerian prostate cancer patients at time of diagnosis is 68.3 years and the

hospital incidence is 127/100,000 cases. In addition the national prostate cancer risk in Nigeria population is two percent of all patients, based on a pool of 110,000 men [7]. The risk of developing prostate cancer doubles for men who have a father or brother affected by prostate cancer, and risk increases further when multiple first-degree relatives are affected [7,8]. Men who underwent castration before puberty and those with congenital abnormalities in androgen metabolism do not develop prostate cancer [9].

Moreover, long-term survival results have shown that health-related quality of life (HRQOL) and The European Organization for Research and Treatment of Cancer (EORTC) instruments have become an important outcomes measure in different clinical settings [10]. The validity and the reliability of these instrument have been published in several literature but none was found to be conducted in south-south Nigeria [11-15].

Hence, this study was sought to assess the quality of life, identify the prevailing treatment pattern and common hormonal treatment symptom among the patients and to test the validity of the EORTC QLQ-C30 and QLQ-PR25 modules in a Nigerian setting.

Methods

Design/setting

A retrospective review of case notes and a cross sectional survey of patients visiting the Urology Clinic Department of the University of Benin Teaching Hospital for medical checkups between May - June, 2015 was conducted. The Clinic operates from 9 am to 2 pm on Tuesdays, Wednesdays and Fridays with three consultants, two resident doctors, two house officers and three Nurses.

Selection criteria

Following ethical approval, from the Ethics and research Committee of the hospital. Patients who have been diagnosed of benign prostatic hyperplasia or prostate cancer, 50 yrs and above and have been receiving treatment for a period not less 4 weeks from the time of data collection were included in the study. Chronically ill looking and newly diagnosed patients who have just reported to the clinic for management were excluded from the study.

Sample

Patients who met the inclusion criteria and visiting the outpatient department of the Urology Clinic of the hospital were consecutively recruited, until the allotted time for data collection elapsed.

Questionnaire/instrument design

The questionnaire used for data collection was extracted from items on the EORTC instruments (EORTC QLQC30 (version 3.0) and EORTC QLQPR25) and modified. The questionnaire consists of two sections.

First Section comprised patients' demographic data including; age, occupation, marital status, and level of education. While the second Section comprised a total of 49 questions drawn from the two EORTC modules:

Module 1 had 24 questions from the QLQ-C30. This is composed of both multi-item scales and single-item measures. which include; Five functional scales: Physical functioning (Q1 - Q5), Role functioning (Q6 & Q7), Emotional functioning (Q14, Q16 – Q18), Cognitive functioning (Q15 & Q19), Social functioning (Q20, Q21) and Symptom scales: Nausea (Q12), Pain (Q8, Q13), Appetite loss (Q11), Insomnia (Q9), Fatigue (Q10), A global health status/QoL scale (Q23 and Q24) and Other single items scale: Financial difficulty (Q22). Each of the multi-item scales includes a different set of items - no item occurs in more than one scale.

Module 2 had 25 questions drawn from QLQ-PR25 that is, the prostate cancer specific module. Which include; Functional scales: sexual activity (Q44 & Q45), sexual functioning (Q46 – Q49). Symptoms scales: Urinary symptoms (Q25 – Q31, Q33), Bowel symptoms (Q34 – Q37), Hormonal treatment-related symptoms (Q38 – Q43), Incontinence aid (Q32)

All sub-scales and single-item measures scores were of range from 1 to 4 except for Q23 & Q24 which range from 1 to 7.

A high scale score represents a desirable response level. Thus, a high score for a functional scale represents a high/healthy level of functioning; a high score for the global health status/QoL represents a high QoL, but a high score for a symptom scale/item represents a low

level of problematic symptoms and therefore a high quality of life.

Data collection

Patients were asked to complete the questionnaire by interview conducted by trained professional Pharmacists after informed consent had been obtained.

Data analysis

Data collected were fed into Microsoft Excel package and rechecked for consistency. It was then analyzed using Statistical Package for Social Science (SPSS version 16.0) for descriptive and inferential statistics. The Mean scores of responses from patients' perception and report of treatment outcomes were transformed to percentages.

ANOVA was used to compare means across groups at 95 % confidence interval with the aid of GraphPad Instat version 2.05a and $P < 0.05$ was taken to be significant.

Results

Of the Fifty patients found to meet the inclusion criteria and approached to participate in this study, forty six consented and were interviewed which yielded a response rate of 92 %

Reliability of the EORTC questionnaires

The test for reliability of the instrument yielded values for Cronbach's Alpha of 0.817, Guttman Split-Half Coefficient of 0.719 and Spearman-Brown Coefficient of 0.799.

Demographic Characteristics of the patients

Demographic analysis revealed that 2963 % of the patients were of age ≥ 70 years, 37 (80.4 %) were married, 27 (58.7 %) were retired and 19 (41.3 %) attained tertiary education, 19 (43.5 %) of the patients were managed with drugs alone and no patient was managed with radiotherapy, other information are shown in Table 1.

Table1: Demographic and clinical characteristics of patients

Item	Frequency N (%) n = 46
Age (Years)	
50 -59	2 (4.3)
60 - 69	15 (32.6)
≥70	29 (63.0)
Marital status	
Single	2 (4.3)
Married	37 (80.4)
Divorced	2 (4.3)
Widowed	5 (10.9)
Occupation	
Civil servant	6 (13.0)
Businessman	7 (15.2)
Farmer	6 (13.0)
Retiree	27 (58.7)
Level of Education	
No formal education	3 (6.5)
Primary Education	15 (32.6)
Secondary Education	9 (19.6)
Tertiary Education	19 (41.3)
Treatment option	
Drugs only	20 (43.5)
Radiotherapy	0 (0.0)
Surgery and drugs	26 (56.5)

Percentage distribution of responses to items on the Quality of Life Sub-Scales

Table 2 shows that about 95.7 % of the patients performed their basic self-care and 17.4 % were a little emotional about their illness.

Table 2: Percentage distribution of responses to items on Quality of Life Sub-Scales

Items	Not at all (%)	A little (%)	Quite a bit (%)	Very much (%)
Physical Functioning				
Do you have any troubles doing strenuous activities, like carrying a heavy travelling bag?	71.7	15.2	4.3	8.7
Do you have any trouble taking a long walk?	60.9	17.4	10.9	10.9
Do you have any trouble taking a short walk outside of the house?	84.8	8.7	2.2	4.3
Do you need to stay in bed or a chair during the day?	67.4	13.0	10.9	8.7
Do you need help with eating, dressing, washing yourself or using the toilet	95.7	2.2	0.0	2.2

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Role Functioning				
Were you limited in doing either your work or other daily activities?	47.8	23.9	15.2	13.0
Were you limited in pursuing your hobbies or other leisure time activities?	54.3	15.2	15.2	15.2
Symptoms Scale				
Have you had pain?	30.4	26.1	30.4	13.0
Have you had trouble sleeping?	43.5	37.0	13.0	6.5
Have you felt weak?	39.1	32.6	17.4	10.9
Have you lacked appetite?	80.4	10.9	2.2	6.5
Have you felt nauseated?	87.0	8.7	4.3	0
Did pain interfere with your daily activities?	47.8	32.6	8.7	10.9
Emotional Functioning				
Did you feel tense?	67.4	17.4	8.7	4.3
Did you worry?	37.0	39.1	10.9	13.0
Did you feel irritable?	80.4	13.0	4.3	0
Did you feel depressed?	62.5	28.3	6.5	0

Percentages may not sum up to 100 due to non – response

Percentage distribution of responses to items on the Prostate Specific Module QLQ PR25

It was observed that 100 % of the patients did not report blood in their stool, 32.6 % were not interested in sex and 58.7 % were not sexually active as shown in Table 3.

Table 3: Percentage distribution of responses to items on QLQ PR25

Items	Not at all (%)	A little (%)	Quite a bit (%)	Very much (%)
Sexual Activity				
To what extent were you interested in sex?	32.6	10.9	21.7	34.8
To what extent were you sexually active	58.7	21.7	8.7	10.9
Sexual Functioning				
To what extent was sex enjoyable for you?	9.0	10.9	20.1	10.9
Did you have difficulty getting or maintaining an erection?	6.5	8.7	6.5	10.9
Did you have ejaculation problems (e.g. dry ejaculation)?	6.5	23.9	0.0	2.2
Have you felt uncomfortable about being sexually intimate?	28.3	4.3	0.0	0.0
Urinary Symptoms				
Have you had to urinate frequently during the day?	15.2	13.0	39.1	32.6
Have you had to urinate frequently during the night?	15.2	21.7	21.7	41.3
When you felt the urge to pass urine, did you have to hurry to get to the toilet?	45.7	23.9	13.0	17.4
Was it difficult for you to get enough sleep, because you needed to get up frequently at night to urinate?	52.2	28.3	6.5	13.0
Have you had difficulty going out of the house because you needed to be close to a toilet?	67.4	19.6	8.7	4.3
Have you had any unintentional release (leakage) of urine?	60.9	19.6	6.5	13.0
Did you have pain when you urinated?	67.4	17.4	10.9	2.2
Have your daily activities been limited by your urinary problems?	52.2	21.7	8.7	15.2
Incontinence Aid				
Answer this question only if you wear an incontinence aid: Has wearing an incontinence aid been a problem for you?	19.6	2.2	2.2	17.4

Bowel Symptoms				
Have your daily activities been limited by your bowel problems?	89.1	4.3	6.5	0.0
Have you had any unintentional release (leakage) of stools?	87.0	6.5	6.5	0.0
Have you had blood in your stools?	**100.0**	0.0	0.0	0.0
Did you have a bloated feeling in your abdomen?	82.6	6.5	6.5	4.3
Hormonal Treatment Symptoms				
Did you have hot flushes?	91.3	2.2	2.2	4.3
Have you had sore or enlarged nipples or breasts?	93.5	2.2	4.3	0.0
Have you had swelling in your legs or ankles?	69.6	17.4	6.5	6.5
Has weight loss been a problem for you?	91.3	4.3	0.0	4.3
Has weight gain been a problem for you?	89.1	8.7	2.2	0.0
Have you felt less masculine as a result of your illness or treatment?	52.2	23.9	4.3	17.4

Descriptive Analysis of Quality of Life Domains from (EORTC QLQ-C30)

Table 4 contains the subscale results showing that physical functioning had a higher mean score of 3.56 ± 0.732, followed by cognitive functioning of 3.54 ± 0.793. The worse functional scale was sexual functioning with 2.16 ± 1.15.

Table 4: Descriptive Analysis of Quality of Life Domains from (EORTC QLQ-C30) Descriptive statistics for subscale

Items	Mean score ± SD	Factor loading	Cronbach's alpha
Physical Functioning			0.817
Do you have any troubles doing strenuous activities, like carrying a heavy travelling bag?	3.50 ± 0.937	0.403	
Do you have any trouble taking a long walk?	3.28 ± 1.047	0.744	
Do you have any trouble taking a short walk outside of the house?	3.74 ± 0.713	0.625	
Do you need to stay in bed or a chair during the day?	3.39 ± 1.000	0.727	
Do you need help with eating, dressing, washing yourself or using the toilet	3.91 ± 0.463	0.808	
Mean of Means	**3.56 ± 0.732**		
Role Functioning			0.777
Were you limited in doing either your work or other daily activities?	3.07 ± 1.083	0.905	
Were you limited in pursuing your hobbies or other leisure time activities?	3.09 ± 1.151	0.905	
Mean of Means	**3.08 ± 1.117**		
Emotional Functioning			0.726
Did you feel tense?	3.51 ± 0.843	0.704	
Did you worry?	3.00 ± 1.011	0.740	
Did you feel irritable?	3.78 ± 0.516	0.799	
Did you feel depressed?	3.59 ± 0.617	0.821	
Mean of Means	**3.47 ± 0.747**		
Cognitive Functioning			0.541
Have you had difficulty concentrating on things like reading newspaper or watching television?	3.59 ±0.805	0.828	
Have you had difficulty remembering things?	3.50 ± 0.782	0.823	
Mean of Means	**3.54 ± 0.793**		
Social Functioning			0.541
Has your physical condition or medical treatment interfered with your family life?	3.65 ± 0.795	0.772	
Has your physical condition or medical treatment interfered with your social activities?	3.02 ± 1.162	0.772	

Mean of Means	**3.02 ± 1.208**		
Symptoms Scale			**0.600**
Have you felt nauseated?	3.83 ± 0.486	0.559	
Have you had pain?	2.74 ± 1.042	0.815	
Did pain interfere with your daily activities?	3.17 ± 0.996	0.806	
Have you lacked appetite?	3.65 ± 0.822	0.658	
Have you had trouble sleeping?	3.17 ± 0.902	0.963	
Have you felt weak?	3.00 ± 1.011	0.637	
Mean of Means	**3.26 ± 0.877**		
Sexual Activity (QLQPR25)			**0.580**
To what extent were you interested in sex?	2.59 ± 1.275	0.709	
To what extent were you sexually active?	1.72 ± 1.026	0.709	
Mean of Means	**2.16 ± 1.15**		
Sexual functioning (n=15)			**0.3797**
To what extent was sex enjoyable for you?	3.00 ± 0.845	0.596	
Did you have difficulty getting or maintaining an erection?	2.33 ± 1.175	0.604	
Did you have ejaculation problems (e.g. dry ejaculation)?	3.07 ± 0.704	0.821	
Have you felt uncomfortable about being sexually intimate?	3.87 ± 0.352	0.777	
Mean of Means	**3.06 ± 0.769**		

Discussion

Quality of life (QoL) in a cross-section of prostate cancer patients receiving treatment in University of Benin Teaching Hospital was studied. Patients had a statistically significant high mean QoL score in all the domains of (EORTC QLQC30 (version 3.0) and EORTC QLQPR25).

The internal consistency assessment given by Cronbach's alpha value indicates that the questionnaire is a reliable instrument with good flexibility. Usually, Cronbach's alpha values above 0.6 are considered good [10-15]. This study therefore provides evidence for the reliability of EORTC instrument in a Nigerian setting, despite the fact that the instrument was developed in Europe with a practice setting and culture that is different from ours. A high scale score represents a desirable response level and therefore, indicates a high quality of life. Thus a high score for a functional scale represents a high/healthy level of functioning; a high score for the global health status/QoL represents a high QoL, but a high score for a symptom scale/item represents a low level of problematic symptoms and therefore a high quality of life.

Furthermore, the scores from all sub-scales were above midpoint indicating a desirable quality of life in the domains of Physical Functioning, Role Functioning, Emotional Functioning, Cognitive Functioning, Social Functioning, Symptoms Scale, Financial difficulty, Sexual Activity and Sexual Functioning.

Patients' demographic characteristics showed that most of the patients were 70 years old and above. None of the study participants was below 50 years old. This is in line with many literature reports that the risk of prostatic diseases increases with age and is more prevalent in men above 60 years of age [16-18]. Most of the patients in this study were married. Retirees made up the largest subgroup of patients. This attributed to the fact that the retirement age from the Nigerian Civil Service is 60 years. A similar study has been reported in Nigeria [7].

In addition, this survey showed that less than half of the patients attained tertiary education followed by a subgroup which only attained primary education. This demographic characteristic contributes to the socioeconomic determinants of health. Patients' level of education is crucial in making lifestyle choices that either serve as a barrier or incentive to health. The likelihood of a learned person making informed lifestyle decisions (such as imbibing a habit of diet low in fats) that would promote or maintain health is greater than that for a person without formal education [19].

In this study, more than half of the patients had undergone prostatectomy may be due to a non-proficient manner of diagnoses with unreliable PSA results, or, patient's decision to remove the prostate for fear of benign disease state becoming a carcinoma and a threat to life. More so, following surgery, drugs were prescribed to the patients either as adjunct therapy or for regulation or maintenance of physiological functions. It was observed that some patients

refused surgery as a treatment option. This may be due to physiological consequences upon sexual function (e.g. dry ejaculation) or for some other reasons which may be at the discretion of the Urologist who albeit, considers both goals of optimizing quantity and quality of life. Some studies have also consider the use of adjunct and therapeutic drugs to improve quality of life of cancer patients [19-21].

In this study setting, the use of radiotherapy was rare because, the prognosis following surgical removal is better than radiotherapy which is associated with relapse. Interestingly, there was a patient in this study whose prostate gland was removed 29 years ago and has been well managed till date.

Treatment-related changes in quality of life among patients caused distress in their partners. A previous multicenter trial of chemotherapy for recurrent prostate cancer showed that a patient's therapy had an effect on the well-being of the patient's spouse or partner [22,23]. Our study showed that the level of spousal distress arising from a patient's sexual and urinary symptoms after primary prostate-cancer treatment was also associated with the partner's level of satisfaction with the treatment outcome. These findings confirmed those of single-institution studies suggesting that patients' urinary or sexual symptoms are problematic for their partners [24,25].

Limitations of this Study

The major limitation was delay in obtaining ethical approval which affected the sample size of patients as a result of short time frame finally available to carry out this study.

The patients complained that the number of items on the questionnaire was too much and the burden of persuading them to completely respond to the questions was on the researcher.

Also, it would have been possible to recruit more patients into this study by expanding the setting to other urology clinics in the urology department of the hospital. This was not possible due to the uncooperativeness from the physicians running the other clinics. One of them specifically said "pharmacists have no business assessing quality of life of patients".

Conclusion

The EORTC QLQ-C30 (version 3.0) and EORTC QLQ-PR25 modules have a high validity in a Nigerian setting. The QoL assessments in the various sub-scales were all above average, depicting a high quality of life in the various domains, the highest was Physical Functioning and lowest was Sexual Activity.

Prostatectomy was the prevailing pattern of managing prostate cancer patients in this study setting. However, drugs were also used either alone or as adjunct to augment positive outcome following prostatectomy. Hormonal Treatment side effects include reports of feeling less masculine followed by pedal edema.

Conflict of Interest

We have no conflict of interest

Contribution of Authors

JSS and ACO designed the study and prepared the first draft. FOO conducted the literature review. IMO collected the data. MAA did the data sorting and SOY conducted the data analysis.

References

1. Hill C, Doyon F The frequency of cancer in France in year 2009, and global trends since 1950. Bull Cancer 2009;92:7-11.
2. American Cancer Society: Cancer Facts & Figures 2003.Atlanta, GA: American Cancer Society, 2003.
3. Quinn M, and Babb P: Patterns and trends in prostate cancer incidence, survival, prevalence, and mortality. Part I: International comparisons. BJU Int 2002;90:162-173.
4. Gronberg H: Prostate cancer epidemiology. Lancet 2003;361: 859-864.
5. Lunenfeld B: The ageing male: demographics and challenges. World J Urol 2002;20:11-16.
6. Trends in aging - United States and worldwide. MMWR Morb Mortal Wkly Rep 2003;52:101-104, 106.
7. Osegbe DN. Prostate cancer in Nigerians: facts and non-facts. J Urol 1997;157(4):1340-1343.
8. Carter BS, Beaty TH, Steinberg GD, Childs B, Walsh PC. Mendelian inheritance of familial prostate cancer. Proc Natl Acad Sci USA1992;89:3367-3371.
9. Haas GP, and Sakr WA: Epidemiology of prostate cancer. CA Cancer J Clin 1997;47:273-287.

10. Chie WC, Yu CC, Yu HJ. Reliability and validity of the Taiwan Chinese version of the EORTC QLQ-PR25 in assessing quality of life of prostate cancer patients. Urol Sci 2010;21:118-125.

11. Park J, Shin DW, Yun SJ, Park SW, Jeon SS, Kwak C, Kwon TG, Kim HJ, Ahn H. Cross-cultural application of the Korean version of the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire for patients with prostate cancer - EORTC QLQ-PR25. Oncology 2013;85(5):299-305.

12. Arraras JI, Villafranca E, Arias de la Vega F, Romero P, Rico M, Vila M, Asín G, Chicata V, Domínguez MA, Lainez N, Manterola A, Martínez E, Martínez M. The EORTC Quality of Life Questionnaire for patients with prostate cancer: EORTC QLQ-PR25. Validation study for Spanish patients. Clin Transl Oncol 2009;11(3):160-4.

13. van Andel G, Bottomley A, Fosså SD, Efficace F, Coens C, Guerif S, Kynaston H, Gontero P, Thalmann G, Akdas A, D'Haese S, Aaronson NK. An international field study of the EORTC QLQ-PR25: a questionnaire for assessing the health-related quality of life of patients with prostate cancer.Eur J Cancer. 2008;44(16):2418-2424.

14. Park KU. Assessment of change of quality of life in terminally ill patients under cancer pain management using the EORTC Core Quality of Life Questionnaire (QLQ-C30) in a Korean sample. Oncology. 2008;74(1):7-12.

15. Chang YJ, Liang WM, Wu HC, Lin HC, Wang JY, Li TC, Yeh YC, Chang CH. Psychometric evaluation of the Taiwan Chinese version of the EORTC QLQ-PR25 for HRQOL assessment in prostate cancer patients. Health Qual Life Outcomes. 2012;10:96.

16. Miller EC, Giovannucci E, Erdman JW Jr, Bahnson R, Schwartz SJ, Clinton SK. Tomato products, lycopene, and prostate cancer risk. Urol Clin North Am 2002;29:83-93,

17. Smith RA, Cokkinides V, Eyre HJ; American Cancer Society. American Cancer Society guidelines for the early detection of cancer, 2003. CA Cancer J Clin 2003;53:27-43.

18. Carroll P, Coley C, McLeod D, Schellhammer P, Sweat G, Wasson J, Zietman A, Thompson I: Prostate-specific antigen best practice policy. Part I: early detection and diagnosis of prostate cancer. Urology 2001;57: 217-224.

19. Kornblith AB, Herndon JE II, Zuckerman E, Godley PA, Savarese D, Vogelzang NJ. The impact of docetaxel, estramustine, and low dose hydrocortisone on the quality of life of men with hormone refractory prostate cancer and their partners: a feasibility study. Ann Oncol 2001;12:633-41.

20. Harden J, Schafenacker A, Northouse L, Mood D, Smith D, Pienta K, Hussain M, Baranowski K. Couples' experiences with prostate cancer: focus group research Oncol Nurs Forum. 2002 ;29(4):701-9

21. Seok H.O, Jin-Wook, Jae-Hyun, Hong-Seok, Du-Geon, Duck-ki, Cheon Jun, Je-Jung: Targeted-cryosurgical ablation of the prostate with androgen deprivation therapy: quality of life in high-risk prostate cancer patients. Asian J Androl2006;8: 629-636.

22. Veierod MB, Laake P, and Thelle DS: Dietary fat intake and risk of prostate cancer: a prospective study of 25,708 Norwegian men. Int J Cancer 1997; 73: 634-638.

23. Hsing AW: Hormones and prostate cancer: what's next? Epidemiol Rev 2001;23:42-58.

24. Soloway CT, Soloway MS, Kim SS, Kava BK. Sexual, psychological and dyadic qualities of the prostate cancer 'couple.' BJU Int 2005;95:780-785.

25. Dacal K, Sereika SM, Greenspan SL. Quality of life in prostate cancer patients taking androgen deprivation therapy. Am Geriatr Soc 2006;54(1):85-90.