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TITLE PAGE

Title: Emotion regulation, affect, psychosocial functioning and well-being in hemodialysis patients.

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ABSTRACT

Background

Emotion regulation refers to the psychological strategies people use to cope with stressors such as hemodialysis. These strategies are associated with a range of physical and psychological variation that may be related to kidney disease and its management. This study explored the associations of two emotion regulation strategies, reappraisal and suppression and considered their impact upon patient wellbeing and kidney disease management.

Study design

Cross sectional study.

Setting & Participants: 106 hemodialysis patients undergoing renal replacement therapy and 94 friends or relatives.

Predictors

Reappraisal and suppression, measured with the Emotion Regulation Questionnaire.

Outcomes

The outcome parameters were measures of affect, psychosocial functioning and wellbeing, measured with the Positive and Negative Affect Scale, the Brief COPE questionnaire, the Kidney Disease Quality of Life-Short Form and the Brief Symptom Inventory.

Results

The Emotion Regulation Questionnaire measured reappraisal and suppression. Greater use of reappraisal was associated with lower levels of anxiety (r = -.22, p=0.03) and greater acceptance of the disease (r=0.20, p=0.04). It was also associated with more experience (r=.26, p=0.007) and expression (r=0.23, p=0.02) of positive emotion and less experience (r=-0.35, p=0.001) and expression (r=-0.29, p=0.003) of negative emotion. Suppression was associated with less positive emotional expression (r=-0.28, p=0.005), higher levels of depression (r=0.22, p=0.03) and somatisation (r=0.25, p=0.012) and greater dissatisfaction with the time spent dealing with their kidney disease (r=-0.21, p=0.04). Suppression was also associated with less emotional coping (r=-0.29, p=0.003) and a greater dissatisfaction with the support received from other people (r=-0.34, p=0.001).

Limitations

The study was focusing on emotion regulation strategies and well being rather than clinical parameters therefore extensive medical data not recorded.

Conclusions

Reappraisal has a range of positive clinical and psychosocial associations in comparison to suppression. The emotion regulation strategy used by hemodialysis patients has important implications for well-being and disease management.

Keywords: Hemodialysis, kidney disease, end stage renal disease (ESRD), emotion regulation, reappraisal, suppression

INTRODUCTION

Background/Rationale

End stage renal disease (ESRD) and the treatment regimes that accompany it challenge the coping abilities of patients and their relatives by requiring them to make and maintain many behavioural and lifestyle changes[1] . Dialysis regimes are significant sources of stress and one study [2] found that over a 1-year period, almost 10% of patients were admitted to hospital with a psychiatric diagnosis. Particular sources of stress include adhering to time consuming treatment schedules, restricting dietary and fluid intake and the prescription of multiple medications. Such challenges invoke emotional responses such as loss, anxiety and depression and it is common for people to regulate their emotions in order to moderate the distress they experience.

Historically, emotions have been viewed as passions that come and go of their own accord, however there is growing appreciation that individuals exert considerable control over which emotions they have and when they have them[3]. For example, a dialysis patient may hide from others the distress of chronic ill health to avoid discussion of its severity. Emotion regulation strategies are believed to be relatively stable over time but with insight and social awareness it is possible for people to re-learn and adjust the emotion regulation strategies they use.At present little is known about the impact of chronic disease upon emotion regulation strategies, although it may be hypothesised that pre-exisiting strategies would be activated when faced with such a stressor.

There are a number of models of emotion regulation, but this study draws upon a process model[4], as shown in Figure 1. The model proposes emotions may be

regulated at five time points during the emotion-generative process. These regulation strategies include 1) selection of the situation, 2) modification of the situation, 3) deployment of attention, 4) change of cognitions (reappraisal) and 5) the modulation of experiential, behavioural or physiological responses (suppression). This study is focusing upon reappraisal and suppression as they are considered to be commonly used strategies that can be defined in terms of individual differences and they reflect both antecedent and response focused strategies.

Reappraisal involves changing how a stressor is construed, for example from "this treatment interferes with my whole life" to "this treatment is keeping me as healthy as I can be". Suppression involves hiding distress from others, for example masking anxiety with a blank face. There are hypothesised to be 3 associations between emotional regulation style and experiential, behavioural and physiological outcomes. Gross and John[4] operationalised this by using the terms 'affective functioning', 'social functioning' and 'well-being'. These 3 associations are hypothesised to be positively and negatively influenced by reappraisal and suppression respectively[5].

Objectives

Studies of emotion regulation to date have used predominantly undergraduate participants[4] and experimentally manipulated the use of reappraisal and suppression in laboratory settings[6,7]. As yet, Gross & John's[4] model has not been applied to a clinical health population despite emotional suppression playing an important role in psychobiological models of disease[8]. The aim of this study is to investigate the associations between reappraisal and suppression and measures of affect, social functioning and well-being.

METHODS

Study design

The study used a cross-sectional design. Patients were recruited during their regular clinic visits on an on-going basis until the sample size was met (see Figure 2). All participants were provided with a questionnaire to complete and a brief questionnaire for a friend or relative. The patient questionnaire took approximately 25 minutes to complete and the relative's questionnaire approximately 5 minutes.

Setting

Participants were recruited from renal dialysis units in Glasgow, Scotland. The study took place at a single time point between October 2005 and March 2006. The protocol and procedures were approved by the North Glasgow University Hospitals Ethics Committee and the Greater Glasgow Research and Development Directorate. All participants provided written consent prior to beginning the study.

Participants

Participants were ESRD patients (n=106) who were receiving hospital hemodialysis. Inclusion criteria included a diagnosis of ESRD, being able to read English, not currently having a functional renal transplant and not receiving home hemodialysis. In addition, a friend or relative of each patient was asked to participate in the study (n=94). Two hundred questionnaires were handed out and 112 were returned. Six were excluded due to large amounts of missing data, which resulted in an analysis rate of 95%. Out of the 200 questionnaires handed out, the 106 included questionnaires reflected a 53% response rate. Reasons for not taking part included poor eyesight,

lack of interest and fatigue. Of those 12 patients who did not get a friend or relative to complete a questionnaire, 7 were widowed and 1 was single. This suggests that social isolation may have been a reason for non-completion of the relative's questionnaire.

Variables of interest

The independent variables were the emotion regulation strategies (reappraisal and suppression) and the dependent variables were the measures of affect, social functioning and well-being.

Measurement

Demographic information was acquired from each patient. This included their primary renal diagnosis, their age, sex and relationship status. Emotional regulation was assessed using the Emotion Regulation Questionnaire (ERQ)[4]. The ERQ consists of 10 statements that assess whether an individual changes the way they think about a situation to change how they feel inside, or whether they mask their feelings and emotions from others. Test-retest reliability at 3 months is .69[4]. Convergent and discriminative validity analyses found that reappraisal was associated with reinterpretation (β=.43, $p<0.05$)[*] and a sense of being able to regulate mood state (β=.20, $p<0.05$) whereas suppression was associated with feeling inauthentic (β=.47, $p<0.05$) and not venting internal feelings (β=.43, $p<0.05$)[4]. Beta values (β) represent standardised regression coefficients, in the first example the figure means that a 1 standard deviation increase in reappraisal leads to 0.43 of a standard deviation increase in reinterpretation, indicating that these constructs are closely associated. This provides further evidence of the vailidity of the reappraisal construct. Patients are asked to rate on a 1 to 7 scale whether they strongly agree or disagree with each

statement (1=strongly disagree to 7=strongly agree). Affect was assessed using the Positive and Negative Affect Scale (PANAS)[9], which measured both the experience of emotion (α=.87 positive affect & α=.85 negative affect)[2] and the expression of emotion (α=.81 positive affect & α=.74 negative affect). In these examples, the statistic Alpha (α) represents the internal consistency of the measure, i.e. how strongly does each item correlate with the total score. Measures with α of below 0.6 are generally considered to have inadequate internal reliability. Further information regarding the measures can be found in the Technical Appenidx, Tables A & B.

The PANAS was also completed by a friend or relative to provide information about the patient's emotional expressive behaviour from other people's perspectives (α=.88 positive affect & α=.81 negative affect).

Social functioning was measured using the Brief COPE questionnaire[10]. The subscales included Emotional Support (α=.71), Substance Misuse (α=.90) and Behavioural Disengagement (α=.65). Single items from the Kidney Disease Quality of Life-Short Form questionnaire (KD-QOL)[11] explored perceived burden on others and satisfaction with support from family and friends. Single stem questions were completed by friends and relatives to explore relationship closeness and peer liking.

Well-being was assessed using the Brief Symptom Inventory[12]. Internal consistency ranged from .74 to .90[13]. Items from the KD-QOL measured frustration and satisfaction with the amount of time spent dealing with their disease.

Sample size

The sample size was calculated using Green's[14] formula for testing individual predictors (N>104+m). A sample size of 105 was required to obtain power of 0.8.

Statistical methods

The statistical analysis was carried out using the computer software package SPSS version 12.0 (SPSS Inc, Chicago, Illinois). The results are expressed as Pearson's r correlations and *p* values are reported. Throughout this study, $p<0.05$ was considered statistically significant. Data were grouped by looking at participant scores on both subscales of the ERQ rather than by the allocation of participants to either a suppression or reappraisal group. Reappraisal and suppression were analysed separately as it is possible for individuals to score high on both strategies or low on both strategies. In this study we did not classify individuals as either 'suppressors' or 'reappraisers' as it is known that people use different emotion regulation strategies at different times. Rather, the study sought to explore how the use of the emotion regulation strategies were associated with a range of outcomes. Cronbach's alphas were calculated to determine the internal consistency of the subscales used in the study and a cut-off of .7 or greater was sought for all those included[15].

RESULTS

Participants

Of the 106 dialysis patients, 55% were female and the mean age was 64 years (age range 19-87 years). Patient characteristics are listed in full in Table 4. Fifty two percent were married and 26% were widowed. Diagnoses included Chronic Renal Failure (cause unknown) n= 26 (25%), primary glomerular disease n= 20 (19%), interstital nephropathy (including polycystic kidney disease) n= 34 (32%),

multisystem disease n= 16 (15%) and diabetic nephropathy n= 9 (9%). The mean age of the patients studied and the distribution of primary renal diagnoses were representative of the prevalent UK dialysis population[16].

Forty two percent of the short questionnaires for friends and relatives were completed by a spouse and 21% by a child (see Table 5). Eighty four percent of respondents had known the dialysis patient for over 10 years.

Data for the main outcome measures of the study, along with reference data for these scales, where available, can be seen in Table 2. This table provides the means, standard deviations and range for each of the scales. In addition Table 2 also makes clear the directionality of the scoring, as well as providing some normative data with which to compare our results. Examination of Table 2 reveals that our data is similar and diverges from previously published reference data in important ways. Looking first at the use of reappraisal, the current study group are similar to the reference norms provided by Gross & John, (2003). Looking at use of suppression however, our sample of dialysis patients appears to endorse suppression items more highly than the refrence group. Our sample also experience lower levels of positive affect and higher levels of negative affect than a sample of 1003 community dwelling adults in Scotland, reported by Crawford and Henry, (2004).[43] Finally, despite these findings, our sample's scores on the BSI subscales also indicates relatively low levels of individuals meeting the caseness cut-offs on these scales.

Affective correlates of emotion regulation

Reappraisal of stress early in the emotion generative process was associated with greater experience (r=..26, p=0.007) and expression (r=.23, p=0.02) of positive emotion and less experience (r=-.35, p=0.004) and expression (r=-.29 p=0.003) of negative emotion (see Table 4). Suppression of emotion later in the process was associated with less expression (r=-.28, p=0.005) of positive emotion. There was also a significant association between friends and relatives reports of patients using reappraisal and them expressing less negative emotion (r=-.245, p=0.02). In addition, there were positive correlations between patient and relatives report of positive (r=.495, p=<0.01) and negative (r=.505, p=<0.01) emotional expression, suggesting a level of agreement about emotions being expressed.

Social correlates of emotion regulation

The reappraisal of stress was not associated with a greater use of emotional coping strategies (r=.03, p>0.05) whereas suppression was associated with less use (r=.-29, p=0.003). The use of emotional coping strategies was correlated with a number of other positive coping techniques including a greater use of self-distraction (r=.294, p<0.01), greater use of active coping strategies (r=.324, p<0.01) and more frequent use of instrumental coping strategies (r=.571, p<0.01). Suppression was found to be associated a greater dissatisfaction with the support received from their family and friends (r=.-.33, p=0.001) (see Table 5).

Well-being correlates of emotion regulation

The cognitive reappraisal of stress was associated with lower levels of anxiety (r=-.22, p=0.028) and greater levels of acceptance (r=.20, p<0.05) (see Table 6).

Acceptance was an important construct as it also correlated with positive reframing ($r=.419$, $p<0.01$), planning ahead to cope with stressors ($r=.427$, $p<0.01$), using humour as a coping strategy ($r=.279$, $p=<0.01$) and less behavioural disengagement ($r=-.241$, $p=0.01$).

Surprisingly, suppression of emotion was not associated with higher levels of anxiety ($r=.13$, $p=0.18$). Suppression was associated with experiencing greater symptoms of depression ($r=.22$, $p=0.03$) and somatisation ($r=.25$, $p=0.01$) and greater dissatisfaction with the amount of time spent dealing with their kidney disease ($r=-.21$, $p=0.04$). Self-blame was also correlated with a number of negative constructs. It was associated with less positive emotional experience ($r=-.355$, $p<0.01$) and expression ($r=.238$, $p=0.02$) and greater levels of negative emotional experience ($r=.388$, $p<0.01$) and expression ($r=.326$, $p=<0.01$).

Clinical determinants of emotion regulation

Two multivariate regression analyses were carried out to explore the clinical determinants of reappraisal and suppression (See Table 7). The only variable that significantly predicted the use of reappraisal was less experience of negative emotion ($\beta=.32$, $p=<0.01$). The 2 variables that predicted the use of suppression were less experience of positive emotion ($\beta=.23$, $p=0.05$) and less perceived support from others ($\beta=.32$, $p =<0.01$). A perception of good social support also predicts less use of suppression. Measures of sex, age, marital status, medical diagnosis or length of time receiving dialysis did not predict use of either emotion regulation strategy.

DISCUSSION

Key findings

The associations between emotion regulation and affective, social and well-being measures have been well researched in non-clinical samples, but data from populations with chronic health problems is limited. This study confirmed that reappraisal of stress early in the emotion-generative process is associated with positive outcomes for hemodialysis patients. Reappraisal offers protection from ongoing and future stressors through positive emotional experiences, stronger social support and greater well-being. Suppressing emotion later in the emotion-generative process is associated with expressing less positive emotion, poor use of social support; feeling unsupported by family and friends, and higher levels of anxiety, depression and somatisation.

With regards to affective measures, the study found that reappraisal is associated with experiencing and expressing more positive emotion and experiencing and expressing less negative emotion. Suppression on the other hand, is associated with less expression of positive emotion suggesting that even if the person is feeling in a positive mood, they are not showing this to other people. The fact that the study found agreement between patient and relatives' reports of emotional expression suggests that the patient's emotional state and emotion regulation strategies are apparent to others. These findings are supported by a study of 49 undergraduate students and 147 of their peers in which agreement was found between reappraisal and greater experience of positive emotion[4].

The study found that socially, suppression is related to less use of emotional support strategies (seeking and accepting support from others) and a greater dissatisfaction with the support received from their family and friends. Emotional support has been associated with better clinical and functional status 1 year after diagnosis of gynaecological cancers[17], which suggests there may be clinical implications to not using adaptive emotional coping strategies.

These findings are also supported by previous papers that have found suppression to impact negatively on relationships with peers[4], romantic partners[18], and caregivers[19]. In one study[17], reappraisal and suppression were manipulated in 86 heterosexual couples whilst they discussed a relationship conflict. Memory for conversation content was greater for reappraisers than suppressors and suggests that reappraisal allows people to focus more on interpersonal situations. Suppressors' self-monitoring of facial expressions and vocal signals distracts them from social interactions and can damage relationships. Supportive relationships can protect against distress[20], promote physical health and well-being[21] and help patients to maintain their dietary regime and attend clinic appointments[22]. Social support also correlates with reduced illness burden, higher global satisfaction with life and better marital satisfaction[23,24]. These findings suggest that the social implications of emotion regulation have considerable implications for patient well-being and the self- and professional-management of kidney disease.

This study also found that reappraisal was associated with lower levels of anxiety and a greater acceptance of kidney disease and dialysis treatment. Suppression was associated with higher levels of anxiety, depression and somatisation and greater

dissatisfaction with the amount of time spent dealing with their disease. Depression and anxiety are prevalent problems in the hemodialysis population and reported rates of depression range from 13.9%[25] to 100%[26]. Depression can impact upon survival and is negatively correlated with quality of life[27]. Withdrawal of dialysis remains an important cause of death in ESRD[28] and has been found to be mediated in part by depressive symptoms[29]. This again suggests that suppressing emotions can have potentially serious implications for individuals.

Studies into the physical implications of emotion regulation and emotional expression have found them to have important roles in psychosomatic models of disease. Previous research suggests that active suppression of strong emotions can increase one's susceptibility to illness[30]. A meta-analysis found emotional expression to be implicated in the course of coronary heart disease, asthma and arthritis[31] and the suppression of emotions to be involved in cancer onset and progression[32,33]. Denollet et al [34] divided heart attack survivors in to 4 groups based on measures of distress and suppression of emotion. The group scoring highest on levels of distress and suppression had a significantly higher death rate (27%) than other groups (7%). Other studies manipulated the use of emotion regulation strategies and found them to be malleable and to have physiological consequences. They identified changes in somatic response, skin conductance, respiratory and cardiovascular activity [35 6].

The findings from this study have clinical relevance in identifying that emotion regulation strategies are associated with a range of important clinical and social parameters. Administration of the ERQ could identify those patients who are suppressing their emotions, initiate a referral to psychological services and form a

framework on which to focus treatment. The cognitive-behavioural basis of reappraisal and suppression fits with current psychological models of coping and adjustment to chronic medical problems, and would be amenable to evidence-based psychological treatment packages[36]. A previous study explored the clinical efficacy of emotion regulation therapy and found that compared to the control group, a supportive-expressive group for women with metastatic breast cancer resulted in a decrease in the suppression of negative affect at 1 yr follow-up[37]. In addition, a case study found that emotion regulation therapy successfully treated the symptomatic, functional and qualitative aspects of Generalised Anxiety Disorder[38].

Based on these findings, further research could investigate the potential of psychological interventions to promote reappraisal in a dialysis population. The long-term implications of changing to a reappraisal strategy could then be assessed and its outcomes measured. With regards to generalizability, the findings of this study may also have clinical value for other populations with chronic health problems such as diabetes or Chronic Obstructive Pulmonary Disease.

Limitations

The findings of this study must be interpreted in the context of its limitations. Primarily this paper was looking at emotion regulation strategies and well being rather than clinical parameters therefore extensive medical data not recorded. In addition, the information was collected by self-report, which depending on the subject area, can be prone to inaccuracies as a result of poor understanding or discomfort with self-disclosure. As suppression is associated with being less likely to report negative emotions, it may make the results of this study more representative of a reappraisal

sample. It is also possible that the questionnaire for friends and relatives deterred those who were socially isolated from participating. Finally, the 53% response rate may have introduced bias with potentially less responders in the suppression group and as a result, fail to reflect the opinions of the whole population. However, triangulation with other dialysis papers[39,40,41,42]revealed similar response rates and patient characteristics to this study.

Interpretation

In this hemodialysis population, reappraisal was associated with greater levels of positive affect, better social functioning and greater well-being than suppression. This has important physical, social and psychological implications for a population with chronic medical problems and warrants further research into the long effects of emotion regulation and the ability of psychological interventions to moderate them.

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TABLE 1: Demographic information: hemodialysis patients

Characteristics	n	%	mean	range	standard deviation
Sex					
Male	48	45.3			
Female	58	54.7			
Age (years)			64	19-87	15.1
Relationship status					
Married	55	51.9			
Widowed	27	25.5			
Single	12	11.3			
Partner	8	7.5			
Divorced	4	3.8			
Primary Renal Diagnoses					
Chronic Renal failure: cause unknown	26	25			
Primary Glomerular Disease	20	19			
Interstitial Nephropathy	34	32			
Multisystem Disease	16	15			
Diabetic Nephropathy	9	9			
Time receiving dialysis (months)			50	1-444	

TABLE 2: Statistics for all scales used

Scale	Mean	SD	Min value	Max value	Direction	Reference Values	
						Mean	SD
Emotion Regulation Questionnaire Reappraisal	4.84	1.14	1	7	Higher score = more agreement	4.6	0.98
Emotion Regulation Questionnaire Suppression	4.73	1.3	1	7	Higher score = more agreement	3.39	1.15
Positive & Negative Affect Scale Positive experience	28.9	9.4	11	48	Higher score = more experience	31.3*	7.65*
Positive & Negative Affect Scale Negative experience	21.9	8.4	10	44	Higher score = more experience	16.0*	5.9*
Positive & Negative Affect Scale Positive expression	27.7	9.9	10	47	Higher score = more expression	*Normative data not available*	
Positive & Negative Affect Scale Negative expression	19.0	7.4	10	39	Higher score = more expression	*Normative data not available*	
Positive & Negative Affect Scale Positive expression – other rated	30.9	9.1	10	47	Higher score = more expression	*Normative data not available*	
Positive & Negative Affect Scale Negative expression – other rated	21.1	8.8	10	50	Higher score = more expression	*Normative data not available*	
Brief COPE Emotional coping	5.2	2.0	2	8	Higher score = greater use of coping strategy	5.75	1.44
Kidney Disease Quality of Life Support from family and friends	2.4	.87	0	3	Higher score = greater satisfaction with support	*Normative data not available*	

Brief Symptom Inventory Somatisation	7.3	4.4	0	19	Higher score = more somatisation	Males: >10 indicates caseness Females: >13 indicates caseness
Brief Symptom Inventory Depression	5.7	5.3	0	23	Higher score = greater levels of depression	Males: >10 indicates caseness Females: >13 indicates caseness
Brief Symptom Inventory Anxiety	5.9	5.1	0	21	Higher score = greater levels of anxiety	Males: >10 indicates caseness Females: >13 indicatescaseness
Brief COPE Acceptance	6.1	2.0	2	8	Higher score = greater use of coping strategy	5.92 1.28
Kidney Disease Quality of Life Too much time is spent dealing with my disease	5.8	4.5	0	16	Higher score = greater disagreement with statement	*Normative data not available*

* These data are from a large UK based non-clinical sample: Crawford and Henry, (2004).

TABLE 3**:** Demographic information: friends and relatives

Characteristics	n	%
Relationship to hemodialysis patient		
Spouse	46	48.9
Child	22	23.4
Friend	8	8.5
Parent	7	7.4
Sibling	6	6.4
Partner	5	5.4
Length of time known patient		
1-4 years	2	1.9
5-9 years	3	2.8
10-14 years	2	1.9
15-19 years	7	6.6
20-24 years	6	5.7
25-29 years	4	3.8
30-34 years	9	8.5
35 years +	61	57.5

TABLE 4: Associations between reappraisal and suppression and affect

	Emotion regulation strategy			
	Reappraisal		Suppression	
	r	p	r	p
Positive emotion				
Experience				
Mood (PANAS)	.26	0.007*	-.20	0.04
Expression				
Self reported	.23	0.02*	-.28	0.005*
Negative emotion				
Experience				
Mood (PANAS)	-.35	<0.001*	.10	0.27
Expression				
Self-reported	-.29	0.003*	-.05	0.96
Peer-rated	-.24	0.02*	.00	0.30

*$p<0.05$

TABLE 5: Associations between reappraisal and suppression and social functioning

	Emotion regulation strategy			
	Reappraisal		Suppression	
	r	p	r	p
Social support				
Brief COPE: Emotional	.14	0.17	-.29	0.003*
Kidney Disease Quality of Life Scale				
Support from others	-.003	0.98	-.33	0.001*

* p≤.05

TABLE 6: Associations between reappraisal and suppression and well-being

	Emotion regulation strategy			
	Reappraisal		Suppression	
	r	p	r	p
Brief Symptom Inventory				
Anxiety	-.22	0.03*	.13	0.18
Depression	-.22	0.03*	.22	0.03*
Somatisation	-.06	0.53	.25	0.012*
Brief COPE				
Acceptance	.20	0.05*	.15	0.14
Kidney Disease Quality of Life Scale				
Time spent on disease	-.07	0.48	-.21	0.04*

* $p \leq .05$

TABLE 7: Determinants of Emotion Regulation

Step	Variables Entered	Emotion regulation strategy			
		Reappraisal		Suppression	
		Beta	p	Beta	p
1	Experience of positive emotion	-.10	.35	.23	.05*
	Experience of negative emotion	.32	.004*	.01	.94
2	BSI Somatisation	-.16	.21	-.24	.08
	BSI Depression	.01	.95	-.18	.32
	BSI Anxiety	.07	.69	.19	.29
3	Brief COPE: Acceptance	-.15	.18	-.02	.89
	Support from Others	.13	.21	.32	.002*
4	Length of Time on Dialysis	.-06	.56	-.16	.10
	Diagnosis	.04	.68	.13	.19
5	Sex	-.08	.41	.05	.62
	Age	.13	.33	-.21	.09
	Relationship Status	-.12	.32	-.15	.21

* $p \leq .05$

LEGENDS

FIGURE 1: A process model of emotion regulation describing 5 antecedent and response focused strategies (Gross, 2002)

According to this model, emotion may be regulated at five time points in the emotion-generative process: (a) selection of the situation, (b) modification of the situation, (c) deployment of attention, (d) change of cognitions, and (e) modulation of experiential, behavioral, or physiological responses. The first four of these processes are antecedent-focused and the fifth is response-focused. The number of response options shown at each of these five points in the illustration is arbitrary, and the heavy lines indicate the particular options selected.

Reprinted from "Emotion Regulation in Adulthood: Timing Is Everything," by J. J. Gross, 2001, *Current Directions in Psychological Sciences, 10*, p. 215. Copyright 2001 by Blackwell Publishers. Reprinted with permission.

FIGURE 2: Selection and recruitment of participants

TECHNICAL APPENDIX

TABLE A: Sample Characteristics, Varimax Rotated Factor Loadings for the 10 Items on the Emotion Regulation Questionnaire, Alpha Reliability, and Scale Intercorrelations in Four Samples

	Sample			
	A	B	C	D
Sample characteristics				
Sample size	791	336	240	116
Mean age (years)	20	20	20	18
% women	67	63	50	64
% African American	05	04	02	03
% Asian American	41	40	24	26
% European American	28	33	56	55
% Latino	09	16	15	09
Reappraisal factor				
1. I control my emotions by changing the way I think about the situation I'm in.	.66	.76	.73	.82
2. When I want to feel less negative emotion, I change the way I'm thinking about the situation.	.83	.73	.82	.85
3. When I want to feel more positive emotion, I change the way I'm thinking about the situation.	.83	.77	.80	.84
4. When I want to feel more positive emotion (such as joy or amusement), I change what I'm thinking about.	.71	.75	.55	.49
5. When I want to feel less negative emotion (such as sadness or anger), I change what I'm thinking about.	.68	.76	.62	.67
6. When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm.	.55	.32	.48	.71
Highest of all cross loadings (absolute values)	**.14**	**.14**	**.15**	**.13**
Internal consistency (alpha)	**.80**	**.77**	**.75**	**.82**
Suppression factor				
7. I control my emotions by not expressing them.	.83	.78	.85	.89
8. When I am feeling negative emotions, I make sure not to express them.	.76	.73	.73	.69
9. I keep my emotions to myself.	.81	.77	.84	.87
10. When I am feeling positive emotions, I am careful not to express them.	.54	.56	.54	.57
Highest of all cross loadings (absolute values)	**.18**	**.12**	**.20**	**.23**
Internal consistency (alpha)	**.73**	**.68**	**.75**	**.76**
Scale intercorrelation	.06	.01	-.04	-.06

Reprinted from Gross JJ, John OP: Individual differences in two emotion regulation processes: Implications for affect, relationships and well-being. J Pers Soc Psychol 85: 348-362, 2003

TABLE B: Description of outcome measures

SCALE	ITEMS	EXAMPLE OF ITEMS
Brief Symptom Inventory 18		
Depression	6	Feeling hopeless about the future
Anxiety	6	Nervousness of shakiness inside
Somatisation	6	Pains in heart or chest
Brief COPE		
Emotional support	3	I've been getting emotional support from others
Acceptance	3	I've been accepting the reality of the fact that it has happened
POSITIVE AND NEGATIVE AFFECT SCALE		
Positive experience	10	Strong
Negative experience	10	Guilty
Positive expression	10	Proud
Negative expression	10	irritable
KIDNEY DISEASE QUALITY OF LIFE-SHORT FORM		
Support from others	1	The support you receive from your family and friends
Time spent dealing with disease	1	Too much time is spent dealing with my kidney disease
SINGLE STEM QUESTIONS		
Likeability	1	X is the kind of person almost everybody likes
Enjoy spending time with	1	X has close relationships with others