CHAPTER 4 RESULTS

4.0 Introduction

This section presents descriptive analyses of the demographic profile, levels of knowledge and fluid compliance status of acute and chronic haemodialysis patients. Measures of fluid compliance include interdialytic weight gain (IDWG), mean predialysis blood pressure (MPBP), rate of fluid adherence (RFA), source of information on fluid and salt control, the person giving advice, frequency of advice received, the form of teaching received, and correlational analyses between knowledge level and source of information, knowledge level, fluid compliance and patients' demographic profile. This is followed by inferential statistics, which includes the comparison of differences in knowledge and fluid compliance between the control and experimental groups at both pre-and post-educational intervention. Multivariate analyses were used to identify factors associated with knowledge of fluid and salt control and fluid compliance.

4.1 Study sample

There were 291 participants recruited in Phase 1 of the study. Twenty-nine patients from Phase 1 dropped out, which reduced the sample size to 262 participants in Phase 2. Reasons for not taking part in Phase 2 were deaths (n = 24), transfers to other dialysis centres (n = 2), renal transplants (n = 2) and conversion to peritoneal dialysis (n = 1). A total of 9 patients from the experimental group and 20 from the control group dropped out. The total number of patients who participated in Phase 2 of the study was 145 from the experimental group and 117 from the control group. The details are summarized in Table 4.1.

Table 4.1: Number of patients recruited into the study

	No. of chronic haemodialysis patients:	No. Recruited
Total chronic haemodialysis patients in 5 hospitals	329	291 met inclusion criteria
Phase 1 –survey	291	291
Phase 2 –educational intervention	291	262 (Response rate 90%) Experimental (N=154) Control (N=137)

4.2 Patient characteristics

The socio demographic characteristics for patients are shown in Table 4.2. The majority of the participants in both control and experimental groups were males and of Malay ethnicity. Participant age was normally distributed (Kolmogorov-Smirnov test, $p = 0.2$), ranging from 19 to 90 years, with mean±SD of 49.62±15.16. The distribution for the duration of dialysis therapy ranged from 6 to 360 months with a median of 60 months, with a positive skew ($p < 0.001$ in Kolmogorov-Smirnov test). Slightly over half of the patients (52.6%) had secondary education in both groups. Almost two-third of the patients (61%) were married. About one third (33.1%) of the patients were unemployed. Hypertension was a common concurrent disease (37.7%), with more than half of patients with hypertension (55.2%) on antihypertensive medications. There were no significant differences for most of the baseline characteristics between the experimental and control groups, as shown in Table 4.2.

Table 4.2: Characteristics of patients

	Overall (N=291)	Experimental (N=154)	Control (N=137)	Experimental *vs*. control χ^2
Mean age (SD), years	52.14(15.05)	49.62(15.16)	54.97(14.45)	0.63
Mean duration of dialysis therapy (SD), months	86.2(65.44)	91.99(63.2)	79.69(67.5)	0.90
Characteristics		n (%)		
Gender				
Male	178 (61.2)	89 (57.8)	89 (65)	
Female	113 (38.8)	65 (42.2)	48 (35)	0.21
Ethnicity				
Malay	165 (56.7)	93 (60.4)	72 (52.6)	
Chinese	97 (33.3)	44 (28.6)	53 (38.7)	0.13
India	26 (8.9)	14 (9.1)	12 (8.8)	
Others	3 (1.0)	3 (1.9)	0	
Educational level				
No education	19 (6.5)	7 (4.5)	12 (8.8)	
Primary	59 (20.3)	26 (16.9)	33 (24.1)	0.06
Secondary	151 (51.9)	81 (52.6)	70 (51.1)	
Tertiary	62 (21.3)	40 (26)	22 (16.1)	
Marital status				
Single	72 (24.7)	42 (27.3)	30 (21.9)	
Married	183 (62.9)	94 (61)	89 (65)	0.56
Widow/widower	36 (12.4)	18 (11.9)	18 (13.1)	
Employment status				
Retired	94 (32.3)	50 (32.5)	44 (32.1)	
Unemployed	113 (38.8)	51 (33.1)	62 (45.3)	0.09
Full time	72 (24.7)	45 (29.2)	27 (19.7)	
Part time	12 (4.1)	8 (5.2)	4 (2.9)	

‘Table 4.2, continued’

	Overall (N=291)	Experimental (N=154)	Control (N=137)	Experimental *vs*. control χ^2
Characteristics		n(%)		
Nil	63 (21.6)	33(21.4)	30(21.9)	
Diabetes	18 (6.2)	8(5.2)	10(7.3)	
Hypertension	10(35.4)	58(37.7)	45(32.8)	
IHD	1 (0.3)	0	1(0.7)	
Others	15 (5.2)	10(6.5)	5(3.6)	0.38
DM &HPT	75 (25.8)	40(26)	35(25.5)	
HPT& IHD	6 (2.1)	3(1.9)	3(2.2)	
DM,HPT&IHD♮	10 (3.4)	1(1.3)	8(5.8)	
Antihypertensive therapy				
Yes	166 (57)	85(55.2)	81(59.1)	0.49
No	125 (43)	69(44.8)	56(40.9)	
No. of antihypertensive medication				
0	126(43.3)	70(45.5)	56(40.9)	
1-2	132(45.4)	71(46.1)	61(44.5)	0.34
3-4	33 (11.4)	13(8.4)	20(14.6)	

♮ Note:
DM-Diabetes mellitus
HPT-Hypertension
IHD-Ischemic heart disease

4.2.1 Pre-intervention fluid overload experience and symptoms

Patients were asked if they had ever experienced fluid overload. Those who reported experiencing fluid overload were asked to describe its symptoms. In both experimental and control groups, more than half of the patients (65.6%) had experienced fluid overload. The most common symptoms experienced were difficulty in breathing (59.1%), followed by cramps during dialysis (9.5%). There were no statistically significant differences (p>0.05) between the proportion of patients that experienced fluid overload and fluid overload symptoms in the experimental and control group (Table 4.3).

Table 4.3: Pre-intervention fluid overload experience and symptoms

	Overall (N=291)		Experimental (N=154)		Control (N=137)		Experimental *vs*. control, χ^2 *p*-value
	Yes n(%)	No n(%)	Yes n(%)	No n(%)	Yes n(%)	No n(%)	
Fluid overload experience	191(65.6)	100(34.4)	102(66.2)	52(33.8)	89(65)	48(35)	0.82
	Overall (N=191)		Experimental(N=102)		Control (N=89)		
Symptoms	Yes n(%)	No n(%)	Yes n(%)	No n(%)	Yes n(%)	No n(%)	
Chest pain	18(6.2)	173(59.5)	14(9.1)	88(57.1)	4(2.9)	85(62)	0.09
Difficulty in breathing	172(59.1)	19 (6.5)	89(57.8)	13(8.4)	83(60.6)	6(4.4)	0.38
Cramps during dialysis	27(9.5)	164(56.4)	14(9.1)	88(57.1)	13(9.5)	76(55.5)	0.96
Others (oedema)	26(8.9)	165(56.7)	12(8.8)	77(56.2)	14(9.1)	88(57.1)	0.97

4.2.2 Sources of information about fluid and salt control

Patients were asked if they had ever received any advice on fluid and salt control, the person who gave the advice, the frequency they received such advice and the form of information they received. From a total of 291 participants, 267 (91.8%) reported receiving information about fluid and salt control prior to this study. The participants indicated that the doctor (72.5%) was most often the person who advised them on fluid and salt control. Most of the participants (73.2%) reported that the advice was given in verbal form (Table 4.4). Comparison of the proportion of source of information between experimental and control groups revealed no statistically significant difference in advice received, frequency and form of information received ($p>0.05$).

Table 4.4: Pre-intervention source of information, frequency and form of information received

	Overall (N=291)		Experimental (N=154)		Control (N=137)		Experimental *vs.* control, χ^2 *P*
	Yes n(%)	No n(%)	Yes n(%)	No n(%)	Yes n(%)	No n(%)	
Received any advice	267(91.8)	24(8.2)	145(94.2)	9(5.8)	122(89.1)	15(10.9)	0.14
	Overall (N=267)		Experimental (N=145)		Control (N=122)		Experimental *vs.* control, χ^2 *P*
Source of information							
Nurse	187 (64.3)	80 (27.5)	97 (63)	48 (31.2)	90 (65.7)	32 (23.4)	0.14
Doctor	211 (72.5)	56 (19.2)	119 (77.3)	26 (16.9)	92 (67.2)	30 (21.9)	0.12
Dietician	152 (52.2)	115 (35.5)	84 (54.5)	61 (39.6)	68 (49.6)	54 (39.4)	0.27
Others	22 (7.60)	245 (84.2)	9 (5.8)	136 (88.3)	13 (9.5)	109 (79.6)	0.12
	Overall n(%)		Experimental n(%)		Control n(%)		
Frequency advice received							
Every dialysis Session	23(7.9)		13(8.4)		10(7.3)		
Monthly	12 (4.1)		7(4.5)		5(3.6)		
Weekly	8 (2.7)		6(3.9)		2(1.5)		0.6
When problems occur	226 (77.7)		118(76.6)		108(78.8)		
First time dialysis	1(0.30)		0		1(0.6)		
Form of teaching received							
Verbal	213 (73.2)		121(78.6)		92(67.2)		
Written/ leaflet	7 (2.4)		5(3.2)		2(1.5)		0.05
Verbal & leaflet	48 (16.5)		18(11.7)		30(21.9)		

4.3 Pre-intervention knowledge on fluid and salt control

4.3.1 Analysis of questionnaire

The knowledge assessment was conducted at baseline and 3 months after the educational intervention was implemented. Knowledge on fluid and salt control was assessed using a questionnaire (Appendix A). The correct response to each question is displayed in Table 4.5.

Pre- intervention

Generally, there was no statistical significant difference in the proportion of correct responses between the experimental and control group. On the whole, for question 1 and 6, the majority responded correctly (90%). The participants in the experimental group had the highest proportion of correct responses for Question 1 (97.4%), followed by Question 6 (96.1%). However, only 42.2% of the participants in the experimental group responded correctly on Question 3, and 51.9% on Question 8.

In the control group, the highest correct responses was for Question 1 (95.6%) and Question 6 (95.6%).The proportion of correct responses in the control group was low (37.2%) for Question 8 (Table 4.5).

Post- intervention

There were no statistically significant differences in the proportion of correct responses assessed at baseline and after 3 months. The educational intervention was initiated for 3 months in the experimental group with notable improvements after the intervention. The control group did not receive any educational intervention. All participants in the experimental group answered Question 1 correctly. However, the odds ratio was low (OR 0.97, 95%CI 0.94 to 1.00). This is indicated by the higher proportion of correct responses in the control group compared to the experimental group. In the experimental group, the proportion of correct answers increased after the intervention, particularly for Question 3 (42.2% to 71.4%), Question 4 (62.3% to 83.8%), Question 7 (61.1% to 72.15%) and Question 8 (51.9% to 96.8%). On the whole, the experimental group had a higher proportion of correct responses for most of the questions than the control group, as indicated by the odds ratios (ORs) and their respective 95% CI, as showed in Table 4.5. The 95% CI did not include Question 1, as statistically significant improvements in correct responses was only observed in Question 3 (OR 1.78, 95%CI 1.09 to 2.90), Question 4 (OR 4.27, 95%CI 2.47 to 7.35), Question 5 (OR 1.84, 95%CI 1.10 to 3.10) and Question 8 (OR 28.52, 95%CI 11.00 to 73.90) after the intervention. The OR (95%CI) for correct responses on Question 4 was 4.27 (2.47 to 7.35) which indicated that the experimental group had a 4.27 times higher likelihood of correct responses than the control group after the intervention. For Question 6, the OR of 2.29 (95%CI 0.41 to 12.68) implies the experimental group had almost 3 times higher likelihood of correct responses than the control group after the intervention, but the association was not significant as the range of the 95%CI includes 1.

Table 4.5: Correct responses for individual knowledge questions, pre- and post- intervention

		Pre intervention		Post Intervention		Correct response experimental *vs.* control group
	Questions	Experimental (N=154) n (%)	Control (N=137) n(%)	Experimental (N=154) n (%)	Control (N=137) n(%)	Odds ratio(OR) (95%CI)
Q1	Purpose of haemodialysis treatment	150 (97.4)	131 (95.6)	154 (100)	133 (97.1)	0.97 (0.94-1.00)
Q2	Importance of fluid and salt restriction	99 (64.3)	98 (71.5)	125 (81.2)	99 (72.3)	1.65 (0.95-2.87)
Q3	Amount of water you need to drink per day is 1 liter (1000 mls)	65 (42.2)	75 (54.7)	110 (71.4)	80 (58.4)	1.78 (1.09-2.90)
Q4	Salt intake per day should be limit to 2-4 gram (½ to 1	96 (62.3)	70 (51.1)	129 (83.8)	75 (54.7)	4.27 (2.47-7.35)
Q5	Allowed to put on weight 1.5-2 kg between dialysis intervals	93 (60.4)	91 (66.4)	120 (77.9)	90 (65.7)	1.84 (1.10-3.10)
Q6	Aware the danger of drinking too much of water	148 (96.1)	133 (97.1)	152 (98.7)	133 (97.1)	2.29 (0.41-12.68)
Q7	Food like ice cream, jelly is safe to eat because it contains less water.	94 (61.1)	95 (69.3)	111 (72.1)	93 (67.9)	1.22 (0.74- 2.02)
Q8	Drinking from small cups and eat ice cube can help in control fluid intake.	80 (51.9)	51 (37.2)	149 (96.8)	70 (51.1)	28.52 (11.00-73.90)

4.4 Assessment of the level of knowledge and its association with source of information pre- and post-intervention

4.4.1 Knowledge levels pre- and post-intervention in the experimental and control group

Table 4.6 shows the knowledge levels (pre- and post-intervention) for both the control and experimental groups. The knowledge scores of the participants were further classified into the categories of "high knowledge levels" and "poor knowledge levels". Patients with mean total knowledge scores of 4 and below were grouped as having "low knowledge levels" and those with mean total knowledge score of 5 and above were grouped as "high knowledge levels". Both experimental and control groups had lower proportions of participants in the "high knowledge level" group in the pre-intervention phase, with no significant differences ($p>0.05$) between the two groups. In the post-intervention phase, the experimental group had a higher proportion of participants in the "high knowledge level" category compared to the control group. This difference was statistically significant ($p<0.05$).

Table 4.6: Knowledge levels pre -and post intervention in the control and experimental group

	Pre- intervention			Between Exp. *vs.* Control χ^2	Post - intervention			Between Exp. *vs.* Control χ^2
Mean total knowledge score†	Overall M(SD)	0-4 n(%)	5-8 n(%)	*p*	Overall M(SD)	0-4 n(%)	5-8 n(%)	*p*
Experimental (n=154)	5.80 (1.31)	60 (39)	94 (61)	0.12	6.48 (0.86)	26 (16.9)	128 (83.1)	0.00
Control (n=137)	5.56 (1.14)	64 (46.7)	73 (53.3)		5.70 (1.08)	54 (39.4)	83 (60.6)	

†Note:
Mean total knowledge score 0-4 imply low knowledge level
Mean total knowledge score 5-8 imply high knowledge level

4.4.2 Association between knowledge level and ever received information

When patients were asked whether they had previously received any information on fluid and salt control, the majority of the patients responded "yes" in both the experimental and control groups but the proportion who responded "yes" for the group with "high knowledge levels" was relatively low (62.8% and 54.1%, respectively) in the pre-intervention phase (Table 4.7). In the experimental group, the proportion which responded "yes" in the "high knowledge levels" group at post- intervention increased from 62.8% to 82.8%. Comparison using chi square within experimental and control groups at the pre- and post- intervention phase showed no statistically significant difference ($p>0.05$). However, there was a significant difference in the knowledge level between the experimental and control groups at the post- intervention phase ($p<0.05$) as shown in Table 4.7

Table 4.7: Association between knowledge levels and ever received information

	Pre-intervention		Within Exp. χ^2	Between Exp. *vs* control χ^2	Post-intervention		Within Control χ^2	Between Exp. *vs* control χ^2
Mean total knowledge score†	0-4 n(%)	5-8 n(%)	*p*	*p*	0-4 n(%)	5-8 n(%)	*p*	*p*
Experimental (n=154)								
Received information previously								
Yes	54 (37.2)	91 (62.8)	0.08		25 (17.2)	120 (82.8)	0.63	
No	6 (66.7)	3 (33.3)			1 (11.1)	8 (88.9)		
Control (n=137)				0.15				0.00
Received information previously								
Yes	56 (45.9)	66 (54.1)	0.59		48 (39.3)	74 (60.7)	0.96	
No	8 (53.3)	7 (46.7)			6 (40.0)	9 (60.0)		

†Note:
A mean total knowledge score of 0-4 implies low knowledge levels
A mean total knowledge score of 5-8 implies high knowledge levels

4.5 Comparison of the mean total knowledge on fluid and salt control by demographic and clinical characteristics pre- and post- intervention between experimental and control groups

4.5.1 Comparison of mean total knowledge score by demographic and clinical characteristics

A repeated-measure ANOVA was used to determine mean total knowledge differences between and within the experimental and control groups, pre-and post-intervention. Table 4.8 displays mean total knowledge by demographic and clinical characteristics for both experimental and control groups. There was no difference in mean total knowledge within the experimental and control group ($p<0.05$) pre- and post-intervention. However, a significant difference ($p<0.05$) was observed between experimental and control groups.

Table 4.8: Mean total knowledge by demographic and clinical characteristics pre- and post-intervention in both experimental and control groups

	Experimental (N=154)			Within Group (Exp *vs.* Exp)	Control (N=137)			Within Group (Control *vs.* Control)	Between group (Exp *vs.* control)
	Mean total knowledge Mean (SD)			*p*	Mean total knowledge Mean (SD)			*p*	*p*
Characteristics	n (%)	Pre-interven-tion	Post-interven-tion		n (%)	Pre-interven-tion	Post-interve n-tion		
Age group (years)									
<40	42 (27.3)	5.69 (1.40)	6.52 (0.77)		20 (14.6)	5.60 (0.88)	5.85 (0.93)		
40-50	25 (16.2)	6.32 (1.11)	6.76 (0.83)	0.38	28 (20.4)	5.25 (0.96)	5.39 (0.92)	0.77	<0.001
50-60	43 (27.9)	5.98 (1.18)	6.53 (0.90)		31 (22.6)	5.77 (1.28)	5.87 (1.28)		
>60	44 (28.6)	5.45 (1.35)	6.23 (0.86)		58 (42.3)	5.58 (1.21)	5.70 (1.07)		
Gender									
Male	88 (57.1)	5.72 (1.38)	6.41 (0.89)	0.89	89 (65.0)	5.45 (0.97)	5.63 (0.96)	0.22	<0.001
Female	66 (42.9)	5.92 (1.20)	6.58 (0.80)		48 (35.0)	5.77 (1.39)	5.83 (1.28)		
Ethnicity									
Malay	93 (60.4)	5.98 (1.33)	6.62 (0.85)		72 (52.6)	5.49 (1.21)	5.71 (1.09)		
Chinese	44 (28.6)	5.40 (1.17)	6.12 (0.82)	0.92	53 (38.7)	5.47 (0.97)	5.53 (0.95)	0.15	<0.001
Indian	14 (9.1)	6.07 (1.44)	6.71 (0.73)		12 (8.8)	6.42 (1.16)	6.42 (1.13)		
Others	3 (1.9)	5.00 (1)	6.00 (1)		0	-	-		

Note:
Within group – pre and post comparison within experimental and control
Between group –comparison between experimental and control

‘Table 4.8, continued’

	Experimental (N=154)			Within Group (Exp *vs.* Exp)	Control (N=137)			Within Group (Control *vs.* Control)	Between group (Exp *vs.* control)
	Mean total knowledge Mean (SD)			*p*	Mean total knowledge Mean (SD)			*p*	*p*
Characteristics	n (%)	Pre-interven-tion	Post-interven-tion		n (%)	Pre-interven-tion	Post-interven-tion		
Educational level									
No education	8 (5.2)	5.50 (0.93)	6.38 (0.74)		12 (8.80)	5.33 (1.56)	5.42 (1.38)		
Primary	26 (16.9)	5.65 (1.23)	6.3 (10.88)	0.86	33 (24.0)	5.70 (1.21)	5.85 (1.15)	0.78	<0.001
Secondary	80 (51.9)	5.85 (1.36)	6.50 (0.90)		70 (51.1)	5.61 (11.13)	5.79 (1.05)		
Tertiary	40 (26)	5.87 (1.34)	6.58 (0.78)		22 (16.1)	5.32 (0.78)	5.36 (0.85)		
Marital status									
Single	42 (27.3)	5.57 (1.32)	6.45 (0.83)		30 (21.9)	5.46 (1.19)	5.67 (1/02)		
Married	94 (61.0)	5.84 (1.35)	6.52 (0.89)	0.05	89 (65.0)	5.69 (1.11)	5.81 (1.08)	0.72	<0.001
Widow/ widower	18 (11.7)	6.17 (0.92)	6.33 (0.84)		18 (13.1)	5.05 (1.26)	5.22 (1.06)		
Employment status									
Retired	50 (32.5)	5.36 (1.32)	6.36 (0.90)		44 (32.1)	5.55 (1.02)	5.61 (1.04)		
Unemployed	51 (33.1)	5.80 (1.22)	6.47 (0.80)	0.93	62 (45.3)	5.69 (1.31)	5.81 (1.21)	0.33	<0.001
Full time	45 (29.2)	6.02 (1.23)	6.67 (0.80)		27 (19.7)	5.37 (0.84)	5.67 (0.83)		
Part time	8 (5.2)	5.75 (1.58)	6.25 (1.17)		4 (2.9)	5.00 (1.41)	5.25 (0.96)		
Duration of dialysis									
<5 years	54 (35.1)	5.81 (1.45)	6.65 (0.78)		64 (46.8)	5.61 (1.01)	5.78 (1.00)		
5-10years	46 (29.9)	5.80 (1.22)	6.28 (0.91)	0.40	41 (29.9)	5.68 (1.29)	5.78 (1.24)	0.88	<0.01
10-15years	39 (25.3)	5.67 (1.28)	6.38 (0.88)		18 (13.1)	5.28 (1.36)	5.50 (1.10)		
>15years	15 (9.7)	6.13 (1.22)	6.73 (0.80)		14 (10.2)	5.21 (0.89)	5.36 (0.93)		

‘Table 4.8, continued’

Characteristics	Experimental (N=154)			Within Group (Exp *vs.* Exp)	Control (N=137)			Within Group (Control *vs.* Control)	Between group (Exp *vs.* control)
	Mean total knowledge Mean (SD)			*p*	Mean total knowledge Mean (SD)			*p*	*p*
	n (%)	Pre-interven-tion	Post-interven-tion		n (%)	Pre-interven-tion	Post-interven-tion		
No. of concurrent disease									
Nil	33 (21.4)	5.76 (1.20)	6.42 (0.82)		30 (21.9)	5.47 (1.01)	5.57 (0.90)		
<2 types	76 (49.4)	5.68 (1.36)	6.46 (0.89)	0.41	61 (44.5)	5.28 (1.16)	5.48 (1.07)	0.52	<0.001
>2 types	45 (29.2)	6.03 (1.30)	6.56 (0.84)		46 (33.6)	6.00 (1.10)	6.09 (1.11)		
Anti-hypertensive therapy									
Yes	85 (55.2)	5.84 (1.18)	6.49 (0.84)	0.71	81 (59.1)	5.70 (1.18)	5.81 (1.16)	0.47	<0.001
No	69 (44.8)	5.75 (1.24)	6.46 (0.88)		56 (40.9)	5.35 (1.06)	5.54 (0.93)		
No. of anti-hypertensive medication									
Nil	70 (45.5)	5.71 (1.28)	6.46 (0.88)		57 (41.6)	5.36 (1.07)	5.54 (0.93)		
1 type	36 (23.4)	5.69 (1.39)	6.50 (0.85)	0.29	37 (27.0)	5.32 (1.08)	5.46 (1.07)	0.76	<0.001
More than 1 type	48 (31.1)	6.02 (1.30)	6.50 (0.85)		43 (31.4)	6.02 (1.21)	6.12 (1.20)		

Note:
Within group – pre and post comparison within experimental and control
Between group –comparison between experimental and control

4.5.1.2 Comparison of mean total knowledge score by demographic and clinical characteristics (post hoc analysis)

The mean total knowledge scores by demographic and clinical characteristics at the pre- and post- intervention phase for both experimental and control groups are displayed in Table 4.9. The maximum total knowledge score was 8 points. In the pre-intervention phase, the 40-50 age group reported the highest mean knowledge score (6.32±1.11), whereas the lowest mean knowledge score was reported among retired participants (5.36±1.32) Comparison of mean knowledge score by gender showed that the highest mean knowledge score were among females in the control group (5.77±1.39). The Indian ethnic group obtained the highest mean total knowledge score in pre- and post-intervention (6.07±1.44 and 6.71±0.73 respectively). By occupational categories, patients with part time employment had the lowest mean knowledge scores (5.00±1.41). There was an increase in post-intervention knowledge scores with the experimental group obtaining higher scores than the control group. The highest post-intervention knowledge score for the experimental group was 6.76±0.83 (from the 40-50 age subgroup) while the highest score in control group was 6.12±1.20 (from the subgroup of patients on more than one type of antihypertensive medication).

Tests of normality for knowledge scores before and after the educational intervention were conducted using normality plots. Result showed both scores were normality distributed (Kolmogorov-Smirnov test, p=0.00). Parametric statistic was applied using paired t-tests to determine knowledge differences pre- and post- intervention for both the control and experimental group. In the experimental group, there were significant increases in mean knowledge scores post-intervention for almost all demographic and clinical characteristics except for Indians and other ethnic minorities, widowers and part-

time employment subgroups) (p<0.05). In the control group, significant differences in mean knowledge scores at both pre -and post- intervention was found in the following subgroups: male, secondary education, unmarried, full time employment, patients not on any antihypertensive medication and with less than 2 types of concurrent disease (p<0.05).

An independent t-test was conducted to determine significant differences between the experimental and control groups on total knowledge scores on fluid and salt control at pre- and post-intervention. Comparison between the experimental and control groups at post-intervention using an independent t-test showed statistically significant differences in mean knowledge score by demographic and clinical characteristics. However, there were no statistically significant differences in the mean knowledge score for patients of Indian ethnic origin, primary education and of part time employment post-intervention for the experimental group (Table 4.9).

Table 4.9: Post hoc analysis of mean total knowledge by demographic and clinical characteristics pre- and post-intervention in both experimental and control groups

	Experimental (N=154)			Within group (Exp *vs.* exp)	Control (N=137)			Within group (control *vs.* control)	Between group (Exp *vs.* control)
	Mean total knowledge Mean (SD)			Paired t test, *p*	Mean total knowledge Mean (SD)			Paired t test, *p*	Indepe d-ent t test,
Characteris-tics	n (%)	Pre-intervent-ion	Post-intervent-ion		n (%)	Pre-Intervent-ion	Post-intervent-ion		
Age group (years)									
<40	42 (27.3	5.69 (1.40)	6.52 (0.77)	<0.001	20 (14.6)	5.60 (0.88)	5.85 (0.93)	0.06	0.04
40-50	25 (16.2	6.32 (1.11)	6.76 (0.83)	0.02	28 (20.4)	5.25 (0.96)	5.39 (0.92)	0.21	<0.001
50-60	43 (27.9	5.98 (1.18)	6.53 (0.90)	<0.001	31 (22.6)	5.77 (1.28)	5.87 (1.28)	0.26	0.01
>60	44 (28.6)	5.45 (1.35)	6.23 (0.86)	<0.001	58 (42.3)	5.58 (1.21)	5.70 (1.07)	0.09	0.01
Gender									
Male	88 (57.1)	5.72 (1.38)	6.41 (0.89)	<0.001	89 (65.0)	5.45 (0.97)	5.63 (0.96)	0.00	<0.001
Female	66 (42.9)	5.92 (1.20)	6.58 (0.80)	<0.001	48 (35.0)	5.77 (1.39)	5.83 (1.28)	0.37	0.01
Ethnicity									
Malay	93 (60.4)	5.98 (1.33)	6.62 (0.85)	<0.001	72 (52.6)	5.49 (1.21)	5.71 (1.09)	0.00	0.02
Chinese	44 (28.6)	5.40 (1.17)	6.12 (0.82)	<0.001	53 (38.7)	5.47 (0.97)	5.53 (0.95)	0.47	0.001
Indian	14 (9.1)	6.07 (1.44)	6.71 (0.73)	0.05	12 (8.8)	6.42 (1.16)	6.42 (1.13)	0.99	0.47
Others	3 (1.9)	5.00 (1)	6.00 (1)	0.23	0	-	-	-	-
Educational level									
No education	8 (5.2)	5.50 (0.93)	6.38 (0.74)	0.02	12 (8.80)	5.33 (1.56)	5.42 (1.38)	0.67	0.09
Primary	26 (16.9)	5.65 (1.23)	6.3 (10.88)	0.04	33 (24.0)	5.70 (1.21)	5.85 (1.15)	0.17	0.10
Secondary	80 (51.9)	5.85 (1.36)	6.50 (0.90)	<0.001	70 (51.1)	5.61 (11.13	5.79 (1.05)	0.01	<0.001
Tertiary	40 (26)	5.87 (1.34)	6.58 (0.78)	<0.001	22 (16.1)	5.32 (0.78)	5.36 (0.85)	0.58	<0.001

Note:
Within group – pre and post comparison within experimental and control
Between group –comparison between experimental and control

‘Table 4.9, continued’

	Experimental (N=154)			Within group (Exp *vs.* exp)	Control (N=137)			Within group (control *vs.* control)	Between group (Exp *vs.* control)
	Mean total knowledge Mean (SD)			Paired t test, *p*	Mean total knowledge Mean (SD)			Paired t test, *p*	Indepe d-ent t test,
Characteris-tics	n (%)	Pre-intervent-ion	Post-intervent-ion		n (%)	Pre-Intervent-ion	Post-intervent-ion		
Marital status									
Single	42 (27.3)	5.57 (1.32)	6.45 (0.83)	<0.001	30 (21.9)	5.46 (1.19)	5.67 (1/02)	0.03	<0.001
Married	94 (61.0)	5.84 (1.35)	6.52 (0.89)	<0.001	89 (65.0)	5.69 (1.11)	5.81 (1.08)	0.05	<0.001
Widow/ widower	18 (11.7)	6.17 (0.92)	6.33 (0.84)	0.42	18 (13.1)	5.05 (1.26)	5.22 (1.06)	0.27	0.01
Employment status									
Retired	50 (32.5)	5.36 (1.32)	6.36 (0.90)	<0.001	44 (32.1)	5.55 (1.02)	5.61 (1.04)	0.32	<0.001
Unemployed	51 (33.1)	5.80 (1.22)	6.47 (0.80)	<0.001	62 (45.3)	5.69 (1.31)	5.81 (1.21)	0.13	0.01
Full time	45 (29.2)	6.02 (1.23)	6.67 (0.80)	<0.001	27 (19.7)	5.37 (0.84)	5.67 (0.83)	0.01	<0.001
Part time	8 (5.2)	5.75 (1.58)	6.25 (1.17)	0.23	4 (2.9)	5.00 (1.41)	5.25 (0.96)	0.39	0.17
Duration of dialysis therapy									
<5 years	54 (35.1)	5.81 (1.45)	6.65 (0.78)	<0.001	64 (46.8)	5.61 (1.01)	5.78 (1.00)	0.05	<0.001
5-10years	46 (29.9)	5.80 (1.22)	6.28 (0.91)	0.003	41 (29.9)	5.68 (1.29)	5.78 (1.24)	0.25	0.03
10-15years	39 (25.3)	5.67 (1.28)	6.38 (0.88)	<0.001	18 (13.1)	5.28 (1.36)	5.50 (1.10)	0.10	<0.001
>15years	15 (9.7)	6.13 (1.22)	6.73 (0.80)	0.03	14 (10.2)	5.21 (0.89)	5.36 (0.93)	0.17	0.01
No. of concurrent disease									
Nil	33 (21.4)	5.76 (1.20)	6.42 (0.82)	0.01	30 (21.9)	5.47 (1.01)	5.57 (0.90)	0.26	<0.001
<2 types	76 (49.4)	5.68 (1.36)	6.46 (0.89)	<0.001	61 (44.5)	5.28 (1.16)	5.48 (1.07)	0.02	<0.001
>2 types	45 (29.2)	6.03 (1.30)	6.56 (0.84)	<0.001	46 (33.6)	6.00 (1.10)	6.09 (1.11)	0.16	0.03

"Table 4.9, continued"

	Experimental (N=154)			Within group (Exp *vs.* exp)	Control (N=137)			Within group (control *vs.* control)	Between group (Exp *vs.* control)
	Mean total knowledge Mean (SD)			Paired t test, *p*	Mean total knowledge Mean (SD)			Paired t test, *p*	Indepe d-ent t test,
Characteris -tics	n (%)	Pre- intervent -ion	Post- intervent -ion		n (%)	Pre- Intervent -ion	Post- intervent -ion		
Anti- hypertensive therapy									
Yes	85 (55.2)	5.84 (1.18)	6.49 (0.84)	<0.001	81 (59.1)	5.70 (1.18)	5.81 (1.16)	0.06	<0.001
No	69 (44.8)	5.75 (1.24)	6.46 (0.88)	<0.001	56 (40.9)	5.35 (1.06)	5.54 (0.93)	0.02	<0.001
No. of antihypertensive medication									
Nil	70 (45.5)	5.71 (1.28)	6.46 (0.88)	<0.001	57 (41.6)	5.36 (1.07)	5.54 (0.93)	0.02	<0.001
1 type	36 (23.4)	5.69 (1.39)	6.50 (0.85)	<0.001	37 (27.0)	5.32 (1.08)	5.46 (1.07)	0.13	<0.001
More than 1 type	48 (31.1)	6.02 (1.30)	6.50 (0.85)	<0.001	43 (31.4)	6.02 (1.21)	6.12 (1.20)	0.25	0.09

Note:
Within group – pre and post comparison within experimental and control
Between group –comparison between experimental and control

4.5.2 Comparison of pre -and post-intervention mean total knowledge scores for the experimental and control group

Table 4.10 showed pre- and post-intervention comparisons on mean total knowledge scores for both the experimental and control group. The overall mean total knowledge scores for the experimental group were higher than the control group pre- and post-intervention. A paired t- test was used to compare the mean total knowledge scores pre- and post-intervention within the experimental and control group. Both groups showed significant differences in mean knowledge scores pre- and post-intervention.

In the pre-intervention phase, no significant differences were observed in the mean knowledge score for the experimental (5.80 ±1.30) and control (5.56±1.14) group. There was a statistically non-significant increase of 0.14 (95% CI 0.05 to 0.23) in the control group. At the post- intervention phase, the mean knowledge increment for the treatment group was found to be statistically significant (0.68, 95% CI 0.50 to 0.84).

An independent t-test was conducted to compare mean total knowledge scores between the experimental and control groups pre- and post-intervention. In the pre-intervention phase, the mean total knowledge score for the experimental group (5.80±1.31) and control group (5.56±1.14) showed no significance difference (0.24, 95% CI 0.05 to 0.53) between both groups. However, there was an increase in mean total knowledge scores post-intervention. The mean total knowledge scores for the experimental group (6.48±0.86) was higher than the control group (5.70±1.08).There was a significant difference in mean knowledge scores between the experimental and the control group post-intervention (0.78, 95% CI 0.56 to 1.01).

Table 4.10: Comparisons on mean total knowledge on fluid and salt control between the experimental and control groups pre- and post-intervention

	Pre-intervention	Between group Exp vs. control		Post-intervention	Between group Exp vs. control		Within Group	
	Mean total knowledge score	Diff (95% CI)	Indept. t test *p*	Mean total knowledge score	Diff (95% CI)	Indept test *p*	Diff (95% CI)	Paired t test *p*
Experimental (n=154)	5.80 (1.31)	0.24 (-0.04, 0.53)	0.09	6.48 (0.86)	0.78 (0.56, 1.01)	0.00	0.68 (0.50, 0.84)	0.00
Control (n=137)	5.56 (1.14)			5.70 (1.08)			0.14 (0.05, 0.23)	0.02

Note:
Within group – pre and post comparison within experimental and control
Between group –comparison between experimental and control

4.6 Evaluating the effectiveness of patient education on knowledge improvement for both experimental and control groups

4.6.1 Evaluating the effectiveness of the educational intervention on the level of knowledge on fluid and salt control for both experimental and control groups

Knowledge on fluid and salt control was assessed once pre-intervention and 3 months post-intervention. The knowledge scores were divided into two categories - "good knowledge level" (scores ranging from 5-8) and "poor knowledge level" (scores ranging from 0-4). Knowledge improvement in this context is defined as recorded knowledge changes from "poor knowledge levels" at the pre-intervention phase to "good knowledge levels" at post-intervention. Table 4.11 showed the outcomes for knowledge improvement post- intervention.

The experimental group

There were one hundred twenty eight (n = 128) participants with good knowledge levels pos-intervention. Forty-five participants showed improvements post-intervention while 83 participants maintained high knowledge levels.

The control group

There were eighty-three participants with good knowledge levels post-intervention. Of these 13 participants demonstrated improvement from low to high knowledge levels while an additional 70 participants maintained high knowledge levels.

Both experimental and control groups showed knowledge improvement on fluid and salt control post-intervention. The proportion of participants which showed knowledge improvement was higher in the experimental group (29.2%) than in the control group (9.5%). The odds ratio (OR 3.94, 95%CI 2.02 to 7.69) showed that 3-month post-intervention, the experimental group had a higher odds with almost 4 times the knowledge improvement than the control group (Table 4.11).

Table 4.11: Outcome for knowledge improvement on fluid and salt control post-intervention for both experimental and control groups

	Experimental (n=154)		Experimental group knowledge improved in 3- month post-intervention	Control (n=137)		Control group knowledge improved in 3- month post-intervention	Odds ratio (95%CI) of improved knowledge for experimental versus control
	Pre	Post	n (%)	Pre	Post	n(%)	OR (95%)
Knowledge scores †			45(29.2)			13(9.5)	3.94 (2.02-7.69)
0-4	60 (39%)	26 (16.9%)		64 (46.7%)	54 (39.4%)		
5-8	94 (61%)	128 (83.1%)		73 (53.3%)	83 (60.6%)		

†Note:
Knowledge scores of 0-4 implies poor knowledge levels
Knowledge scores of 5-8 implies good knowledge levels

4.7 Determining predictors and associations between knowledge levels, demographic and clinical factors at post-intervention for the experimental group

4.7.1 Factors associated with knowledge improvement on fluid and salt control post-intervention.

Table 4.12 displays the results of the univariate and multivariate analysis for factors affecting knowledge improvement post-intervention for the experimental group. Explanatory variables or factors with significance levels of 0.2 and below ($p \leq 0.20$) in the univariate analyses were included in the multivariate logistic regression analysis.

As shown in Table 4.12, in the univariate analysis, the proportion of participants with knowledge improvement was lower in patients who had experienced fluid overload (38.2%). The proportion of participants with knowledge improvement was higher in those who had received advice on fluid and salt control (40 %) than those who reported not receiving such advice (33.3%).

Proportion of knowledge improvement (38.8%) was reported low among those who had not received verbal advice, however, the association was not found to be significant. Likewise, the majority (60.0%) of those who received written advice reported non-improvement ($p>0.05$).

The highest percentages of knowledge improvement were found for the following factors; participants above 60 years old (45.5%), female (57.6%), of minority ethnicity (66.7%), unmarried (45.2%), uneducated (62.5%) unemployed (60.8%), and less than 5 years of dialysis therapy (46.3%). Regardless of the frequency of concurrent disease, there was a higher proportion of patients with no improvement in knowledge than the proportion that

reported improvement. There were lower proportions in knowledge improvement among patients taking antihypertensive medication (40.0%) than those who were not on any antihypertensive medication (43.5%). With regards to the number of antihypertensive medications, the proportion of knowledge improvement was lower among those with a greater number of antihypertensive medications.

As shown in Table 4.12, the variables included in multivariate analyses were advice received, frequency of advice received, and duration of dialysis therapy, marital status, number of concurrent diseases, and number of antihypertensive medication used. The multivariate logistic model indicated that the number of hypertensive medication taken by patients was the only significant predictor of knowledge improvement (OR 2.27, 95% CI 0.08 to 0.79) than the subgroup with more than one antihypertensive medication. In the test for goodness of fit, the chi-square value for the Hosmer-Lemeshow test was 7.43 with a significance level of 0.49 (significance value more than 0.05) implying a good fit.

Table 4.12: Results of multivariate logistic regression analysis predicting post-intervention knowledge improvement in the experimental group

		Knowledge improvement n (%)		Univariate X^2 p	β	Multivariate logistic regression model of improved *vs*. non improved knowledge§
Factors	N=154	ǂImproved	Non improved			OR (95%CI)
Fluid overload experience						
Yes	102	39(38.2)	63(61.8)	0.24	-	-
No	52	25(48.1)	27(51.9)			
Advice received previously						
Yes	145	58(40)	87(60)	0.12	-0.78	0.46(0.06-3.68)
No	9	3(33.3)	6(66.7)		-	Reference
Form of teaching received previously						
Verbal	121	47(38.8)	74(61.2)			
Written /leaflet	5	2(40)	2(60)	0.51	-	-
Verbal & written	18	9(50)	9(50)			
Personal background						
Age group						
<40yrs	42	18(42.9)	24(57.1)			
40-50yrs	25	9(36.0)	16(64.0)			
50-60yrs	43	17(39.5)	26(60.5)	0.87	-	-
>60yrs	44	20(45.5)	24(54.5)			
Gender						
Male	88	36(40.9)	52(59.1)			
Female	66	28(57.6)	38(42.4)	0.85	-	-
Ethnicity						
Malay	93	36(38.7)	57(61.3)			
Chinese	44	20(45.5)	24(54.5)	0.71	-	-
Indian	14	6(42.9)	8(57.1)			
Others	3	2(66.7)	1(33.1)			
Marital status						
Single	42	19(45.2)	23(54.8)	0.20	0.38	1.47(0.54-3.95)
Married	94	414(3.6)	53(56.4)		0.20	1.22(0.51-2.93)
Widow/widower	18	4(22.2)	14(77.8)		-	Reference

Note:
ǂKnowledge improvement: knowledge level changes from low (score 0-4) to high (score 5-8)
§ Logistic regression model; Hosmer and Lemeshow test, χ^2 (8) = 7.43, P = 0.49

‘Table 4.12, continued’

		Knowledge improvement n(%)		Univariate X^2 p	β	Multivariate logistic regression model of improved *vs*. non improved knowledge§
Factors	N=154	Improved‡	Non improved			OR (95%CI)
Educational level						
No education	8	59(62.5)	3(37.5)			
Primary	26	11(42.3)	15(57.7)	0.63	-	-
Secondary	80	33(41.2)	47(58.8)			
Tertiary	40	15(37.5)	25(62.5)			
Employment status						
Retired	50	23(46.0)	27(54.0)			
Unemployed	51	20(60.8)	31(39.2)	0.69	-	-
Full time	45	19(57.8)	2642.2			
Part time	8	2(25.0).	6(75.0)			
Duration of dialysis therapy						
< 5yrs	54	25(46.3)	29(53.7)		0.42	1.52(0.59-3.94)
5-10yrs	46	17(37.0)	29(63.0)	0.19	0.34	1.40(0.53-3.75)
10-15yrs	39	1(41.0)	23(59.0)		0.52	1.68(0.61-4.62)
>15yrs	15	6(40)	9(60.0)		-	Reference
No. of concurrent disease						
Nil	33	12(36.4)	21(63.6)		-0.54	0.58(0.21-1.57)
< 2 types	76	37(48.7)	39(51.3)	0.20	0.56	1.75(0.89-3.40)
>2 types	45	15(33.3)	30(67.7)		-	Reference
Antihypertensive therapy						
Yes	85	34(40)	51(60)			
No	69	30(43.5)	39(56.5)	0.66	-	-
No. of antihypertensive medications						
0	70	31(55.7)	39(44.3)		0.82	2.27(1.08-4.79)*
1	36	18(50.0)	18(50.0)	0.19	0.40	1.49(0.71-3.13)
> 1	48	15(31.2)	33(68.8)		-	Reference

Note:
‡Knowledge improvement: knowledge level changes from low (score 0-4) to high (score 5-8)
§ Logistic regression model; Hosmer and Lemeshow test, χ^2 (8) = 7.43, P = 0.49
*Significant level p<0.05

4.8 Determining fluid compliance pre- and post- intervention in the experimental and control group

4.8.1 Comparison of fluid compliance at pre- and post-intervention for both the experimental and control groups

Comparison of pre- and post-intervention fluid compliance for the experimental and control groups is depicted in Table 4.13. Within the experimental group comparison, the mean IDWG during the pre-intervention phase (2.34kg±0.73) was higher than at the 1-month (1.98kg±0.54), 3-month (1.99kg±0.54) and 6-month (2.00kg±0.76) post-intervention phase respectively. In the experimental group, comparison of the baseline mean IDWG with the 6-month post-intervention mean IDWG, showed a significant reduction of 0.35kg (95%CI 0.25 to 0.45). In the control group, there was no significant difference for the mean IDWG between the baseline and 6-month post-intervention (OR 0.002, 95%CI 0.09 to 0.08). Comparison between the experimental and control groups revealed significant differences for all mean IDWG reductions at 1-month (p = 0.02), 3-month (p = 0.00) and 6-month (p = 0.00) post-intervention respectively.

There were no significant differences in MPBP means in the experimental and control groups (104.75mmHg±12.06 vs. 104.73mmHg±13.06) during the pre-intervention phase. In both the experimental and control group, there were no significant differences in the reduction of mean MPBP from baseline to 6-month post intervention (p > 0.05). There were significant changes in mean MPBP between the control and experimental groups in the post-intervention phase. The mean MPBP (±SD) in the experimental groups were 105.67mmHg±12.43 to 104.70mmHg±12.26 and 105.41mmHg±13.18 to 106.38mmHg±11.34 at the post-intervention phase (Table 4.13). There were no significant differences between the experimental and control groups in all mean MPBP

reductions between the two groups for the 1-month, 3-month and 6-month post-intervention, respectively.

The mean RFA baseline for both the experimental and control groups were 47.14%±25.92 and 49.04%±24.93, respectively. The within group comparison revealed a significant increase in mean RFA in the experimental group 6-month post- intervention (17.77, 95% CI 13.84 to 21.70), however, the increase in mean RFA in the control group was not statistically significant (1.29, 95% CI 2.71 to 5.29). There were significant differences (p = 0.00) in the mean RFA of the experimental group versus the control group at 1-month (68.54%±23.23 *vs*. 50.75%±29.34), 3-month (64.58%±25.33 *vs.* 46.88%±26.65), and 6-month (64.66%±24.86 *vs.* 48.91%±25.91) post-intervention.

Table 4.13: Comparison of fluid compliance between experimental and control groups at 1-month, 3-month and 6-month and within each group from baseline to 6-month.

Variables	Group	Baseline	Between groups (Experimental vs. control)								Within each groups (6 –month *vs.* baseline)	
			1-month			3-month			6-month			
		Mean (SD)	Mean (SD)	Diff (95%)	*p*	Mean (SD)	Diff (95%)	*p*	Mean (SD)	Diff (95%)	*p*	Diff (95%)	*p*
IDWG/ kg	Experimental	2.34 (0.73)	1.98 (0.54)	-0.21 (-0.34, -0.08)	0.02	1.99 (0.54)	-0.25 (-0.40, -0.11)	<.001	2.00 (0.76)	-0.21 (-0.35, -0.07)	<.001	0.35 (0.25, 0.45)	<.001
	Control	2.22 (0.55)	2.20 (0.55)			2.24 (0.65)			2.22 (0.76)			-.002 (-0.09, 0.08)	0.96
MPBP /mmHg	Experimental	104.75 (12.06)	105.67 (12.43)	0.26 (-2.86, 3.38)	0.87	105.34 (12.28)	-1.04 (-3.95, 1.86)	0.48	104.70 (12.26)	-0.45 (-3.5, 2.60)	0.77	0.09 (-1.48, 1.65)	0.91
	Control	104.73 (13.06)	105.41 (13.18)			106.38 (11.34)			105.15 (12.72)			-0.46 (-2.38, 1.47)	0.64
RFA/%	Experimental	47.14 (25.92)	68.54 (23.23)	17.79 (11.39, 24.18)	<.001	64.56 (25.33)	17.68 (11.33, 24.03)	<.001	64.66 (24.86)	15.75 (9.55, 21.96)	<.001	-17.77 (-21.7, 13.84)	<.001
	Control	49.04 (24.93)	50.75 (29.34)			46.88 (26.65)			48.91 (25.91)			1.29 (-2.71,5.29)	0.52

4.8.2 Trends of fluid compliance at pre- and post-intervention for both the control and experimental group

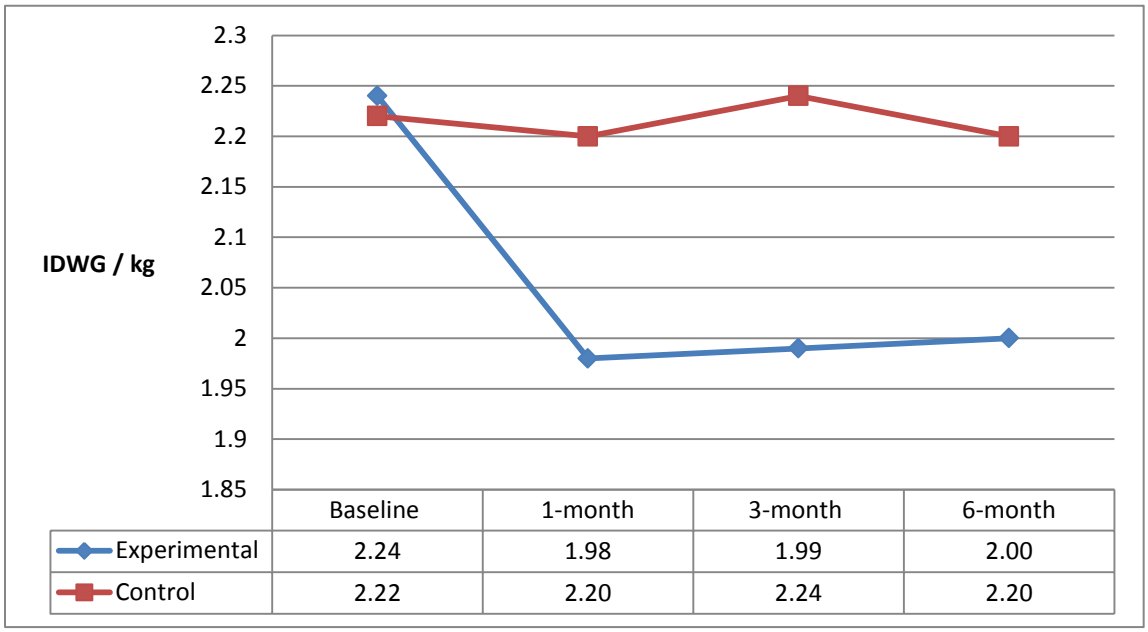
Fluid compliance (IDGW, MPBP and RFA) was measured at both the pre-intervention (baseline) and post-intervention phase (1-month, 3-month and 6-month). The trends for fluid compliance at baseline, 1-month, 3-month and 6-month are displayed in Figure 1, 2 and 3.

The line graph (Figure 4.1) shows the linear trend of the IDWG at baseline, 1-, 3-, and 6-month. There was a significant decrease in the IDWG at 1- month post-intervention (p <0.05) and a minor increase at 3- and 6 -month post intervention for the experimental group (p< 0.001). The IDWG for the control group remained stable at baseline and post-intervention.

A mixed between-within subject ANOVA (combination of between-subjects ANOVA and repeated measures ANOVA) was conducted to assess whether there were IDWG differences in experimental and control groups across four time periods (pre-intervention, one-month, three-month and six-month).

The following assumptions were tested; a) independence of observations and normality were met b) assumption of sphericity was violated. The Greenhouse-Geisser Epsilon was used to correct the degrees of freedom.

The result of the analysis showed that there was a significant difference in change of IDWG over the baseline, 1-, 3- and 6-month intervention for the experimental and control groups (Wilks' lambda = 0.89, F (3,258) = 10.77, p<0.001, Partial Eta Squared = 0.11). The effect size, Partial Eta Squared (0.11) indicated a very large effect size (Cohen, 1988). The main effect comparing the experimental and control groups was significant, F (1,260) = 4.31, p <0.05, Partial Eta Squared = 0.02, which suggested significant differences in IDWG between the experimental and control groups. The effect size, Partial Eta Squared (0.02) indicated a very small effect size (Cohen, 1988).



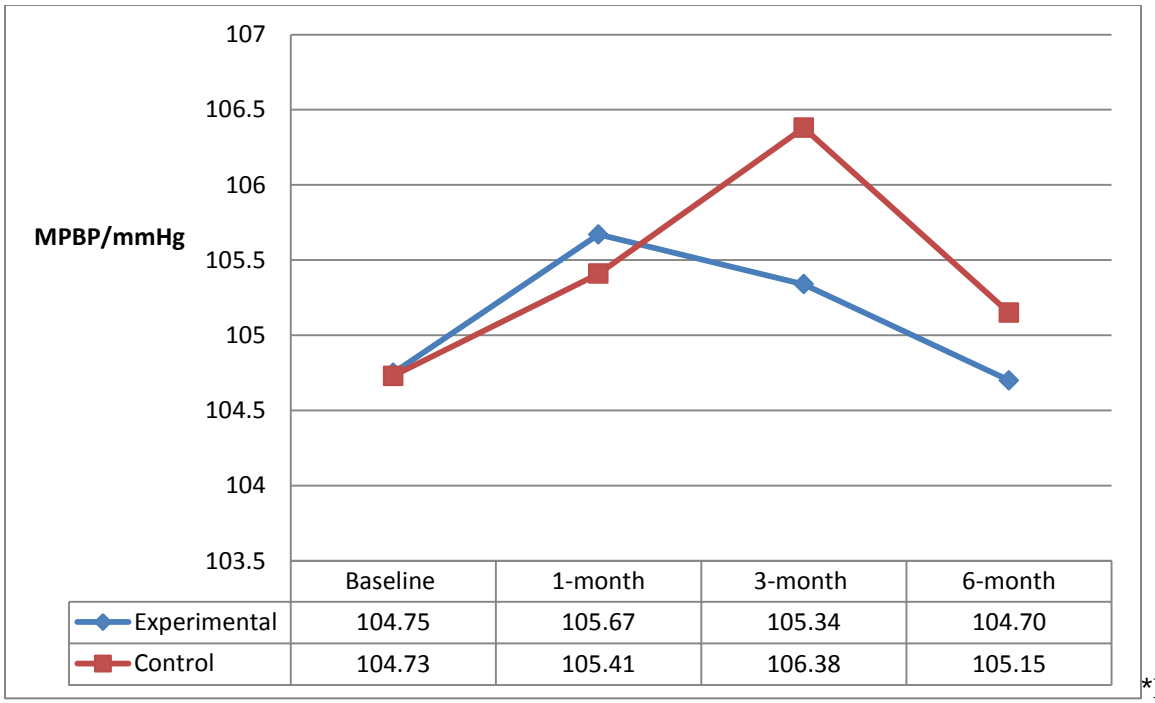
	Baseline	1-month	3-month	6-month
Experimental	2.24	1.98	1.99	2.00
Control	2.22	2.20	2.24	2.20

**Significant level at p<0.05 (p<.001)

Figure 4.1: Line graph showing linear trend of IDWG/kg at baseline 1-, 3-, and 6-month

Figure 4.2 shows the linear trend of the MPBP /mmHg at baseline 1-, 3-, and 6-month . Generally, the MPBP reading in the experimental group was lower than in the control group. The trend showed an increase in the MPBP from baseline to 1-month post-intervention in the experimental group (104.75mmHg to 105.67mmHg) and a decrease to 104.70mmHg at 6-month post- intervention. In the control group, there was an increase in the MPBP at baseline and at 3-month post-intervention (104.73mmHg to 106.38mmHg) which decreased to 105.15 mmHg at 6-month post-intervention. This was found to be not significant ($p = 0.77$).

A mixed between-within subject ANOVA was conducted to assess whether there were MPBP differences in experimental and control groups across the four time periods (pre-intervention, one-month, three-month and six-month). There was no statistically significant difference in MPBP change from the baseline over the 1-, 3-, and 6-month intervention for both the experimental and control groups, Wilks' lambda = 0.99, F (3,258) = 0.64, p>0.05 , Partial Eta Squared = 0.007. The main effect of comparing the two groups was not significant, F (1,260) = 0.04, p = 0.84, Partial Eta Squared = 0.00, suggesting there was no difference in MPBP between the experimental and control groups.

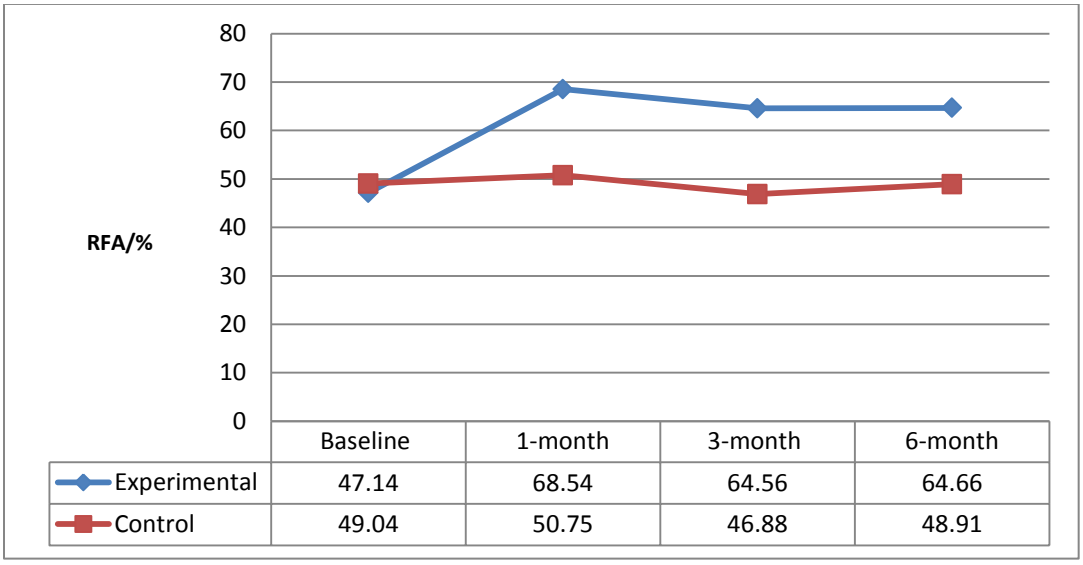


*Not significant p>0.05 (p=0.77)

Figure 4.2: Line graph showing linear trend of MPBP/mmHg at baseline 1-, 3-, and 6-month

Figure 4.3 showed the trend of the RFA for both the experimental and control groups, pre- and post-intervention. There was a huge increase in RFA at baseline compared to 1-month post intervention (47.14% to 68.54%, $p<0.001$) which remained stagnant at 3- and 6- month (64.56% and 64.66% respectively) post-intervention for the experimental group. There were minor changes ($p<0.001$) in the RFA in the control group at baseline (49.04%) and at 1-month (50.75%), which decreased to 46.88 % (3-month) and increased significantly ($p<0.001$) again to 48.91% at 6-month post-intervention.

The results of the mixed between-within subject ANOVA revealed that there was significant difference in change of RFA over the baseline, 1-, 3-, and 6-month intervention for experimental and control groups, Wilks' lambda = 0.82, F (3,258) = 19.26, p <0.001, Partial Eta Squared = 0.18. The effect size, Partial Eta Squared (0.18) indicated a very large effect size (Cohen, 1988). The main effect comparing the experimental and control groups was significant, F (1,260) = 18.98, p <0.001, Partial Eta Squared = 0.07, suggesting significant difference in RFA between the experimental and control groups. The Partial Eta Squared (0.007) indicated a very small effect size (Cohen, 1988).



	Baseline	1-month	3-month	6-month
Experimental	47.14	68.54	64.56	64.66
Control	49.04	50.75	46.88	48.91

**Significant level at p<0.05 (p<.001)

Figure 4.3: Line graph showing linear trend of RFA/% at baseline 1-, 3-, and 6-month

4.8.3 Fluid compliance levels pre- and post-intervention for both the experimental and control groups.

a) Interdialytic weight gain (IDWG)

Compliance refers to participants with IDWGs of 2 kg and below, while participants with IDWGs of more than 2 kg were considered non-compliant. The proportion of compliance on the IDWG was 31.0% and 35.0% respectively at pre-intervention for both the experimental and control groups. There was no significant difference in the proportion of compliance with IDWG between the experimental and control group (p=0.49). However, the proportion of compliance on the IDWG in the experimental group was found to be increased in the post-intervention phase. In the experimental group, there was a statistically significant increase in the proportion of patients who complied with the IDWG at 1-month (58.6 %), 3-month (65.5%) and 6-month (62.8 %) post-intervention (Table 4.14).

The compliance level for the control group remained low or almost unchanged at post-intervention with 35.0% at one-month, and 33.3% at three-month and six-month follow-up respectively. There were significant differences in the proportion of compliance on the IDWG between the experimental and control groups post-intervention for all phases (Table 4.14). McNemar's test was conducted to compare the baseline IDWG compliance with IDWG compliance within group at six-month post-intervention. The results revealed a significant difference (p= 0.00) in compliance levels for all experimental groups post-intervention.

Table 4.14: Compliance with interdialytic weight gain (IDGW) pre- and post-intervention

	Pre- intervention (Between groups)			Post- intervention (Between groups)									Within group (6 –month *vs*. baseline)
IDWG	Baseline		Exp. *vs*. control χ^2	1-month		Exp. *vs*. control χ^2	3- month		Exp. *vs*. control χ^2	6-month		Exp. *vs*. control χ^2	Mc Nemar Test
	C† n (%)	NC‡ n (%)	*p*	C† n (%)	NC‡ n (%)	*p*	C† n (%)	NC‡ n (%)	*p*	C† n (%)	NC‡ n (%)	*p*	
Patients' Group													
Experimental (N=145)	45 (31.0)	100 (69.0)		85 (58.6)	60 (41.4)		95 (65.5)	50 (34.5)		91 (62.8)	54 (37.2)	<.001	<.001
			0.49			<.001			<.001				
Control (N=117)	41 (35.0)	76 (65.0)		41 (35.0)	76 (65.0)		39 (33.3)	78 (66.7)		39 (33.3)	78 (66.7)		0.82

Note:
C† Compliance: IDWG ≤ 2kg
NC‡ Noncompliance: IDWG >2kg

b) Mean pre-dialysis blood pressure (MPBP)

Table 4.15 shows compliance levels measured using the MPBP pre- and post-intervention in both the experimental and control groups. Compliance was defined as a MPBP of 100 mmHg and below while non-compliance was defined as a MPBP above100mmHg. There were no significant differences between the proportion of patients who complied with the MPBP at baseline and post-intervention. In the pre-intervention phase, the proportion of compliance was 34.5% and increased to 35.9 %(one- month), 35.2% (three-month) and 39.3 % (six-month) for the experimental group. Comparison between experimental and control groups revealed no statistical significant differences (p>0.05) in both groups pre- and post-intervention phases. The results of the comparison within group for both experimental and control groups showed no significant differences at six-month post-intervention with p=0.30 and 1.00 respectively.

Table 4.15:Compliance with mean predialysis blood pressure (MPBP) pre- and post-intervention

	Pre- intervention (Between groups)			Post- intervention (Between groups)									Within group (6 –month *vs*. baseline)
MPBP	Baseline		Exp. *vs*. control χ^2	1-month		Exp. *vs*. control χ^2	3- month		Exp. *vs*. control χ^2	6-month		Exp. *vs*. control χ^2	Mc Nemar Test
	C† n (%)	NC‡ n (%)	*p*	C† n (%)	NC‡ n (%)	*p*	C† n (%)	NC‡ n (%)	*p*	C† n (%)	NC‡ n (%)	*p*	
Patients' Group													
Experimental (N=145)	50 (34.5)	95 (65.5)		52 (35.9)	93 (64.1)		51 (35.2)	94 (64.8)		57 (39.3)	88 (60.7)		0.30
			0.57			0.34			0.07			0.32	
Control (N=117)	39 (33.3)	78 (66.7)		36 (30.8)	81 (69.2)		29 (24.8)	88 (75.2)		38 (32.5)	79 (67.5)		1.00

Note:
C† Compliance: MPBP ≤ 100mmHg
NC‡ Noncompliance: MPBP>100mmHg

c) Rate of fluid adherence (RFA)

RFA compliance was defined an adherence rate of more than 75% to recommended interdialytic weight gain between dialysis intervals. Compliance levels measured using the RFA pre- and post-intervention in both the experimental and control groups are displayed in Table 4.16. There were no significant difference in RFA compliance for both experimental and control groups in the pre-intervention phase (17.2% and 21.4%, respectively, p=0.40). At post-intervention, the experimental group showed tremendous increase in compliance levels from 17.2% to 62.1% at one-month, which was sustained at three- and six-month (50.3%). The results showed significant differences in RFA compliance between the experimental and control groups at one-month, three-month and six-month post-intervention. The comparison between pre-and six month post-intervention within group showed significant differences in the experimental group (p=0.00)

Table 4.16: Compliance with rate of fluid adherence (RFA) at pre and post- intervention

	Pre- intervention (Between groups)			Post- intervention (Between groups)									Within group (6 –month *vs*. baseline)
RFA	Baseline		Exp. *vs*. control χ^2	1-month		Exp. *vs*. control χ^2	3- month		Exp. *vs*. control χ^2	6-month		Exp. *vs*. control χ^2	Mc Nemar Test
	C† n (%)	NC‡ n (%)	*p*	C† n (%)	NC‡ n (%)	*p*	C† n (%)	NC‡ n (%)	*p*	C† n (%)	NC‡ n (%)	*p*	
Patients' Group													
Experimental (N=145)	25 (17.2)	120 (82.8)	0.40	90 (62.1)	55 (37.9)	<.001	73 (50.3)	72 (49.7)	<.001	73 (50.3)	72 (49.7)	<.001	<.001
Control (N=117)	25 (21.4)	92 (78.6)		28 (23.9)	89 (76.1)		24 (20.5)	93 (79.5)		24 (20.5)	93 (79.5)		1.00

Note:
C† Compliance: RFA ≥ 75%
NC‡ Noncompliance: RFA < 75%

4.90 Evaluating the effectiveness of patient education on fluid compliance improvement at 1-, 3- and 6-month post-intervention for both the experimental and control groups.

4.9.1 Fluid compliance outcome at 1-month post-intervention for both the experimental and control groups

The three indicators for fluid compliance were categorised into two groups- compliance and noncompliance. The compliance group included interdialytic weight gain (IDWG) of less than 2kg, mean pre-dialysis blood pressure (MPBP) of less than 100mmHg, and an adherence rate of more than 75%. Improvement in compliance refers to change from patient non-compliance at pre-intervention to compliance at any of the post-intervention phases.

Table 4.17 showed the outcome for fluid compliance improvement one-month post-intervention for the IDWG, MPBP and RFA.

The experimental group

There were 85 participants who demonstrated compliance on the IDWG post-intervention. Of these 65 participants improved from noncompliance to compliance while 20 participants maintained compliance pre- and post-intervention.

There were 52 participants who demonstrated compliance on the MPBP post-intervention. Twenty-one of these participants improved noncompliance to compliance whereas 31 participants maintained compliance pre- and post-intervention.

There were 90 participants who were compliant on the RFA post-intervention, from which 69 participants showed an improved from noncompliance to compliance while 21 participants maintained compliance pre- and post-intervention.

The control group

There were 41 participants who demonstrated compliance on the IDWG post-intervention, which consisted of 12 participants who showed improvement from noncompliance to compliance and 29 participants who maintained compliance pre- and post-intervention.

Of thirty six participants who demonstrated compliance on the MPBP post-intervention, 14 participants improved from noncompliance to compliance while 22 participants maintained compliance pre- and post-intervention.

There were 28 participants who demonstrated compliance on the RFA post-intervention, from which 12 participants improved from noncompliance to compliance while 16 participants maintained compliance pre- and post-intervention.

Both experimental and control groups showed improved compliance on the IDWG, MPBP and RFA at 1-month post-intervention (Table 4.17). The proportion of participants that showed compliance improvement on the IDWG was higher in the experimental group (35.9%) than the control group (10.3%). The odds ratio (OR 4.89, 95%CI 2.40 to 9.72) showed that the experimental group had nearly 5 times higher odds of compliance improvement than the control group at one-month post-intervention.

Improvement in baseline MPBP compliance was slightly higher in the experimental group (14.5%) than the control group (12.0%). The participants in the experimental group did not show much improvement in MPBP compliance compared to the control group, as reflected by the small odds ratio value (OR 1.25, 95%CI 0.60 to 2.57). The experimental group only had one time higher odds of compliance improvement than the control group

at one-month post-intervention. The odds ratio was not statistically significant at $\alpha = 0.05$.

The proportion of participants with compliance improvement on the RFA was the highest among the three indicators; the experimental group had a higher percentage (47.6%) than the control group (10.3%). The odds ratio (OR 7.94, 95%CI 4.02 -15.68) showed the experimental group had almost eight times higher odds of compliance improvement than the control group at 1-month post-intervention.

Table 4.17: Outcome for fluid compliance 1-month post-intervention

	Experimental (N=145)		Experimental group compliance improved in 1 month post intervention	Control (N=117)		Control group compliance improved in 1 month post intervention	Odds ratio (95%CI) of improved compliance for experimental vs. control
	Baseline	1month	n (%)	Baseline	1 month	n (%)	
IDWG†			52 (35.9)			12 (10.3)	4.89 (2.40 -9.72)
≤2kg	45 (31)	85 (58.6)		41 (35)	41 (35.0)		
> 2kg	100 (69)	60 (41.4)		76 (65)	76 (65.0)		
MPBP†			21 (14.5)			14 (12.0)	1.25 (0.60-2.57)
≤100mmHg	50 (34.5)	52 (35.9)		39 (33.3)	36 (30.8)		
> 100mmHg	95 (65.5)	93 (64.1)		78 (66.7)	81 (69.2)		
RFA †			69 (47.6)			12 (10.3)	7.94 (4.02-15.68)
≥75%	25 (17.2)	90 (62.1)		25 (21.4)	28 (23.9)		
< 75%	120 (82.8)	55 (37.9)		92 (78.6)	89 (76.1)		

†Note: Compliance
Interdialytic weight gain (IDWG): ≤ 2kg
Mean predialysis blood pressure (MPBP): ≤100mmHg
Rate of fluid adherence (RFA): ≥75%

4.9.2 Outcome for fluid compliance at 3-month post-intervention for both experimental and control groups

Table 4.18 showed outcome for fluid compliance improvement three-month post-intervention for the IDWG, MPBP and RFA.

The experimental group

There were 95 participants who demonstrated compliance on the IDWG post-intervention. Of these 57 participants improved from noncompliance to compliance while 38 participants maintained compliance pre- and post-intervention.

Fifty one participants showed compliance on the MPBP post-intervention. Of these, 16 participants improved from noncompliance to compliance and 35 participants maintained compliance pre- and post-intervention.

Seventy-three participants demonstrated compliance on the RFA post-intervention, from which 53 participants improved from noncompliance to compliance while 20 participants maintained compliance pre- and post-intervention.

The control group

There were 39 participants who demonstrated compliance on the IDWG post-intervention. Of these, 7 participants showed improvement from noncompliance to compliance while 32 participants maintained compliance pre- and post-intervention.

There were 29 participants who demonstrated compliance on the MPBP post-intervention, which consisted of 11 participants who improved from noncompliance to compliance while 18 participants maintained compliance pre- and post-intervention.

Twenty-four participants demonstrated compliance on the RFA post-intervention. Of these 11 participants improved from noncompliance to compliance while 13 participants maintained compliance pre- and post-intervention.

Table 4.18 displays results for both the experimental and control groups, which showed improved compliance on the IDWG, MPBP and RFA at three-month post-intervention. The percentage of compliance improvement was lower at three-month compared to one-month post-intervention. However, the proportion of participants that showed compliance improvement on the IDWG was still higher in the experimental group (39.6%) than the control group (6.0%). The odds ratio (OR 10.30, 95%CI 4.47 to 23.70) showed the experimental group had 10 times higher odds of compliance improvement than the control group post-intervention.

The compliance improvement on the MPBP remained low at three-month post intervention, but the percentage for the experimental group was still higher (11.0%) than the control group (9.4%).

The odds ratio for the experimental group had one higher odds of compliance improvement than the control group post-intervention (OR 1.20, 95%CI 0.53 to 2.69). The odds ratio was not statistically significant at $\alpha = 0.05$. The proportion of participants that showed compliance improvement on the RFA compared to the baseline was higher in the experimental group (36.6%) than the control group (9.4%). The odds ratio (OR 5.55, 95%CI 2.74 to 11.26) showed the experimental group had an almost six times higher odds of compliance improvement than the control group at three-month post-intervention.

Table 4.18: Outcome for fluid compliance 3- month post –intervention

	Experimental (n=145)		Experimental group compliance improved in 3-month post intervention	Control (n=117)		Control group compliance improved in 3-month post intervention	Odds ratio (95% CI) of improved compliance for experimental *vs.* control
	Baseline	3 month	n (%)	Baseline	3 month	n(%)	
IDWG†			57(39.6)			7(6.0)	10.30 (4.47-23.70)
≤2kg	45 (31)	95 (65.5)		41 (35)	39 (33.3)		
>2 kg	100 (69)	50 (34.7)		76 (65)	78 (66.7)		
MPBP†			16(11.0)			11(9.4)	1.20 (0.53-2.69)
≤100mmHg	50 (34.5)	51 (35.2)		39 (33.3)	29 (24.8)		
>100mmHg	95 (65.5)	94 (64.8)		78 (66.7)	88 (75.2)		
RFA†			53(36.6)			11(9.4)	5.55 (2.74-11.26)
≥75%	25 (17.2)	73 (50.3)		25 (21.4)	24 (20.5)		
< 75%	120 (82.8)	72 (49.7)		92 (78.6)	93 (79.7)		

†Note: Compliance
Interdialytic weight gain (IDWG): ≤ 2kg
Mean predialysis blood pressure (MPBP): ≤100mmHg
Rate of fluid adherence (RFA): ≥75%

4.9.3 Outcome for fluid compliance at 6-month post-intervention for both the experimental and control groups.

Table 4.19 showed outcome for fluid compliance improvement 6-month post-intervention

The experimental group

Ninety-one participants demonstrated compliance on the IDWG post-intervention. Of these, 39 participants improved from noncompliance to compliance while 52 participants maintained compliance pre- and post-intervention.

There were 57 participants who demonstrated compliance on the MPBP post-intervention, from which 19 participants improved from noncompliance to compliance while 38 participants maintained compliance pre- and post-intervention.

Of 73 participants who demonstrated compliance on the RFA post-intervention, 53 participants improved from noncompliance to compliance and 20 participants maintained compliance pre- and post-intervention.

The control group

There were 39 participants who demonstrated compliance on the IDWG post-intervention. From these, 8 participants improved from noncompliance to compliance and 31 participants maintained compliance pre- and post-intervention.

Of 38 participants who showed compliance on the MPBP post-intervention, 16 participants improved from noncompliance to compliance while 22 participants maintained compliance pre-and post-intervention.

There were 24 participants who demonstrated compliance on the RFA post-intervention. Of these, 11 participants improved from noncompliance to compliance while 13 participants maintained compliance pre- and post-intervention.

There was an increase in compliance percentage for the three fluid compliance indicators at six- month post intervention compared to the baseline, which was up 62.8% (IDWG) from the baseline at 31%, 39.3% (MPBP) from the baseline 34.5% and 50.3% (RFA) from the baseline of 17.2% (Table 4.19). The proportion of participants that showed compliance improvement on the IDWG was higher in the experimental group (33.8%) than the control group (6.8%). The odds ratio (OR 6.95, 95%CI 3.14 to15.42) showed that the experimental group had a nearly 7 times higher odds of compliance improvement than the control group at six-month post-intervention.

There was no difference in the percentage of compliance improvement on the MPBP; both groups had similar percentages (13.1% and 13.7% respectively). Participants from the experimental group did not show compliance improvement but the experimental group had a nearly 1 time higher odds of compliance improvement than the control group at 6-month post-intervention as reflected by the odds ratio (OR 0.95, 95%CI 0.47 to 1.95). The odds ratio was not statistically significant at $\alpha = 0.05$.

The percentage of compliance improvement on the RFA remained unchanged at 3-month and 6-month. The proportion of participants in the experimental group had a higher percentage (36.6%) than the control group (9.4%). The odds ratio of RFA improvement at 6-month post-intervention (OR 5.55, 95%CI 2.74 to11.26) was similar to the odds ratio at 3-month post-intervention.

Table 4.19: Outcome for fluid compliance 6-month post intervention

	Experimental (N=145)		Experimental group compliance improved in 6-month post-intervention	Control (N=117)		Control group compliance improved in 6-month post-intervention	Odds ratio (95%CI) of improved compliance for experimental vs. control
	Baseline	6 month	n (%)	Baseline	6 month	n (%)	
IDWG †			49(33.8)			8(6.8%)	6.95 (3.14-15.42)
≤2kg	45 (31)	91 (62.8)		41 (35)	39 (33.3)		
> 2kg	100 (69)	54 (37.2)		76 (65)	78 (66.7)		
MPBP †			19(13.1)			16(13.7%)	0.95 (0.47-1.95)
≤100mmHg	50 (34.5)	57 (39.3 %)		39 (33.3)	38 (32.5)		
>100 mmHg	95 (65.5)	88 (60.7 %)		78 (66.6)	79 (67.5)		
RFA †			53(36.6)			11(9.4%)	5.55 (2.74-11.26)
≥75%	25 (17.2%)	73 (50.3)		25 (21.4)	24 (20.5)		
<75%	120 (82.8)	72 (49.7)		92 (78.6)	93 (79.5)		

†Note: Compliance
Interdialytic weight gain (IDWG): ≤ 2kg
Mean predialysis blood pressure (MPBP): ≤100mmHg
Rate of fluid adherence (RFA): ≥75%

4.10 Determining the predictors and association between fluid compliance, demographic factors and knowledge post-intervention in the experimental group.

4.10.1 Factors associated with fluid compliance improvement at 1-, 3-, and 6-month post intervention for the experimental group

The factors associated with fluid compliance on three indicators – IDWG, MPBP and RFA were analysed using univariate and multivariate analysis. Table 4.20 to 4.28 displays the results of the Chi-square test (univariate) and logistic regression (multivariate) analysis of factors affecting compliance improvement post-intervention for noncompliant participants in the experimental group (n = 100).

4.10.1.1 Factors associated with interdialytic weight gain (IDWG) compliance improvement at 1-, 3- and 6-month post-intervention in the experimental group

a) Factors associated with IDWG compliance improvement and predictors of compliance improvement on the IDWG: comparing the baseline to 1-month post-intervention

One hundred participants were identified as noncompliant on the IDWG at the pre-intervention phase. The univariate analysis of proportion for compliance improvement on the IDWG at baseline and 1-month post-intervention is shown in Table 4.20. Participants above 60 years of age (60.0%), females (54.3%), of Indians ethnicity (58.3%) married (52.5%), without formal education (100.0%) with more than 15 years of dialysis therapy (71.43%), and part time employment (80.0%), with no concurrent disease (69.6%), and no antihypertensive therapy (58.3%) showed the highest IDWG improvement. Participants who had poor knowledge of fluid and salt control showed higher proportions (52.5%) of IDWG improvement than those who had good knowledge.

As shown in Table 4.20, only one variable (number of concurrent diseases) with $p \leq 0.2$ was included in the multivariate logistic regression analysis. Participants with no concurrent disease were more likely to have IDWG improvement (OR 2.00, 95%CI 0.95 to 4.21) than the group with more than two concurrent diseases. However, the logistic model indicated that the number of concurrent disease was not a significant predictor of IDWG improvement ($p>0.05$). In the test for goodness of fit, the Chi-square value for the Hosmer-Lemeshow test was 0.00 with a significance level of 1.00 ($p >0.05$), implying a good fit.

Table 4.20: Results of the logistic regression analysis predicting IDWG compliance improvement at 1-month post-intervention for the experimental group

Factors		Respondents n(%)		Univariate χ^2 p	β	Logistic regression model of improved *vs.* non improved compliance[§]
		Improved[ǂ]	Non improved			
Personal background	N=100					
Age group						
<40yrs	29	16(55.2)	13(44.8)	0.33	-	-
40-50yrs	18	6(33.3)	12(66.7)			
50-60yrs	30	18(60.0)	12(40.0)			
>60yrs	23	12(52.2)	11(47.8)			
Gender						
Male	65	33(50.8)	32(49.2)	0.74	-	-
Female	35	19(54.3)	16(45.7)			
Ethnicity						
Malay	61	33(54.1)	28(45.9)	0.45	-	-
Chinese	25	12(48)	13(52)			
Indian	12	7(58.3)	5(41.7)			
Others	2	0	2(100)			
Marital status						
Single	27	14(51.9)	13(48.1)	0.99	-	-
Married	59	31(52.5)	28(47.5)			
Widow/widower	14	7(50)	7(50)			
Educational level						
Primary and below	18	10(55.6)	8(44.4)	0.78	-	-
Secondary	54	29(53.7)	25(46.3)			
Tertiary	28	13(46.4)	15(53.6)			
Employment status						
Retired	31	17(54.8)	14(45.2)	0.39	-	-
Unemployed	31	17(54.8)	14(45.2)			
Full time	33	14(42.4)	19(57.6)			
Part time	5	4(80)	1(20)			

Note:
ǂImproved: Noncompliance becomes compliance
§ Logistic regression model; Hosmer and Lemeshow test, χ^2 (1) = 0.00, p = 1.00
# Knowledge 0-4 (poor knowledge)
Knowledge 5-8(good knowledge)

‘Table 4.20, continued’

Factors		Respondents n(%)		Univariate χ^2 p	β	Logistic regression model of improved *vs.* non improved compliance[§]
		Improved[ǂ]	Non improved			
Personal background	N=100					
Duration of dialysis therapy						
< 5yrs	37	15(40.5)	22(59.5)			
5-10yrs	28	14(50)	14(50)	0.39	-	-
10-15yrs	28	18(64.3)	10(35.7)			
>15yrs	7	5(71.4)	2(28.6)			
No. of concurrent disease						
Nil	23	16(69.6)	7(30.4)		0.69	2.00(0.95-4.21)
< 2	48	22(45.8)	26(54.2)	0.15	0.25	1.29(0.67-2.48)
>2	29	14(48.3)	15(51.7)		-	Reference
Antihypertensive therapy						
Yes	52	24(46.2)	28(53.8)	0.22	-	-
No	48	28(58.3)	20(41.7)			
No.of anti-hypertensive medication						
0	48	28(58.3)	20(41.7)			
1	21	10(47.6)	11(52.4)	0.47	-	-
>1	31	13(41.9)	18(58.1)			
Knowledge#						
0- 4	40	21(52.5)	19(47.5)	0.93	-	-
5-8	60	31(51.7)	29(48.3)			

Note:
ǂImproved: Noncompliance becomes compliance
§ Logistic regression model; Hosmer and Lemeshow test, χ^2 (1) = 0.00, p = 1.00
# Knowledge 0-4 (poor knowledge)
Knowledge 5-8(good knowledge)

b) Factors associated with the IDWG compliance improvement and predictors of compliance improvement on the IDWG: comparing the baseline to 3-month post-intervention for the experimental group.

The results of the univariate analysis in Table 4.21 show the proportion of IDWG compliance improvement from baseline to three-month post-intervention as grouped by variable. Participants from the 50-60 age bracket (65.5%) who were female (62.9%), Malay (62.3%) widowed (61.6%), with primary education and below (61.10%), unemployed (65.6%), with a duration of 10-15 years of dialysis therapy (71.4%), and no concurrent disease (73.9%), as well as no antihypertensive therapy (58.3%) showed higher IDWG compliance improvement. However, participants on a single type of antihypertensive medication had a higher percentage (71.4%) than any other subgroup. Participants with "poor knowledge level" on fluid and salt control showed higher proportions (67.5%) of improved IDWG compliance than those with good knowledge level (50%)

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As shown in Table 4.21, the variables included in the multivariate analysis were duration of dialysis therapy, number of concurrent diseases, the number of antihypertensive medication and knowledge on fluid and salt control. The multivariate logistic model showed that none of the variables were significant predictors of IDWG improvement ($p>0.05$), as all the CIs included a 1 between the value. In the goodness of fit test, the Chi-square value for the Hosmer-Lemeshow Test was 6.81 with a significance level of 0.45 ($p > 0.05$), implying a good fit.

Table 4.21: Results of multivariate logistic regression analysis predicting IDWG compliance improvement at 3-month post-intervention for the experimental group

Factors		Respondents n(%)		Univariate χ^2 p	β	Multivariate logistic regression model of improved *vs.* non improved compliance§
		Improved‡	Non improved			
Personal background	N=100					
Age group						
<40yrs	29	17(56.7)	13(43.3)	0.33	-	-
40-50yrs	18	7(38.9)	11(61.1)			
50-60yrs	30	19(65.5)	10(34.5)			
>60yrs	23	14(60.9)	9(39.1)			
Gender						
Male	65	35(53.8)	30(46.2)	0.39	-	-
Female	35	22(62.9)	13(37.1)			
Ethnicity						
Malay	61	38(62.3)	24(37.7)	0.63	-	-
Chinese	25	13(52)	11(48)			
Indian	12	5(41.7)	7(58.3)			
Others	2	1(50)	1(50)			
Educational level						
Primary and below	18	11(61.1)	7(38.9)	0.81	-	-
Secondary	54	31(57.4)	23(42.6)			
Tertiary	28	15(53.6)	13(46.4)			
Employment status						
Retired	31	18(58.1)	13(41.9)	0.53	-	-
Unemployed	32	21(65.6)	11(34.4)			
Full time	32	16(50)	16(50)			
Part time	5	2(40.0)	3(60.0)			
Duration of dialysis therapy						
< 5yrs	37	21(55.3)	17(44.7)	0.12	0.17	1.18(0.42-3.32)
5-10yrs	28	12(42.9)	16(57.1)		-0.40	0.67(0.22-2.080)
10-15yrs	28	20(71.4)	8(28.6)		0.75	2.12(0.73-6.19)
>15yrs	7	5(71.4)	2(28.6)		-	Reference
No. of concurrent disease					-	
Nil	23	17(73.9)	6(26.1)	0.12	0.12	1.13(0.42-3.06)
< 2	48	23(47.9)	25(52.1)		-0.340	0.712(0.34-1.48)
>2	32	17(58.6)	12(41.4)		-	Reference

Note:
‡Improved: Noncompliance to compliance

§ Logistic regression model; Hosmer and Lemeshow test, χ^2 (7) = 6.81, *P* = 0.45
# Knowledge 0-4 (poor knowledge)
Knowledge 5-8(good knowledge)

'Table 4.21, continued'

Factors		Respondents n(%)		Univariate χ^2 p	β	Multivariate logistic regression model of improved *vs.* non improved compliance§
		Improved‡	Non improved			
Personal background	N=100					
Antihypertensive therapy						
Yes	52	29(55.8)	23(44.2)	0.80	-	-
No	48	28(58.3)	20(41.7)			
No antihypertensive medication						
0	48	28(58.3)	20(41.7)		0.32	1.03(0.44-2.40)
1	21	15(71.4)	6(28.6)	0.17	0.03	1.37(0.614-3.07)
>1	31	14(45.2)	17(54.8)		-	Reference
Knowledge#						
0-4	40	27(67.5)	13(32.5)	0.08	0.24	1.27(0.70-2.27)
5-8	60	30(50)	30(50)		-	Reference

Note:
‡Improved: Noncompliance to compliance
§ Logistic regression model; Hosmer and Lemeshow test, χ^2 (7) = 6.81, *P* = 0.45
# Knowledge 0-4 (poor knowledge)
Knowledge 5-8(good knowledge)

c) Factors associated with IDWG compliance improvement and predictors of compliance improvement on the IDWG: comparing the baseline to 6-month post-intervention for the experimental group.

The univariate analysis of proportion by the highest percentage for various factors was conducted for IDWG compliance improvement from baseline to 1 -month (Table 4.22). Participants from the 50-60 age bracket (53.3%), who were female (54.3%), single (55.6%), uneducated (100.0%), retired (58.1%), more than 10-15 years of dialysis therapy (60.7%), no concurrent disease (65.2%), and no antihypertensive therapy (56.2%) showed the highest IDWG compliance improvement. Participants who had poor knowledge of fluid and salt control showed higher proportions (52.5%) of IDWG compliance improvement than those with good knowledge.

The variables included in multivariate analysis were the duration of dialysis therapy, number of concurrent diseases, antihypertensive therapy, number of antihypertensive medication and knowledge on fluid and salt control. However, all the factors did not significantly predict IDWG compliance improvement as indicated by all the CIs, which included one. In the test for goodness of fit, the chi-square value for the Hosmer-Lemeshow Test was 8.56 with a significance level of 0.38 ($p > 0.05$) implying a good fit.

Table 4.22: Results of multivariate logistic regression analysis predicting IDWG compliance improvement at 6-month post-intervention for the experimental group.

Factors		Respondents n(%)		Univariate χ^2 p	β	Multivariate logistic regression model of improved *vs.* non improved compliance[§]
		Improved[ǂ]	Non improved			
Personal background	N=100					
Age group						
<40yrs	29	13(44.8)	16(55.2)	0.75	-	-
40-50yrs	18	7(38.9)	11(61.1)			
50-60yrs	30	16(53.3)	14(46.7)			
>60yrs	23	12(52.2)	11(47.8)			
Gender						
Male	65	29(44.6)	36(55.4)	0.36	-	-
Female	35	19(54.3)	16(45.7)			
Ethnicity						
Malay	61	3(049.1)	31(50.8)	0.97	-	-
Chinese	25	12(48.0)	13(52.0)			
Indian	12	5(29.2)	7(58.3)			
Others	2	1(50)	15(0)			
Educational level						
Primary and below	18	9(50.0)	9(50.0)	0.30	-	-
Secondary	54	29(53.7)	25(46.3)			
Tertiary	28	10(35.7)	18(64.3)			
Employment status						
Retired	31	18(58.1)	13(41.9)	0.59	-	-
Unemployed	31	14(54.8)	17(45.2)			
Full time	33	14(42.4)	19(57.6)			
Part time	5	2(40.0)	3(60.0)			

Note:
ǂImproved: Noncompliance becomes compliance
§ Logistic regression model; Hosmer and Lemeshow test, χ^2 (8) = 8.56, P = 0.38
# Knowledge 0-4 (poor knowledge)
Knowledge 5-8(good knowledge)

‘Table 4.22, continued’

Factors		Respondents n(%)		Univariate χ^2 p	β	Multivariate logistic regression model of improved *vs.* non improved compliance[§]
		Improved[ǂ]	Non improved			
Personal background	N=100					
Duration of dialysis therapy						
< 5yrs	37	13(35.1)	24(64.9)		-0.48	0.62(0.20-1.84)
5-10yrs	28	13(46.4)	15(53.6)	0.12	-0.19	0.82(0.27-2.52)
10-15yrs	28	17(60.7)	11(39.3)		0.63	1.87(0.63-5.54)
>15yrs	7	5(71.4)	2(28.6)		-	Reference
No. of concurrent disease						
Nil	23	15(65.2)	8(34.8)	0.13	-0.52	0.60(0.215-1.65)
< 2 types	48	19(39.6)	29(60.4)		-0.76	0.47(0.214-1.03)
>2 types	29	14(48.3)	15(51.7)		-	Reference
Antihypertensive therapy						
Yes	52	21(40.4)	31(59.6)	0.11	-0.57	0.57(0.27-1.22)
No	48	27(56.2)	21(43.8)		-	Reference
No. antihypertensive medication						-
0	48	27(56.2)	21(43.8)			
1	21	8(38.1)	13(61.9)	0.27		
> 1	41	13(41.9)	18(58.1)			
Knowledge#						
0-4	40	23(57.5)	17(42.5)	0.12	0.48	1.62(0.85-2.99)
5-8	60	25(41.7)	35(58.3)		-	Reference

Note:
ǂImproved: Noncompliance becomes compliance
§ Logistic regression model; Hosmer and Lemeshow test, χ^2 (8) = 8.56, P = 0.38
# Knowledge 0-4 (poor knowledge)
Knowledge 5-8(good knowledge)

4.10.1.2 Factors associated with MPBP compliance improvement at 1-, 3-, and 6-month post- intervention in the experimental group.

a) Factors associated with the MPBP compliance improvement and predictors of compliance improvement on the MPBP: comparing the baseline to 1-month post-intervention for the experimental group.

There were 95 noncompliant participants on the MPBP in the pre-intervention phase. The univariate analysis for MPBP compliance improvement which compared the baseline to the 1-month post-intervention showed on overall a higher proportion of non-improvement compared to the proportion with improvement. From the Table 4.23, it was indicated that the highest proportion of MPBP compliance improvement were participants in the 60 and above age bracket (34.6%), male (47.6%), Chinese (40%), widowed (30.8%) with primary education (37.5.0%), retired (27.6%), with a duration of dialysis therapy of 10-15 years (39.1%), with more than 2 concurrent illnesses (36.7%), on antihypertensive therapy (22.6%), and participants who were on more than 1 type of antihypertensive medication (28.9%). Participants who had poor knowledge of fluid and salt control showed a higher proportion of MPBP compliance improvement (25.0%) than those who had good knowledge.

The factors included in the multivariate analysis were age group, duration of dialysis therapy, and number of concurrent diseases. The multivariate logistic model indicated the number of concurrent disease as the only significant predictor of MPBP compliance improvement (OR 0.08 95%CI 0.10 to 0.71). In the test for goodness of fit, the Chi-square value for the Hosmer-Lemeshow test was 2.49 with a significance level of 0.96 ($p > 0.05$), implying a good fit.

Table 4.23: Results of the multivariate logistic regression analysis predicting MPBP compliance improvement at 1-month post-intervention for the experimental group.

Factors		Respondents n(%)		Univariate χ^2 p	β	Multivariate logistic regression model of improved *vs.* non improved compliance[§]
		Improved[ǂ]	Non improved			
Personal background	N=95					
Age group						
<40yrs	19	2(10.5)	17(89.5)	0.18	-1.13	0.32(0.06-1.62)
40-50yrs	22	3(13.6)	19(86.4)		-0.20	0.82(0.28-2.40)
50-60yrs	28	7(25.0)	21(75.0)		0.02	1.02(0.42-2.45)
>60yrs	26	9(34.6)	17(65.4)		-	Reference
Gender						
Male	53	10(47.6)	43(58.1)	0.39	-	-
Female	42	11(26.2)	31(73.8)			
Ethnicity						
Malay	58	9(15.5)	49(84.5)	0.63	-	-
Chinese	25	10(40)	15(60)			
Indian	10	2(20)	8(80)			
Others	2	0	2(100)			
Educational level						
Primary and below	20	7(35.0)	13(65.0)	0.22	-	-
Secondary	51	11(21.6)	40(78.4)			
Tertiary	24	3(12.5)	21(87.5)			
Employment status						
Retired	29	8(27.6)	21(72.4)	0.68	-	-
Unemployed	29	7(24.1)	22(75.9)			
Full time	33	5(15.2)	28(84.8)			
Part time	4	1(25.0)	3(75.0)			

Note:
ǂImproved: Noncompliance becomes compliance
§ Logistic regression model; Hosmer and Lemeshow test, χ^2 (8) = 2.49, P = 0.96
# Knowledge 0-4 (poor knowledge)
Knowledge 5-8(good knowledge)

‘Table 4.23, continued’

Factors		Respondents n(%)		Univariate χ^2 p	β	Multivariate logistic regression model of improved *vs.* non improved compliance[§]
		Improved[ǂ]	Non improved			
Personal Background	N=95					
Duration of therapy						
< 5yrs	32	5(15.6)	27(84.4)	0.07	0.97	2.631(0.30-23.02)
5-10yrs	32	7(21.9)	25(78.1)		1.39	4.012(0.46-34.82)
10-15yrs	23	9(39.1)	14(60.9)		1.87	6.46(0.74-56.51)
>15yrs	8	0	8(100)		-	Reference
No. of concurrent disease						
Nil	11	1(9.1)	10(90.9)	0.05	-2.47	0.08(0.10-0.71)*
< 2	54	9(16.7)	45(83.3)		-0.55	0.57(0.250-1.33)
>2	30	11(36.7)	19(63.3)		-	Reference
Antihypertensive therapy				0.88		-
Yes	62	14(22.6)	48(77.4)			
No	33	7(21.2)	26(78.8)			
No antihypertensive medication						
0	33	7(21.2)	26(78.8)			-
1	24	3(12.5)	21(87.5)	0.31		
>1	38	11(28.9)	27(71.1)			
Knowledge#						
0-4	32	8(25.0)	24(75.0)	0.62		-
5-8	63	13(20.6)	50(79.4)			

Note:
ǂImproved: Noncompliance becomes compliance
§ Logistic regression model; Hosmer and Lemeshow test, χ^2 (8) = 2.49, P = 0.96
*Significance level at p<0.05
Knowledge 0-4 (poor knowledge)
Knowledge 5-8(good knowledge)

b) Factors associated with the MPBP compliance improvement and predictors of compliance improvement on the MPBP: comparing the baseline to 3-month post-intervention for the experimental group.

The univariate analysis of proportion on MPBP compliance improvement comparing the baseline to 3-month post intervention showed the highest proportion of improvement in the 60 and above age bracket (23.1%) as well as in females (26.2%),widows (38.5%), those with no education or primary education (both 25%), retirees (27.6%), and those with a duration of dialysis therapy of 5-10 years (21.9%) as well as participants who had more than 2 concurrent illnesses (20.0%) and whom were not on any antihypertensive therapy (18.2%) (Table 4.24). Participants who had good knowledge of fluid and salt control showed higher proportions (20.6%) of MPBP compliance improvement than those who had poor knowledge.

Explanatory variables with significance level of 0.2 and below ($p \leq 0.2$) in univariate analyses were included in the multivariate logistic regression model. The variables included in the multivariate analysis were gender, marital status, and knowledge of fluid and salt control. The multivariate logistic model indicated that marital status was the only significant predictor of MPBP improvement ($p<0.05$). Married participants had a lower odds of MPBP compliance improvement (OR 0.29, 95% CI 0.11to 0.77) than those who were widowed, collectively. Single participants had a lower odds of MPBP compliance improvement (OR 0.19, 95%CI 0.05 to 0.71) than the widowed group. In the test for goodness of fit, the Chi-square value for the Hosmer-Lemeshow test was 2.90 with a significance level of 0.82 ($p > 0.05$), implying a good fit.

Table 4.24: Results of the multivariate logistic regression analysis predicting MPBP compliance improvement at 3-month post-intervention for the experimental group.

Factors		Respondents n (%)		Univariate X^2 p	β	Multivariate logistic regression model of improved *vs.*non improved compliance[§]
		Improved‡	Non improved			
Personal background	N=95					
Age group						
<40yrs	19	2(10.5)	17(89.5)			
40-50yrs	22	2(9.1)	20(90.9)	0.45	-	-
50-60yrs	28	6(21.4)	22(78.6)			
>60yrs	26	6(23.1)	20(76.9)			
Gender						
Male	53	5(9.4)	48(90.6)	0.03	-0.64	0.53(0.23-1.21)
Female	42	11(26.2)	3173.8		-	Reference
Ethnicity						
Malay	58	5(8.6)	53(91.4)			
Chinese	25	8(32.0)	17(68)	0.22	-	-
Indian	10	3(30)	7(100)			
Others	2	0	-			
Marital status						
Single	18	4 (21.0)	15(79.0)		-1.66	0.19(0.05-0.71)*
Married	64	8(12.5)	56(87.5)	0.07	-1.25	0.29(0.11-0.77)*
Widow/widower	13	5(38.5)	8(61.5)		-	Reference
Educational level						
Primary and below	20	5(25.0)	15(75.0)			
Secondary	51	9(17.6)	42(82.40	0.33	-	-
Tertiary	24	2(8.3)	22(91.7)			

Note:
‡Improved: Noncompliance becomes compliance
[§] Logistic regression model; Hosmer and Lemeshow test, χ^2 (6) = 2.90, P = 0.82
*Significance level at p<0.05
Knowledge 0-4 (poor knowledge)
Knowledge 5-8(good knowledge)

‘Table 4.24, continued”

Factors		Respondents n(%)		Univariate X^2 p	β	Multivariate logistic regression model of improved *vs.*non improved compliance[§]
		Improved[ǂ]	Non improved			
Personal background	N=95					
Employment status						
Retired	29	8(27.6)	21(72.4)	0.25	-	-
Unemployed	29	4(13.8)	25(86.2)			
Full time	33	3(9.1)	30(90.9)			
Part time	4	1(25.0)	3(75.0)			
Duration of dialysis therapy						
< 5yrs	32	3(9.4)	29(90.6)	0.50	-	-
5-10yrs	32	7(21.9)	25(78.1)			
10-15yrs	23	5(21.7)	18(78.3)			
>15yrs	8	1(12.5)	7(87.5)			
No. of concurrent disease						
Nil	11	1(9.1)	10(90.9)	0.71	-	-
< 2	54	9(16.7)	45(83.3)			
>2	30	6(20)	24(80)			
Antihypertensive therapy						
Yes	62	10(16.1)	52(83.9)	0.80	-	-
No	33	6(18.2)	27(81.8)			
No antihypertensive drugs						
0	33	6(18.2)	27(81.8)	0.81	-	-
1	24	3(12.5)	21(87.5)			
>1	38	7(18.4)	31(81.6)			
Knowledge#						
0-4	32	3(9.4)	29(90.6)	0.16	-0.80	0.45(0.19-1.13)
5-8	63	13(20.6)	50(79.4)		-	Reference

Note:
ǂImproved: Noncompliance becomes compliance
[§] Logistic regression model; Hosmer and Lemeshow test, χ^2 (6) = 2.90, P = 0.82
*Significance level at p<0.05
Knowledge 0-4 (poor knowledge)
Knowledge 5-8(good knowledge)

c) Factors associated with the MPBP compliance improvement and predictors of compliance improvement on the MPBP: comparing the baseline to 6-month post-intervention for the experimental group.

The univariate analysis of proportion on MPBP compliance improvement comparing the baseline to 6-month post-intervention showed that the highest proportions of compliance improvement were in participants aged 60 years and above (30.8%) as well as in those who were female (21.4%), widowed (38.5%), retired (31.0%), with only primary education (31.2%), a duration of dialysis therapy of 5-10 years (37.5%), with more than 2 concurrent disease(26.7%), and not on any antihypertensive therapy (24.2%) (Table 4.25). Participants who had good knowledge of fluid and salt control had higher proportions (22.2%) of MPBP compliance improvement than those with poor knowledge.

The variables included in the multivariate analysis ($p \geq 0.2$) were marital status and duration of dialysis therapy. However, both variables were found to be non-significant predictor of MPBP compliance improvement as indicated by the CIs that included one. In the test for goodness of fit, the Chi-square value for the Hosmer-Lemeshow Test was2.82 with a significance level of 0.83 ($p > 0.05$), implying a good fit.

Table 4.25: Results of multivariate logistic regression analysis predicting compliance improvement of MPBP in the 6-month post-intervention for the experimental group

Factors		Respondents n(%)		Univariate χ^2 p	β	Multivariate logistic regression model of improved *vs*. non improved compliance[§]
		Improved[ǂ]	Non improved			
Personal background	N=95					
Age group						
<40yrs	19	2(10.5)	17(89.5)	0.31	-	-
40-50yrs	22	3(13.6)	19(86.4)			
50-60yrs	28	6(21.4)	22(78.6)			
>60yrs	26	8(30.8)	18(69.2)			
Gender						
Male	53	10(18.9)	4(381.1)	0.76	-	-
Female	42	9(21.4)	33(78.6)			
Ethnicity						
Malay	60	12(20.7)	48(79.3)	0.92	-	-
Chinese	25	5(20)	20(80)			
Indian	10	2(20)	8(80)			
Others	2	0	2(100)			
Marital status						
Single	18	1(5.6)	17(94.4)	0.08	-3.06	0.05(0.01-0.40)
Married	64	13(20.3)	51(79.7)		-0.55	0.578(0.23-1.46)
Widow/widower	13	5(38.5)	8(61.5)		-	Reference
Educational level						
Primary and primary	20	6(30.0)	14 (70.0)	0.40	-	-
Secondary	51	8(15.7)	43(84.3)			
Tertiary	24	5(20.8)	19(79.2)			
Employment status						
Retired	29	9(31.0)	20(69.0)	0.33	-	-
Unemployed	29	4(13.8)	25(86.2)			
Full time	33	5(15.2)	28(84.8)			
Part time	4	1(25.0)	3(75.0)			

Note:
ǂImproved: Noncompliance becomes compliance
[§] Logistic regression model; Hosmer and Lemeshow test, χ^2 (6) = 2.82, P = 0.83
Knowledge 0-4 (poor knowledge)
Knowledge 5-8(good knowledge)

‘Table 4.25, continued’

Factors		Respondents n(%)		Univariate χ^2 p	β	Multivariate logistic regression model of improved *vs*. non improved compliance
		Improved‡	Non improved			
Personal Background	N=95					
Duration of dialysis therapy						
< 5yrs	32	3(9.4)	29(90.6)	0.02	1.35	3.85(0.47-31.28)
5-10yrs	32	12(37.5)	20(62.5)		1.88	6.52(0.808-52.67)
10-15yrs	23	4(17.4)	19(82.6)		1.24	3.46(0.38-31.90)
>15yrs	8	0	89(100.0)		-	Reference
No. of concurrent disease						
Nil	11	2(18.2)	9(81.8)			
< 2	54	9(16.7)	45(83.3)	0.54	-	-
>2	30	8(26.7)	22(73.3)			
Antihypertensive therapy						
Yes	62	11(17.7)	51(82.3)	0.45	-	-
No	33	8(24.2)	25(75.8)			
No antihypertensive drugs						
0	33	8(24.2)	25(75.8)	0.54	-	-
1	24	3(12.5)	21(87.5)			
>1	38	8(21.1)	30(78.9)			
Knowledge#						
0-4	32	5(15.6)	27(84.4)	0.45	-	-
5-8	63	14(22.2)	49(77.8)			

Note:
‡Improved: Noncompliance becomes compliance
§ Logistic regression model; Hosmer and Lemeshow test, χ^2 (6) = 2.82, P = 0.83
# Knowledge 0-4 (poor knowledge)
Knowledge 5-8(good knowledge)

4.10.1.3 Factors associated with compliance improvement on the RFA at 1-, 3-, and 6-month post-intervention for the experimental group.

a) Factors associated with RFA compliance improvement and predictors of compliance improvement on the RFA: comparing the baseline to 1-month post-intervention for the experimental group.

The univariate analysis of proportion with RFA compliance improvement comparing the baseline to 1-month showed the highest proportions of improvement among the 50-60 age bracket (66.7%), females (57.4%), those married (58.6%), with secondary education (59.0%), employed part-time (83.3%), as well as those with a dialysis therapy duration of more than 15 years(77.8%), with no concurrent disease (69.2%), no antihypertensive therapy (57.1%), and those taking only on a single type of antihypertensive medication (Table 4.26). Participants who had poor knowledge of fluid and salt control showed higher proportions (62.0%) of RFA compliance improvement than those who had good knowledge.

The single variable included in multivariate analysis was the duration of dialysis therapy. However, multivariate logistic regression analyses showed that dialysis therapy duration was not a significant predictor of RFA compliance as indicated by the CI that included one. In the test for goodness of fit, the Chi-square value for the Hosmer-Lemeshow test was 0.00 with a significance level of 1 ($p > 0.05$), implying a good fit.

Table 4.26: Results of the multivariate logistic regression analysis predicting the RFA compliance improvement at 1-month post intervention in the experimental group

Factors		Respondents n(%)		Univariate χ^2 p	β	Logistic regression model of improved *vs.* non improved compliance[§]
		Improved[ǂ]	Non improved			
Personal background	N=120					
Age group						
<40yrs	33	17(51.5)	16(48.5)	0.40	-	-
40-50yrs	22	10(45.5)	12(54.5)			
50-60yrs	33	22(66.7)	11(33.3)			
>60yrs	32	19(59.4)	13(40.6)			
Gender						
Male	73	41(56.2)	32(43.8)	0.89	-	-
Female	47	27(57.4)	20(42.6)			
Ethnicity						
Malay	63	42(57.5)	31(49.2)	0.96	-	-
Chinese	32	17(53.1)	15(46.9)			
Indian	12	7(58.3)	5(41.7)			
Others	3	2(66.7)	1(5)			
Marital status						
Single	34	19(55.9)	15(44.1)	0.82	-	-
Married	70	41(58.6)	29(41.4)			
Widow/widower	16	8(50.0)	8(50.0)			
Educational level						
Primary and below	25	15(60)	10(40)	0.65	-	-
Secondary	61	36(59.0)	25(41.0)			
Tertiary	34	17(50)	17(50)			

Note:
ǂImproved: Noncompliance becomes compliance
[§] Logistic regression model; Hosmer and Lemeshow test, χ^2 (2) = 0.00, P = 1.00
Knowledge 0-4 (poor knowledge)
Knowledge 5-8(good knowledge)

‘Table 4.26, continued’

Factors		Respondents n (%)		Univariate χ^2 p	β	Logistic regression model of improved *vs*. non improved compliance[§]
		Improved	Non improved			
Personal background	N=120					
Employment status						
Retired	37	23(62.2)	14(37.8)	0.36	-	-
Unemployed	37	18(48.6)	19(51.4)			
Full time	40	22(55.0)	18(45.0)			
Part time	6	5(83.3)	1(16.7)			
Duration of dialysis therapy						
< 5yrs	42	20(47.6)	22(52.4)	0.17	-0.69	0.50(0.20-1.24)
5-10yrs	35	18(51.4)	17(48.6)		-0.95	0.388(0.15-1.01)
10-15yrs	34	23(67.6)	11(32.4)		0.09	1.091(0.42-2.85)
>15yrs	9	7(77.8)	2(22.2)		-	Reference
No. of concurrent disease						
Nil	26	18(69.2)	8(30.8)	0.25	-	-
< 2	57	28(49.1)	29(50.9)			
>2	37	15(59.5)	22(40.5)			
Antihypertensive therapy						
Yes	64	36(56.2)	2843.8	0.92	-	-
No	56	32(57.1)	24(42.9)			
No. antihypertensive medication						
0	56	32(57.1)	24(42.9)	0.73	-	-
1	24	15(62.5)	9(37.5)			
>1	40	21(52.5)	19(47.5)			
Knowledge#						
0-4	50	31(62.0)	19(38.0)	0.32	-	-
5-8	70	37(52.9)	33(47.1)			

Note:
ǂImproved: Noncompliance becomes compliance
§ Logistic regression model; Hosmer and Lemeshow test, χ^2 (2) = 0.00, P = 1.00
# Knowledge 0-4 (poor knowledge)
Knowledge 5-8(good knowledge)

b) Factors associated with RFA compliance improvement and predictors of compliance improvement on the RFA: comparing the baseline to 3-month post-intervention for the experimental group.

Table 4.27 shows the univariate analysis of proportion with RFA improvement comparing the baseline to three-month post-intervention. The highest proportion of compliance improvement was observed in the 60 and above age group (56.2%), females (40.4%), minority ethnicity (66.7%), widows (50.0), those with primary education and below (48.0%), retirees (51.4%), duration of dialysis therapy of 10-15 years (61.8%), participants who had no concurrent disease (57.1%), those not on any antihypertensive therapy (44.6%), and those taking only a single type of antihypertensive medication (58.3%). Participants who had poor knowledge of fluid and salt control showed higher proportions (48.0%) of RFA compliance improvement than those who had good knowledge.

The variables included in the multivariate analysis ($p \geq 0.2$) were duration of dialysis therapy, number of concurrent diseases and number of antihypertensive medication. There were significant predictors of RFA compliance improvement as indicated by the CIs that did not include one. Participants with less than 5 years of dialysis therapy had lower odds (OR 0.15, 95%CI 0.03-0.78) than those above 15 years. Participants with less than two concurrent diseases had lower odds (OR 0.18, 95%CI 0.06-0.54) than those with more than two concurrent disease, and those taking one type of antihypertensive medication having higher odds (OR 3.99, 95%CI 1.22-13.00) than more than one type of antihypertensive medications. In the test for goodness of fit, the Chi-square value for the Hosmer-Lemeshow test was 2.26 with a significance level of 0.95 ($p > 0.05$), implying a good fit.

Table 4.27: Results of the multivariate logistic regression analysis predicting the RFA compliance improvement at3-month post-intervention for the experimental group.

Variables		Respondents n(%)		Univariate χ^2 p	β	Multivariate logistic regression model of improved *vs.* non improved compliance[§]
		Improved†	Non improved			
Personal background	N=120					
Age group						
<40yrs	33	13(39.4)	20(60.6)			
40-50yrs	22	7(31.8)	15(68.2)			
50-60yrs	33	15(45.5)	18(54.5)	0.31	-	-
>60yrs	32	18(56.2)	14(43.8)			
Gender						
Male	73	34(46.6)	39(53.4)	0.50	-	-
Female	47	19(40.4)	28(59.6)			
Ethnicity						
Malay	73	36(49.3)	37(52.7)	0.29	-	-
Chinese	32	12(37.5)	20(62.5)			
Indian	12	3(25)	9(75)			
Others	3	2(66.7)	1(33.3)			
Marital status						
Single	34	15(44.1)	19(55.9)			
Married	70	30(42.9)	40(57.1)	0.87	-	-
Widow/widower	16	8(50)	8(50)			
Educational level						
Primary and below	25	12(48.0)	13(52.0)			
Secondary	61	29(47.5)	32(52.5)	0.47	-	-
Tertiary	34	12(35.3)	22(64.7)			
Employment status						
Retired	37	19(51.4)	18(48.6)			
Unemployed	37	17(45.9)	20(54.1)	0.52	-	-
Full time	40	14(35.0)	26(65.0)			
Part time	6	3(50)	3(50)			

Note:
†Improved: Noncompliance becomes compliance
[§] Logistic regression model; Hosmer and Lemeshow test, χ^2 (7) =2.26, P = 0. 95
Knowledge 0-4 (poor knowledge)
Knowledge 5-8(good knowledge)

‘Table 4.27, continued’

Factors		Respondents n(%)		Univariate χ^2 p	β	Multivariate logistic regression model of improved *vs.* non improved compliance[§]
		Improved†	Non improved			
Personal background	N=120					
Duration of dialysis therapy						
< 5yrs	42	14(33.3)	28(66.7)		-1.92	0.15(0.03-0.78)*
5-10yrs	35	13(37.1)	22(62.9)	0.05	-1.56	0.21(0.04-1.13)
10-15yrs	34	21(61.8)	13(38.2)		-0.18	0.83(0.17-4.14)
>15yrs	9	5(55.6)	4(44.4)		-	Reference
No. of concurrent disease						
Nil	26	15(57.1)	11(42.3)		-0.19	0.82(0.20-3.44)
< 2	57	18(31.6)	39(68.4)	0.03	-1.71	0.18(0.06-0.54)**
>2	37	20(54.1)	17(45.9)		-	Reference
Antihypertensive therapy						
Yes	64	28(43.8)	36 (56.2)	0.92	-	-
No	56	25(44.6)	31(55.4)			
No. of antihypertensive medication						
0	56	25(44.6)	31(55.4)	0.19	0.35	1.42(0.44-4.56)
1	24	14(58.3)	10(41.7)		1.38	3.99(1.22-13.0)*
>1	40	14(35.0)	26(65.0)		-	Reference
Knowledge						
0-4	50	24(48.0)	26(52.0)	0.48	-	-
5-8	70	29(41.4)	41(58.6)			

Note:
†Improved: Noncompliance becomes compliance
[§] Logistic regression model; Hosmer and Lemeshow test, χ^2 (7) =2.26, P = 0. 95
**Significance level at p<0.01
*Significance level at p<0.05
Knowledge 0-4 (poor knowledge)
Knowledge 5-8(good knowledge)

c) Factors associated with RFA compliance improvement and predictors of compliance improvement on the RFA: comparing the baseline to 6-month post-intervention for the experimental group.

The univariate analysis of proportion with RFA improvement comparing the baseline to 6-month post-intervention showed the highest proportion of RFA compliance improvement in participants aged over 60 years (53.1%), males (45.2%), Malays (47.9%), those unmarried (55.9%), with no education (75.0%), part-time employment (50.0%), and with a duration of dialysis therapy of more than 15 years (66.7%) as well as participants who had no concurrent diseases (65.%), and those not on any antihypertensive therapy (50.0%). Participants who had poor knowledge of fluid and salt control showed higher proportions (50.0%) of improved RFA (Table 4.28).

The variables included in multivariate analysis were the duration of dialysis therapy and number of concurrent diseases. However, there were no significant predictors of RFA compliance improvement as all the CIs included one in the multivariate logistic model. In the test for goodness of fit, the Chi-square value for the Hosmer-Lemeshow Test was 6.96 with a significance level of 0.54 ($p > 0.05$) implying a good fit.

Table 4.28: Results of the multivariate logistic regression analysis predicting the RFA compliance improvement at 6-month post-intervention in the experimental group.

Factors		Respondents n(%)		Univariate χ^2 p	β	Multivariate logistic regression model of improved *vs.* non improved compliance[§]
		Improved‡	Non improved			
Personal background	N=120					
Age group						
<40yrs	33	15(45.5)	18(54.5)			
40-50yrs	22	8(36.4)	14(63.6)	0.59	-	-
50-60yrs	33	13(39.4)	20(60.6)			
>60yrs	32	17(53.1)	15(46.9)			
Gender						
Male	73	33(45.2)	40(54.8)	0.78	-	-
Female	47	20(42.6)	27(57.4)			
Ethnicity						
Malay	73	35(47.9)	38(52.1)			
Chinese	32	13(40.6)	19(59.4)			
Indian	12	4(33.3)	8(66.7)	0.73	-	-
Others	3	1(33.3)	2(66.7)			
Marital status						
Single	34	19(55.9)	15(44.1)			
Married	70	29(41.4)	41(58.6)	0.22	-	-
Widow/ widower	16	5(31.2)	11(68.8)			
Educational level						
Primary and below	25	12(48.0)	13(52.0)			
Secondary	61	28(45.9)	33(54.1)	0.70	-	-
Tertiary	34	13(38.2)	12(61.8)			
Employment status						
Retired	37	18(48.6)	19(51.4)			
Unemployed	37	16(43.2)	21(56.8)			
Full time	40	16(40.0)	24(60.0)	0.88	-	-
Part time	6	3(50.0)	3(50.0)			

Note:
*Improved: Noncompliance becomes compliance
§ Logistic regression model; Hosmer and Lemeshow test, χ^2 (6) = 6.96, P = 0.54
# Knowledge 0-4 (poor knowledge)
Knowledge 5-8(good knowledge)

‘Table 4.28, continued’

Factors		Respondents n(%)		Univariate χ^2 p	β	Multivariate logistic regression model of improved *vs.* non improved compliance[§]
		Improved[ǂ]	Non improved			
Personal background	N=120					
Duration of dialysis therapy						
< 5yrs	42	12(8.6)	30(71.4)		-0.82	0.45(0.16-1.22)
5-10yrs	35	14(40.0)	21(60.0)	0.01	-0.77	0.46(0.16-1.33)
10-15yrs	34	21(61.8)	13(38.2)		0.24	1.26(0.46-3.53)
>15yrs	9	6(66.7)	3(33.3)		-	Reference
No of concurrent disease						
Nil	26	17(65.4)	9(34.6)	0.02	-0.12	0.89(0.37-2.13)
< 2 types	57	19(33.3)	38(66.7)		-0.73	0.48(0.23-1.02)
>2 types	37	17(45.9)	20(54.1)		-	Reference
Antihypertensive therapy						
Yes	64	25(39.1)	39(60.9)	0.25	-	-
No	56	28(50.0)	28(50.0)			
No antihypertensive medication						
0	56	28(50.0)	28(50.0)	0.38	-	-
< 2	24	8(33.3)	16(66.7)			
> 2	40	17(42.5)	23(57.5)			
Knowledge#						
0-4	50	25(50.0)	25(50.0)	0.28	-	-
5-8	70	28(40.0)	42(60.0)			

Note:
*Improved: Noncompliance becomes compliance
[§] Logistic regression model; Hosmer and Lemeshow test, χ^2 (6) = 6.96, P = 0.54
Knowledge 0-4 (poor knowledge)
Knowledge 5-8(good knowledge)

4.11 Summary

This chapter provided the results of the data collected from 291 respondents although only 262 participated in the education intervention contributing to a response rate of 90%. Patient characteristics were presented in frequency, percentages and mean. The majority of the participants were middle aged, Malay, male, with secondary education; they were also mostly married, unemployed and were on an average of 8 years of dialysis therapy. The most common concurrent disease was hypertension followed by diabetes mellitus. The majority was on antihypertensive therapy and took at least two types of antihypertensive medication.

Two thirds (65.6%) of participants reported experiencing fluid overload. Patients also reported difficulty in breathing as the most common symptom. Almost all the participants (91.8%) had received advice on fluid control prior to this study, with doctors and nurses most often being the source of information. However, the advice was frequently given verbally only when problems had occurred.

The experimental group had higher mean total knowledge scores compared to the control group, and there was a significance difference in knowledge levels between these groups post-intervention. The knowledge improvement was three times higher in the experimental group as compared to the control group. Findings from this study show that educational intervention may be an effective means of knowledge improvement. The multivariate analysis indicated the number of antihypertensive medication as the only significant predictor of knowledge improvement, in that participants who were not taking antihypertensive medications were more likely to have knowledge improvement.

Three indicators for fluid compliance were – interdialytic weight gain (IDWG), mean predialysis blood pressure (MPBP) and rate of fluid adherence (RFA). The IDWG and RFA compliance level increased significantly at 1-, 3- and 6-month post intervention in the experimental group compared to control group. However, there was no difference in MPBP compliance levels between the experimental and control group post-intervention.

The odds ratio indicated the effectiveness of the education intervention on the experimental group. The results revealed that the experimental group had a higher odds ratio as compared to the control group. Multivariate logistic regression was performed to identify predictors for IDWG, MPBP and RFA compliance improvement. The findings showed there were no predictors for IDWG compliance improvement. The number of concurrent disease and marital status were significant predictors for MPBP compliance improvement, while the duration of dialysis therapy, number of concurrent disease and number of antihypertensive medications were significant predictors for RFA compliance improvement.

The effect of patient education on fluid compliance appears to be a positive one in haemodialysis settings. However, the researcher feels that there is a need for the issue of discrepancy of effect in MPBP compliance improvement to be further explored in future studies.