



UNIVERSITI PUTRA MALAYSIA

***FACTORS ASSOCIATED WITH FOOD CHOICE VALUES AMONG
OLDER HEMODIALYSIS PATIENTS IN SELECTED DIALYSIS CENTRES
IN SELANGOR, MALAYSIA***

FATIN IZZATY BINTI MOHD SHAHRIN

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HEMODIALYSIS PATIENTS IN SELECTED DIALYSIS CENTRES IN
SELANGOR, MALAYSIA**

By

FATIN IZZATY BINTI MOHD SHAHRIN

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

June 2019

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

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June 2019

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Hemodialysis (HD) among the elderly has unique clinical features, where these patients have more co-morbidity, require more frequent hospitalization and use more drugs and health services compared to the younger populations. In addition, poor nutritional status may impede their appetite, food accessibility, and preparation. With individual's social lives mainly focused around food, the food-related activities (e.g., shopping, cooking and dining out) become of greater significance to the elderly but are more difficult to achieve. Thus, this study aimed to determine the factors associated with food choice values (FCVs) among HD elderly in selected dialysis centres.

A cross-sectional study was conducted among 119 elderly, aged 60 years and above on maintenance HD. By using simple random sampling, nine HD centres were selected from Petaling and Hulu Langat districts, Selangor as the study locations. Socio-demographic, dietary intake, malnutrition risk, depression, health-related quality of life (HRQOL) and FCVs were assessed via interview session. Dialysis Malnutrition Score (DMS) was used to evaluate nutritional status while Patient Health Questionnaire-9 (PHQ-9) used to assess the severity of depressive symptoms. HRQOL was assessed by using the Kidney Disease Quality of Life-36 (KDQOL-36) questionnaire. The medical profile and dry weight were obtained from the subjects' medical records. Anthropometric assessments such as height, pre-dialysis weight, and post-dialysis weight were also conducted. The variables associated with FCVs were tested with Pearson Correlation and Multiple Linear Regression (MLR).

The mean age of the subjects was 67 ± 6 years. The subjects comprised of approximately equal number of males (50.4%) and females (49.6%). Majority of the subjects were Malay (60.5%). Hypertension (87.4%) and diabetes mellitus (71.4%) were the major co-morbidities among subjects. There were 49.6% of the subjects who did not achieve the desirable serum albumin of ≥ 40 g/L, 58.0% had high serum phosphate (>1.6 mmol/L) while 61.3% of the subjects had low hemoglobin level. About 6.7% of the subjects were underweight. Majority of the subjects had inadequate energy and protein intakes (91.6%), were moderately malnourished (71.4%), non-depressed (84.0%) and obtained better HRQOL score in terms of symptoms/problems (73.37 ± 17.01) and effects of kidney disease (72.63 ± 19.74) subscales. Safety, sensory appeal, and organic factors were the strongest perceived of FCVs. There was a significant negative correlation between age ($p<0.05$), energy intake ($p<0.05$), protein intake ($p<0.01$) and fat intake ($p<0.01$) with total FCVs score. The MLR model suggested that 12.1% of the variance in the FCVs was explained by age and fat intake.

In conclusion, this research found that health was not the main factor in determining the FCVs among HD elderly. Instead, safety, sensory appeal, and organic factors were deemed to be more important when assessed by FCVs questionnaire. Subject who experienced aging and increased in total energy, protein and fat intakes felt that food choice was no longer important. Age and fat intake also had an impact on FCVs of HD elderly. Thus, these findings could be taken into account for dietitians to understand the factors associated with FCVs when designing and delivering nutritional intervention regarding healthy choices of fat intake targeting HD elderly.

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

**FAKTOR-FAKTOR YANG BERKAITAN DENGAN NILAI PILIHAN
MAKANAN DALAM KALANGAN PESAKIT HEMODIALISIS WARGA TUA DI
PUSAT DIALISIS TERPILIH DI SELANGOR, MALAYSIA**

Oleh

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Hemodialisis (HD) dalam kalangan warga tua mempunyai ciri-ciri klinikal yang unik, di mana pesakit mempunyai lebih banyak morbiditi, kemasukan ke hospital lebih kerap dan menggunakan lebih banyak ubat dan perkhidmatan kesihatan berbanding pesakit yang lebih muda. Tambahan pula, status pemakanan yang merosot boleh menghalang selera, akses dan penyediaan makanan mereka. Dengan kehidupan sosial individu yang memberi tumpuan kepada makanan, aktiviti yang berkaitan dengan makanan (misalnya membeli-belah, memasak dan makan) menjadi lebih penting kepada warga tua tetapi lebih sukar untuk dicapai. Oleh itu, kajian ini bertujuan untuk menentukan faktor yang berkaitan dengan nilai pilihan makanan (FCVs) dalam kalangan pesakit HD warga tua di pusat dialisis terpilih.

Kajian rentas ini dijalankan terhadap 119 orang tua, berusia 60 tahun dan ke atas yang sedang menjalani HD. Dengan menggunakan sampel mudah rawak, sembilan pusat HD dipilih dari daerah Petaling dan Hulu Langat, Selangor sebagai lokasi kajian. Sosio-demografi, pengambilan makanan, risiko malnutrisi, depresi, kualiti hidup yang berkaitan dengan kesihatan (HRQOL) dan FCVs dinilai melalui sesi wawancara. *Dialysis Malnutrition Score (DMS)* digunakan untuk menilai status pemakanan manakala *Patient Health Questionnaire-9 (PHQ-9)* digunakan untuk menilai keterukan gejala depresi. HRQOL dinilai dengan menggunakan borang soal selidik *Kidney Disease Quality of Life-36 (KDQOL-36)*. Profil perubatan dan *dry weight* diambil daripada rekod perubatan pesakit. Penilaian antropometri seperti tinggi, berat badan sebelum dan selepas dialisis juga dilakukan. Faktor yang berkait dengan FCVs dianalisis dengan menggunakan *Pearson Correlation* dan *Multiple Linear Regression (MLR)*.

Umur min subjek ialah 67 ± 6 tahun. Subjek terdiri daripada bilangan lelaki (50.4%) dan perempuan (49.6%) yang hampir sama. Majoriti subjek adalah Melayu (60.5%). Hipertensi (87.4%) dan kencing manis (71.4%) merupakan penyakit utama dalam kalangan subjek. Terdapat 49.6% subjek tidak mencapai *serum albumin* ≥ 40 g/L, 58.0% mempunyai serum fosfat yang tinggi (>1.6 mmol/L) manakala 61.3% subjek mempunyai tahap *hemoglobin* yang rendah. Kira-kira 6.7% subjek kurang berat badan. Majoriti subjek mempunyai pengambilan tenaga dan protein yang tidak mencukupi (91.6%), sederhana malnutrisi (71.4%), tidak tertekan (84.0%) dan mempunyai skor HRQOL yang lebih baik dari segi *symptoms/problems* (73.37 ± 17.01) dan *effects of kidney disease* (72.63 ± 19.74). Faktor keselamatan, daya sensori, dan organik didapati paling penting terhadap subjek. Terdapat hubungan negatif yang signifikan antara umur ($p < 0.05$), pengambilan tenaga ($p < 0.05$), pengambilan protein ($p < 0.01$) dan pengambilan lemak ($p < 0.01$) dengan jumlah skor FCVs. Model MLR menunjukkan bahawa 12.1% varians dalam FCVs dijelaskan oleh umur dan pengambilan lemak.

Kesimpulannya, penyelidikan ini menemukan bahawa kesihatan bukanlah faktor utama yang menentukan pilihan makanan dalam kalangan warga tua yang menjalani HD, sebaliknya faktor keselamatan, daya sensori, dan organik adalah sangat penting. Subjek yang mengalami peningkatan umur dan pengambilan tenaga, protein dan lemak merasakan bahawa pemilihan makanan adalah tidak penting. Umur dan pengambilan lemak juga mempunyai impak terhadap FCVs. Oleh itu, perkara ini boleh diambil kira oleh dietitian untuk memahami faktor yang berkaitan dengan FCVs apabila merancang dan menyampaikan intervensi pemakanan melibatkan pemilihan makanan berlemak secara sihat yang menyasarkan warga tua yang sedang menjalani HD.

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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee were as follows:

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LIST OF ABBREVIATIONS

ESRD	End-stage renal disease
CKD	Chronic kidney disease
HD	Hemodialysis
PEW	Protein-energy wasting
FCVs	Food choice values
HRQOL	Health-related quality of life
BMI	Body mass index
pmp	Per million populations
FFQ	Food-frequency questionnaire
LOHAS	Lifestyle of health and sustainability
FCQ	Food choice questionnaire
MNT	Medical Nutrition Therapy
PD	Peritoneal dialysis
ISRNM	International Society of Renal Nutrition and Metabolism
SGA	Subjective Global Assessment
MIS	Malnutrition-Inflammation Score
DMS	Dialysis Malnutrition Score
BIA	Bioelectrical Impedance Analysis
DS	Depressive symptoms
PHQ-9	Patient Health Questionnaire
KDQOL	Kidney Disease Quality of Life
WHO	World Health Organization
DD	Dialysis day
NDD	Non-dialysis day
PCS	Physical composite score
MCS	Mental composite score
MLR	Multiple linear regression
AVF	Arteriovenous fistula
BCF	Brachiocephalic fistula
USRDS	United States Renal Data System
EPO	Erythropoietin
LBM	Lean body mass

CHAPTER 1

INTRODUCTION

1.1 Study Background

End-stage renal disease (ESRD) is a non-curable condition of permanent loss of kidney function. It is defined as glomerular filtration rate of less than 15 ml/min/1.73m² with the presence of signs and symptoms of uremia (K/DOQI, 2000). It is a recognised public health crisis worldwide in which chronic kidney disease (CKD) was ranked 27th in the list of causes of the total number of deaths worldwide in 1990 but rose to 18th in 2010 (Jha et al., 2013). Current projections stipulate that the worldwide population of ESRD patients living on dialysis could be over 2 million by 2030 (Szczzech & Lazar, 2004).

In Malaysia, an ascending trend of the incidence and prevalence of ESRD patients was observed for the previous 20 years (Bujang et al., 2017). Furthermore, the acceptance rate for both dialysis modalities almost doubled whereas the prevalence rate had risen subsequently more than two-fold over the past 10 years (Wong & Goh, 2016). The latest available 24th Report of the Malaysian Dialysis and Transplant Registry in 2016 recorded a total of 39,711 patients receiving dialysis treatment of which 35,781 (90%) were on hemodialysis (HD) and 3,930 (10%) on peritoneal dialysis (PD) (Wong & Goh, 2016). These figures represented HD as the most favoured treatment modality for ESRD in Malaysia.

More than 80% of all patients who receive treatment for kidney failure are in affluent countries with universal access to health care and large elderly populations (Jha et al., 2013). In Malaysia, the highest percentage of age distribution of new dialysis patients in 2016 was the 55-64 years age group followed by the ≥65 years with 32% and 26%, respectively (Wong & Goh, 2016). Aging has been linked with greater susceptibility related to the commencement of chronic diseases, such as diabetes mellitus, high blood pressure, and also, CKD which is a progressively debilitating and disabling chronic medical condition (Melo et al., 2016). HD among elderly CKD patients has unique clinical features, where these patients have more co-morbidities, require more hospitalizations and use more drugs and health services compared to the younger population (Braga et al., 2011).

In addition, poor nutritional status among elderly could be secondary to their physical, economic and social difficulties that may impede their appetite, food accessibility, and preparation (Burrowes et al., 2002; Burrowes, 2003; Morley, 2001). A high proportion of HD elderly was reported to depend on others for food preparation and food shopping (Burrowes et al., 2003). Furthermore, with individuals' social lives mainly focused around food, the food-related activities (e.g. shopping, cooking and dining out) become of greater significance to elderly

but are more difficult to achieve (Lumbers & Raats, 2006). Thus, there is a need to comprehend the two factors that may affect food choices which are the distal (e.g. genetics, geography, culture, etc.) and proximal (e.g. taste preferences, knowledge, beliefs, availability, etc.) factors (Lyerly & Reeve, 2015) among HD elderly. A novel approach to explore how HD elderly prioritize food choice may be especially useful to figure out the individual-level determinants of eating variations and for the tailoring of nutritional interventions in this population.

1.2 Problem statement

The pace of population aging around the world is increasing dramatically. In 2017, the global population aged 60 years or above was 962 million, which constitute about 13% of the global population. This number was more than two-fold than in 1980 where there were 382 million elderly globally (United Nations, 2017). In addition, the fractions of the global population over 60 years will almost double from 12% to 22% between 2015 and 2050 (United Nations, 2017). Whereas, the population aged 60 or over is projected to rise twofold from 549 million in 2017 to nearly 1.3 billion in 2050 in Asia (United Nations, 2017). By the year 2035, Malaysia is anticipated to achieve aging population status, at which point 15% of the total population will be 60 years and older according to the Department of Statistics Malaysia.

Among the aging population along with the increment in co-morbidities such as diabetes, hypertension, and obesity, the future prevalence of CKD will likely increase as well among elderly (Bujang et al., 2017). Moreover, the aging population in Malaysia is predicted to have a huge effect on the figure of incident dialysis patients as the risk of ESRD increases with age (Bujang et al., 2017). Looking at the trend in the past nine years, the total number of incident dialysis patients was increased from 24% in 2007 to 26% in 2016 among the Malaysian elderly aged 65 years and above (Wong & Goh, 2016).

Despite the fact that HD therapy is life-saving, HD patients are susceptible to numerous nutritional-related issues such as protein-energy wasting (PEW), anemia, fluid and electrolytes imbalance and mineral bone disorders (Himmelfarb & Ikizler, 2010). These issues are usually managed by using medical nutrition therapy, a specialised nutrition guideline for the care of dialysed patients. The guideline primarily centered upon the recommendations of energy, protein, potassium, phosphorus, and sodium (Khor et al., 2018) to be delivered to HD patients as an individual-level dietary intervention. However, a study conducted among HD elderly patients where the dietary intake was assessed using 3-day dietary records observed that the mean dietary intakes did not meet the current renal-specific dietary recommendations (Martins et al., 2015). This enlightened the fact that multiple dietary restrictions repeatedly advised to dialysis patients are difficult to achieve. It may imposed a certain challenge in which dialysis patients need to make a major change in their habitual food intake and lifestyle (Khor et al., 2018).

Thus, knowledge of how and why HD elderly patients choose their food could provide apprehension on individual-level determinants of eating variations. The food choice values (FCVs) can be explained by 'factors that individual consider when deciding which foods to purchase and/or consume' (Lyerly & Reeve, 2015). Identifying how HD elderly prioritize FCVs probably beneficial in contributing to the broad and meaningful healthy eating interventions among this population. Studies investigating FCVs within HD elderly population are unknown and unavailable. In fact, the study of FCVs is still very scarce in Malaysia (Asma et al., 2010). Some determinants of food choice were investigated among adults, between Malay husbands and wife in an urban community and also among households in Klang Valley (Abdul Rahman, Khattak & Mansor, 2013; Asma et al., 2010; Rahim et al., 2015). Nevertheless, none of the international or local studies tackles how nutrition-related conditions contributed to factors influencing food choice among the elderly. This study thereby attempted to investigate factors underlying the food selection among HD elderly.

1.3 Research questions

1. What are the socio-demographic, medical history, anthropometric profile, dietary intake, malnutrition risk, depression, health-related quality of life (HRQOL) and FCVs among HD elderly in selected dialysis centres?
2. Is there any association between the following independent variables and FCVs among HD elderly in selected dialysis centres?
 - a. Socio-demographic
 - b. Anthropometric profile
 - c. Dietary intake
 - d. Malnutrition risk
 - e. Depression
 - f. HRQOL
3. Which factor contributes to FCVs among HD elderly in selected dialysis centres?

1.4 Objectives

1.4.1 General objective

To determine the factors associated with food choice values (FCVs) among HD elderly in selected dialysis centres.

1.4.2 Specific objectives

1. To determine the socio-demographic, medical history, anthropometric profile, dietary intake, malnutrition risk, depression, HRQOL and FCVs among HD elderly in selected dialysis centres.

2. To determine the associations between socio-demographic, anthropometric profile, dietary intake, malnutrition risk, depression and HRQOL with FCVs among HD elderly in selected dialysis centres.
3. To determine factors that contributes to FCVs among HD elderly in selected dialysis centres.

1.5 Null hypotheses

1. There are no significant associations between socio-demographic, anthropometric profile, dietary intake, malnutrition risk, depression and HRQOL with FCVs among HD elderly in selected dialysis centres.
2. There is no significant factor that contributes to the FCVs among HD elderly in selected dialysis centres.

1.6 Conceptual framework

A previous study examining food choice and health across the life course in older adults suggested the need to explore food choice among specific sub-groups experiencing particular life changes such as those who have developed a particular chronic disease (Delaney & McCarthy, 2011). Thus, this study took the unique opportunity to look at the association of common underlying conditions among ESRD elderly and how these affect their current food choices. The research framework (Figure 1.1) showed the independent variables and the dependent variable. The independent variables comprise of six factors namely (1) socio-demographic, (2) anthropometric profile, (3) dietary intake, (4) malnutrition risk, (5) depression, and (6) HRQOL.

The socio-demographic factors include age, sex, ethnicity, religion, marital status, educational level, current employment status and household income (monthly). This research highlights a few interesting variables (e.g. nutritional status, depression, and HRQOL) which probably associate with food choice. Nutritional status includes anthropometric assessments, dietary intake and malnutrition risk. Elderly patients with CKD often have an altered nutritional status and will progressively deteriorate as renal function worsens (Lacquaniti et al., 2009). The anthropometric profile includes height, pre- and post-dialysis weight, dry weight and Body Mass Index (BMI). Low food intake among HD elderly subjects (Martins et al., 2015) and the necessity to optimize diet involves knowledge on various factors impacted food choices in elderly (Gunsam & Murden, 2007). PEW is common and affects both geriatric and HD patients (Çelik et al., 2011). Depression is a nutritional risk factor and was acknowledged as the main mental health problem in ESRD patients (Drayer et al., 2006) while poor HRQOL was also usually observed in dialysis patients due to the high burden of co-morbidity and complications that are common in ESRD (Kim et al., 2013). These variables have attracted interest for this study to find any possible association with the dependent variable, FCVs, which was evaluated by the FCVs questionnaire.

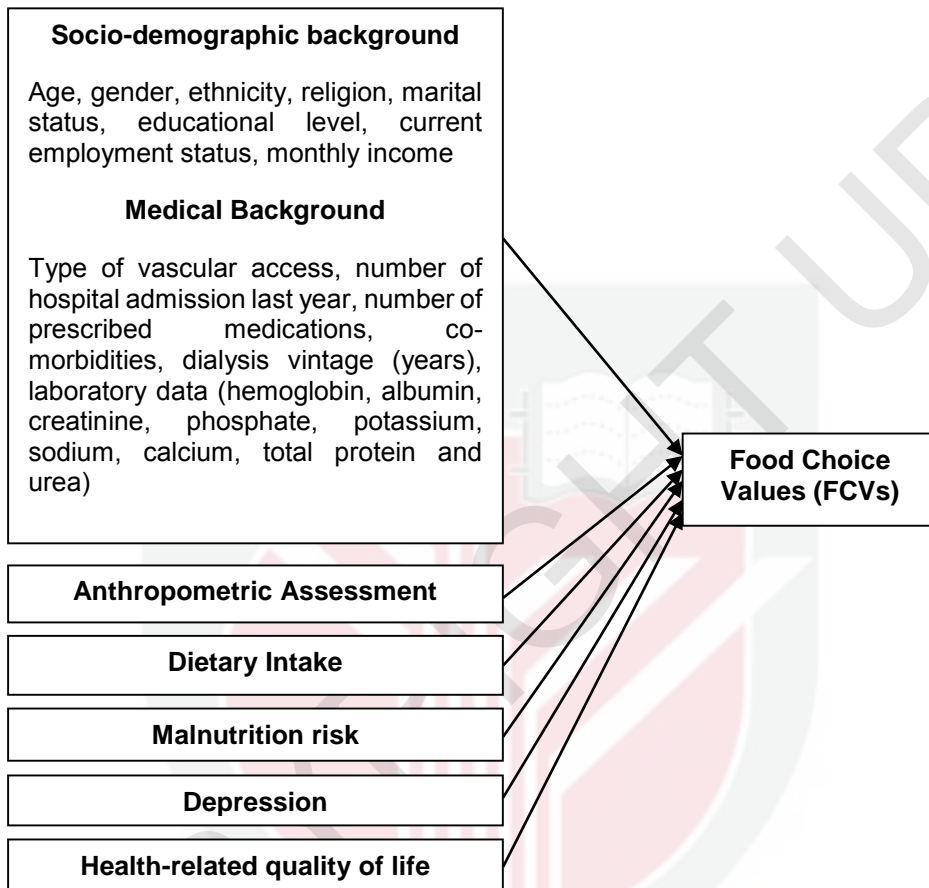


Figure 1.1: The research framework

1.7 Significance of the study

This study was the first to attempt the exploration of factors associated with FCVs among HD elderly. The outcome of this study may provide new insight into the potency of food choice as one individual-level determinant of eating variation among HD elderly. Furthermore, the information obtained can act as baseline data for future research in identifying the determinants and barriers to food choices among diseased elderly. Besides that, the novel outcomes of this study may contribute to the scarce literature regarding food choices in Malaysia which mostly focused on the general population. The findings from this study may offer unique and important perspectives to dietitians to acknowledge the role of food choice in producing the desired change of dietary intervention among the elderly.

Findings from this study may also have an important implication on effective individual-level nutrition interventions provided by dietitians or any other health care professionals. It emphasizes the importance of dietitians to understand the point of view of subjects whom an intervention intends to be served. It is believed that incorporation of food choice in healthy food interventions among elderly patients undergoing dialysis treatment is necessary to guide the elaboration and planning of health programs, which should be exclusively designed for this population. Closing the gaps between the wide ranges of food aspects may lead to possibilities of age-based strategies or policies on top of the implementation of existing nutritional recommendations.

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LIST OF PUBLICATIONS

- Fatin-Izzaty, M. S & Noraida, O. (2018). Factors Associated With Total Satisfaction With Food-related Life Among Elderly In Rumah Seri Kenangan, Selangor. *International Journal of Public Health and Clinical Sciences*, 5(4), 246-253. (Published)
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- Fatin Izzaty, M. S., Lim, Z.Y., Noraida, O., Nor Fadhlina, Z. & Zulfitri 'Azuan, M.D. (2019). Association of socio-demographic characteristics, nutritional status, risk of malnutrition and depression with quality of life among elderly haemodialysis patients. *Mal J Nutr*, 25(1), 1-11. (Published)



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