

**PROVIDER COST AND PATIENT'S
WILLINGNESS TO PAY FOR HEMODIALYSIS
TREATMENT IN HEMODIALYSIS UNIT,
HOSPITAL USM**

by

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**Dissertation submitted in partial fulfilment of the
requirements for the degree of
Bachelor of Health Sciences (Nursing)**

June 2013

DECLARATION

I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.



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CERTIFICATE

This is to certify that the dissertation entitled '**Provider Costs and Patient's Willingness to Pay for Hemodialysis Treatment, at Hemodialysis Unit, Hospital USM**' is the bona fide record of research work done by Umami Nabila binti Radzi, Matric Number: 105156 during the period of September 2012 to June 2013, under my supervision. This dissertation submitted in partial fulfillment for the Degree of Bachelor of Science (Health) in Nursing. Research work and collection of data belong to Universiti Sains Malaysia.



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LIST OF ABBREVIATIONS

- | | | |
|------------------|---|------------------------------------|
| 1. WTP | - | Willingness to pay |
| 2. CKD | - | Chronic Kidney Disease |
| 3. ESRD | - | End-Stage Renal Disease |
| 4. TPB | - | Theory of Planned Behavior |
| 5. RRT | - | Renal Replacement Therapy |
| 6. HD | - | Hemodialysis |
| 7. PD | - | Peritoneal Dialysis |
| 8. RM | - | Ringgit Malaysia |
| 9. WHO | - | World Health Organization |
| 10. SPSS | - | Statistical Package Social Science |
| 11. Hospital USM | - | Hospital Universiti Sains Malaysia |
| 12. MOH | - | Ministry of Health |
| 13. GFR | - | Glomerular Filtration Rate |
| 14. NKF | - | National Kidney Foundation |

**PROVIDER COST AND PATIENT'S WILLINGNESS TO PAY FOR
HEMODIALYSIS TREATMENT IN HEMODIALYSIS UNIT, HOSPITAL
UNIVERSITI SAINS MALAYSIA (HOSPITAL USM).**

ABSTRACT

The increase number of end stage renal failure (ESRD) patients requires for hemodialysis currently, variations in quality of care and escalation of healthcare cost become a burden on patients, families and the healthcare system. Thus, there is a need to conduct a study in order to estimate the real cost of hemodialysis treatment per visit, their willingness to pay (WTP) and perception towards healthcare services. The study objectives are; to calculate the treatment cost of hemodialysis treatment at Hospital USM, to determine patient's WTP for the treatment, and to assess the factors that influence patient's WTP. A cross sectional study was conducted among 37 ESRD patients who received hemodialysis treatment at Hospital USM, Kelantan, Malaysia during the study period. Participants were selected purposively and a set of self-administered questionnaire was used for data collection. While data for costing analysis was obtained from the Finance Department, Hospital USM that was previously prepared for the Casemix implementation (in 2012) in Hospital USM. Data was analyzed using Statistical Package for Social Science (SPSS) software version 20.0, includes linear regression test and non-parametric (Kruskal Wallis and Mann-Whitney) tests. The estimated cost of hemodialysis treatment is RM 136.22. The average amount of patient's WTP for this treatment is RM18.78 per visit. Age, education, income and family size were significantly associated to patient's WTP. The majority of respondents (65%) is unwilling to pay for the treatment. However, patients of high education background and high monthly income were more willing to pay for hemodialysis treatment compared to the other group. In conclusion, there is a need to look for a

standard clinical pathway for the management of ESRD patients. This is important to provide useful information for decision-makers to ensure effective resources allocation and the delivery of high-quality care.

Keywords: ESRD, Hemodialysis, Cost, Willingness-to-pay.

KOS PEMBEKAL DAN KESANGGUPAN PESAKIT MEMBAYAR RAWATAN HEMODIALISIS DI UNIT HEMODIALISIS, HOSPITAL UNIVERSITI SAINS MALAYSIA (HOSPITAL USM).

ABSTRAK

Peningkatan bilangan pesakit peringkat akhir penyakit buah pinggang yang menjalani rawatan hemodialisis, perubahan dalam kualiti penjagaan dan peningkatan kos penjagaan kesihatan, meletakkan beban kepada pesakit, keluarga, dan sistem penjagaan kesihatan. Hal ini memerlukan satu kajian mengira kos sebenar rawatan hemodialisis bagi setiap lawatan, kesanggupan pesakit untuk membayar dan persepsi terhadap perkhidmatan penjagaan kesihatan. Objektif kajian adalah; untuk mengira kos rawatan hemodialisis di Hospital USM, menentukan kesanggupan pesakit membayar untuk rawatan, dan menilai faktor-faktor yang mempengaruhi kesanggupan membayar dalam kalangan pesakit. Satu kajian keratan lintang melibatkan 37 pesakit peringkat akhir penyakit buah pinggang yang menjalani rawatan hemodialisis di Hospital USM, Kelantan, Malaysia semasa pengumpulan data. Pesakit dipilih menggunakan kaedah persampelan bertujuan dari Unit Hemodialisis, Hospital USM dan soal-selidik kendalian sendiri digunakan dalam kajian ini. Selain itu, data bagi analisa kos diperolehi dari Unit Kewangan di Hospital USM, yang telah disediakan bagi tujuan pelaksanaan Casemix (2012) di Hospital USM. Data dianalisa menggunakan Pakej Statistik untuk Sains Sosial (SPSS) perisian versi 20.0 melibatkan ujian regresi linear dan ujian bukan parametrik (Kruskal Wallis dan Mann-Whitney). Anggaran kos rawatan hemodialisis ialah RM 136.22. Jumlah purata caj perkhidmatan yang sanggup dibayar oleh responden ialah RM18.78 bagi satu lawatan. Umur, pendidikan, pendapatan dan saiz keluarga mempunyai perkaitan yang signifikan dengan kesanggupan membayar. Majoriti responden (65%) tidak sanggup membayar untuk rawatan. Namun, pesakit yang

mempunyai latar belakang akademik dan pendapatan yang tinggi lebih menyatakan kesanggupan untuk membayar bagi rawatan hemodialysis berbanding kumpulan lain. Kesimpulannya, adalah menjadi keperluan untuk melihat standart aliran carta klinikal dalam pengurusan pesakit ESRD. Hal ini penting untuk memberi maklumat berguna bagi pembuat keputusan dalam memperuntukkan sumber di samping memberi penjagaan yang berkualiti tinggi.

Kata kunci: ESRD, Hemodialisis, Kos, Kesanggupan untuk membayar.

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

End-stage renal disease (ESRD) is inevitably fatal unless treated by renal replacement therapy (RRT) (Ansell, Risdale & Caskey, 2010). ESRD is one of the most severe complications of Diabetes type 1 and data on patients' risk of developing ESRD are sparse (Finne *et al.*, 2005). The examples of RRT required by patient diagnosed with ESRD include hemodialysis, continuous ambulatory peritoneal dialysis (CAPD) and renal transplantation (Liu & Hooi, 2007).

Nowadays, there is a positive growth in the number of local renal transplant and associated with better survival and quality of life for patients with ESRD (19th Report of The Malaysian Dialysis & Transplant Registry 2011) . However, not every patient suitable for a kidney transplant (Ansell *et al.*, 2010) as there are many factors need to be considered before the procedure. Also, it is a major procedure that still unable to match the rising number of patients being listed in the transplant waiting list (Lim *et al.*, 2012).

As a result, dialysis will remain in the foreseeable future as the mainstay of treatment for ESRD in Malaysia (Lim, Lee & Morad, 2005) and it is an effective life saving treatment for ESRD (Lim *et al.*, 2000) for patient to survive.

Currently, the prevalence of ESRD is increasing worldwide (icks *et al.*, 2010). In Malaysia alone, the incidence of new patients needing dialysis is growing rapidly from 45 per million populations (pmp) per year in 1996 to 108 pmp in 2004 (Liu & Hooi, 2007).

In the United States, the incidence and prevalence of kidney failure are rising, the outcomes are poor, and the costs are high (Levey *et al.*, 2003).

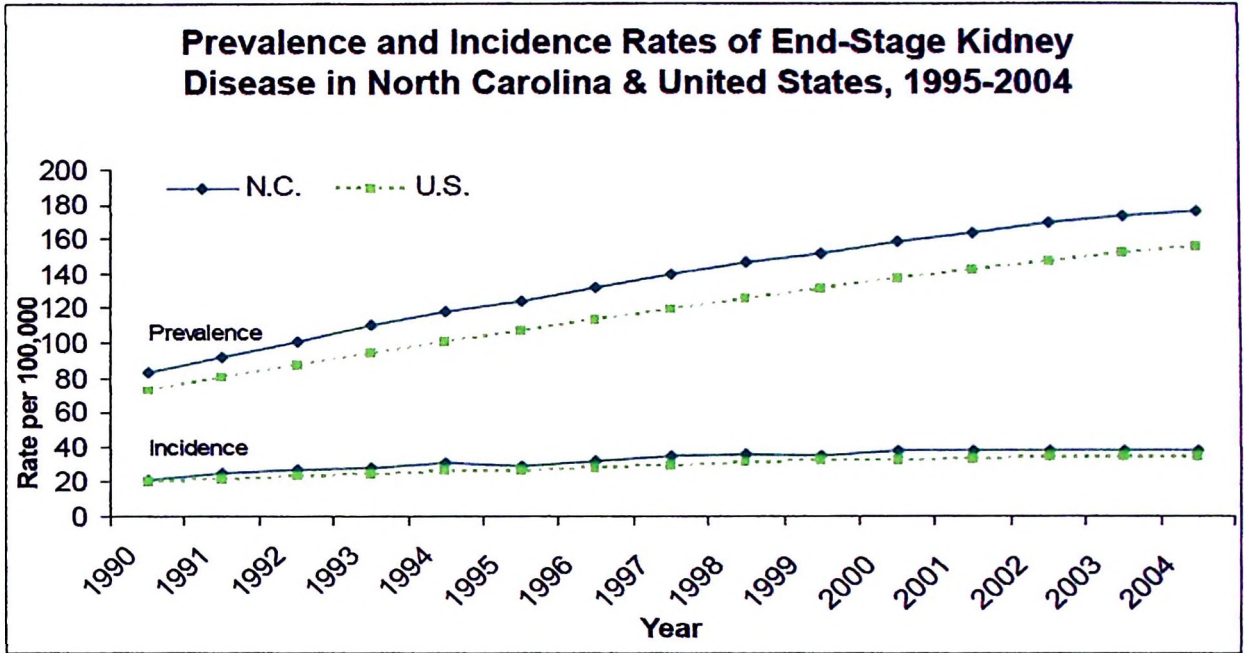


Figure 1.1: The prevalence and incidence rates of ESRD in North Carolina and United States from 1990 to 2004. (Source: UNC Kidney Center, 2007)

Figure 1.1 showed that the incidence and prevalence of ESRD between 1994 and 2005 that has been progressively increased in both North Carolina and the United States (Vupputuri & Jennette, 2007).

in health economics, cost of treatment plays an important role. Moreover, in chronic diseases such as ESRD, are of those diseases that not also threat physical health, but also endanger other health dimensions. Thus, it makes appropriate and comprehensive planning and rehabilitation of patients inevitable (Rezapoor, Azar & Safari, 2012).

It is reported that the annual expenditures ESRD per patient have increased slightly in recent years (Yang & Hwang, 2008).

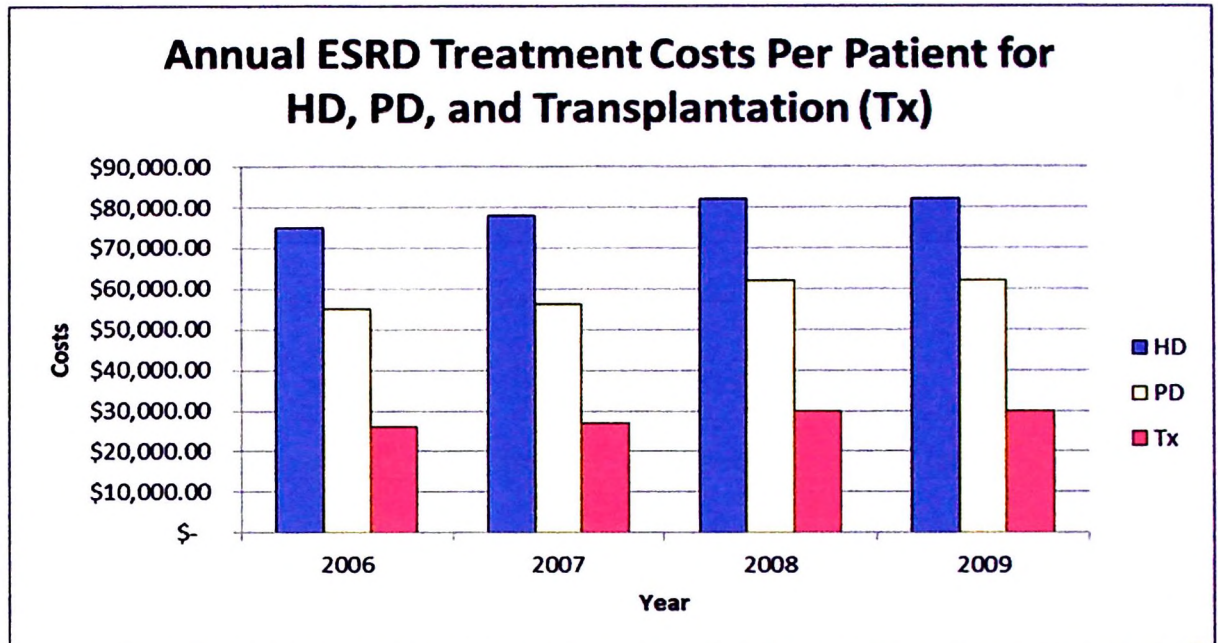


Figure 1.2: ESRD annual expenditures per patient in United States. (Source: United States Renal Data System's 2010 Annual Data Report and 2011 Annual Data Report).

Figure 1.2 showed the annual treatment costs for ESRD patients includes hemodialysis, peritoneal dialysis (PD) and transplant in the United States from 2006 to 2009. The costs for hemodialysis is nearly triple the costs for transplant. It is obvious that treatment for patient with hemodialysis is rather costly as compared to the other two treatment options.

In fact, the costs of hemodialysis for 1 year were less than the costs of transplantation for both the first year and the following years (Elsharif *et al.*, 2010).

Hemodialysis is a way of treatment for patients to survive. It works by removing 2/3 blood from the body; filtered through a dialyzer to clean the toxins, excess water, and electrolytes; and then returning clean blood back to the patient (Shepard, 2011).

Then again, renal failure is a complex debilitating chronic illness with significant comorbidity, including diabetes, cardiovascular disorder, anemia, hormonal and electrolyte disorders, affecting substantial and increasing numbers of the population (Mitchell *et al.*, 2009) which surely can put additional costs such as costs for the drugs and further investigations.

Meanwhile, healthcare organizations use various types of budgets; including operating and capital budgets, to plan and monitor their financial status. In this case, the operating budget is especially relevant to nurses because they are closer to the patients and know what is needed to provide appropriate care and services on a daily basis (Sherman, 2012). At the same time, during these tough economic times, nurses can face difficult financial choices. Thus, strategic decisions that balance quality and costs are called for in delivering nursing care (Harrington, 2011) as nurses are the front line health care providers for patient management (IOM, 2011).

Most of past studies of the economic consequences for RRT have focused on the direct and indirect costs. Beyond examining the estimated cost of treatment, it is important to understand patient preferences for the delivery of this type of RRT, hemodialysis. To the best of researcher knowledge, there is no studies have analyzed the benefits of hemodialysis treatment in monetary terms so far. For this reason, in this present study, the willingness to pay (WTP) for hemodialysis treatment is measured, which is one of methods suggested to

measure benefits in monetary terms (Narbro & Siostrom, 2000). This method of assessment provides an insight into the burden of disease as it relates to quality of life (Leevapan *et al.*, 2011).

Grassmann *et al.* (2005) emphasized that the high social and economic costs of dialysis should be of priority concern and this had inspired the researcher to conduct a study regarding cost analysis of hemodialysis and patient's WTP at Hemodialysis Unit, Hospital USM, Kubang Kerian, Kelantan.

As a referral and teaching hospital, Hospital USM, provides treatment services to its patients based on dedicated administration and management approaches. This involve using high quality services, a commitment to teaching and research, optimal financial strategies, core human resources values, and sensitivity to the social needs (Kamari, 2009). For this purpose, an evaluation is required to justify the exact costs that ESRD patients undergoing hemodialysis.

1.2 Problem Statements

The number of patients with ESRD has been growing world widely, due to the aging of the population and the increasing incidence of diseases associated with renal failure, such as diabetes and hypertension, among other reasons. Because of this recent growth, national spending for ESRD treatment has been increasing. This growing drain on public resources concerns policymakers who fear that only countries with high levels of economic development and associated gross domestic product (GDP) can sustain such rising expenditures (Luno, 2007).

Apart from that, the worldwide demand and economic cost of RRT is rapidly becoming a burden for healthcare systems (Adomakoh *et al.*, 2004). Furthermore, Chronic Kidney Disease (CKD) is under diagnosed and undertreated, then resulting in lost opportunities for prevention (Levey *et al.*, 2003). There are several indicators that suggest the number of patients on RRT worldwide will still increase during the years to come and it will keep or even increase the interest on the economic study of the cost of these therapies (Carmona *et al.*, 2007).

As can be seen, those who suffer from ESRD have a big challenge ahead of them, physically, emotionally, socially as well as financially (Lai, 2012).

There is a wide variability of ESRD patient that came to the Hospital USM seeking for treatment. But, not all of them are regular patients undergoing hemodialysis at Hemodialysis Unit, Hospital USM. Based on the statistics data available at the Medical Record Unit, Hospital USM, there were 271 new ESRD patients registered at Hospital USM in 2010, and increased to 278 patients in 2011. These patients had received hemodialysis for three (3) times a week as prescribed by the physician.

Apart from that, by the end of 2010, there were 21,639 patients in Malaysia receiving hemodialysis treatment throughout the country, with 25 % receiving dialysis treatment provided by the Ministry of Health (MOH) hospitals, 30 % by non-Governmental organization (NGO) centers and about 45 % by the private sector (Lai, 2012).

Being on dialysis can place a financial burden on patients, their families and health care system (Brown, 2011). Furthermore, when ESRD is consequent to a condition like diabetes (Lee, 2011), and might accompanied by other serious health problems that will impose more direct financial burdens on patients and their families.

Therefore, to get the most exactly amount of money spent by the government for hemodialysis, the composite rate costs was analyzed, which may consist of nursing services supplies, equipment, drugs, and administrative efforts associated with dialysis treatments (Rettig *et al.*, 1990).

Although economic factors are not generally a primary consideration at the time of prescribing dialysis, it has become clear that the economic resources targeted towards this area need to be reviewed and allocated in the most effective way possible (Adomakoh *et al.*, 2004).

Considering that over 92% of the incident patients end up in hemodialysis (Lim *et al.*, 2012), the objective of this study is to determine the costs of hemodialysis and the willingness-to-pay (WTP) for hemodialysis treatment among ESRD patient undergoing hemodialysis in Hospital USM.

Willingness to pay (WTP) method was originally developed in welfare economic theory based on human behavior in markets where supply and demand determine consumer preferences (Narbro & Sjostrom, 2000).

To help understand more about individual's reasoning for their WTP for hemodialysis treatment, some additional variables were integrated into this study. The researcher use some of variables derived from one of the most widely used and successful models designed to predict human behaviour of WTP, which is Ajzen's (1988) Theory of Planned Behavior (TPB). Its conceptual framework is discusses further in the Chapter 2; **Literature Review.**

1.3 Research Objective

1.3.1 General Objective

To assess the cost of treatment and the willingness to pay among ESRD patients undergone hemodialysis treatment, at Hemodialysis Unit, Hospital USM.

1.3.2 Specific Objectives

1. To define cost of hemodialysis treatment among ESRD patient in Hospital USM.
2. To determine patient's willingness to pay (WTP) for hemodialysis treatment.
3. To define the association of WTP with the selected risk factors (socio-demographic, socio-economic, and perception toward healthcare services).

1.4 Research Questions

1. What are the costs of treatment provided to hemodialysis patient?
2. What is the level of patient's willingness to pay for hemodialysis?
3. What is the association of patient's WTP with the selected risk factors among hemodialysis patients?

1.5 Hypothesis

H_0 : There is no significant association between willingness-to-pay and selected risk factors among ESRD patients undergoing hemodialysis at Hemodialysis Unit, Hospital USM.

H_A : There is a significant association between willingness-to-pay and selected risk factors among ESRD patients undergoing hemodialysis at Hemodialysis Unit, Hospital USM.

1.6 Definition of Term

- Chronic kidney disease (CKD)** Any condition that causes reduced kidney function over a period of time. CKD is present when a patient's glomerular filtration rate remains below 60 milliliters per minute for more than 3 months or when a patient's urine albumin-to-creatinine ratio is over 30 milligrams (mg) of albumin for each gram (g) of creatinine (30 mg/g) (The National Kidney Disease Education Program U.S., 2012).
- End-stage renal disease (ESRD)** Total and permanent kidney failure. When the kidneys fail, the body retains fluid (The National Kidney Disease Education Program U.S., 2012).
- Hemodialysis (HD)** Dialysis (removal of uraemic solutes in the blood) is carried out across an artificial membrane housed in a dialyser connected to the patient's arterio-venous fistula via an extra corporeal circuit. A machine is required for the purpose (Lim, Lee, & Morad, 2000).
- Willingness-to-pay (WTP)** Willingness to pay (WTP) is the price amount that someone is willing to pay to acquire a good or service (Munene, 2006).
- Prevalence** The number of existing cases of a disease at a given point in time (Imerman, 2004).

Incidence	The number of new cases of the disease that are reported in a given time period (usually a year) (Imerman, 2004).
Dialyzer	A large canister containing thousands of small fibers through which patient's blood is passed (The National Kidney Disease Education Program U.S., 2012).
Dialysis water	Water that has been treated to meet the requirements of the CSA-ISO standards and which is suitable for use in hemodialysis applications, including the preparation of dialysis fluid, reprocessing of dialysate, preparation of concentrates and preparation of substitution fluid for online convective therapies.
Vascular access	A general term to describe where blood is removed from and returned to the body during Hemodialysis. A vascular access may be an arteriovenous (AV) fistula, an AV graft, or a catheter (The National Kidney Disease Education Program U.S., 2012).
Patient	Recipient of nursing care. This includes individuals, families and groups (Kozier & Erb's, 2010). In this study, the recipient of nursing care is the patients undergoing hemodialysis in Hemodialysis Unit, Hospital USM.

1.7 Significance of the Study

The improved mortality rates of prevalent ESRD patients and the continuing growth of incident ESRD patients both contribute to the rising cost pressures encountered (Chuang, 2011).

Considering high cost remedial interventions in this area and its heavy fiscal burden on health care systems due to the high demand, thus implementing policies to provide cost-effectiveness hemodialysis get essential and it can also provide estimating health care policies economically and properly (Rezapoor, Azar & Safari, 2012).

Care of patients with ESRD is important to enable Hemodialysis Unit, Hospital USM. to develop strategies for more cost-efficient care. With the information, an idea of the effect of disease on the social resources and the socio-economic impact of disease on communities can be achieved (Lorenzo *et al.*, 2010). Thus, an accurate estimate of the cost of caring for patients with ESRD is needed.

There are few factors that can contribute to the rising cost of treatment. Adherence to clinical practice guidelines has improved survival and reduces hospitalizations and the use of resources (Lacson *et al.*, 2009). Besides that, the complication of vascular access account for most hospitalization and access thrombosis or dysfunction can contribute to missed dialysis and consequently leads to more intervention and the use of resources (Anvari *et al.*, 2012). Moreover, the dialysis center faced financial consequences as a result of non adherence to the schedule (the unused setup is not reimbursed, thus raising overall cost per treatment). Although dialysis is lifesaving, it only replaces 10 % of normal renal function. Patient may continue to encounter many medical problems such as salt and water

retention, hyperparathyroidism, hypertension and heart disease (Longhman-Adham, 2003). As health care professionals, nursing staff play an important role in educating patients in preventing from other complications that might add further interventions and others cost for the treatment. Thus, the researcher's personal experience as a nursing student has led to an intense interest in understanding this present topic.

In nursing aspect, the findings of this present study can help to develop strategies for controlling costs: resource management (focusing on inputs, both human and materials) and care management (focusing on the actual care delivered) (Harrington, 2011). On the other hand, better understanding of the distribution of costs can also help in identifying the areas of inefficiency (Lorenzo *et al.*, 2010), and by managing inputs and throughputs, nurses can evaluate trends in costs per outputs or patient discharges over time (Harrington, 2011).

Besides that, as healthcare costs increase, efforts to improve the efficiency and effectiveness of the healthcare system must take into account nurses' contribution to ensuring the cost-effective and high-quality care (Dall *et al.*, 2009). Furthermore, nurses will have the source of information in order to make decisions that allow a better allocation of resources while giving care towards patients.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter reviewing the current literature related to the cost of hemodialysis treatment. It presents information on ESRD patients, patient's willingness to pay (WTP) for hemodialysis and the risk factors associated with the WTP among ESRD patients. All these issues are included in this chapter just to justify this study and determine the research design and tools required to achieve its objectives.

2.2 Overview of End-stage Renal Disease (ESRD)

End-stage renal disease (ESRD) occurs when an individual's kidneys can no longer function to eliminate waste and toxins from the body (Muvuela, 2006). The terms end-stage renal failure (ESRF) and end-stage renal disease (ESRD) are used interchangeably. The term ESRD has been retained because of its administrative usage in the United States referring to patients treated by dialysis or transplantation (National Kidney Foundation, 2002). ESRD is defined as irreversible decline in a person's own kidney function which is severe enough to be fatal in the absence of dialysis or transplantation (Abbasi *et al.*, 2010). Based on Table 2.1 ESRD is included under stage 5 of chronic kidney disease (CKD) and refers to individuals with an estimated glomerular filtration rate (GFR) less than 15 mL per minute per 1.73 m² body surface area, or those requiring dialysis irrespective of GFR.

Stage	Description	GFR (mL/min/1.73m ²)
1	Kidney damage with normal or ↑ GFR	>90
2	Kidney damage with mid ↓ GFR	60-89
3	Moderate ↓ GFR	30-59
4	Severe ↓ GFR	15-29
5	Kidney failure	<15 (or dialysis)

Table 2.1: The 5 stages of Chronic Kidney Disease (CKD) defined by estimated Glomerular Filtration Rate (GFR) (Sources: NKF).

2.3 Hemodialysis and its burden to patient and health care system.

It is acknowledgement that. ESRD is the mere disease that affects both health and health care expenditures (Zelmer, 2007). It is predicted that in 2030, the number of patients inflicted to ESRD will be increased to 70% in developing countries, which their total economy forms 15% of global economy (Barsoum, 2006).

Moreover, people with ESRD require either kidney transplant or dialysis treatment to compensate lack of kidney failure and to sustain their lives (Muyuela, 2006). These patients however, can live longer and productively lives with the help of hemodialysis (Shepard, 2011).

The hemodialysis unit is a unique environment where patients can attend for treatment over many years (Burns, 2010). As the result, the number of people requiring dialysis is increasing every year. According to Muyuela (2006), hemodialysis is the most

commonly used treatment modality for ESRD in the United States. This is similar to Mahdavi (2007) where it is reported that more than 50% of these patients are treated by hemodialysis method. People undergoing hemodialysis must receive treatments for three times a week, and comply with the strict dietary restrictions and medication regimen (Muyuela, 2006).

The growing number of patient inflicted to ESRD will consume 2-4% of healthcare budget (Kirby & Vale, 2001). Hemodialysis is, undoubtedly, a critical treatment and also unaffordable for some patients (Rezapoor, Ebadi & Safari, 2012). With cost-effectiveness strategies, that is implemented in most developing countries, treatment burden on patients can be reduce by providing cost-effectiveness hemodialysis and help estimating health care policies economically and properly (Modi, 2006; Mahdavi, 2008). Furthermore, it can also rationally be used in low-income countries (Mahdavi, Heidary, Aghighi & Rajolani, 2008) and it can provide adequate analytical information in order to properly allocate financial resources for health managers (Foley & Collins, 2007).

2.4 Funding for Dialysis Treatment

In Malaysia, there are multiple sources of funding available for dialysis. In 2006, the 19th Report of the Malaysian Dialysis and Transplant Registry (2011) reported that the government continues to be the main payer for dialysis therapy for new and existing patients. These funding are channeled not only to the government dialysis centers but also as subsidy to NGO's centers as well as payment of dialysis for civil servants and their

dependents in private centers. Besides, it report that out of pocket payment (self-funding for dialysis) was about 22 to 23%.

Haller (2011) emphasized that providing health care for ESRD patients is complex and intensive, and requiring considerable amounts of limited health care funding. In report of Medicare Payment Policy by Hackbarth *et al.* (2010), they argued whether payments for dialysis treatment for 2012 are adequate to cover the costs that efficient providers incur and how much providers' costs should change in the update year (2013). by examine several indicators of payment adequacy. The results includes sufficient provider capacity, volume growth (the number of dialysis treatments) has kept pace with growth in the number of beneficiaries, improvements in quality, and sufficient provider access to capital.

In 2010, they estimates that Medicare margin for composite rate services and dialysis services was 2.3% and it will be increased to 2.7% in 2012. Therefore, the continual global growth in the chronic renal failure population and rising interest in economic expenses in health care resources demand a more cost-effective approach to medical decision making (Haller, 2011).

2.5 Costs for hemodialysis treatment

The costs of dialysis around the world can vary widely according to many local market conditions and hemodialysis cost is driven largely by the fixed costs of facility space and staff (Paul *et al.*, 2008). In the economic study done by Rodríguez *et al.*, (2007), cost-per-procedure was analyze, and seven basic cost types were calculated which are

personnel (time spend on each procedure implicated), laboratory testing, surgical material (gloves, masks, gowns, dressings, syringes), medical material, drugs, other concepts (hospitalization stay, hours of staying at the dialysis room) and indirect costs (general and structural).

For example, the cost of hemodialysis treatment per session are reported at \$72.1 (RM 219.94) in Barbados (Adomakoh *et al.*, 2004), in India hemodialysis costs per session around Rs. 4500 (RM 254.96) (Suja *et al.*, 2012) and according to the study in Saudi Arabia, the costs of each maintenance hemodialysis session were estimated to be 1,114 SR (RM 906.17) (Saran, 2012).

Result from previous study done by Paul *et al.* (2008) report that, machines for hemodialysis cost \$18 000 to \$30 000 each, but the machines have a 5 to 10 year life cycle, and, three to six patients can be treated on one machine per week. The cost of dialyzers for hemodialysis ranges from \$1000 to \$5000 per year. Other items that factor into the cost of hemodialysis are additional facility costs such as maintenance and utilities.

According to Argentero *et al.* (2007), there are two components of costs for composite rate services, the fixed costs and the variable costs. Fixed costs include capital investments, operational overhead, and labor costs (e.g., nursing staff) associated with managing a dialysis facility. Variable costs are setup costs and supply costs (e.g., drugs).

In addition. Sherman (2011) stated that an operating budget has two main types of expenses: employment costs and non-salary expenses. Employment costs (the largest part of the unit budget) include salaries and wages for hospital employees and contract staff. Non-salary expenses include medical supplies used for patient care (such as I.V. tubing and

A.V. Fistula), pharmacy costs for stock medications and syringes, and maintenance of equipment used on the unit.

In a study done by Rezapoor *et al.* (2012) at Bou-Ali-Sina Hospital report that hemodialysis cost in Iran is cheaper than developed countries. Again, they categorize the hemodialysis service costs into three groups: direct operational costs, indirect organizational and social costs and capital costs of hemodialysis unit.

All things considered, the aim of the present study was to calculate the operational cost of hemodialysis similar with a study by Ranasinghe *et al.* (2011), and the capital costs such as expenditure for building and dialysis machines. Except for the indirect nonmedical costs (e.g., lost time from work and unpaid assistance from family members) are not included (Komenda *et al.* 2012). Each per procedure cost analysis has been standardized based on current nursing practice at Hemodialysis Unit, Hospital USM, Kubang Kerian, Kelantan (See **Appendix 7**; Figure 2.0: Flow Chart of Patients Undergoing Hemodialysis Treatment at Hospital USM).

2.6 Willingness-to-Pay (WTP)

According to Xie *et al.* (2008), one method of estimating the monetary value of intangible costs is through contingent valuation method, which is a stated preference method based on the levels of WTP. In fact, the intangible costs are non-marketable resources which reflect the patient's level of pain and suffering, and the limitations imposed by this pain (Pervin *et al.*, 2008).

In brief, the WTP function is used in identifying the price an individual is willing to pay for a given level of quality given specific levels of price and utility (Lusk & Hudson, 2004). It is based on the principle that the maximum amount of money an individual is willing to pay for a commodity which is an indicator of the value to him or her of that commodity (Munene, 2006).

After all, in the environmental economics studies, there are several approaches, but WTP is used most commonly (Gafni, 1991). This approach seeks to establish what value people attach to health care outcomes or interventions by asking them how much they would be prepared to pay to obtain the benefits of treatment or avoid the negative aspects of illness (Smith & Cunningham, 2004).

The WTP method is appealing because it is a measure of consumer preferences, which makes it possible to put monetary values on the benefits of a treatment, including the intangible benefits. WTP is derived from a theory on behavior in markets, but in our context it is applied to a field where we do not have a market in the sense that supply and demand determines behavior (Narbro & Sjostrom, 2000).

The level of WTP can be estimated through open-ended or discrete questions (Narbro & Sjostrom, 2000). In this present study, the WTP was estimated by open-ended and close-ended questions (Appendix 4). In open-ended question, the respondents are asked to state the maximum amount of money they are willing to give up to avoid a risk or to be able to receive a certain treatment, screening, or prevention program (Narbro & Sjostrom, 2000). Besides that, in a close-ended question, the respondent are asked directly whether they are willing or not to pay for the treatment.

In a study by Herold (2010), 78.5% of the participants were willing to pay for a kidney; there were significant correlations between gender, health status, household income, preferred source of a kidney and WTP. While kidney transplant was the most cost-effective treatment available for ESRD and affords patients with the best quality of life, the current supply of kidneys does not meet the demand.

Otherwise, the WTP analysis done by McFarlane *et al.* (2007) in Canada, about one fourth of the participants spontaneously, commented that the \$50,000/yr figure was generous, whereas another one fourth observed that this amount seemed inadequate. All participants were willing to trade money for health.

2.7 Conceptual / Theoretical Framework

2.7.1 Theory of Planned Behaviour (TPB)

This study is applying the Planned Behavior theory (Figure 2.1), which was generated by Aizen & Fishbein in 1980. Briefly, this theory suggested that behavior will be predicted by behavioral intention. Behavioral intention, in turn, is determined by three variables; attitude toward the behavior, which is the person's positive or negative evaluation of performing the particular behavior, second is the subjective norms, which is the person's perception of social normative pressure, that is, that relevant others believe he or she should or should not perform the particular behavior and lastly, perceived behavioral control, which is the perceived ease of performing the behavior, reflecting past experience as well as anticipated impediments and obstacles (Ajzen, 1988).

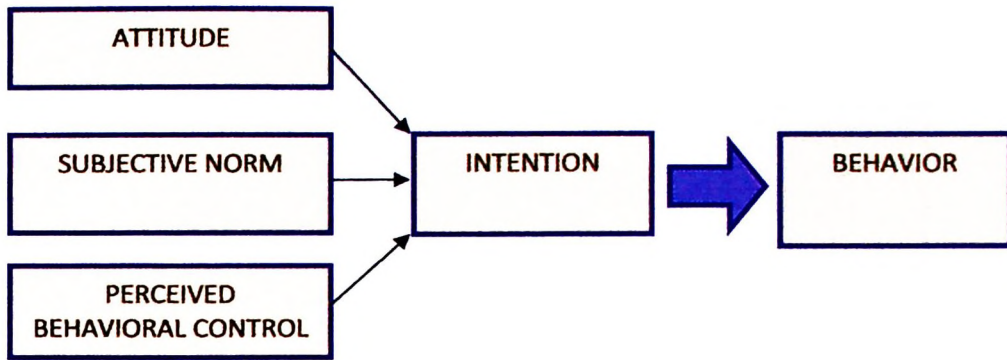


Figure 2.1: Ajzen and Fishbein’s Theory of Planned Behavior.

The person’s attitude towards an item is important in determining a person’s intentions to or not to purchase the item (Ajzen & Fishbein, 1980). WTP refer both to preference and behavior. The preference of consumers is formed based on three considerations: a consumer needs and desires; information about the existence and characteristics of a good or service and judgment about one’s own probable benefit from that good or service relating to one's other needs and desires; and capacity to satisfy them, given the price and the cost of the transaction (Gebresilassie & Mariam, 2011).

2.7.2 Factors influencing patient’s WTP.

By applying the Azjen’s theory to the reasoning of patient to use hemodialysis treatment, the uptake of treatment in patient’s hemodialysis schedule will depend upon the patient’s positive intention towards the treatment. This will be influenced by the patient’s beliefs about the value of treatment and belief about the control he or she has in his or her past experiences. The attitude towards treatment and services will be also influenced by the personality traits of individual patient.

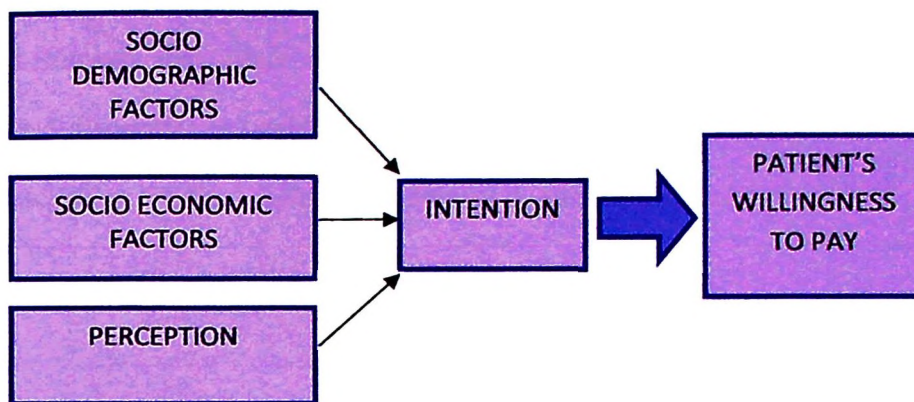


Figure 2.2: Conceptual model adaptation of Ajzen and Fishbein’s Theory of Planned Behavior showing the factors affecting patient’s willingness to pay for Hemodialysis.

According to Munene (2006), clients are first of all equipped with a set of beliefs about attributes possessed by different products. For ESRD patients, they have many options of treatment including hemodialysis, CAPD and renal transplantation (Liu & Hooi, 2007). The clients then develop a preference ranking for the products. Finally, depending on the budget or other constraints, customers make decisions about whether to purchase.

Another factor that may be negatively or positively associated with WTP for treatment is the patients’ perceptions towards treatment (Munene, 2006). According to the previous studies, illness and treatment perceptions appeared to be more positive in transplanted patients compared to dialysis patients (Griva *et al.*, 2009), whereas peritoneal dialysis patients held more positive illness perceptions compared to patients treated with hemodialysis (Timmers *et al.*, 2008). In addition, the studies showed that illness perceptions and treatment perceptions contribute significantly to several aspects of quality of life (Jansen *et al.*, 2010).

Apart from that, patient demographics may also affect the patient attitude toward hemodiaysis treatment and ultimately the WTP for the treatment. Study by Niccum *et al.*