

Association between Health-Related Quality of Life and Psychological Distress at Different Stages of Chronic Kidney Disease

(Hubungan antara Kualiti Hidup Berdasarkan Kesihatan dan Distres Psikologi Pesakit Buah Pinggang Kronik pada Tahap Penyakit yang Berbeza)

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ABSTRACT

The prevalence of chronic kidney disease (CKD) have increased and become one of the major public health concerns worldwide including Malaysia. Previous studies on CKD generally focused on patients who were already undergoing dialysis treatment; however, studies investigating the stresses experienced by pre-dialysis CKD patients were limited. This study aimed to examine the prevalence of psychological distress and their association with the Health Related Quality of Life (HRQoL) during the different stages of CKD. This cross-sectional study involved 200 pre-dialysis patients from stages 3 to 5, who were recruited from the Nephrology Clinic at the National University of Malaysia Medical Centre (UKMMC). The instruments used in this study were the Short Form 36 (measuring HRQoL) and Hospital Anxiety and Depression Scale (HADS) to measure the psychological distress. The results showed that the prevalence of depression and anxiety increased proportionally with the CKD stages. The HRQoL sub-component scores declined as the CKD stages increased except for social functioning. An impaired HRQoL was associated with depression and anxiety in the CKD patients. The results suggested that it is very important to manage kidney disease at an early stage and that a healthier lifestyle is adopted.

Keywords: Anxiety; chronic kidney disease; depression, health related quality of life

ABSTRAK

Prevalens penyakit buah pinggang kronik (CKD) semakin meningkat dan menjadi salah satu masalah kesihatan awam yang utama di seluruh dunia termasuk Malaysia. Kajian terdahulu ke atas pesakit CKD umumnya tertumpu kepada pesakit yang telah menjalani rawatan dialisis. Walau bagaimanapun, kajian berkenaan tekanan yang dialami oleh pra-dialisis pesakit CKD adalah terhad. Kajian ini bertujuan untuk mengkaji prevalen distres psikologi dan hubungannya dengan Kualiti Hidup Kesihatan (HRQoL) pada tahap penyakit CKD yang berbeza. Kajian keratan rentas ini melibatkan 200 pesakit pra-dialisis yang berada pada tahap 3 hingga 5, yang telah dipilih dari Klinik Nefrologi di Pusat Perubatan Universiti Kebangsaan Malaysia (PPUKM). Instrumen yang digunakan dalam kajian ini ialah Short Form 36 (mengukur HRQoL) dan Skala Hospital Anxiety and Depression Scale (HAD) untuk mengukur tekanan psikologi. Hasil kajian menunjukkan bahawa prevalen kemurungan dan kebimbangan meningkat berkadaran dengan peningkatan tahap CKD. Skor HRQoL bagi setiap sub-komponen menurun apabila tahap penyakit CKD meningkat kecuali bagi komponen kefungsiian sosial. HRQoL pesakit yang merosot dikaitkan dengan kemurungan dan kebimbangan yang dialami oleh pesakit CKD. Keputusan kajian ini menunjukkan bahawa adalah sangat penting untuk pengurusan penyakit buah pinggang dilakukan pada peringkat awal dan gaya hidup yang lebih sihat diamalkan.

Kata kunci: Kebimbangan; kemurungan; kesihatan; kualiti hidup; penyakit buah pinggang kronik

INTRODUCTION

Chronic kidney disease (CKD) refers to a permanent loss of kidney function that is prevalent for at least three months (Levey 2012; Ministry of Health Malaysia 2011). CKD has been identified as one of the major public health problems in Malaysia and various other countries worldwide. The increase in CKD prevalence has placed a large human, economic and social burden on the health care systems of various countries (Ministry of Health Malaysia 2011; Perlman et al. 2003). Having CKD as a physical illness

affects the individual physically and also has implications for their psychological health, daily functioning, general well-being as well as social functioning, which in turn, may impair their health-related quality of life (Bakewell et al. 2002).

The health-related quality of life (HRQoL) generally refers to an individual's physical, psychological and social functioning (Korevaar et al. 2000). It is an important marker of how a CKD patient is coping with the condition (Pagels et al. 2012). The HRQoL is found to be

compromised even in the early stages of CKD up to the end stage of renal disease (ESRD) (Cruz et al. 2011; Pagels et al. 2012; Soni et al. 2010). In general, pre-dialysis CKD patients tended to report reduced quality of life (QoL) than normal populations (Fukuhara et al. 2007; Hansen et al. 2009; Korevaar et al. 2000; Tong 2013) but relatively higher than patients undergoing dialysis (Perlman et al. 2003). Specifically, pre-dialysis CKD patients tended to rate lower on physical function, physical role, general health and the physical components of HRQoL than the general population. In addition, HRQoL significantly predicts mortality and hospitalization (Mapes 2003; Spiegel et al. 2008) which could influence the prognosis and course of the disease.

There are mixed findings regarding the deterioration of HRQoL according to the different stages of CKD. Pagels et al. (2012) found that all dimensions of HRQoL deteriorated significantly with the different CKD stages, with a substantial reduction at stage 5 CKD (ESRD). This finding was supported by several studies (Mujais et al. 2009; Soni et al. 2010). The QoL is reduced in pre-dialysis patients at all stages of CKD but there is no significant difference in the QoL for the different stages (Cruz et al. 2011; Perlman et al. 2003). However, other studies did not show changes in the QoL according to the different stages of CKD.

The HRQoL is further compromised with the presence of depression among CKD patients. The prevalence of depressive symptoms is higher in CKD patients compared to general population and in some patient with CKD; their symptoms meet the criteria for major depression (Ricardo et al. 2010). Furthermore, Lee et al. (2013) found that depression was also quite prevalent in pre-dialysis CKD patients. Although they found that the prevalence of depression did not differ significantly across the stages, depression is associated with reduced HRQoL. The presence of major depressive episodes in patients with CKD generally results in a higher risk of hospitalization and progression of the disease to ESRD (Hedayati et al. 2010; Ricardo et al. 2010; Zalai et al. 2012).

Anxiety has been examined to a lesser degree compared to depression; however, it can be assumed that it also further deteriorates according to the condition of CKD patients. The study by Lee et al. (2013) found that both anxiety and depression were prevalent in pre-dialysis CKD patients, and associated with a reduced QoL. However, the prevalence of anxiety was not associated with the different stages of CKD, which was similar to their findings on depression.

Although it has been established that the HRQoL is impaired in the CKD population, and that there is a high prevalence of depression and anxiety with this chronic disease, to date, no studies have examined the association of the HRQoL, depression and anxiety with the different stages of CKD among patients in Malaysia. As such, the purpose of this cross-sectional study is to examine the prevalence of depression and anxiety focusing on moderate

to severe level and their association with the HRQoL according to the different CKD stages in Malaysia.

MATERIALS AND METHODS

RESEARCH DESIGN

This cross-sectional study using purposive sampling was conducted between October and December 2013 in Nephrology Clinic of the National University of Malaysia Medical Centre (UKMMC). The participants were chronic end-stage renal disease patients at stages 3, 4, 5 with GFR less than 60 mL.

PARTICIPANTS AND PROCEDURE

This study involved 200 pre-dialysis patients aged between 20 and 80 years. A total of 230 pre-dialysis were approached however only 200 aged between patients had completed the questionnaire. The sample size calculation was determined using Tabachnick and Fidell (2007). The patients who met the criteria – pre-dialysis patients at stages 3 to 5 and able to communicate either in Malay or English – were included, whereas patients with comorbid health problems, such as stroke and dementia were excluded because it will affect the level of psychological distress and quality of life. This study was approved by the UKMMC Scientific Research and Ethical Committee. The selected patients were given informed consent before the interview, which was conducted whilst they were waiting for treatment at the Nephrology Clinic.

INSTRUMENTS

The level of CKD stage was defined based on the glomerular filtration rate (GFR) from the patients' medical records. The Health Related Quality of Life (HRQoL) was assessed using the Short Form-36 (SF-36) (Ware et al. 1993). The Malay version of SF-36 used in this study has acceptable reliability and validity among Malaysian respondents with high internal consistency of 0.7 (Sararaks et al. 2005). The SF-36 evaluates various aspects of functioning and well-being which provide an overall impression of the HRQoL and was developed as the best compromise between response burdens. It is a generic self-completed questionnaire with eight dimensions (including physical functioning, physical role, emotional role, social functioning, pain, mental health, vitality and general health). These contribute to the evaluation of two major aspects of the functioning of the patients - physical (physical component summary, PCS) and mental (mental component summary, MCS) (Ware et al. 1993). It takes about 15 min to answer the questions. Scoring is by summing the responses for each of the items in the dimension and converting them by a scoring algorithm to a scale from 0 (poor health) to 100 (good health). A higher score indicates better functioning, less pain or greater well-being.

In addition, anxiety and depression were assessed using the Hospital Anxiety and Depression Scale (HADS). The HADS was developed by Zigmond and Snaith (1983) to identify caseness (possible and probable) of anxiety disorder and depression; both contain seven items. HADS has been used extensively in somatic, psychiatric, primary care patients and the general population (Bjelland et al. 2002). This questionnaire, which has been validated and translated into the Malay language, showed good reliability and validity with Cronbach's alpha ranging from 0.58 to 0.75 in the study of patients with hypertension (Norfazillah et al. 2013). Yusoff et al. (2011) study showed high reliability with Cronbach's alpha of 0.88 For HADS- anxiety and 0.79 for HADS-depression among husband of cancer patients. The HADS is a self-report questionnaire consisting of 14 items. There were seven items in HADS anxiety and depression respectively. The category of severity of HADS is 0-7 is normal, 8-10 mild, 11-14 moderate and 15-21 severe. In addition, questions about socio-demographics, such as age, gender, marital status and working status, were also included.

DATA ANALYSIS

All the raw data were keyed into the IBM Statistical Package for the Social Sciences (IBM SPSS) version 21. The normality of the data was examined using skewedness and kurtosis \pm

1.0 (Chan et al. 2003). There was no missing data in this study. The descriptive analysis was mainly used to describe the findings, such as demographic data and percentage of anxiety and depression. ANOVA was used to determine the HRQoL according to the stage of CKD. Pearson's correlation was carried out to measure the relationship between the HRQoL and anxiety and depression.

RESULTS AND DISCUSSION

The sample consisted of 200 pre-dialysis patients aged between 20 and 80 years from the UKKMC - 53.5% were male and 46.5% were female. Most of the patients in the sample (82.5%) were married and 9.5% and 6.5% were single and widowed, respectively. The remaining 1.5% was divorced. The majority of these patients (66.5%) were Muslim, 26.5% Buddhist and 6.5% Hindu. Most of the patients were unemployed (48.5%), 26.5% were still working and the remaining 25% were retired (Table 1).

Figure 1 shows the percentage of patients who reported symptoms of depression and anxiety, which increased with the more advanced stages of CKD. The rate of depression increased from 4.9% in Stage 3 to 12.5% in stage 4 and 14.5% in stage 5. Similarly, anxiety rose from 7.4% in stage 1 CKD to 9.4% in stage 2 and 10.9% in stage 5. However there were no significant difference in the proportion of anxiety and depression across the stages.

TABLE 1. Demographic profile of the total CKD patient population

Demographic Variable	Frequency	Percentage
Age		
20-35	17	8.5
36-50	33	16.5
51-65	67	33.5
66-80	83	41.5
Gender		
Male	107	53.5
Female	93	46.5
Marital status		
Married	165	82.5
Single	19	9.5
Widowed	13	6.5
Divorce	3	1.5
Religion		
Muslim	133	66.5
Buddhist	53	26.5
Hindu	13	6.5
Christian	1	0.5
Working status		
Employed	53	26.5
Unemployed	97	48.5
Retired	50	25
CKD stages		
Stage 3	81	40.5
Stage 4	64	32.0
Stage 5	55	27.5

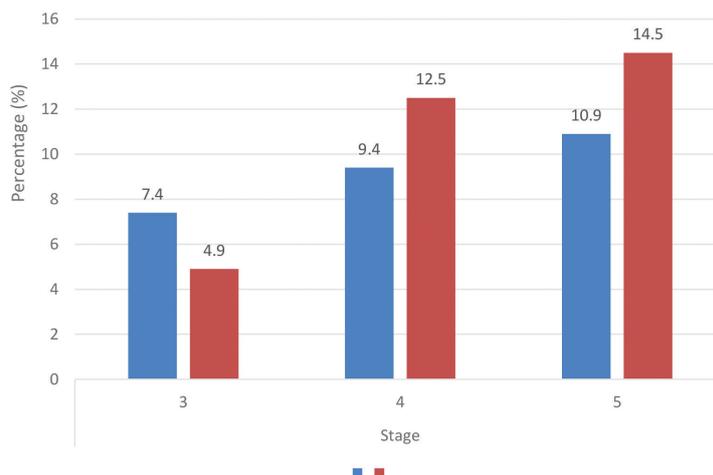


FIGURE 1. Percentage of anxiety and depression in CKD stages

Table 2 shows that the majority of the HRQoL sub-component scores declined with increasing stages of CKD, except for the social functioning sub-component. The results showed that out of the eight sub-components, only the physical functioning, physical role, and emotional role sub-components were significantly impaired ($p < 0.05$) across the stages of CKD. However, the bodily pain sub-component increased at stage 4, but declined at stage 5.

The results from Table 3 show the correlation between HRQoL sub-component with anxiety and depression. Physical functioning, physical role, general health, vitality, emotional role and mental health were negatively correlated with anxiety and depression. These suggest that the higher the level of anxiety and depression, the lower is the physical functioning, physical role, general health, vitality, emotional role and mental health among CKD patient.

The incidence and prevalence of chronic kidney disease (CKD) have increased rapidly and mostly affect the psychological aspects of the CKD patients. Anxiety and depression are the most common psychological problems among CKD patients and were associated with increased morbidity and mortality and diminished quality of life

(Kaveh et al. 2011). The current study aimed to explore the prevalence of depression and anxiety in CKD patients in stages 3 to 5 as well as their associated HRQoL in Malaysia. The results showed that both prevalence of depression and anxiety in our sample of CKD patients in stages 3 to 5 increased proportionally with the stages of CKD. An impaired HRQoL was associated with both depression and anxiety in the CKD patients.

Previous studies showed that both the prevalence of anxiety and depression increased significantly across the CKD stages. Our findings showed that there is a low prevalence of depression in our sample of pre-dialysis CKD patients which ranges from only 4.9% to 14.5% compared to previous finding (Lee et al 2013). This is due to the different levels of anxiety and depression severity from this study. Lee et al. (2013) included all levels of severity from mild to severe anxiety or depression. However our findings focused only on prevalence of patients who experienced moderate to severe level of anxiety and depression. The results showed that there was no significant difference between the depression and anxiety across the CKD stages and also was consistent with study by Lee et al. (2013).

TABLE 2. HRQoL ACCORDING TO THE STAGES OF CKD

	Stage 3 ($n=81$) Mean \pm SD	Stage 4 ($n=64$) Mean \pm SD	Stage 5 ($n=55$) Mean \pm SD	P-Value
Physical functioning	83.09 \pm 20.10	72.39 \pm 22.97	66.85 \pm 22.66	< 0.05
Physical role	84.57 \pm 21.58	79.69 \pm 23.09	69.77 \pm 23.53	< 0.05
Bodily pain	59.26 \pm 9.32	60.94 \pm 8.37	56.69 \pm 9.08	< 0.05
General health	59.85 \pm 5.60	59.25 \pm 6.20	59.05 \pm 6.88	Ns
Vitality	72.07 \pm 14.81	72.20 \pm 13.77	67.90 \pm 15.41	Ns
Social functioning	57.78 \pm 10.49	55.31 \pm 10.23	59.09 \pm 11.27	Ns
Emotional role	86.62 \pm 21.31	81.25 \pm 23.66	74.54 \pm 24.40	< 0.05
Mental health	79.42 \pm 14.72	78.23 \pm 15.59	76.97 \pm 15.14	Ns

TABLE 3. Correlation health related quality of life with anxiety and depression

	Anxiety (r)	Depression (r)
Physical functioning	-0.41**	-0.31**
Physical role	-0.42**	-0.29**
Bodily pain	0.04	0.01
General health	-0.16*	-0.27**
Vitality	-0.29**	-0.28**
Social functioning	-0.01	-0.07
Emotional role	-0.47**	-0.27**
Mental health	-0.32**	-0.19**

* $p < .05$, ** $p < .001$

The results showed that some of the HRQoL dimensions deteriorated significantly across the CKD stages with the lowest score in pre-dialysis stage 5 CKD. The largest significant differences between the patient groups were seen in the physical functioning, physical role and emotional role while bodily pain increased in stage 4 and declined in stage 5 CKD. This results showed that as the CKD stages increase, there will be a reduction in the HRQoL components, especially in the physical domain, which indicates a deterioration of physical functions due to the loss of energy, feeling tired easily, fatigue and feeling worn out, which are among the most common symptoms in CKD patients. These findings are in line with the previous studies (Mujais et al. 2009; Pagel et al. 2012) which show that CKD impairs HRQoL, especially the physical component of the CKD patients, due to the worsening of the renal function. In addition, the emotional role component showed a significant decrease across the CKD stages. The decline in the emotional component indicates that the CKD stages had a negative impact on daily life that resulted in a decline in physical health and an increase in the level of stress, anxiety and depression across the CKD stages. As expected, the decline in the emotional role component of HRQoL was seen in the duration preceding the initiation of dialysis among the CKD patients (Pagel et al. 2012). However, in this study the social functioning showed the significant increment across the CKD stages. This could be due to a better social adaptation and coping to their illness.

This study also found that most of the HRQoL sub-components had low to moderate correlation with anxiety and depression. This is consistent with the study by Lee et al. (2013) found that this reduction of quality of life could be due to the presence of depression and anxiety in pre-dialysis patients. They found that in general more pre-dialysis patients in their study suffered from depression as compared to anxiety or combined. They noted that all depressed patients rated significantly reduced QoL. Since the findings from this study reported the increment of anxiety and depression and the reduction of HRQoL with the advanced stage of CKD, they supported some findings from the previous literature (de Oreo et al. 1997; Fukuhara et al. 2007; Spiegel et al. 2008). This indicated that CKD has profound effects on the quality of life, especially the

patients' physical, emotional and psychosocial well-being domains, which seems to imply a restriction in their daily lives. Therefore, the early detection of anxiety and depression should be conducted in order to prevent further CKD complications and to improve the quality of life among CKD patients. This shows the importance of screening for psychological distress in CKD patients as there is a high potential that depression and anxiety could influence the outcome of the illness.

The advantages of this study are to create the awareness for health providers, patients and their family concerning psychological distress experienced by the pre-dialysis patients across the stages. The results of this study can be utilized by the hospital and clinics to provide counselling services to increase the quality of life of patients.

The main limitation of this study is making causal inferences of the progression of depression and anxiety throughout the stages of CKD and the associated HRQoL outcome, since it was a cross-sectional study. Therefore, this calls for future research to follow patients during their illness trajectory, which is longitudinal in nature. Despite this limitation, this study is the first investigation relating to HRQoL, depression and anxiety at different stages of CKD patients in Malaysia, where little is known about the prevalence of psychological distress in CKD patients as well as the effect of these psychological issues on the HRQoL of the patients.

CONCLUSION

In conclusion, it was observed that pre-dialysis CKD patients do report significant psychological distress and despite the low prevalence, they still negatively impact patients' HRQoL. Thus, intervention programs such as psycho-education program for the patients and their family should be implemented in hospitals and clinics to increase the quality of life and at the same time to reduce the levels of anxiety and depression among patients with CKD.

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REFERENCES

- Bakewell, A.B., Higgins, R.M. & Edmunds, M.E. 2002. Quality of life in peritoneal dialysis patients: Decline over time and association with clinical outcomes. *Kidney International* 61(1): 239-248.
- Bjelland, I., Dahl, A.A., Haug, T.T. & Neckelmann, D. 2002. The validity of the Hospital Anxiety and Depression Scale: An updated literature review. *JPsychosom. Res.* 52(2) 69-77.
- Chan, Y.H. 2003. Biostatistics 101: Data presentation. *Singapore Medical Journal* 44(6):280-285.
- Cruz, M.C., Andrade, C., Urrutia, M., Draibe, S., Nogueira-Martins, L.A. & Sesso, R.D.C.C. 2011. Quality of life in patients with chronic kidney disease. *Clinics (São Paulo, Brazil)* 66(6): 991-995.
- de Oreo, P.B. 1997. Hemodialysis patient assessed functional health status predicts continued survival, hospitalization and dialysis attendance compliance. *Am. J. Kidney* 30: 204-212.
- Fukuhara, S., Yamazaki, S., Marumo, F., Akiba, T., Akizawa, T. & Fujimi, S. 2007. Health related quality of life of predialysis patients with chronic renal failure. *Nephrology Clinical Practice* 105(1): 1-8.
- Hansen, R.A., Chin, H., Blalock, S. & Joy, M.S. 2009. Predialysis chronic kidney disease: Evaluation of quality of life in clinic patients receiving comprehensive anemia care. *Research in Social and Administrative Pharmacy* 5(2): 143-153.
- Hedayati, S.S., Minhajuddin, A.T., Afshar, M., Toto, R.D., Trivedi, M.H. & Rush, A.J. 2010. Association between major depressive episodes in patients with chronic kidney disease and initiation of dialysis, hospitalization, or death. *The Journal of the American Medical Association* 303(19): 1946-1953.
- Kaveh, K. & Kimmel, P.L. 2011. Compliance in haemodialysis patients: Multidimensional measures in search of a gold standard. *Am. J. Kidney Dis.* 37(2): 244-266.
- Korevaar, J.C., Jansen, M.A., Merkus, M.P., Dekker, F.W., Boeschoten, E.W. & Krediet, R.T. 2000. Quality of life in predialysis end-stage renal disease patients at the initiation of dialysis therapy. *Peritoneal Dialysis International. Journal of the International Society for Peritoneal Dialysis* 20(1): 69-75.
- Lee, Y., Kim, M.S., Cho, S. & Kim, S.R. 2013. Association of depression and anxiety with reduced quality of life in patients with pre-dialysis chronic kidney disease. *International Journal of Clinical Practice* 67(4): 363-368.
- Levey, A.S. & Coresh, J. 2012. Chronic kidney disease. *Lancet.* 379(9811): 165-180.
- Mapes, D.L., Lopes, A.A. & Satayatham, S. 2003. Health-related quality of life as a predictor of mortality and hospitalization: The dialysis outcomes and practice patterns study (DOPPS). *Kidney International* 64(1): 339-349.
- Ministry of Health Malaysia. 2011. *Clinical Practical Guidelines: Management of Chronic Kidney Disease in Adults*. http://www.msn.org.my/Doc/PublicDoc_PB/CPGManagementOfChronicKidneyDisease.pdf
- Mujais, S.K., Story, K., Brouillette, J., Takano, T., Soroka, S., Franek, C., Mendelsohn, D. & Finkelstein, F.O. 2009. Health-related quality of life in CKD patients: Correlates and evolution over time. *Clinical Journal of the American Society of Nephrology* 4(8): 1293-1301.
- Pagels, A.A., Söderkvist, B.K., Medin, C., Hylander, B. & Heiwe, S. 2012. Health-related quality of life in different stages of chronic kidney disease and at initiation of dialysis treatment. *Health and Quality of Life Outcomes* 10(1): 71-84.
- Perlman, R.L., Kaiser, M., Finkelstein, F., Eisele, G., Roys, E., Liu, L., Burrows-Hudson, S., Port, F., Messana, J.M., Bailie, G., Rajagopalan, S. & Saran, R. 2003. The longitudinal chronic kidney disease study: A prospective cohort study of predialysis renal failure. *Seminars in Dialysis* 16(6): 418-423.
- Ricardo, A.C. 2010. Depression and chronic kidney disease. *Kidney* 19(4): 172-174.
- Sararaks, S., Azman, A.B., Low, L.L., Rugayah, B., Aziah, A.M., Hooi, L.N., Abdul Razak, M., Norhaya, M.R., Lim, K.B., Azian, A.A. & Geeta, S. 2005. Validity and reliability of the SF-36: The Malaysian context. *Medical Journal of Malaysia* 60(2): 163-179.
- Soni, R.K., Weisbord, S.D. & Unruh, M.L. 2010. Health-related quality of life outcomes in chronic kidney disease. *Current Opinion in Nephrology and Hypertension* 19(2): 153-159.
- Spiegel, B.M.R., Melmed, G., Robbins, S. & Esrailian, E. 2008. Biomarkers and health related quality of life in end-stage renal disease: A systematic review. *Clinical Journal of the American Society of Nephrology* 3(6): 1759-1768.
- Tabachnick, B.G. & Fidell, L.S. 2007. *Using Multivariate Statistics*. 5th ed. Boston: Pearson Education, Inc.
- Tong, A., Wong, G.M.C., Taggart, S., Henning, P., Mackie, F., Carrol, R.P., Howard, K. & Craig, J.C. 2013. Quality of life of young adults and adolescents with chronic kidney disease. *The Journal of Pediatrics* 163(4): 1179-1185.
- Ware, J.E., Snow, K.K., Kosinski, M. & Gandek, B. 1993. *SF-36® Health Survey Manual and Interpretation Guide*. Boston, MA: New England Medical Center, the Health Institute.
- Yusoff, N., Low, W.Y. & Yip, C.H. 2011. Psychometric properties of the Malay version of the Hospital Anxiety and Depression Scale: A study of husbands of breast cancer patients in Kuala Lumpur, Malaysia. *Asian Pacific Journal of Cancer Prevention* 12: 915-917.
- Zalai, D., Szeifert, L. & Novak, M. 2012. Psychological distress and depression in patients with chronic kidney disease. *Seminars in Dialysis* 25(4): 428-438.
- Zigmond, A.S. & Snaith, R.P. 1983. The hospital anxiety and depression scale. *Acta Psychiatrica Scandinavica* 67(6): 361-370.
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