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# IMPACT OF CHRONIC KIDNEY DISEASE ON ILLNESS PERCEPTIONS, COPING, SELF-EFFICACY, PSYCHOLOGICAL DISTRESS AND QUALITY OF LIFE

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Running head: Psychosocial predictors of QoL in chronic kidney disease

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## **ABSTRACT**

## **Background**

Patients with chronic kidney disease (CKD) experience a significant impact on psychological well-being and quality of life (QoL). To date, exploration of the potential mediators between individual disease perceptions and quality of life in CKD is limited. Underpinned by the Common Sense Model (CSM), this study evaluated the potential mediating role of self-efficacy, coping styles and psychological distress on the relationship between illness perceptions and QoL in patients living with CKD.

## **Methods**

Participants were 147 people (mean age 61.1 years (SD=12.0)) with Stage 3 CKD ( $n=5$ ), Stage 4 CKD ( $n=57$ ) or end-stage kidney disease (ESKD; Stage 5;  $n=85$ ). Measures included kidney function (eGFR), illness perceptions (Brief Illness Perceptions Questionnaire; BIPQ), coping styles (Carver Brief COPE scale; COPE), psychological distress (Hospital Anxiety and Depression Scale; HADS), self-efficacy (General Self-Efficacy Scale; SE) and QoL (Kidney Disease Quality of Life Short Form; KDQoL-SF). Correlational analyses were performed, followed by regression modelling.

**Results**

Correlational analyses indicated that poorer QoL was associated with greater distress, engagement in maladaptive coping, poorer illness perceptions and lower self-efficacy. Regression analysis revealed that illness perceptions predicted QoL, with psychological distress acting as a mediator. The proportion of variance explained by the final model was 65.7%.

## **Discussion**

These findings provide partial validation of the CSM in a CKD cohort. Based on these results, we suggest that psychological interventions are likely to have a beneficial impact on QoL if they target the mediating psychological processes associated with illness perceptions and psychological distress.



Chronic kidney disease (CKD), and the subsequent development of end-stage kidney disease (ESKD), have been recognised as a global health problem [1]. Around 10% of Australian adults (1.7 million) have at least one sign of CKD [2], and the prevalence of CKD in Australia has increased by around 20% from 2005 to 2010 [1]. According to the Australian Institute of Health and Welfare, in 2011 CKD accounted for 0.9% of the overall total burden of disease and injury in Australia and it is projected that this burden will increase further [3]. In addition to the direct consequences of CKD and ESKD on the individual, these conditions place a burden on the healthcare system both directly (e.g. costs of dialysis) and also through cardiovascular and associated diseases (e.g. coronary heart disease, stroke and peripheral vascular disease), as well as cognitive decline [2, 4].

In addition to the burden on the Australian healthcare system, CKD and ESKD are associated with significant economic and personal impact on patients and their families. Upon diagnosis of CKD, individuals are likely to report increased psychological distress and as the severity of the disease increases so does the severity of mental health symptoms, particularly anxiety and depression [5-13]. The prevalence of depression and anxiety in ESKD cohorts has been consistently reported to be between 20% and 50% [11, 14-16]. In addition to significant mental health concerns, CKD and ESKD cohorts report poor quality of life (QoL), and QoL has been shown to deteriorate with the progression of disease activity [17-20]. Due to the significant burden of CKD and ESKD and associated high psychological comorbidity, several researchers have recommended that a biopsychosocial treatment approach is needed [18, 21]. Bale and colleagues [21] argue that improved clinical outcomes may come about not through invariant biological risk factors, but by modifiable psychosocial factors.

One potential psychosocial model that may help to identify modifiable psychosocial factors is the Common Sense Model (CSM) developed by Leventhal and colleagues [22]. The CSM has been applied across several chronic illnesses including arthritis, diabetes, human

immunodeficiency virus, hypertension (see meta-analysis [23]) and CKD [24] showing the importance of two psychosocial processes - illness perceptions and coping styles - mediating the relationship between disease activity and outcomes such as psychological distress and QoL.

In brief, illness perceptions refer to an individual's cognitive and emotional perceptions of illness. Illness perceptions are commonly assessed across five dimensions: consequences (How much does the illness impact on my physical and psycho-social well-being?); causes (What factors caused or influenced the illness?); identity (How is my identity impacted by having an illness?); timelines (Is the illness chronic, acute or cyclical?); and cure or control (Can the illness be cured or controlled?) [25]. For example, individuals living with CKD are likely to see their condition as chronic and as having a significant impact on their emotional well-being. Research across several chronic illnesses has identified that poorer illness perceptions are associated with increased illness symptoms and greater anxiety and depression [26-34]. The significant impact of poor illness perceptions in CKD cohorts has also been investigated, with several studies demonstrating that poorer illness perceptions are associated with increased disease activity, psychological distress, reduced medication adherence, and poorer QoL [24, 35-43].

In relation to coping styles, Lazarus and Folkman [44] refer to coping as a way in which an individual engages, both behaviourally and cognitively, to attenuate the impact of a stressor. Two of the most commonly reported coping styles identified in the literature are adaptive (or problem-focused) and maladaptive (or emotion-focused) coping. In brief, maladaptive coping tends to focus on ameliorating the associated emotional distress (e.g., praying, avoiding), while adaptive coping involves actively engaging in strategies that target the source of the stress (e.g., planning, problem solving). In CKD, maladaptive coping is associated with increased anxiety and depression and lowered QoL, adaptive coping is associated with an amelioration of these symptoms [45].

Another psychological process that may play a mediating role influencing QoL, is self-efficacy (SE). SE refers to the perceived ability to cope and overcome challenges. Research involving chronic illness conditions - including kidney disease - has identified that lower SE is strongly associated with poorer disease and pain management, lower medication adherence, [46-50], increased psychological distress [47, 51-53] and reduced QoL [50, 54-56]. These findings suggest that along with illness perceptions and coping styles, SE may act as a mediator influencing QoL.

Despite the increasing prevalence of CKD and ESKD, and the associated high prevalence of psychological distress and poor QoL, the mechanisms underpinning the psychological associations remain poorly understood [57]. Given this, the aim of the current study was to explore the utility of the CSM in patients living with CKD. Consistent with the CSM and the work by Knowles and colleagues [24] it was hypothesized that: (1) poorer illness perceptions, and maladaptive coping will be associated with increased psychological distress and poorer QoL; (2) self-efficacy and adaptive coping will be associated with reduced psychological distress and greater QoL; and (3) self-efficacy, adaptive and maladaptive coping, and distress will mediate the relationship between illness perceptions and QoL.

## **METHODS**

In total, 147 individuals diagnosed with CKD participated in this study; 62 (42%) were female and their mean age was 61.1 (SD12.0) years. Demographic details and illness characteristics are shown in Table 1.



Table 1. Participant demographics

Variable	<i>n</i> (%)
Gender	
Male	62 (42.2%)
Female	85 (57.8%)
Employment	
Unemployed	8 (5.4%)
Casual/Part-time employed	17 (11.6%)
Full-time employed	32 (21.8%)
Homemaker	9 (6.1%)
Retired/Unable to work	30 (20.4%)
Other	51 (34.7%)
Education	
Primary	10 (6.8%)
Secondary School	60 (40.8%)
Technical and Further Education	25 (17.0%)
Tertiary-undergraduate	24 (16.3%)
Tertiary-postgraduate	22 (15.0%)
Other	6 (4.1%)
Marital status	
De facto	5 (3.4%)
Divorced	17 (11.6%)
Married	76 (51.7%)
Single	27 (18.4%)
Separated	5 (3.4%)
Widowed	17 (11.6%)
Drinking alcohol	
Don't drink at all	64 (43.5%)
Drink every day in moderate amounts	9 (6.1%)
Drink occasionally (once a week or less)	62 (42.2%)
Drink only on weekends (moderate use)	8 (5.4%)
Other	4 (2.7%)
Living with	
Family	39 (26.5%)
Partner	58 (39.5%)
Alone	37 (25.2%)
Housemates	6 (4.0%)
Other	7 (4.8%)
Kidney disease stage	
Stage 3	5 (3.4%)
Stage 4	57 (38.8%)
Stage 5 (end stage)	85 (57.8%)

## Materials

### *Kidney disease activity*

Renal function was measured by estimated Glomerular Filtration Rate (eGFR). CKD is divided into five stages. The stages are based on the eGFR and we recruited only those with stage 3 or worse renal function: Stage 3 (moderate CKD), is defined as eGFR between 30-59 mL/min (N=5), Stage 4 (severe CKD) as eGFR between 15-29 mL/min (N=57), and stage 5 (End Stage CKD) as eGFR <15 mL/min (N=85).

#### *Illness perceptions:*

Illness perceptions were measured using the Brief Illness Perception Questionnaire (BIPQ), a 9-item questionnaire evaluating cognitive and emotional representations of illness across eight dimensions: consequences, timeline, personal control, treatment control, identity, concern, understanding and emotional response [25]. Each item is assessed on an 11-point rating scale. For example: “How much does your illness affect your life: 0 [not at all] – 10 [severely affects my life]”. Based on the intercorrelation analysis, items 3, 4 and 7 were reversed to be constant with the other items in the scale. Exploratory factor analysis using the principal axis factoring method with an Oblimin rotation, after removal of items with significant cross-loading or weak factor loadings (< .4) identified a 5-item factor solution. The five items composed of: “How much does your illness affect your life”, “How much control do you feel you have over your illness”, “How much do you experience symptoms from your illness”, “How concerned are you about your illness”, and “How much does your illness affect you emotionally”. The BIPQ score is the average of the five items, with higher scores reflecting poorer illness perceptions.

Cronbach’s alpha was 0.73.

#### *Coping styles:*

Coping styles were measured using the Carver Brief Coping Questionnaire (Brief-COPE) a 28-item (14-subscale) questionnaire exploring the ways in which individuals tend to cope with a

stressor on a 4-point rating scale: 0 “I haven’t been doing this at all” - 3 “I’ve been doing this a lot” [58]. An exploratory factor analysis was conducted using the principal axis factoring method with an Oblimin rotation. After removal of items with significant cross-loading or weak factor loadings ( $< .4$ ) two coping styles, namely maladaptive and adaptive coping styles, were identified. Subscale scores were obtained by averaging the items, with higher scores indicating a greater engagement in maladaptive or adaptive coping.

Maladaptive coping styles (Cronbach’s alpha 0.71) consisted of four items: "Using alcohol/drugs to feel better", "Using alcohol/drugs to get through it", "Criticising myself" and "Blaming myself". There were 10 adaptive coping items (Cronbach’s alpha 0.82): "Doing something about my situation", "Taking action to better the situation", "Getting help and advice", "Trying to see things positively", "Getting comfort/understanding from others", "Looking for something good in what is happening", "Accepting reality", "Advice/help about what to do", "Learning to live with it" and "Thinking about what steps to take".

#### *Self-efficacy:*

Self-efficacy was measured using the General Self-Efficacy Scale (GSE) [30], a 10-item measure assessing perceived self-efficacy; that is, optimistic self-beliefs in relation to overcoming challenges in one’s life. Responses are made on a 4-point scale, for example: “I can always manage to solve difficult problems if I try hard enough”: 1 [Not at all true] to 4 [Exactly true]. Items were summed, giving a score range of 10 to 40, with higher scores indicating greater self-efficacy. Cronbach’s alpha was 0.92.

#### *Psychological distress:*

Psychological distress was measured by the Hospital Anxiety and Depression Scale (HADS) [59]), a 14-item self-report questionnaire assessing levels of anxiety (ANX; 7 items) and

depression (DEP; 7 items) over the prior week. Each question is assessed on a 4-point Likert Scale, for example: “I feel tense or ‘wound up’” (0 = not at all; 3 = most of the time). Subscale scores were derived by summing respective anxiety and depression items, with values being interpreted as: 0-7 (normal), 8-10 (mild), 11-15 (moderate), and 16-21 (severe) [60]. Internal consistency of the subscales for anxiety and depression were 0.82 and 0.76 respectively. Overall psychological distress was calculated by summing the two subscales and dividing by two, giving a score range of 0 to 21, with higher scores indicating greater distress; Cronbach’s alpha was 0.87

#### *Quality of life:*

Quality of life was measured by the Kidney Disease Quality of Life Short Form (KDQoL-SF) [61] which consists of 43 kidney disease-targeted items (e.g., “My kidney disease interferes too much with my life”) assessed on a range of different answer formats (e.g., Yes/No, 1 = not at all to 5 = extremely). Item scores are transformed into a 0–100 range and then averaged, with overall higher scoring indicating better quality of life. Cronbach’s alpha was 0.82

#### **Procedures**

Patients attending two large metropolitan hospital dialysis clinic were invited to participate in the study. Consenting patients could complete the questionnaire at a time and place convenient to them and return the questionnaire using a pre-paid envelope or to their dialysis nurse. The study protocol was approved by the Hospital Human Research Ethics Committee (HREC-A 019/14). An executive steering committee (all authors) oversaw project planning, procedures and ongoing data collation.

#### **Statistical analyses**

Exploratory analysis and visual inspection of the data indicated that all study variables met the necessary assumptions for statistical analysis (e.g., normality, linearity). Correlational analyses was used to test hypothesis one and two. Prior to testing the 3<sup>rd</sup> hypothesis, divergent validity was first assessed using the heterotrait-monotrait (HTMT) method [62]. After the study variables were found to demonstrate discriminant validity, hypothesis three was tested using mediation analysis with 1,000 bootstrap samples, using the PROCESS macro for SPSS, developed by Preacher and Hayes [63]. The procedures suggested by Hayes [64] allow for detecting the difference between the direct effect of a predictor on an outcome variable (i.e., QoL).

## RESULTS

Of the 147 participants, the majority ( $n=109$ , 74.1%) reported no anxiety symptoms, 38 (25.9%) reported mild, moderate or severe anxiety symptoms, while 98 (66.7%) reported no depressive symptoms and 49 (33.3%) reported mild, moderate or severe levels of depressive symptoms. As shown in Table 2, correlational analyses supported our first hypothesis, that poorer illness perceptions and maladaptive coping would be associated with increased psychological distress and poorer QoL. Our second hypothesis was partially supported, in that self-efficacy was associated with reduced psychological distress and greater QoL, but was not significantly related to psychological distress or QoL. While eGFR was positively related to adaptive coping and negatively related to maladaptive coping, it was not significantly correlated with any other study variable.

Table 2. Correlations and descriptive values of study variables.

	1	2	3	4	5	6	Mean (SD)
1. eGFR	-						14.62 (7.34)
2. Illness perceptions	.03	-					6.24 (2.03)
3. Self-efficacy	-.14	-.24**	-				31.38 (5.17)
4. Maladaptive coping	.18*	.34**	-.25**	-			0.31 (0.51)
5. Adaptive coping	-.24**	.07	.28**	.11	-		1.39 (0.63)
6. Psychological distress	-.01	.54**	-.57**	.35**	.03	-	5.63 (3.45)
7. Quality of life	-.03	-.70**	.46**	-.29**	-.01	-.71**	67.50 (14.92)

Note. \*\*  $p < 0.01$ , \*  $p < 0.05$ .

As shown in Figure 1, psychological distress was the strongest predictor of QoL and demonstrated the strongest mediating effects between illness perception and QoL. The direct effect of illness perception on QoL was significant, but the strength of this effect ( $\beta = -.489$ ) was moderate in relation to the total indirect effect ( $\beta = -.231$ ). Self-efficacy and maladaptive and adaptive coping were not found to mediate the relationship between illness perceptions and QoL. The final model indicated that approximately 65.7% of variance in QoL was accounted for ( $R^2 = 65.7\%$ ,  $F(5, 112) = 42.98$ ,  $p < .001$ ). Table 3 provides a summary of the mediational model indirect, direct, and total effects.

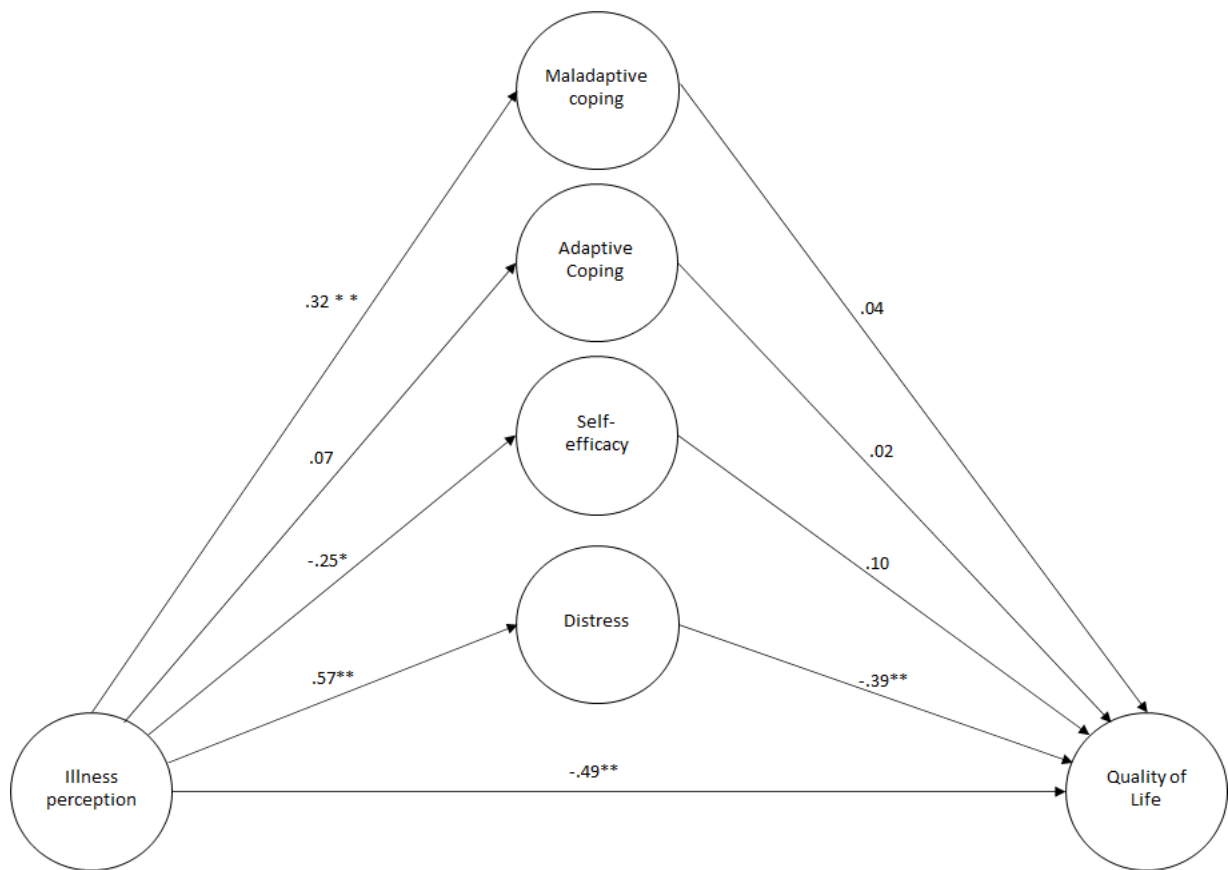


Figure 1. Standardised regression coefficients for the relationship between eGFR and QoL, as mediated by scores on the maladapting coping, adaptive coping, illness perception, self-efficacy, and distress (\* $p < .05$ , \*\* $p < .001$ ).

Table 3. Indirect, direct, and total effects for the relationship between illness perception and quality of life.

Effect	B (SE) <sup>a</sup>	[95% BC bootstrapped CI]	$\beta$
Indirect effects			
Maladaptive coping	.097 (.185)	[-.257, -.484]	.014*
Adaptive coping	.009 (.054)	[-.109, .131]	.009
Self-efficacy	-.171 (.140)	[-.473, .071]	-.024
Psychological distress	-1.577 (.400)	[-2.429, -.873]	-.222*
Total indirect effect	-1.642 (.442)	[-2.569, -.830]	-.231*
Direct effect	-3.477 (.485)	[-4.437, -.2517]	-.489*
Total effect	-5.119(.459)	[-6.028, -4.210]	-.720*

Note.  $N = 147$ . B = unstandardised coefficient; SE = standard error; BC = bias-corrected; CI = confidence interval;  $\beta$  = standardised coefficient. \* Statistically significant based on 95% bias-corrected bootstrapped confidence interval not including 0. <sup>a</sup> Bootstrap standard error.

## DISCUSSION

Our finding that around a quarter (25.9%) of participants experienced mild to severe anxiety, while a third (33.3%) experienced mild to severe depression is consistent with past research involving CKD cohorts [5-13]. The findings that poorer illness perceptions were associated with increased psychological distress and reduced QoL supported our first hypothesis. These results suggest that, as individuals perceive their illness as concerning, affecting their life and emotions, and having significant symptoms, psychological distress and poorer QoL ensue. These results are consistent with past chronic illness research demonstrating that poorer illness perceptions are associated with increased anxiety and depression [26-34]. Previous research involving CKD cohorts have also demonstrated the strong association between poor illness perceptions and increased psychological distress and poorer quality of life [24, 35-43].

Partial support for our second hypothesis was found, while higher self-efficacy was associated with reduced psychological distress and increased QoL, adaptive coping was related to neither psychological distress nor QoL. These findings, consistent with past research, suggest that self-efficacy is associated with reduced psychological distress [47, 51-53] and higher QoL [50, 54-56]. We found partial support for our third hypothesis, in that psychological distress mediated the relationship between illness perceptions and QoL. This finding is consistent with the premise of the CSM in that outcomes such as QoL are influenced by illness perceptions, whilst illness perceptions in turn affect QoL via mediators, in this case - psychological distress. This finding extend the only published CSM study of CKD [24], which found that illness perceptions had a direct and indirect (via adaptive and maladaptive coping) effect on anxiety and depression, showing that psychological distress serves as a mediator of QoL. Based on these findings, we suggest that psychological interventions are likely to have a beneficial impact on QoL if they target the mediating psychological processes associated with illness perceptions and psychological distress.



While the current study has a relatively large sample size and performed thorough assessments of the domains of interest, using validated measures, it is not without limitations. All participants having been drawn from two metropolitan hospitals in the same city, limits the generalisability of these findings and therefore replication with larger more representative (e.g., city and regional) samples is required. Due to the cross-sectional nature of the study, true causal (mediational) relationships could not be tested. Interestingly, the current study found that kidney disease status (eGFR) was not correlated with any of the study variables except for adaptive and maladaptive coping. This findings is inconsistent with past research which has found that greater kidney disease status was associated with poorer psychological well-being and quality of life [17-20]. Given these findings, further research is needed to explore the role of coping, self-efficacy and other potential mediators of QoL, including self-esteem, social support, personality and resilience factors (e.g., locus of control, optimism, hardiness), and health related factors (e.g., adherence to medical recommendations, mental health engagement).

## **Conclusions**

The current study illuminates the role of illness perceptions and psychological distress on individual QoL in people with CKD. Specifically, the study demonstrated that psychological distress mediated the influence of illness perceptions on QoL. These results provided further evidence for the importance of exploring illness perceptions and psychological distress in cohorts living with CKD.

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