

# HOME HAEMODIALYSIS IN MALAYSIA

ABU BAKAR SULEIMAN  
ZAKI MORAD

## SUMMARY

*A review of the home haemodialysis programme at the General Hospital, Kuala Lumpur, between 1977 and 1984 revealed that out of 194 patients accepted into the programme, 187 completed home training and continued haemodialysis at home, seven died before having started on the training programme. The majority of patients required less than four months to be trained; 107 patients performed dialysis independently and 24 required assistance only for the insertion of needles. Patient survival was 93%, 80% and 69% at one, three and five years, respectively.*

*Rehabilitation has been excellent and few social problems were encountered. Our experiences with home haemodialysis have shown that the majority of patients were able to assume responsibility for their own dialysis, and this has contributed to the good survival and excellent rehabilitation.*

*Home haemodialysis was started in Boston in 1963,<sup>1</sup> in Seattle<sup>2</sup> and London<sup>3</sup> in 1964, for the treatment of end stage renal disease (ESRD). It is now well-established as a therapy for patients with ESRD.*

*Home haemodialysis has been practised in Malaysia since 1977. This report reviews the experiences of patients accepted for treatment between 1977 and 1984. All patients were treated by the Department of Nephrology, General Hospital, Kuala Lumpur, which supervises patients living all over the country.*

## PATIENTS AND METHODS

All patients who were accepted for home haemodialysis and started on the training programme were included in this study. Patients on haemodialysis indefinitely in the hospital or who were on haemodialysis in preparation for renal transplantation were excluded.

Patients on the home haemodialysis programme were dialysed in the training unit, and taught by staff specially designated for this purpose. Patients were started on the training programme after they had been stabilised on dialysis, and were taught according to a schedule, with the objective of being able to perform self-dialysis independently. A helper, usually a member of the family, was also taught the procedures about two weeks before the patients returned home.

---

Abu Bakar Suleiman, MBBS (Monash) M. Med (S'pore), FRACP  
Consultant Nephrologist and Head

Zaki Morad, MBBS (Mal), MRCP (UK)  
Consultant Nephrologist  
Department of Nephrology, General Hospital  
50586 Kuala Lumpur, Malaysia

---

Patients were dialysed four hours three times weekly, using proportioning machines and hollow fibre artificial kidneys, with arteriovenous fistulas for blood access. Water used for dialysis was treated by reverse osmosis or deioniser.

Patients were reviewed one month after returning home and three monthly subsequently. Charts were submitted to the unit every month, and blood tests were performed every three months.

All patients reviewed had been on haemodialysis for at least six months. The degree of self-dialysis practised by the patients were noted.

Patient survival was calculated by actuarial methods.<sup>4</sup> All deaths occurring during the period reviewed were included. No post-mortems were performed.

### Criteria for accepting patients on the home haemodialysis programme

Selection criteria was liberal, and the financial ability to pay for treatment was the limiting factor. Patients with disseminated malignancy and severe strokes were not accepted into the programme. The patients' families and employers were usually consulted and the long-term financial implications carefully explained.

All patients were given technical advice and work done by local contractors in installing the relevant equipment at home were checked to ensure that electrical supply, water supply and pressure, and plumbing attachments were adequate and safely installed.

## RESULTS

One-hundred-and-ninety-four patients were treated between 1977 and 1984; 118 were males and 76 females. There were 147 Chinese, 40 Malays and seven Indians, and they came from all over the country (Table I). The majority of patients were in the third to sixth decades of life (Table II). One-hundred-and-eighty-seven out of the 194 patients completed the training for

home haemodialysis. The rest had died before they could begin the training programme.

### Period of training

The period of training necessary before returning home varied between one month and more than six months (Table III). Patients requiring more than six months were either elderly or had difficult vascular access problems. The majority of helpers were either spouses or children of the patients, but 18 patients were sent home without anybody trained to assist them at home (Table IV).

Fifteen patients were not able to perform self-dialysis before returning home although they were all taught the procedure initially. Dialysis was performed by their respective helpers. The majority were elderly females with dependent personalities and had very supportive but overly protective families who would not allow the patients to perform self-dialysis.

TABLE I  
PATIENTS ON HOME HAEMODIALYSIS  
IN MALAYSIA (1984)

State	Number of patients
Selangor	34
Federal Territory /Wilayah Persekutuan	23
Perak	18
Penang	16
Sarawak	14
Johor	14
Melaka	10
Kedah	7
Negeri Sembilan	6
Pahang	5
Terengganu	4
Sabah	4
Kelantan	2
Perlis	1
Total	158

**TABLE II**  
**CHARACTERISTICS OF PATIENTS ON THE**  
**HOME HAEMODIALYSIS PROGRAMME**

<b>Sex distribution</b>		<b>Ethnic distribution</b>						
Male	: 118	Chinese	: 147					
Female	: 76	Malays	: 40					
		Indians	: 7					
<b>Age distribution</b>								
Age (years)	9-19	20-29	30-39	40-49	50-59	60-69	>70	
No. of patients	2	31	53	67	28	11	2	

Diabetics : 15; Non-diabetics : 179.

**TABLE III**  
**PERIOD OF TRAINING FOR**  
**HOME HAEMODIALYSIS**

Period of training (months)	Number of patients
1 -	38
2 -	76
3 -	56
4 -	7
>6	10
<b>Total</b>	<b>187</b>

### Degree of self-dialysis

The nature of assistance required of the helper had been regularly monitored; new helpers were trained should previous ones be unable to help,

following marriage or transfer to another town. Out of 158 patients currently on home haemodialysis, 107 performed dialysis completely independently, while 24 only required assistance to insert the needles. However, 12 patients who were able to perform self-dialysis were dialysed completely by the helper on returning home (Table V). Eight were dependent personalities with very supportive families who preferred dialysis to be performed by the helper; four were very wealthy and preferred to have the dialysis performed for them by paid staff.

### Financial burden

The treatment imposed a heavy burden on patients or their families; 108 had to pay for the treatment themselves while 55 had treatment paid for by the employer. Twenty patients admitted to having severe financial difficulties

**TABLE IV**  
**RELATIONSHIP BETWEEN HELPERS AND PATIENTS ON**  
**HOME HAEMODIALYSIS**

Helpers	Spouse	Offspring	Sibling	Parent	Other family	Paid staff
Number of patients	69	37	11	4	4	15
No helper	18	-	-	-	-	-

**TABLE V**  
**DEGREE OF SELF-DIALYSIS ACHIEVED BY**  
**PATIENTS ON HOME HAEMODIALYSIS**

Performs self-dialysis independently	107
Performs self-dialysis, but requires assistance to insert the needles	24
Trained for self-dialysis, but dialysed by helper on returning home	12
Not trained, dialysis performed by helper throughout	15

as a result of haemodialysis (Table VI). In five patients, inadequate dialysis as a result of financial difficulties resulted in the complications that led to deaths from uraemia or pulmonary oedema.

The cost of treatment to the patient is shown on Table VII, and is subsidised as it excludes the cost of staff salaries, blood tests, X-rays and medicine.

There were 36 deaths during the eight-year period (Table VIII) and sudden death of cardiac origin, uraemia and pulmonary oedema accounted for 21 (58.3%) of all deaths. Deaths related to uraemia (Table IX) were mainly due to inadequate dialysis associated with financial difficulties in five patients; one patient died due to vascular access failure.

### Survival

Patient survival is shown in Fig. 1. The one, two, three and five-year survival for the total

**TABLE VI**  
**FINANCIAL DIFFICULTIES AND ITS**  
**CONSEQUENCES**

Number of patients who admitted to having financial problems	20
Number of patients who dialysed less than 3 times weekly	6
Number of deaths related to consequences of inadequate dialysis	5

**TABLE VII**  
**COST OF HOME HAEMODIALYSIS TO THE PATIENT**

Items	Malaysian Ringgit (\$)
Haemodialysis machine with deioniser	25,000
Cost of renovation to the home*	2,000
Recurrent costs per year:	
disposable items**	12,012
water and electricity	1,092

\*for cost of electrical wiring and air conditioner, which is optional.

\*\*based on three dialysis treatments per week and three uses for each dialyser.

**TABLE VIII**  
**CAUSES OF DEATH IN PATIENTS ON THE**  
**HOME HAEMODIALYSIS PROGRAMME**

Causes	Number
Sudden death, cardiac origin	12
Pulmonary Oedema	3
Cancer	3
Septicaemia infected AV fistula	3
Cerebrovascular accident	3
Uraemia	6
Dialysis encephalopathy	1
Miliary TB	2
Cardiac tamponade	1
Pulmonary embolism	1
Unknown	1
Total	36

**TABLE IX**  
**CAUSES OF DEATHS RELATED TO URAEMIA**

Left treatment	4
Vascular access failure	1
Inadequate dialysis	1

group were 93%, 85%, 80% and 69%, respectively. Patients under the age of 30 years at the start of dialysis had one and three-year survival rates of 95%; those between 30 and 50 years had one, three and five-year survival rates, of 93%, 81% and 72%. Patients over the age of 50 had one and three-year survival rates of 95% and 70%, while

the diabetics had one and three-year survival rates of 73% and 55%.

### Rehabilitation

All except five patients had returned to their previous employment, obtained new employment

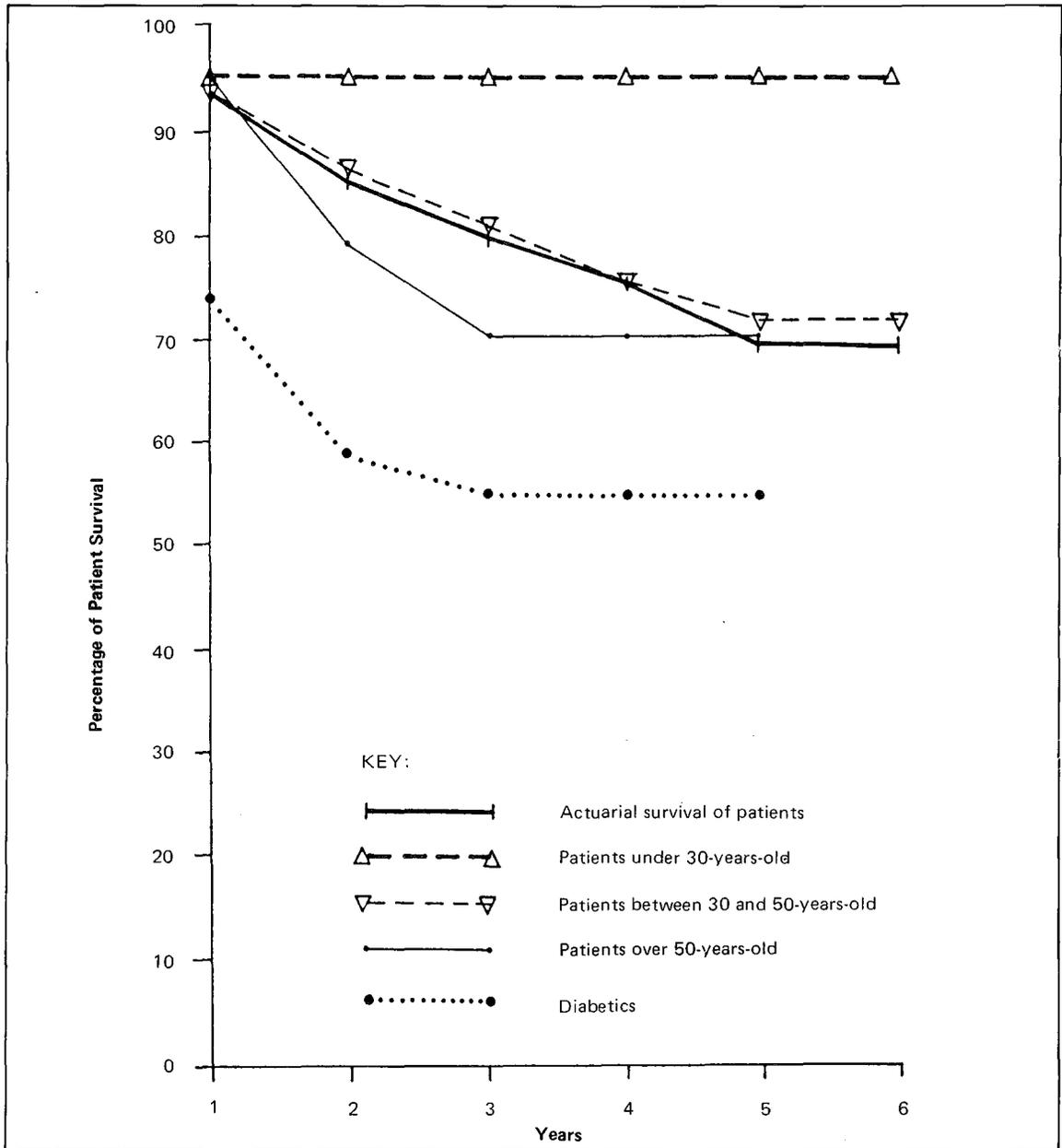


Fig. 1 Actuarial survival of patients on home haemodialysis (1977 - 1984).

or returned to household duties. Patients attending secondary or tertiary educational institutions continued with their education. The characteristics of the five patients with poor rehabilitation are presented in Table X.

### Social problems

There were few social problems encountered. Because of limited space, three patients had to move house to accommodate the installation of the haemodialysis machine; one patient had to rent a room near his home to accommodate the haemodialysis machine.

In two patients, their marriages were disrupted, after starting home haemodialysis, and ending in divorce. In ten cases, where all the patients were female, the ten helpers considered themselves tied down with the haemodialysis procedure, and reported that their life-style had become restricted. All these helpers were daughters of the patients.

### DISCUSSION

As had been reported elsewhere, patient survival on home haemodialysis have been excellent with 93%, 80% and 69% surviving one, three and five years respectively. Our experience of increasing mortality with increasing age, and among diabetics is well known.<sup>5,6</sup>

Despite a liberal policy of accepting patients for haemodialysis, all patients were able to return home for haemodialysis. Those who were handicapped by poor vision, advanced age and severe illness before starting dialysis required a longer period of training and assistance in performing the dialysis procedure. In a situation where the option for centre haemodialysis is not available, this experience reinforces the point made by Delano *et. al.*, that home hamodialysis can be successful even in the less than ideal patient.<sup>7</sup>

In the training period, it is important to build up the patients' confidence and independence through a patient, persistent, thorough and enthusiastic approach, and by excluding family members from the training until the last two weeks before returning home. We consider it important that the home training unit be a separate entity so that patients can identify with it and the staff, and to minimise dependency on family members or professional staff. We feel that this was largely successful as the majority of patients were able to continue self-dialysis at home with minimal or no assistance from family members. The few who could not be trained for self-dialysis or who upon returning home had the dialysis performed by the helper, were either very dependent personalities or who had unduly overprotective families

TABLE X  
CHARACTERISTICS OF PATIENTS WITH POOR REHABILITATION

Age (yrs)	Sex	Occupation	Special problems
42	Male	Self-employed	Severe bone disease
49	Male	Executive	Diabetic, poor vision, amputated lower limb
62	Male	Retired businessman	Diabetic, poor vision, amputated lower limb
63	Male	Retired businessman	Severely ill predialysis, Ambulatory but inactive one year after starting dialysis
62	Female	Housewife	Overprotective family curbs activity

who would not allow the patient to be more independent. In this latter situation, most of the patients were elderly and were mothers who were obviously held in great esteem and affection by the respective families, and who were in fact quite capable of performing self-dialysis.

The main constraint to more patients receiving treatment on haemodialysis was financial, and it was not surprising that 20 patients (12.3%) had financial difficulties. However, very few patients died as a consequence of inadequate dialysis related to financial difficulties. There was no mortality related to equipment failure which is a reflection of the safety of modern dialysis equipment.

Rehabilitation has been excellent, and this may be related to the selection criteria, whereby most of these patients were motivated and had initiative, as the financial burden of the treatment cost had to be borne by the patients or the employers. We feel that our approach of emphasising self-dialysis and independence also contributed to the high rate of rehabilitation.

There were relatively few social problems encountered, although the divorces occurring in two patients were indicative of the stress on the family. Adjustment to home haemodialysis is stressful for the patient and family,<sup>8</sup> and we feel that our policy of encouraging as many patients as possible to perform self-dialysis independently, helped not only to enhance the patients' confidence and self-esteem, but also minimised disruptions in the families' daily activities.

By contrast, increasing the participation of a member of the patient's family in the treatment increased the stress on the family, as evidenced by the ten daughters who helped their mothers on dialysis, but felt that their life-style had become restricted as a result.

Our experiences with home haemodialysis have shown that home haemodialysis can be successfully practised, with the majority of patients being able to assume responsibility for their own dialysis. This contributed significantly to the high rate of rehabilitation. The main obstacle to more patients receiving treatment on home haemodialysis has been the high cost of treatment.

## ACKNOWLEDGEMENT

We thank the Director-General of Health, Malaysia, for permission to publish this paper.

## REFERENCES

- <sup>1</sup> Merrill S P, Sekupak E, Cameron E, *et al.* Haemodialysis in the home. *JAMA* 1964; 190 : 468-470.
- <sup>2</sup> Curtis F K, Cole S S, Fellows B S, *et al.* Haemodialysis in the home. *Trans Am Soc Artif Intern Organs* 1965; 11 : 7-10.
- <sup>3</sup> Baillod R A, Comty C, Ilahi M, *et al.* Overnight haemodialysis in the home. *Proc Eur Dial Transplant Assoc* 1965; 2 : 99-103.
- <sup>4</sup> Cutter S S, Ederer F. Maximum utilisation of the life-table method in analysing survival. *J Chron Dis* 1958; 8 (6) : 699-712.
- <sup>5</sup> Cameron J S, Ellis F G, Ogg C S, *et al.* A comparison of mortality and rehabilitation in regular dialysis and transplantation. *Proc Eur Dial Transplant Assoc* 1970; 7 : 25-32.
- <sup>6</sup> Lewis E S, Foster D M, De La Puente J, *et al.* Survival data for patients undergoing chronic intermittent haemodialysis. *Ann Int Med* 1969; 70 : 311-315.
- <sup>7</sup> Delango B G, Lundin A P, Friedman E A. Successful home haemodialysis in purportedly unacceptable patients. *Nephron* 1982; 31 : 191-193.
- <sup>8</sup> Soberson W J, Kurtz S B, Anderson C F, Mitchell J C, *et al.* Results of treatment of renal failure by means of home haemodialysis. *Mayo Clin Proc* 1984; 59 : 663-668.