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Original Article

Anxiety Status and its Relationship with General Health Related Quality of Life among Prostate Cancer Patients in Two University Hospitals in Kuala Lumpur, Malaysia

Mohamad Rodi ISA [1, 2], Foong Ming MOY [2], Azad Hassan ABDUL RAZACK [3], Zulkifli MD ZAINUDDIN [4], Nur Zuraida ZAINAL [5]

1. *Population Health & Preventive Medicine, Faculty of Medicine, Universiti Teknologi Mara (UiTM) Sungai Buloh Campus, Jalan Hospital, Selangor Darul Ehsan, Malaysia*
2. *Julius Centre, Dept. of Social & Preventive Medicine, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia*
3. *Dept. of Surgery, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia*
4. *Dept. of Surgery, Universiti Kebangsaan Malaysia Medical Centre , Jalan Yaacob Latif, Kuala Lumpur, Malaysia*
5. *Dept. of Psychological Medicine, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia*

***Corresponding Author:** Email: rodi@salam.uitm.edu.my

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Abstract

Background: This study aimed to determine the prevalence of anxiety among prostate cancer patients, and to ascertain the association between stress status, socio-demographic, medical and surgical illness, current urinary problem and cancer status with general health-related quality of life (HRQOL) among these patients.

Methods: A hospital based, cross sectional study was conducted at Surgical Clinic, University Malaya Medical Centre (UMMC) and Universiti Kebangsaan Malaysia Medical Centre (UKMMC) using universal sampling.

Result: A total of 193 patients were recruited. The prevalence of anxiety was 25.4% (95%CI: 19.2 – 31.6). The anxiety ratings were mild anxiety (10.4%), moderate anxiety (13.6%) and severe anxiety (1.6%). The total quality of life among stress group was 59.2 ± 14.7 and among non-stress group was 73.9 ± 12.7. There was a significant negative weak correlation between anxiety score and total quality of life (r_s=-0.534, P<0.001). In multivariable analysis, there was a significant difference in the total quality of life (QOL) among anxiety status [adj. mean diff. = -9.1 (95%CI: -15.2, -4.7)]. The adjusted mean difference was associated by age category of the patients (P<0.001); living partner (P<0.001); intermittency (P=0.035) and problem of hematuria during micturition (P=0.005).

Conclusion: The prevalence of anxiety among prostate cancer was moderately high. Treating the urination problem as well as encouraging living with spouse/family may improve the quality of life among anxiety condition of these patients.

Keyword: Anxiety, Health, Quality of Life, Prostate cancer

Introduction

Anxiety is defined as a state of apprehension and fear arising from the anticipation of a threatening event and often impairing psychological and physical functioning (1). According to the International Classification of Disorders (ICD-10) and other classification in psychiatry, a core anxiety symptoms need to be present in order to diagnose anxiety disorder (2) and that anxiety also be abnormal, causing disruption such as emotional distress or disruption of functioning, to fulfill an anxiety disorder (3).

In response to danger, anxiety is normal when its severity is in the proportion, however it's become abnormal when the threat is outlasts (4). The pathological anxiety is identified by (3,5): (i) being out of proportion to the level of threat; (ii) persistence or deterioration without intervention; (iii) a level of symptoms which are unacceptable regardless of the level of threat; and (iv) a disruption of usual or desirable functioning.

The physical symptoms of anxiety may include increased heart rate and breathing, tight muscles, restlessness, exercise perspiration, fatigue and headaches (6). Anxiety can be chronic (extended over time) or episodic (related to specific circumstances) (7) and there are many types of anxiety disorder and each has a range of symptoms. Mahuire et al., (8) has classified the feature of anxiety into apprehensive expectation, vigilance and scanning, motor tension and autonomic hyperactivity and Maynard et al., (9) classified anxiety into cognitive and somatic where **c**ognitive anxiety is the mental aspect that involves negative thought patterns, while somatic anxiety is the psychological component of anxiety that involves autonomic arousal. Since anxiety is a frequent response to threat, it is found in all clinical populations.

Men diagnosed with prostate cancer were more likely to have anxiety disorder than men in the general community (10, 11). However, anxiety decreased significantly with subsequent rounds of examination and with increasing age (12). The mean anxiety level clinically reduced from 20% to 12% from the time of diagnosis to the time of survey. It was associated with reductions in psychomotor, agitation, weakness, fatigue and pessimism (13). Low levels of anxiety among prostate cancer demonstrate the ability of patients to cope with the diagnosis and management of malignant disease (14).

Prostate cancer patients are repeatedly exposed to such potential anxiety and fear because of the requirement for continual prostatic specific antigen (PSA) monitoring (12,14). There was 66% prostate cancer patients reported no anxiety whist waiting the PSA test result and 2% reports high level of anxiety (10). Prostate cancer patients may hope for a normal prostate specific antigen (PSA) result every time during follow up therefore screening is needed to reduce anxiety level as one of the motivations (15).

Prostate cancer patients experience higher levels of anxiety, with a greater incidence of clinically significant anxiety overall than men without prostate cancer (16). An effective decision strategies and stressful health intervention were found to be clinically associated with increasing anxiety levels; however anxiety itself cannot be an appropriate measure for decision aids evaluator (17). Anxiety in prostate cancer is not only associated with initial diagnosis but also as part of the ongoing disease process (14).

The aim of this study was to determine the prevalence of anxiety among prostate cancer patients and to ascertain the association between anxiety status, socio-demographic, medical and surgical illness, current urinary problem and cancer status with general health related quality of life (HRQOL) among these patients in two university hospitals in Kuala Lumpur, Malaysia.

Material and Methods

This was a hospital based, cross-sectional study involving prostate cancer patients currently having followed up treatment at University Malaya Medical Centre (UMMC) and University Kebangsaan Malaysia Medical Centre (UKMMC) in Kuala Lumpur. The study was conducted between 1st July 2009 and 30th September 2011. By using universal sampling, all prostate cancer patients aged more than 50 and above, visiting the outpatients' urology clinics was screened for the eligibility in the study. Their names and registration numbers were recorded in the registry book. We excluded those who were illiterate and could not answer the questionnaire in Malay and English languages and those had psychiatric problem and currently on treatment for that problem. The socio-demographic, medical and surgical characteristics, current urinary problems and current cancer status were recorded. Double checked up done from the patients' folder for the accuracy of the data.

Assessment for health related quality of life (HRQOL)

The HRQOL was assessed using Short Form Health Survey with 36 questionnaires (SF-36). The SF-36 comprises 36 items and has eight domains which are: Physical function (ten items), role-physical (four items), bodily pain (two items), mental health (five items), role-emotional (three items), vitality-energy (four items), general health perception (five items) and social functioning (two items). Each of the eight scales scores from 0 to 100 with higher scores indicating higher function (18). SF-36 also targeting the physical component summary (PCS) and mental component summary (MCS) derived from the eight subscales (19). The SF-36 has been translated to Malay version by a group of researchers from University of Science, Malaysia (USM) under the International Quality of Life Assessment (IQOLA) Project (20, 21).

Assessment for anxiety level

Anxiety score was assessed by using Depression Anxiety Stress Scale Version-21 (DASS-21). DASS-21 questionnaire was used to measure psychological depression, anxiety and stress (20). It comprises 21 items that are divided into three subscales measure depression, anxiety and stress. There are seven items for depression (DASS-Depression), seven items for anxiety (DASS-Anxiety) and seven items for stress (DASS-Stress). The DASS-Anxiety scale assesses the autonomic arousal, skeletal muscle effects, situational anxiety and subjective experience of anxious affects (22). Responses had ranged from 0 (did not apply to me at all) to 3 (applied to me very much, or most of the time). Individual items were summed and times twice, with higher scores indicating greater anxiety level. Anxiety classification is depend on the score on DASS-Anxiety (22): (i) 0 – 7 : normal; (ii) 8 - 9 : mild anxiety; (iii) 10 - 14 : moderate anxiety; (iv) 15 - 19 : severe anxiety; and (v) ≥ 20 : very severe anxiety.

The original DASS-Depression, DASS-Anxiety and DASS-Stress subscales have cronbach's alpha ranging from 0.76 to 0.84, while the internal consistency ranging from 0.83 to 0.91 (22). The translated Malay version of DASS-21 demonstrated good concurrent and criterion-related validity with the cronbach's alpha of 0.84, 0.74 and 0.79 respectively (23).

Statistical Package for Social Sciences, version 20.0 (SPSS Inc, Chicago, IL) was used for data analysis. The scoring for the HRQOL was performed using Quality Metric SF-HRQOL scoring software (Quality Metric Incorporated, Lincoln, RI). The score of anxiety and total quality of life were entered as continuous variables. The prevalence of anxiety was calculated after the scoring of anxiety classified into binary (anxiety and non-anxiety). All independent variables were entered as categorical.

The association between score of anxiety and score of quality of life (QOL) was analyzed using Spearman rho's correlation. The association between independent variables, the anxiety status (yes and no) and the score of quality of life was analyzed by using two-way analysis of variance (ANOVA). The *P* value significance was taken at less than 0.05. Results with showed statistical significance were analyzed using multi-factorial ANOVA to control for the confounding factors. After model developed, checking for the interaction and model assumption done for the final model to find the factors that influence the QOL in between the anxiety status of the prostate cancer.

Results

A total number of 193 patients involved in this study. The prevalence of anxiety was 25.9% (95%CI: 19.7 – 32.1). The distributions of the anxiety classification by the places are show in Table 1. Figure 1 shows the correlation between the anxiety score and score of quality of life. There was a significant negative moderate correlation between stress score and total quality of life (r_s = -0.534, P<0.001).

Table 1: Classification of the Anxiety

Classification	UMMC, n=109, n(%)	UKMMC, n=84, n(%)	Total, n=193, n(%)
Mild Anxiety	8 (8.3)	14 (16.7)	22 (11.4)
Moderate Anxiety	16 (14.7)	9 (10.7)	25 (13.0)
Severe Anxiety	2 (1.8)	1 (1.2)	3 (1.6)
Total	26 (23.9)	24 (28.6)	50 (25.9)

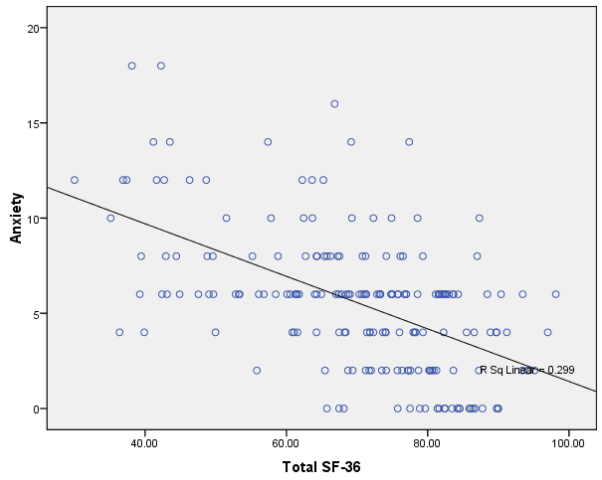

Fig. 1: The scatter plot between anxiety score and score of quality of life./ Note: Spearman rho's = -0.534, *P*<0.001*/* denotes statistically significant at α=0.05

Table 2 and 3 show the distribution of the scores of all the domains of the HRQOL, two summary statuses and total QOL stratified by anxiety status. All the domain scores of the non-anxiety group were higher compared to anxiety group. In anxiety group, the highest score domain was mental health (MH) and the lowest score domain was role physical (RP) (74.7 and 35.5 respectively) and in non- anxiety group, the highest score domain was also mental health (MH) and the lowest score domain was also role physical (RP) (85.2 and 65.4 respectively). For the PCS, MCS and total QOL, the non-anxiety group scores were also higher compared to anxiety group. Table 4 shows the comparison of the scores of HRQOL domains and two component summaries comparing the anxiety status. There were significant differences in all HRQOL domains, PCS, MCS and total QOL. These mean that the overall QOL among anxiety group was significantly lower compared to non-anxiety group among prostate cancer patients [mean difference: -14.7 (95%CI: -19.0, -10.4), *P*<0.001]. In two-way ANOVA analysis for the association between independent variables, the anxiety status (yes and no) and the score of QOL, there were many factors that found to be significant differences. The factors were: (i) patients' characteristics: age (*P*<0.001), marital status (*P*=0.047), living partner (*P*=0.004), educational level (*P*=0.027) and smoking status (*P*=0.047); (ii) patients' past medical and surgical illness: renal problem (*P*=0.012), history of surgery (*P*=0.017) and family history of prostate cancer (*P*=0.026); (iii) current urinary problems: frequency (*P*<0.001), urgency (*P*<0.001), nocturia (*P*=0.004), satisfaction with the micturition (*P*<0.001), intermittency (*P*<0.001), dysuria (*P*=0.007), hematuria (*P*<0.001) and incomplete emptying (*P*<0.001); and (iv) current cancer status: presenting PSA (*P*=0.008).

Table 5 shows the comparison between crude and adjusted QOL. The crude QOL shows there was statistically significant difference comparing QOL between the anxiety status (*P*<0.001). After adjustment, the QOL score in both anxiety status was still significant (*P*<0.001). Table 6 shows the associated factors that influence the stress status to the QOL after adjustment. It was found that only four factors that had statistically significant factors which were: age category (*P*<0.001); living partner (*P*<0.001); intermittency (*P*=0.035); and problem with hematuria (*P*=0.005).

Table 2: Quality of life of the patients according to domains (stress) (n=50)

	PF	RP	BP	GH	VT	SF	RE	MH	PCS	MCS	Total
Mean	56.0	35.5	60.8	65.6	62.1	66.0	57.3	74.7	55.8	64.5	59.2
Std dev	24.4	39.5	15.2	14.6	12.7	14.7	45.2	14.3	15.0	14.2	14.7
25th percentile	35.0	0.0	52.0	55.0	53.8	50.0	0.0	63.0	43.0	55.3	44.2
50th percentile	62.5	25.0	62.0	70.0	60.0	62.5	66.7	76.0	56.7	68.4	63.2
75th percentile	75.0	56.3	70.5	77.0	75.0	75.0	100.0	84.0	64.9	76.1	69.6

RF = Physical Functioning, RP = Role limitations due to physical health, BP = Bodily pain, GH = General health perception, VT = Vitality, SF = Social Functioning, RE = Role limitation due to emotional problem, MH = General Mental Health

Table 3: Quality of life of the patients according to domains (no depression) (n=143)

	PF	RP	BP	GH	VT	SF	RE	MH	PCS	MCS	Total
Mean	75.3	65.4	69.6	76.9	71.4	74.1	82.1	85.2	71.0	76.9	73.9
Std dev	18.5	36.5	13.9	12.5	12.0	16.7	30.1	11.0	13.7	10.9	12.7
25th percentile	65.0	50.0	62.0	72.0	65.0	62.5	66.7	76.0	62.4	71.1	67.5
50th percentile	80.0	75.0	70.0	77.0	75.0	75.0	100.0	88.0	73.2	78.6	75.8
75th percentile	90.0	100.0	74.0	87.0	80.0	87.5	100.0	96.0	80.2	83.7	82.4

RF = Physical Functioning, RP = Role limitations due to physical health, BP = Bodily pain, GH = General health perception, VT = Vitality, SF = Social Functioning, RE = Role limitation due to emotional problem, MH = General Mental Health

Table 4: The comparison of the scores of the domains of the health related quality of life and two coefficient summaries comparing the anxiety status among prostate cancer patients

Domain	anxiety (n=50) (mean (sd)) / (median (IQR)) #	No anxiety (n=144) (mean (sd)) / (median (IQR)) #	Mean Difference (95% CI) / Z δ	*P*-value
Physical Functioning	62.5 (40)#	80.0 (25.0) #	-5.25 δ	<0.001*
Role Physical	25.0 (56.3)#	75.0 (50.0) #	-4.47 δ	<0.001*
Bodily Pain	60.8 (15.2)	69.6 (14.0)	-8.9 (-13.3, -4.2)	<0.001*
General health	65.6 (14.6)	76.9 (12.5)	-11.3 (-15.5, -7.0)	<0.001*
Vitality	62.1 (12.7)	71.5 (12.0)	-9.4 (-13.4, -5.5)	<0.001*
Social Functioning	66.0 (14.7)	74.1 (16.7)	-8.1 (-13.4, -2.8)	0.003*
Role Emotional	66.7 (100)#	100.0 (33.3) #	-3.47 δ	0.001*
Mental Health	74.7 (14.3)	85.2 (11.0)	-10.5 (-14.4, -6.7)	<0.001*
Physical component summary	55.8 (15.0)	71.0 (13.7)	-15.2 (-19.7, -10.6)	<0.001*
Mental component summary	64.5 (14.2)	76.9 (10.9)	-12.4 (-16.3, -8.6)	<0.001*
Total QOL	59.2 (14.7)	73.9 (12.7)	-14.7 (-19.0, -10.4)	<0.001*

CI: confidence intervals; IQR: interquartile range; sd: standard deviation; Z: Mann Whitney U test* denotes statistically significant at α=0.05

Table 5: Comparison between crude and adjusted quality of life score

Quality of life	Anxiety status	Score QOL (95% CI)	F stat (df)	*P*-value
Crude Quality of life	Anxiety	59.2 (55.5, 62.9)	45.60	<0.001*
	No Anxiety	73.9 (71.8, 76.1)	(1,191)	
Adjusted Quality of Life	Anxiety	52.3 (46.6, 55,9)	21.62	<0.001*
	No Anxiety	61.4 (56.4, 66.9)	(1,165)	

* denotes statistically significant at α=0.05

Table 6: The associated factors that influence the anxiety status to the quality of life

Variable	Categories	Adjusted QoL score (95%CI)	Adjusted Mean difference (95%CI)	F stat (df)	*P*-value
Age category	Less than 60 years old	66.1 (57.8, 74.3)	Reference	6.479	1
	60 - 69.9 years old	57.8 (52.4, 63.2)	-8.3 (-18.3, 1.8)	(3,165)	0.173
	70 - 79.9 years old	54.5 (49.3, 59.6)	-11.6 (-21.3, -1.9)		0.010*
	more than 80 years old	49.5 (43.2, 55.7)	-16.6 (-27.6, -5.5)		0.001*
Living partner	with partner/family	63.5 (59.0, 68.0)	Reference	15.350	<0.001*
	alone	50.4 (43.1, 57.7)	-13.1 (-19.7, -6.5)	(1,165)	
Intermittency	Yes	54.9 (49.4, 60.4)	-4.2 (-8.0, -0.3)	4.501	0.035*
	No	59.0 (53.6, 64.4)	Reference	(1,165)	
Hematuria	Yes	53.1 (46.8, 59.4)	-7.7 (-13.1, -2.3)	8.023	0.005*
	No	60.8 (55.6, 66.0)	Reference	(1,165)	

* denotes statistical significant at $\alpha = 0.05$; $R^2 = 0.538$ (Adjusted $R^2 = 0.490$)

Discussion

Anxiety symptoms are common in cancer patients (2,24) and receiving such a cancer diagnosis may lead to anxiety which adversely influence these men's relationships with others (25). The prevalence of anxiety in this study was higher compared to the percentage of anxiety among general adult population (26). However, the percentage was lower compared to male automotive assembly workers (27).

The DASS-Anxiety score in this study population was 5.54 ± 3.72 which was higher compared to anxiety score using DASS-21 assessment among general UK adult population (26), first year psychology students (28) and among non-clinical samples in UK (29). However, the anxiety score was lower compared to among male automotive assembly workers (27) and among older primary care patients (30). There was no reported extremely severe anxiety in this population. However, there was reported extremely severe anxiety among general adult UK population (26) and among male automotive assembly workers (27).

In this study, all domain HRQOL scores among non-anxiety group were lower compared to anxiety group. There was a significant negative moderate correlation between stress score and total QOL (r_s = -0.534, P<0.001). Anxiety may impair the QOL of the patient's live as it may cause psychological and physical suffering, interferes with day to day functioning, delay in return to work

and affect the relationships and decision making (31).

The crude and adjusted QOL had shown significant differences comparing the QOL in between the anxiety status ($P<0.001$). The study was also found that the associated factors with QOL and anxiety status were: age category ($P<0.001$), living partner ($P<0.001$), intermittency ($P=0.035$) and problem with hematuria ($P=0.005$). The score of the anxiety decreased significantly with increasing age which is also the same finding with other study (12, 32, 33).

Intermittency and hematuria were found to be the associated factors for QOL stratified by anxiety status. Hematuria is not common in prostate cancer patients compared to intermittency. However, advanced prostate cancer may present with hematuria (34) and it could be the reason why the QOL among those who had this urinary problem. Therefore, treating psychiatric morbidity in cancer patients can greatly improve their QOL (35). There are many measures that can be implemented to reduce anxiety are likely to improve the QOL in patients living with prostate cancer (14) via effective pharmacological or psychotherapeutic treatment to improve the QOL for patients with anxiety disorder (36). However, recognition of psychological distress is often hampered by patient's unwillingness to disclose emotional problems and doctors reluctance to probe into psychological areas.

There were some limitations in our study. The study was not able to infer the temporal sequence (37) between the anxiety status and QOL since this was only a cross-sectional study. By using universal sampling, it has a tendency to non-sampling error like selection bias, response bias and non-response bias. The patients who participated in the study could be different from patients who did not participate in the study and the extrapolation from patients who participate and non-participate is problematic, due to non-response bias.

There was little strength in our study. SF-36 and DASS-Anxiety are self-administered. However our cronbach's α for SF-36 was 0.718 and DASS-Anxiety was 0.767 that show it had a good psychometric property in our population. The multivariate analysis adjustment through the stepwise method was done to adjust for the confounding factors. Checking the interaction, multicollinearity and model assumption and outlier were also done before the final model developed to find the associated factors that influenced QOL comparing anxiety status.

Recommendation

In the future, clinicians should be trained by professionals to detect distress in their patients and to pay more attention to their emotional concerns. Treating the urination problem by urologist as well as encouraging living with spouse / family member may improve the quality of life among stress condition of these patients. Helping men cope with stress before prostate cancer surgery may speed up both their physical and physiological recovery.

Conclusion

The prevalence of anxiety among prostate cancer was moderately high. The quality of life among prostate cancer with anxiety was significantly lower compare to patients without anxiety. Measures that can be implemented to reduce anxiety are likely to improve the quality of life in patients living with prostate cancer.

Ethical considerations

Ethical issues (Including plagiarism, Informed Consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc) have been completely observed by the authors.

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References

1. Khan H, Kalia S, Itrat A, Khan A, Kamal M, Khan MA, Khalid R, Khalid S, Javed A, Javed A, Umer A, Naqvi H (2007). Prevalence and demographics of anxiety disorders: a snapshot from a community health centre in Pakistan. *Ann Gen Psychiatry*, 6: 30.
2. Stark, D, Kiely, M, Smith, A, Velikova, G, House, A, & Selby, P (2002). Anxiety Disorders in Cancer Patients: Their Nature Associations, and Relation to Quality of Life. *J Clin Oncol,* 20: 3137-3148.
3. World Health Organization (2007). International Statistical Classification of Diseases and Related Health Problems 10th Revision Version for 2007. Retrieved from http://apps.who.int/classifications/apps/icd/icd10online/ [15 June 2010]
4. Cowen P, Harrison P, Burns T (2007). Short Oxford Textbook of Psychiatry. 6th ed. Oxford University Press, Oxford
5. American Psychiatric Association (2000). *Diagnostic and Statistical Manual of Mental Disorder (DSM-IV-TR).* 4th ed. American Psychiatric Publishing, Washington.
6. Smith JC (1993). *Understanding Stress and Coping.* Person, New York
7. Rothfeld GS, Romaine, DS (2005). *The Encyclopedia of Men's Health.* Fact on File, Inc., New York
8. Mahuire P, Faulkner A, Regnard C (1995). The Anxious Person. In Regnard , Hockley J, Doyle (Eds.). *Flow Diagrams in Advanced Cancer and other Disease* (1st. ed.). Still Water Books, London
9. Maynard IW, Smith MJ, Warwick-Evans L (1995). The Effects of a Cognitive Intervention on Competitive State Anxiety and Performance in Semi-Professional Soccer Players. *Journal of Sport and Exercise Psychology,* 17: 428-446.
10. Hinz A, Krauss O, Stolzenburg JU, Schwalenberg T, Michalski D, Schwarz R (2009). Anxiety and depression in patients with prostate cancer and other Urogenital Cancer: A Longitudinal Study. *Urologic Oncology: Seminars and Original Investigations,* 27: 367-372.
11. Couper JW, Bloch S, Love A, Duchesne G, Macvean M, Kissane DW (2006). The psychosocial impact of prostate cancer on patients and their partners. *MJA,* 185: 428-432.
12. Carlsson S, Aus G, Wessman C, Hugosson J (2007). Anxiety associated with prostate cancer screening with special reference to men with a positive screening test (elevated PSA) – Results from a prospective, population-based, randomized study. *European Journal of Cancer,* 43: 2109-2116
13. Sharpley CF, Bitsika V, Christie DRH (2007). Causal 'mapping' of Depression and Anxiety Among Prostate Cancer Patients : A Preliminary Interview Study. *The Journal of Mens Health Gender,* 4(4): 402-408.
14. Wilkinson S, Warren K, Ramsden A, Matthews A, Chodak G (2008). Do "Rapid" PSA Assays Reduce Anxiety and Stress of Prostate Cancer Patients Undergoing Regular Review? A Prospective Evaluation. *Urology,* 71:567-572.
15. Dale W, Bilir P, Han M, Meltzer D (2005). The Role of Anxiety in Prostate Carcinoma A Structured Review of the Literature. *Cancer,* 104(3): 467-478.
16. Sharpley CF, Bitsika V, Christie, DHR. (2008). Psychological Distress among Prostate Cancer Patients: Fact Or Fiction? *Clinical Medicine: Oncology,* 1:563-572.
17. Bekker HL, Legare F, Stacey D, O'Connor A, Lemyre L (2003). Is anxiety a suitable measure of decision aid effectiveness: a systematic review? *Patient Education and Counseling,* 50:255-262
18. Ware JE, Kosinski M, Dewey JE (2000). *How to score version two of the SF–36 Health Survey.* Lincoln (RI), QualityMetric Incorporated, USA.
19. Ware JE, Sherbourne CD (1992). The MOS 36-item Short Form Health Survey (SF-36). I. Conceptual Framework and Item Selection. *Med Care,* 30:473-483.

20. Ware JE, Barbara G, & for the IQOLA Project (1998). Overview of the SF-36 Health Survey and the International Quality of Life Assessment (IQOLA) Project. *J Clin Epidemiol,* 51(11):903-912.
21. Bullinger M, Alonso J, Apolone G, Leplege A, Sullivan M, Wood-Dauphinee S, et al. (1998). Translating Health Status Questionnaires and Evaluating Their Quality: The IQOLA Project Approach. *J. Clin Epidemiol,* 51(11): 913-923.
22. Lovibond PF, Lovibond, SH (1995). *Manual for the Depression Anxiety Stress Scales*. 2nd ed. Psychology Foundation of Australia, Sydney.
23. Musa R, Fadzil MA, Md Zain Z (2007). Translation, validation and psychometric properties of Bahasa Malaysia version of the Depression Anxiety and Stress Scales (DASS). *ASEAN Journal of Psychiatry,* 8(2): 82-89.
24. Stark D, House A (2000). Anxiety in cancer patients. *Br J Cancer,* 83(10): 1261-1267.
25. Kunkel EJS, Bakker JR, Myers RE, Oyasanmi O, Gomelia LG (2000). Biopsychosocial Aspects of Prostate Cancer. *Psychosomatics,* 41: 85-94.
26. Crawford JR, Henry JD (2003). The Depression Anxiety Stress Scales (DASS): Normative data and latent structure in a large non-clinical sample. *Br J Clin Psychol,* 42: 111-131.
27. Abdin E, Nordin R, Lin N, Abdullah MR, Winn T, Raja-Hussain TMA. (2008). Self-perceived Depression, Anxiety, Stress and Their Relationships with Psychosocial Job Factors in Male Automotive Assembly Workers. *Industrial Health,* 46: 90-100.
28. Lovibond PF, Lovibond SH (1995). The structure of negative emotional states: Comparison of the depression anxiety stress scales (DASS) with Beck Depression and Anxiety Inventories. *Behav Res Ther.,* 33(3): 335-343.
29. Henry JD, Crawford JR (2005). The short-form version of the Depression Anxiety Stress Scales (DASS-21): Construct validity and normative data in a large non-clinical sample. *Br J Clin Psychol,* 44: 227-239.
30. Gloster AT, Rhoades HM, Novy D, Klotsche J, Senior A, Kunik M, et al. (2008). Psychometric properties of the Depression Anxiety and Stress Scale-21 in older primary care patients. *Journal of Affective Disorders,* 110: 248-259.
31. Maguire P (1997). Improving the Quality of Life of Cancer Patients In Levy J.A, Jasmin C & Bez G (Eds.), *Cancer. AIDS and Quality of Life*. Plenum Press, New York.
32. Nelson CJ, Weinberger MI, Balk E, Holland J, Breitbart W, Roth AJ. (2009). The chronology of distress, anxiety, and depression in older prostate cancer patients. *Oncologist,* 14(9): 891-899.
33. Macefielda RC, Lane JA, Metcalfea C, Down L, Neal DE, Hamdy FC, et al. (2009). Do the risk factors of age, family history of prostate cancer or a Higher Prostate Specific Antigen Level Raise Anxiety at Prostate Biopsy? *Euro J Cancer,* 45: 2569-2573.
34. Bryant RJ, Catto, JWF (2008). Hematuria. *Surgery (Oxford),* 26(4): 150-153.
35. Ford S, Lewis S, Fallowfield L (1995). Psychological Morbidity in Newly Referred Patients with Cancer. *Journal of Psychosomatic Research,* 39(2): 193-202.
36. Mendlowicz MV, Stein MB (2000). Quality of Life in Individuals with Anxiety Disorders. *Am J Psychiatry,* 157: 669-682.
37. Aschengrau A, Seage GR (2003). *Essentials of Epidemiology in Public Health*. Jones and Bartlett Publishers, Sudbury, Massachusetts.