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NUTRITIONAL STATUS AND QUALITY OF LIFE AMONG HEMODIALYSIS PATIENTS IN MALAYSIA

NOR BAIZURA BINTI MD. YUSOP

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NUTRITIONAL STATUS AND QUALITY OF LIFE AMONG HEMODIALYSIS PATIENTS IN MALAYSIA

By

NOR BAIZURA BINTI MD. YUSOP

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Master of Science

OCTOBER 2008

UPM

This thesis is dedicated to
My parents,
Mr. Md Yusop Hj. Abdul Hamid and Mrs. Badariah Hj. Ismail
&
My beloved husband,
Megat Mohd Hafez Megat Mohd Ghazali

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

NUTRITIONAL STATUS AND QUALITY OF LIFE AMONG HEMODIALYSIS PATIENTS IN MALAYSIA

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NOR BAIZURA BINTI MD. YUSOP

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Chairperson: Dr. Chan Yoke Mun, PhD

Faculty: Medicine and Health Sciences

Hemodialysis treatment provides progressive improvement in decreasing the risk of mortality and mobility. However, insufficient hemodialysis treatment and hemodialysis related complications tend to decrease patient's nutritional status and overall quality of life.

The objective of this cross-sectional study was to determine the nutritional status and quality of life among hemodialysis patients. A total of 90 subjects were recruited from Hospital Kuala Lumpur and dialysis centres of the National Kidney Foundation of Malaysia. Data on socioeconomics, demography, medical history, hemodialysis treatment and nutritional status were collected. Anthropometry assessment included weight, height, mid-arm circumference and mid-arm muscle circumference, skin fold thicknesses at four sides (biceps, triceps, subscapular and suprailliac), calf circumference and bioimpedance assessment. Subjective Global Assessment was

conducted. Biochemical indices including renal function test, liver function test, glucose test, electrolytes, lipid profile, hemoglobin and hematocrit were ascertained. Information on dietary intake were collected using 24-hour diet recall and one-day food record. Information on appetite level and eating habits were collected. Kidney Disease Quality of Life Short Form was used to determine quality of life of the subjects.

Subjects comprised 48.9% males and 51.1% females. The sample size predominately Chinese (n=62, 68.9%), followed by Malays (n=19, 21.1%), Indians (n=7, 7.8%) and others (n=2, 22.0%). The mean age of subjects was 49.7 ± 14.1. Approximately 30% of the subjects achieved the recommended body mass index for hemodialysis patients. Approximately 80% and 34% of the subjects had triceps skinfold and mid-arm circumference less than 50th percentiles, respectively. Approximately 48% subjects had serum albumin level lower than 4.0 mg/dL. About 58.6% had elevated serum phosphate (> 1.6 mmol/L). For lipid profile, 28.8% subjects had elevated total cholesterol (> 5.2 mmol/L), 71.1% had serum cholesterol of less than 5.2 mmol/L. The mean total energy and protein intake was 26.8 ± 7.0 kcal/kg and 1.0 ± 0.3 g/kg, respectively.

Results of the *Kidney Disease Quality of Life Short Form* analysis showed that the highest score was for dialysis staff encouragement (75.28 ± 23.55). The lowest score was for work status (27.78 ± 34.4). In the General Linear Model univariate analysis, blood flow was found to contribute to complication of the kidney, while calf

circumference and mid-arm muscle circumference were predictors for the support and satisfaction of the treatment, blood flow, serum albumin, serum creatinine and protein intake were predictors for the physical health composite. As for mental health composite, diabetes was the only contributory factor. Multivariate regression showed similar results were obtained with exception of treatment support and satisfaction.

In conclusion, low blood flow, diabetes, increased serum calcium and low serum creatinine had an impact on quality of life of the subjects. Longitudinal study is required to determine the cause and effect mechanism between the associated factors and quality of life.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

STATUS PEMAKANAN DAN KUALITI HIDUP DIKALANGAN PESAKIT HEMODIALISIS DI MALAYSIA

Oleh

NOR BAIZURA BINTI MD. YUSOP

OKTOBER 2008

Pengerusi: **Dr. Chan Yoke Mun, PhD**

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Rawatan hemodialisis mengurangkan risiko penyakit dan kematian. Walau bagaimanapun, ketidakcukupan rawatan hemodialisis dan komplikasi rawatan akan menyebabkan penurunan status pemakanan dan kualiti hidup pesakit.

Objektif kajian rentas ini ialah menentukan status pemakanan dan kualiti hidup dalam kalangan pesakit hemodialysis. Kajian ini terdiri daripada 90 orang subjek yang dipilih dari Hospital Kuala Lumpur dan pusat dialisis Persatuan Buah Pinggang Malaysia. Semua data yang berkaitan sosioekonomi, demografi, sejarah perubatan, rawatan hemodialysis dan status pemakanan telah diambil. Penilaian antropometri terdiri daripada berat, tinggi, indeks jisin tubuh, lilitan tengah lengan dan lilitan tengah otot lengan, ketebalan kulit di empat bahagian (*biceps, triceps, subscapular, dan suprailliac*), lilitan betis and *bioimpedance assessment. SubjectiveGlobal*

Assesment dijalankan. Data biokimia termasuklah ujian fungsi renal, ujian fungsi hati, ujian glukos, elektrolit, profil lemak, hemoglobin dan hematokrit. Untuk pengambilan dietari, ingatan diet 24 jam dan satu hari rekod makanan digunakan. Data berkaitan selera dan tabiat makanan juga telah diambil. Borang soal selidik *Kidney Disease Quality of Life Short Form* telah digunakan untuk memperolehi data tentang kualiti hidup pesakit.

Subjek terdiri daripada 48.9% lelaki dan 51.1% perempuan. Data didominasikan oleh kaum China (n=62, 68.9%), diikuti oleh Melayu (n=19, 21.1%), India (n=7, 7.8%) dan lain-lain (n=2, 2.2%). Min umur ialah 49.7 ± 14.1 tahun. Hasil penilaian antropometri menunjukkan bahawa dianggarkan 30% mencapai saranan indeks jisim tubuh untuk pesakit hemodialysis. Sebanyak 80% dan 34% daripada subjek mempunyai *triceps* dan lilitan tengah otot lengan kurang daripada 50 persentail daripada saranan. Data biokimia menunjukan sebanyak 47.7% daripada pesakit mempunyai aras serum albumin (39.9 ± 4.3 mg/dL) rendah daripada 4.0 mg/dL. Sebanyak 58.6% mempunyai serum fosfat yang tinggi (>1.6 mmo/L) Untuk profil lipid , terdapat 28.8% subjek dengan aras jumlah kolesterol (> 5.2 mmol/L) yang tinggi, 71.1% daripada subjek mempunyai aras serum kolesterol kurang daripada 5.2 mmol/L. Purata jumlah pengambilan tenaga dan protein ialah 26.8 ± 7.0 kcal/kg dan 1.0 ± 0.3 g/kg.

Hasil analysis *Kidney Disease Quality of Life Short Form* menunjukkan jumlah skor paling tinggi ialah *dialysis staff encouragement* (75.28 ± 23.55). Secara kontra, skor

terendah ialah status pekerjaan (27.78 ± 34.44). Analisis *General Linear Model univariate*, pengubah yang menyumbang kepada komplikasi buah pinggang ialah log aliran darah. Untuk *treatment support and satisfaction*; log lilitan betis dan lilitan tengah lengan dan lilitan tengah otot lengan adalah peramal . Log aliran darah, log serum albumin, log serum kreatinin dan pengambilan protein adalah penentu untuk *physical health composite*. Akhir sekali, untuk *mental health composite*, hanya diabetes muncul sebagai peramal. Dalam analisis selanjutnya, hasil daripada multivariate regression menunjukan hasil yang sama untuk faktor dan peramal kecuali *support and satisfaction of the treatment*.

Aliran darah yang rendah, diabetes, peningkatan serum kalsium dan serum kreatinin yang rendah memberi kesan kepada kualiti hidup pesakit. Kajian jangkamasa panjang diperlukan untuk menentukan mekanisma punca dan kesan diantara faktor-faktor dan kualiti hidup.

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I certify that an Examination Committee has met on **20 October 2008** to conduct the final examination of **Nor Baizura Bt. Hj. Md. Yusop** on her **Master Science** thesis entitled "**Nutritional Status and Quality of Life among Hemodialysis Patients**" in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The committee recommends that the student be awarded the Master Science (Community Nutrition).

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Date: 15 January 2009

DECLARATION

I declare that the thesis is my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently, submitted for any other degree at Universiti Putra Malaysia or at any other institution.

_____

Nor Baizura Md. Yusop

Date:

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LIST OF ABBREVIATIONS

CKD	Chronic Kidney Disease
BCAA	Branched-chain amino acids
BIA	Bioelectrical impedance analysis
BMI	Body Mass Index
BP	Bodily pain
CAPD	Continuous Ambulatory Peritoneal Dialysis
DD	Dialysis day
DEI	Dietary energy intake
DEXA	Dual-energy X-ray absorptiometry
DM	Diabetes mellitus
DPI	Dietary protein intake
EAA	Essential amino acids
ESRD	End stage renal disease
FFM	Fat free mass
FM	Fat mass
GFR	Glomerular filtration rate
GH	General health perception
HD	Hemodialysis
HKL	Hospital Kuala Lumpur
IDWG	Interdialytic weight gain
KDOQI	Kidney Disease Outcomes Quality Initiative
KDQOL-SF™	Kidney Disease Quality of Life Short Form
KT	Kidney transplant
LBM	Lean body mass
MAC	Mid-arm circumference
MAMC	Mid-arm muscle circumference
MCS	Mental component scale
MH	Mental health
MIA	Malnutrition, Inflammation and Atherosclerosis
MICS	Malnutrition-inflammation complex syndrome
MNT	Medical Nutrition Therapy
NDD	Non dialysis day
NKF	National Kidney Foundation
nPCR	Protein catabolic rate
PCM	Protein calorie malnutrition
PCS	Physical component scale
PD	Peritoneal dialysis
PEM	Protein energy malnutrition
PF	Physical functioning
QOL	Quality of life
RE	Role limitations due to emotional problems
REE	Resting energy expenditure

RP	Role limitations due to physical problems
RRT	Renal replacement therapy
SF	Social functioning
SGA	Subjective global assessment
TAA	Total amino acids
TPD	Tidal peritoneal dialysis
VT	Vitality
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

1.1 Introduction

Kidney failure is defined as Glomerular Filtration Rate (GFR) of less than 15 mL/min per 1.73 m^2, with presence of signs and symptoms of uremia (K/DOQI, 2000). End stage renal disease (ESRD) is a stage where patient has total and long-lasting kidney failure which requires Renal Replacement Therapy (RRT), either through dialysis treatment or transplantation (Lameire and Mehta, 2000). End Stage Renal Disease is a recognized worldwide public health problem (Eknoyan et al., 2004). In Malaysia, there was an increase of newly diagnosed dialysis patients from 952 in 1996 to 2774 in 2004 and kidney transplantation (KT) from 151 in 1996 to 185 in 2004, respectively (Malaysian Dialysis & Transplant Registry, 2006).

The increasing prevalence of ESRD is parallel to the increasing prevalence of Type 2 Diabetes Mellitus (T 2 DM). The prevalence of diabetes for all age groups worldwide was approximately 2.8% in 2000 and estimated to reach 4.4% in 2030. In line with that, the total number of people with diabetes is projected to rise from 171 million in 2000 to 366 million in 2030 (Wild et al., 2004).

Earlier study by Lok and colleagues (2004) reported that DM patients had a higher incidence rate of dialysis compared to their non-DM counterparts. It is thus projected that the incidence of ESRD will increase in the future due to the "diabetic epidemic" (Wild et al., 2004).

In Malaysia, diabetic nephropathy is the main cause of ESRD. It was reported that 52% of new ESRD cases were due to uncontrolled DM (Malaysian Dialysis & Transplant Registry, 2006). A study conducted at the east coast of Malaysia found that 48% of diabetic patients had proteinuria and 16% microalbumia, which are the earliest indicators of diabetic kidney disease (Wong, 2005). Kong et al. (2006) reported that among their 733 diabetic patients, the prevalence of macroalbuminuria and microalbuminuria was 15.7% and 39.7%, respectively. In a study on 5,549 Asian DM patients, it was found that the prevalence of micro and macroalbuminuria was 58.6% and indicated an increase in risk of cardiovascular and renal diseases (Wu et al., 2005).

1.2 Statement of Problem

Hemodialysis (HD) treatment improves nutritional markers among HD patients including the improvement of serum creatinine, serum albumin, serum prealbumin, normalized protein catabolic rate (nPCR) (Pupim et al., 2002) and dietary intake of the patients (Mehrotra et al., 2002). However, study had showed that HD is highly associated with malnutrition (Rutledge and McMahon, 2000) and lower quality of life

(QOL) (Liu et al., 2006). Prevalence of severe malnutrition among HD patients is reported to be about 4.6% - 19% while 72% - 90.9% and 4.6%-28% were mild malnourished and well-nourished, respectively (Rutledge and McMahon, 2000; Jones et al., 2004; Morais et al., 2005).

The QOL of patients of kidney transplant (KT) was reported to be better than those of HD and Continuous Ambulatory Peritoneal Dialysis (CAPD) patients (Fen and Chuan, 2004). Quality of life is a potential indicator of RRT outcome and a measure of risk of morbidity and mortality of ESRD patients on treatment (Valderrabano et al., 2001; Kalantar-Zadeh et al., 2001). Kalantar-Zadeh et al. (2001) showed that the mental health dimension of QOL displayed a stronger association with mortality among patients on HD. In another study, Morsch et al. (2006) found a close relationship between physical health dimension of QOL with morbidity and mortality.

Both nutritional status and QOL were the main outcomes of HD treatment that influenced patients' general health status (Kalantar-Zadeh et al., 2001). Nutritional status is an important factor that determines the overall QOL of patients undergoing dialysis treatment. Several studies reported that nutritional markers such as body mass index (BMI), cholesterol, serum albumin, hemoglobin (Malaysian Dialysis & Transplant Registry, 2003) as well as dietary intakes may influence QOL (Buckner and Dwyer, 2003).