

# Are the Beck depression inventory score, SF 36 score and progression of the disease changing with education in chronic kidney disease patients?

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## Abstract

**Aim:** Patient education is important for patients with predialysis chronic renal disease (CKD) because it can delay the progression of the disease to end-stage renal failure. Anxiety and depression may also contribute to the progression of the disease in patients with CKD. We evaluated the influences of education on progression of CKD, the Short Form 36 Health Survey (SF36), and the Beck Depression Inventory (BDI) in predialysis CKD patients.

**Material and Methods:** 121 patients with nondialysis stage 2-5 CKD were involved in this study. At the start of the study, the SF36 and BDI scoring were performed in all patients and their creatinine clearances were calculated. 31 patients were given education on CKD by the dialysis specialist nurse once a month. At the end of the sixth month, SF36 and BDI were rescored, and their creatinine clearances were recalculated.

**Results:** There were no significant differences between the two groups regarding age, gender, creatinine clearance, and duration of chronic kidney disease. At the end of the sixth month, when the educated and uneducated patients were compared, while the increase of the creatinine level was significant in the two groups, the SF36 and BDI scores were found to be improved significantly in the study group.

**Conclusion:** The results of this study suggested that patient education may improve the SF36 and BDI scores, but it does not affect the progression of the disease for at least six months in duration.

**Keywords:** Anxiety; CKD; Depression; Patient Education; Progression.

## INTRODUCTION

Chronic kidney disease (CKD) is a serious worldwide health problem that has increased in prevalence in recent years. Anxiety and depression can be seen even in the early stages of the disease (1) and they are important in CKD patients due to their effects on the progression of the disease. Patient education is likely to improve medical and psychosocial outcomes like anxiety and depressive symptoms in such patients (2). Our study aimed to evaluate the effectiveness of patient education on progression of the disease, together with the SF36 and BDI scores, in the predialysis CKD patients.

## MATERIAL and METHODS

121 CKD patients who were in stages 2 to 5, >18 years old, not receiving dialysis, were included in this study. The demographic and laboratory data of all patients were recorded. 31 of the 121 patients were given education once a month according to the stage of CKD by a specialist dialysis nurse. Books, magazines and internet data were

used as educational materials. We continued to follow the routine practice in the other patients. The SF36 and BDI tests were performed in all patients at the initiation of the study and six months later. Whether any differences between the two groups regarding disease progression, the SF36 and BDI scores were re-evaluated. These evaluations were also performed before and after the given education in the educated group (Figure 1).

### Measures

Depressive symptoms were measured by the Beck Depression Inventory (BDI). Both questionnaires consisted of 21 questions. Each question was scored between 0-3. The BDI score > 11 showed the presence of depressive symptoms.

SF36: It consisted of eight subscales: physical functioning (PF), physical role (PR), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), emotional role (RE), and mental health (MH). The answers were added in each multi-item scale and transformed into a scale

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from 1 to 100, where 100 is the highest possible score. The eight subscales were further aggregated into physical component summary measures (PCS) and mental component summary measures (MCS).

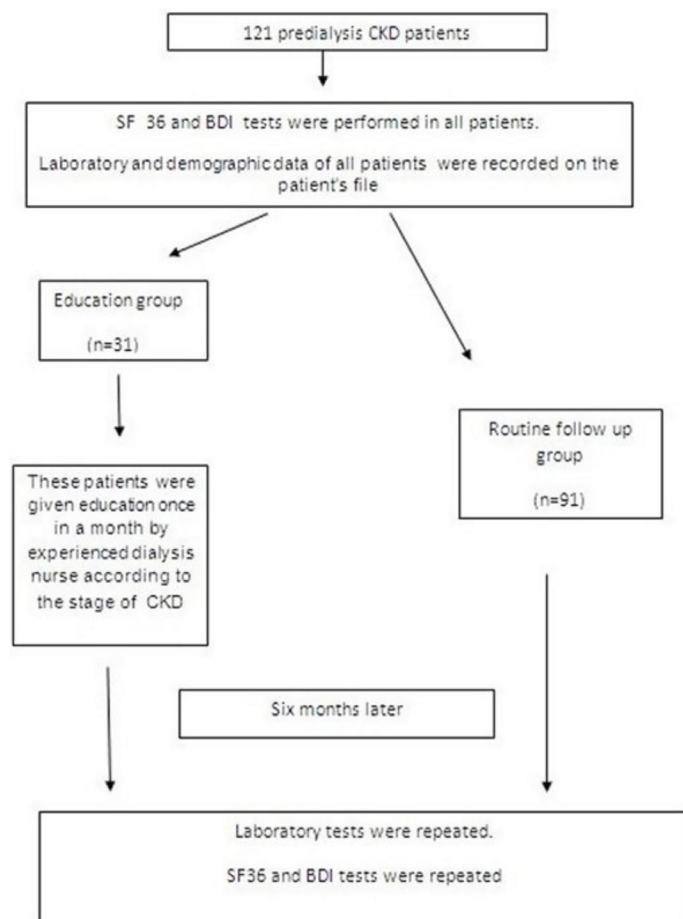


Figure 1. The design of our study

### Statistical analysis

Data were presented descriptively as mean (standard deviation) and median(range) for continuous variables, frequency (percentage) for categorical variables. Continuous variables were compared with the use of Student's t-test or the Mann-Whitney U-test for skewed data. Chi-square and McNemar's tests were used to evaluate comparisons between qualitative data. p-value of <0.05 (two-sided) was used to indicate statistical significance. Statistical analysis was performed with SPSS version 17.0.

## RESULTS

The baseline creatinine, creatinine clearance, age, gender, and duration of the disease of the two groups were not different. Likewise, serum electrolytes, glucose, albumin, LDL, C reactive protein, hemoglobin, parathormone, body mass index of the two groups were similar.

### Baseline

**BDI score:** It was significantly higher in group 2 compared to group 1. Group 1 BDI score was  $30 \pm 9.4$ , and group 2 BDI score was  $14.3 \pm 9.6$  ( $p < 0.001$ ). The number of BDI positive (BDI score  $\geq 11$ ) patients was 29/31 in group 1, 54/90 in group 2. The number of BDI positive patients in group 1 was significantly higher than group 2 ( $p < 0.001$ ).

Baseline Eight subscale: physical functioning (PF), role physical (PR), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role emotional (RE), and mental health (MH) of SF36 of the two groups were similar. Furthermore, physical component summary measures (PCS) and mental component summary measures (MCS) of the two groups were also similar (Table 1).

Table 1. The baseline characteristics of Groups 1 and 2

	Group 1	Group 2	p-value
Creatinine (mg/dL)	2.48 $\pm$ 1.09	2.81 $\pm$ 1.4	0.34
Cre. Clearance (ml/min)	30.6 $\pm$ 14.7	27.9 $\pm$ 15.4	0.28
Age (year)	53.6 $\pm$ 14	59.1 $\pm$ 15.1	0.81
Gender (F/M)	16/15	50/40	0.49
Duration of disease (month)	26.2 $\pm$ 18.9	27.5 $\pm$ 23.3	0.87
BDI scale	30.4 $\pm$ 9.4	14.3 $\pm$ 9.6	<0.001*
BDI positive patients	29/31	54/90	0.001*
PF	20.6 $\pm$ 6.3	20 $\pm$ 6.1	0.64
PR	5.7 $\pm$ 1.8	5.9 $\pm$ 1.8	0.74
BP	7.5 $\pm$ 2.7	7.2 $\pm$ 2.6	0.78
GH	15.7 $\pm$ 4.2	14.5 $\pm$ 4.3	0.20
VT	14.9 $\pm$ 4.4	13.5 $\pm$ 5.1	0.16
SF	7.8 $\pm$ 3.8	7.35 $\pm$ 2.6	0.76
RE	4.2 $\pm$ 1.4	4.6 $\pm$ 1.4	0.36
MH	21.2 $\pm$ 5.2	21.4 $\pm$ 5.5	0.84
PCS	35 $\pm$ 8.03	33.6 $\pm$ 8.09	0.40
MCS	48 $\pm$ 11.5	46.8 $\pm$ 11.4	0.97

BDI: Beck Depression Inventory, PF: physical functioning, PR: role physical, BP: bodily pain, GH: general health, VT: vitality, SF: social functioning, RE: role emotional, MH: mental health, PCS: physical component summary measures, MCS: mental component summary measures

\*significantly higher in group 1

### Six months later

Serum creatinine was  $2.7 \pm 1.2$  mg/dl in group 1, and  $3.4 \pm 2.2$  mg/dl in group 2 after six months. Serum creatinine did not differ between the two groups ( $p < 0.26$ ). BDI scores of the two groups after six months were similar ( $p < 0.64$ ). BDI score of group 1 was  $13 \pm 8.9$ , and BDI score of Group 2 was  $14.4 \pm 10.1$ . When the SF36, PF, PR, SF, FRK, RE, MH scores were evaluated, it was determined that the scores of Group 2 were higher than Group 1. However, VT, BP, and GH scores of the two groups were similar. The number of BDI positive patients was significantly reduced in Group 1 ( $p < 0.001$ ) six months later. However, the number of BDI positive patients was as baseline in Group 2 ( $p < 1$ ). The MCS score was significantly higher in Group 2 compared to Group 1 after six months ( $p < 0.001$ ). The PCS score was significantly higher in Group 2 compared to Group 1 after six months also ( $p < 0.01$ ). (Table 2).

When the educated group (Group 1) and the routine follow-up group (Group 2) were compared firstly, it was found that:

**In Group 1;**

While the initial serum creatinine was 2,4±1 mg/dl, it was 2,7 ±1,2 mg/dl six months later. Serum creatinine significantly increased compared to baseline (p<0,007). The BDI score was 30,4 ±9,4 initially, and it was 13±9,4 six months later. The BDI score revealed a significant reduction after being educated (p<0,001). The number of BDI positive patients was significantly decreased in Group 1 compared to baseline (p<0,001). When eight multi-item scales of SF, GH, BP, MH, and PF was evaluated, it was found that it had significantly decreased compared to baseline. Other components of SF36 tests were similar compared to baseline. The PCS score was significantly increased compared to baseline (p<0,001); however, the MCS score was significantly decreased compared to baseline (p<0,001) (Table 3).

**In Group 2;**

While the initial serum creatinine was 2,8± 1,4 mg/dl, it was 3,48 ±2,25 mg/dl six months later. Serum creatinine had significantly increased compared to baseline (p<0,001). The BDI score was 14,3 ±9,6 initially, and it was 14,4± 10 six months later. The BDI score was similar six months later compared to baseline (p:0,93). The number of BDI positive patients was similar in group 1 compared to baseline (p:1). When eight multi-item scales of SF, MH, GH, and VT were evaluated, it was found that it had significantly increased compared to baseline. BP had significantly decreased, and other components were similar six months later. The PCS score was significantly increased compared to baseline (p<0,001); however, the MCS score was similar compared to baseline (p:0,3) (Table 4).

**Table 2. The comparison of Groups 1 and 2 six months later**

	Group 1	Group 2	p-value
Cre (mg/dl)	2.73± 1.29	3.48± 2.25	0.26
BDI scale	13± 8.9	14.4± 10.1	0.64
BDI positivity	17/31	54/90	0.61
PR	5.7± 1.8	5.9± 1.8	0.004#
PF	5± 1.2	6.4± 1.6	<0.001#
SF	6.3± 1.7	7.6± 2.5	0.005#
BP	9.8± 4.7	7.6± 2.56	0.052*
GH	13± 2.8	15.2± 4.1	0.002#
VT	14.6± 3.1	14.1± 5.1	0.51
RE	3.9± 2.3	4.8± 1.1	<0.001#
MH	13.3± 4.2	22.2± 5.2	<0.001#
MCS	38.1± 5.8	48.4± 10.2	<0.001#
PCS	45.2± 5.6	50± 11.2	0.01#

BDI: Beck Depression Inventory, PF: physical functioning, PR: role physical, BP: bodily pain, GH: general health, VT: vitality, SF: social functioning, RE: role emotional, MH: mental health, PCS: physical component summary measures, MCS: mental component summary measures  
 \*significantly higher in Group 1  
 #significantly higher in Group 2

**Table 3. Group 1 (baseline- six months later)**

	Baseline	Six months later	p-value
Cre (mg/Dl)	2.48±1.09	2.3± 1.29	0.007#
BDI scale	30.4± 9.4	13± 8.9	<0.001*
BDI positivity	29/31	17/31	0.004*
PH	20.6± 6.3	5.7± 1.8	0.05*
PF	5.7± 1.8	5± 1.2	0.01*
BP	7.5± 2.7	6.3± 1.7	0.03*
GH	15.7± 4.2	9.8± 4.7	0.002*
VT	14.9± 4.4	13± 2.8	0.74
SF	7.8± 3.8	14.6± 3.1	0.05
RE	4.2± 1.4	3.9± 2.3	0.08
MH	21.2± 5.2	13.3± 4.2	<0.001*
PCS	35± 8.03	38.1± 5.8	<0.001*
MCS	48 ± 11.5	45.2± 5.6	<0.001*

BDI: Beck Depression Inventory, PF: physical functioning, PR: role physical, BP: bodily pain, GH: general health, VT: vitality, SF: social functioning, RE: role emotional, MH: mental health, PCS: physical component summary measures, MCS: mental component summary measures  
 \*significantly higher in baseline  
 #significantly higher six months later

**Table 4. Group 2 (baseline- six months later)**

	Baseline	Six months later	p-value
Cre (mg/Dl)	2.81± 1.4	3.48± 2.25	<0.001#
BDI scale	14.3± 9.6	14.4± 10.1	0.93
BDI positivity	54/90	54/90	1
PH	20± 6.1	5.9± 1.8	<0.001*
PF	5.9± 1.8	6.4± 1.6	0.07
BP	7.2± 2.6	7.6± 2.5	0.004#
GH	14.5± 4.3	7.6± 2.56	<0.001*
VT	13.5± 5.1	15.2± 4.1	<0.001#
SF	7.35± 2.6	14.1± 5.1	0.06
RE	4.6± 1.4	4.8± 1.1	0.07
MH	21.4± 5.5	22.2± 5.2	<0.001#
PCS	35± 8.03	48.4± 10.2	<0.001#
MCS	48 ± 11.5	50± 11.2	0.3

BDI: Beck Depression Inventory, PF: physical functioning, PR: role physical, BP: bodily pain, GH: general health, VT: vitality, SF: social functioning, RE: role emotional, MH: mental health, PCS: physical component summary measures, MCS: mental component summary measures  
 \*significantly higher in baseline  
 #significantly higher six months later

**DISCUSSION**

CKD is a disease that requires a multidisciplinary approach. The multidisciplinary team should consist of a nephrologist, education nurse, dietitian, psychologist,

social support specialist, and vascular surgeon. Multidisciplinary support may delay the progression of the disease by altering the quality of life of the patient and improving compliance (1-3).

Patient education is a component of CKD management programs in KDIGO 2012 guideline (4). Education can improve risk factors regarding the progression of CKD. Numerous studies are present about patient education in CKD patients. These studies involve clinical pharmaceutical activities, face-to-face education, support of specialist renal nursing, guidebooks, interactive and telephone communication. In our study, patient education was given by a specialist nurse, using educational brochures, once a month.

In the study by Walker et al., proteinuria, blood pressure, HbA1c, cholesterol, and a significant reduction in tobacco use were found to lead to improvement in GFR 12 months later in nondialysis CKD patients when educated by the specialist in renal nursing (5). In another study, while a pharmacist-based intervention did not improve blood pressure control, it improved guideline adherence and increased the number of antihypertensive medications prescribed to subjects with poorly controlled blood pressure (6). Choi and Lee observed significant improvement in scores regarding being informed about CKD together with self-care practice scores after eight weeks of delivering face-to-face education and individualized consultation to 31 predialysis patients in the outpatient nephrology clinic (7).

As shown above, the CKD progression rate of patients was observed to decrease with patient education in some studies, whereas no significant changes were observed in others. We used the serum creatinine level and the creatinine clearance as indicators of renal function loss in the assessment of the disease progression. We did not find any difference between the education group and the routine follow-up group regarding renal function loss six months later.

Depression and anxiety are common in patients with chronic kidney disease. The reported elevated prevalence of depressive symptoms and depression has varied substantially among individuals with CKD from 15% to 50% (8). Education and counseling are important for improving mood among patients with CKD. Depressive and anxiety symptoms are associated with an increased risk of poor clinical outcome. Several studies have shown that patients with depressive symptoms have a higher risk of progression to death, proteinuria, dialysis, and composite events (9-13).

We evaluated not only the relationship between disease progression and patient education in our study but also whether any changes in SF36 and BDI scores occur with patient education. We did not find any difference regarding renal function loss between the education group

and the routine follow-up group six months later. However, we determined a significant reduction in BDI score in the educated group compared to baseline six months later ( $p < 0.001$ ). The number of BDI positive patients was significantly decreased in Group 1 compared to baseline ( $p < 0.001$ ). When eight multi-item scales of SF, GH, BP, MH, and PF scores were assessed, it was found significantly decreased compared to baseline. On the other hand, the BDI score was similar six months later compared to baseline ( $p: 0.93$ ), and the number of BDI positive patients was similar in Group 1 compared to baseline ( $p: 1$ ) in the routine follow-up group. The evaluation of the eight multi-item scores of SF, MH, GH, and VT revealed a significant increase compared to baseline.

## CONCLUSIONS

In our study, we found that patient education did not lead to any difference regarding disease progression at six months. However, we found a significant improvement in the BDI and SF36 scores with education. These significant changes suggest that the emotional state of patients can create a positive effect on disease progression via providing increased long-term patient compliance.

This study has several limitations. Firstly, six months may be a short duration to see the effect of patient education on the progression of the disease. Secondly, patients were visiting the specialist nurse for 30 minutes on a single day per month. Thirdly, the education levels of the patients were not included in their demographic data.

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