1  **Modelling the relationship between perfectionism, self-compassion and**
2      **psychological health outcomes in kidney transplant recipients**

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16

17  **Abstract**

18  Chronic kidney disease (CKD) affects around 850 million people globally,
19  imposing significant physical and psychological health burdens. This study tested
20  a model of how perfectionism, via its effect on self-compassion, stress and coping,
21  can affect health outcomes such as health-related quality of life and intuitive
22  eating for people with long-term conditions, which had not been previously tested
23  in a sample of people with CKD. To address this gap, structural equation
24  modelling was used to model the association between these constructs in a
25  sample of kidney transplant recipients (n=354) and a non-CKD comparison group
26  (n=400). Results showed that 'maladaptive' perfectionism significantly predicted
27  lower levels of self-compassion, coping, intuitive eating and health-related quality
28  of life, and higher levels of stress. However, self-compassion was found to buffer
29  this effect, demonstrating that higher levels of this positive self-attitude could
30  help to ameliorate the negative associations between maladaptive perfectionism
31  and health outcomes.

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33  **Keywords**: perfectionism; self-compassion; intuitive eating; quality of life;
34  kidney disease; kidney transplant

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36  **1    Background**

37  **1.1   Chronic kidney disease**

38  Chronic kidney disease (CKD) affects around 850 million people globally (Francis
39  *et al.*, 2024). It is characterised by long-term deterioration in kidney functioning
40  that can be initially asymptomatic but is associated with fatigue, pain, weakness
41  and sleep problems as disease severity increases (Brown *et al.*, 2018). For patients

in end-stage kidney disease (ESKD), defined as kidney function <10%, dialysis or kidney transplant becomes necessary (NICE, 2018). Kidney transplants offer significant long-term survival advantage over dialysis (Chaudhry *et al.*, 2022), but often come with high levels of clinical monitoring, other health complications and need for scrupulous medication adherence (Shupo *et al.*, 2016; Gibbons *et al.*, 2021) that can affect a kidney transplant recipient's (KTR's) psychological health. Unsurprisingly, there is an increased prevalence of depression and anxiety in people with CKD (Shirazian *et al.*, 2017) which is associated with numerous poor health outcomes, including more rapid kidney function decline (Tsai *et al.*, 2012), non-adherence to medical advice (DiMatteo, Lepper and Croghan, 2000) and increased risk of premature death (Palmer *et al.*, 2013).

## 1.2   Perfectionism

One construct that can play a key role in adjustment to and management of chronic illness is perfectionism – a multidimensional trait characterised by striving for flawlessness, concern over mistakes and excessive self-scrutiny (Stoeber and Otto, 2006; Molnar, Sirois and Methot-Jones, 2016). Perfectionism is generally conceptualised as having two factors; maladaptive perfectionism or 'perfectionistic concerns' (PC) and adaptive perfectionism or 'perfectionistic strivings' (PS). PC encompasses concern over mistakes, excessively high standards and fear of negative evaluation (Stoeber and Otto, 2006) and is associated with lower engagement in preventative health behaviours (Williams and Cropley, 2014) and maladaptive coping with illness (Shanmugasegaram *et al.*, 2014). PS is characterised by high personal standards and an intrinsic motivation to succeed (Stoeber and Otto, 2006) and in general population samples is associated with problem-focused coping (Stoeber, Damian and Madigan, 2017) and better physical health (Molnar *et al.*, 2006). However, in clinical samples, PS appears to be less adaptive (Molnar, Sirois and Methot-Jones, 2016) and has been associated with lower levels of health functioning (Molnar *et al.*, 2012) and higher levels of psychopathology (Limburg *et al.*, 2017).

## 1.3   Self-compassion

Within this context, an approach that could be useful for KTRs is self-compassion, a self-attitude characterised by non-judgemental awareness of painful thoughts and feelings, recognition of common humanity and kindness towards oneself during difficult times (Neff, 2003). It is associated with increased practice of health-promoting behaviours (Sirois and Rowse, 2016; Dunne, Sheffield and Chilcot, 2018), lower levels of depression and anxiety (Linardon *et al.*, 2020) and use of adaptive coping strategies (Sirois, Kitner and Hirsch, 2015). It is also associated with better adjustment to long-term health conditions (Sirois and Wood, 2016), improved health outcomes in chronic illness populations (Morrison *et al.*, 2021), seeking medical consultation when needed, and conscientiously following medical advice (Terry *et al.*, 2013).

## 1.4   Intuitive eating

Another approach that could be useful for KTRs, particularly those that had to follow a restrictive 'kidney diet' prior to transplantation (McCloskey, Clarke and Rayner, 1997), is intuitive eating (IE).  IE is an adaptive eating behaviour characterised by having unconditional permission to eat when you are hungry, eating for physical rather than emotional reasons, relying on internal hunger and

89 satiety cues to determine what, when and how much to eat, and honouring your
90 health and practising 'gentle nutrition' (Tylka and Kroon Van Diest, 2013). It is
91 associated with lower levels of disordered eating (Babbott *et al.*, 2023), lower
92 cholesterol, BMI and blood pressure (Van Dyke and Drinkwater, 2022) and has
93 been identified as a potentially useful form of nutritional counselling for people
94 with CKD (Pereira *et al.*, 2021).

## 1.5    Modelling perfectionism in illness

96 The *Stress and Coping Cyclical Amplification Model of Perfectionism in Illness*
97 (SCCAMPI; Molnar, Sirois and Methot-Jones, 2016) posits a theoretical explanation
98 for the impact that perfectionism can have on health, via self-compassion. Self-
99 compassion is known to be negatively associated with perfectionism (Linnett and
100 Kibowski, 2020) and this is particularly likely to be the case in medical populations
101 where there is already a greater tendency towards negative self-evaluation
102 (Harrison *et al.*, 2015). The SCCAMPI suggests that perfectionism is likely to
103 negatively affect self-compassion, which then has a detrimental effect on stress
104 and coping which, in turn, negatively impacts illness symptoms and health-related
105 behaviours.

## 1.6    The present study

107 Although there have been several studies that use the SCCAMPI to date (e.g.
108 Sirois *et al.*, 2019, 2021), the model has never been tested with people with CKD.
109 Consequently, this study tested the model in a sample of KTRs using
110 multidimensional perfectionism and self-compassion as predictors of health-
111 related quality of life (HRQoL) – which was used in place of illness symptoms due
112 to a lack of appropriately brief symptom scales for KTRs[1] - and the health-related
113 behaviour of IE.

114 This paper will test 1) a mediation model with perfectionism as the core predictor,
115 self-compassion the key mediator through which perfectionism influences
116 outcomes, and the health-promoting behaviour of IE as the outcome; and 2) an
117 extended model with perfectionism predicting self-compassion, which predicts
118 stress and coping, which subsequently predict the outcome measures of IE and
119 HRQoL.

120

## 2    Research question, aims and objectives

122 This study aimed to use the SCCAMPI to develop and test a model of how
123 perfectionism and self-compassion are associated with IE and HRQoL for KTRs by
124 addressing the following question:

125 *How are perfectionism and self-compassion associated with IE and HRQoL in*
126 *KTRs and a non-CKD comparison group?*

127 This was achieved via the following objectives:

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1 [1] This approach has also been used in other studies using the SCCAMPI (e.g.
2 Sirois *et al.*, 2019),

1. Test a mediation model investigating the direct and indirect relationships between perfectionism and IE, with self-compassion as a mediator, in a group of KTRs and a comparison group

2. Test an extended model exploring the direct and indirect relationships between perfectionism, IE and HRQoL, via self-compassion, coping and stress, in a group of KTRs[2]

## 3    Method

Cross-sectional data were collected using self-report surveys, administered online.

### 3.1    Participants

Power analysis (Soper, 2023) indicated that to detect an effect size (i.e. regression weight between variables) between 0.3 and 0.5 ($\alpha$=0.05, power=0.80), Model 1 (six latent variables, 20 observed variables) would require 156-161 participants in each group and Model 2 (eight latent variables, 36 observed variables) would require 88-177. Participants were recruited online via social media and CKD organisations and charities, in the UK only due to ethical approval constraints.

### 3.2    Measures

Short-form or brief measures were chosen where possible to limit questionnaire length and reduce participant burden.

*Sociodemographics.* Once they had consented, participants were asked to provide their age, gender, ethnicity, education level, occupational status and to indicate whether English was their first language. The KTR group were also asked about when they were first diagnosed with CKD, their current transplant, whether they had ever been on dialysis, and any other health conditions.

*Coping.* Coping was measured using the three-item Coping Efficacy Scale (CES; Gignac, Cott and Badley, 2000). Items are responded to on a five-point Likert scale ranging from 'Strongly disagree' to 'Strongly agree'. None of the items are reverse-scored, and higher scores indicate higher levels of coping. It has shown good internal consistency of 0.79-0.90 in other illness populations (Voth and Sirois, 2009; Gick and Sirois, 2010).

*Health-related quality of life.* HRQoL was measured using 12 items from the Kidney Disease Quality of Life-36 (KDQOL-36) survey (Peipert *et al.*, 2019). The items used were taken from the v.1 of the SF-12 (Ware, Kosinski and Keller, 1996), which is a measure that assesses the impact of health on an individual's everyday life. The measure uses a variety of scale responses, including Likert and yes/no questions. The KDQOL-36 uses a scoring spreadsheet which provides a SF-12 Mental Composite Score (MCS) and Physical Composite Score (PCS), relating to the person's mental and physical HRQoL. It is not possible to estimate internal consistency due to the instrument's structure, but studies have shown the

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[2] This model was only tested in the KTR group because the HRQoL and coping measures were designed for people living with illness and therefore inappropriate for administration to the comparison group.

168 KDQOL-36 and the SF-12 MCS and PCS components to be valid and reliable
169 measures (Yang *et al.*, 2013; Peipert *et al.*, 2018).

170 *Intuitive eating.* IE was measured using an alternate model of the Intuitive Eating
171 Scale-2 (IES-2) posited by Saunders et al. (2018) with 11 items loading onto the
172 three latent variables of (1) Eating for physical rather than emotional reasons, (2)
173 Reliance on hunger and satiety cues, and (3) Body-food choice congruence. Items
174 are responded to on a five-point Likert scale ranging from 'Strongly Disagree' to
175 'Strongly Agree'. Four items were reverse-scored, and higher scores indicate
176 higher levels of IE. Saunders et al. (2018) report good internal consistency for all
177 subscales ('Eating for physical rather than emotional reasons' = 0.84, 'Reliance
178 on hunger and satiety cues' = 0.78, 'Body-food choice congruence' = 0.89) and
179 Linnett et al. (2025) demonstrated the amended scale's factorial validity in a
180 sample of KTRs and a non-CKD comparison group.

181 *Perfectionism.* Perfectionism was measured using the short form of the Almost
182 Perfect Scale-Revised (SAPS; Rice, Richardson and Tueller, 2014). The scale
183 contains eight items, responded to on a seven-point Likert scale ranging from
184 'Strongly disagree' to 'Strongly agree'. None of the items were reverse-scored,
185 and higher scores indicate higher levels of perfectionism. The SAPS has two
186 subscales: Standards, which relates to positive or adaptive perfectionism
187 (perfectionistic strivings (PS)), and Discrepancy, which relates to negative or
188 maladaptive perfectionism (perfectionistic concerns (PC)). It has shown good
189 internal consistency of 0.90-0.94 in previous studies (Barnett and Sharp, 2016;
190 Milicev *et al.*, 2023).

191 *Self-compassion.* Self-compassion was measured using the Self-Compassion Scale
192 short form (SCS-SF; Raes *et al.*, 2011). The scale contains 12 items, and
193 participants are asked to indicate on a five-point Likert scale (from 'Almost never'
194 to 'Almost always') how often they act that way towards themselves when they are
195 going through a difficult time. Six items are reverse-scored, and higher scores
196 indicate higher levels of self-compassion. The SCS-SF has six subscales, which
197 represent the three dyads of self-compassion: (1) Self-kindness/Self-judgement,
198 (2) Common humanity/Isolation, and (3) Mindfulness/Over-identification. It has
199 shown good internal consistency of 0.85-0.87 in previous studies (Neff and
200 Germer, 2013; Smeets *et al.*, 2014) and has a near-perfect correlation with the
201 long form of the scale (Raes *et al.*, 2011).

202 *Stress.* Stress was measured using the ten-item Perceived Stress Scale (PSS;
203 Cohen, Kamarck and Mermelstein, 1983). Participants indicate on a five-point
204 Likert scale (from 'Never' to 'Very often') how often they have felt or thought a
205 certain way in the last month. Four items are reverse-scored, and higher scores
206 indicate higher levels of stress. A systematic review of the psychometric
207 properties of the PSS (Lee, 2012) found that internal consistency ranged between
208 0.78-0.91 across ten studies.

### 3.3 Analysis

210 All models were specified and analysed in SPSS AMOS v.29 (Amos Development
211 Corporation, 2022) and estimated using maximum likelihood estimation. Model fit
212 was evaluated using standard goodness-of-fit indices (Hu and Bentler, 1999; Kline,
213 2011), including relative chi-square (CMIN/DF), chi-square and degrees of
214 freedom, the comparative fit index (CFI), the non-normed fit index (NNFI), the

root mean square error of approximation (RMSEA), and the standardised root mean square residual (SRMR). Conventional thresholds for these fit indices are defined as a CMIN/DF <3, CFI and NNFI values >0.90, and RMSEA and SRMR values <0.08 (Browne and Cudeck, 1993; Hu and Bentler, 1999; Tabachnick and Fidel, 2013).

### 3.3.1 Measurement models

Several confirmatory factor analyses were first performed to check measurement model fit for the latent variables to be used in the structural equation models (SEMs). Invariance tests were then performed on the measurement models included in Model 1 (IE and perfectionism; see below) to ascertain whether the instruments were operating in the same way in both the KTR and comparison groups (Byrne, 2004, 2016). These were hierarchical analyses testing constrained models against a baseline unconstrained model (where no constraints were imposed on the estimated parameters of the model) to identify whether there were statistically significant differences ($p>.05$) between the KTR and comparison groups in how these constructs were measured. For the IE measurement model, the constrained models tested against the baseline (unconstrained) model were (1) Measurement weights, (2) Measurement weights + structural weights; and (3) Measurement weights + structural weights + structural covariances. For the perfectionism measurement model, the constrained models tested against the baseline (unconstrained) model were (1) Measurement weights and (2) Measurement weights + structural covariances.

### 3.3.2 Structural equation models

*Model 1.* This model tested the mediating role of self-compassion on the relationship between multidimensional perfectionism (PS and PC) and IE. Baron and Kenny's (1986) conventional guidelines for mediation were used to guide the analyses. Analyses of mediation effects employed a bootstrapped procedure based on 5,000 samples with 95% confidence intervals calculated. Using this procedure, an indirect effect is considered significant if both the upper and lower bounds of the confidence intervals do not contain zero (Preacher and Hayes, 2008). This model was tested in both the KTR and comparison groups and was run twice per group to detect differences in the direct effect between the predictor and the dependent variable with and without the presence of the mediator.

*Model 2.* The second model was based on the SCCAMPI. This accounted for the effects of stress and coping with additional outcome variables of physical and mental HRQoL. This model was only tested within the KTR group as this is specifically a model of perfectionism in *illness* and some of the measures (coping, HRQoL) could only be administered to the KTR group as they ask questions directly related to living with a health condition.

### 3.4    Ethical considerations

Ethical approval was granted on 22/07/2021 by the University of Leicester (ref: 26219-rjl48-ls:healthsciences). Written informed consent to participate and to publish anonymous and/or aggregate data was received from all participants prior to study involvement. The study was conducted in accordance with the Declaration of Helsinki.

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## 4 Results

## 4.1 Participants

755 people completed the survey. One person was removed as they were aged <18. The final sample consisted of 754 adults (354 KTRs and 400 people without CKD) living in the UK, meeting sample size requirements for both models. The KTR group was slightly older than the comparison group; both groups were predominantly white and female. See Table 1 for full sociodemographic characteristics of both samples.

## 4.2 Descriptive statistics

Descriptive statistics and correlations for both groups are displayed in Table 2. Bivariate and partial correlations are presented between PS and all variables, the latter controlling for the suppressor effects of PC on PS[3]. PC was significantly negatively associated with self-compassion and IE for both groups. It was also negatively associated with coping and HRQoL, and positively associated with stress, for KTRs. PS, controlling for the suppressor effects of PC, had small positive associations with coping, HRQoL and IE for KTRs. It was not significantly associated with stress or self-compassion in either group, or with IE for the comparison group.

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**Table 1**

*Demographic characteristics of the survey samples (N=755)*

|  | KTRs (*n*=354) | Comparison (*n*=400) |
|---|---|---|
| *Age (years)* | 53.10 (12.46) | 39.39 (12.91) |
| Range | 20-87 | 18-78 |
| *Gender identity* |  |  |
| Female | 264 (74.6) | 337 (84.3) |
| Male | 90 (25.4) | 51 (12.8) |
| Non-binary/third gender | - | 10 (2.5) |
| Prefer to self-describe | - | 2 (0.5) |
| *Ethnicity* |  |  |
| Asian/Asian British | 12 (3.4) | 21 (5.3) |
| Black/African/Caribbean/Black British | 3 (0.8) | 7 (1.8) |
| Mixed/multiple ethnic groups | 4 (1.1) | 13 (3.3) |
| White | 330 (93.2) | 357 (89.3) |
| Other, or prefer not to say | 5 (1.4) | 2 (0.5) |
| *Highest education level* |  |  |
| Postgraduate degree | 64 (18.1) | 273 (68.3) |
| Undergraduate degree | 91 (25.7) | 64 (16.0) |

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[3] PC can act as a suppressor variable when there are high levels of overlap between the dimensions, making PS appear less adaptive (Hill and Curran, 2015; Limburg *et al.*, 2017).

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| | | |
|---|---|---|
| Higher education | 56 (15.8) | 24 (6.0) |
| A-level | 39 (11.0) | 24 (6.0) |
| GCSE or equivalent | 81 (22.9) | 8 (2.0) |
| No qualification | 9 (2.5) | 3 (0.8) |
| Other, unsure, or prefer not to say | 14 (4.0) | 4 (1.0) |
| *Occupation* | | |
| Employed part-time | 66 (18.6) | 87 (21.8) |
| Employed full-time | 90 (25.4) | 177 (44.3) |
| Self-employed | 30 (8.5) | 16 (4.0) |
| Full-time student | 5 (1.4) | 76 (19.0) |
| Unemployed – looking for work | 7 (2.0) | 4 (1.0) |
| Unemployed – not looking for work | 10 (2.8) | 1 (0.3) |
| Unable to work | 35 (9.9) | 6 (1.5) |
| Retired | 103 (29.1) | 22 (5.5) |
| Other, or prefer not to say | 8 (2.3) | 11 (2.8) |
| *Years since diagnosis* | 26.00 (15.00-37.00)[†] | - |
| Range | 3-74 | - |
| *Years since current transplant* | 7.00 (5.00-13.00)[†] | - |
| Range | 1-44 | - |

Figures denote Mean (*SD*) or *n* (%) unless otherwise stated. [†] Median ($25^{th}$ – $75^{th}$ centile).

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**Table 2**

*Variable correlations, means (M), standard deviations (SD) and internal consistencies (α)*

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | $\alpha_{KTR}$ | $M_{KTR}$ | $SD_{KTR}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Coping | - | .39*** | .44*** | .32*** | -.03$^{ns}$ | .14* | -.32*** | .43*** | -.46*** | .90 | 3.68 | 1.17 |
| 2. HRQoL: Physical | - | - | .16** | .17** | .06$^{ns}$ | .18*** | -.25*** | .22*** | -.30*** | - | 42.96 | 11.50 |
| 3. HRQoL: Mental | - | - | - | .39*** | -.14** | .11* | -.49*** | .61*** | -.75*** | - | 45.12 | 11.54 |
| 4. Intuitive eating | - | - | - | - | -.04$^{ns}$ | .13* | -.36*** | .49*** | -.46*** | .88 | 3.18 | 0.88 |
| 5. Perf. strivings | - | - | - | -.08$^{ns}$ | - | - | .44*** | -.23*** | .19*** | .95 | 4.83 | 1.72 |
| 6. Perf. strivings$^{\dagger}$ | - | - | - | .07$^{ns}$ | - | - | .45*** | .08$^{ns}$ | -.11$^{ns}$ | .95 | 4.83 | 1.72 |
| 7. Perf. concerns | - | - | - | -.31*** | .45*** | .46*** | - | -.67*** | .60*** | .95 | 3.64 | 1.84 |
| 8. Self-compassion | - | - | - | .39*** | -.33*** | -.03$^{ns}$ | -.65*** | - | -.74*** | .88 | 3.06 | 0.82 |
| 9. Stress | - | - | - | -.33*** | .34*** | .05$^{ns}$ | .60*** | -.68*** | - | .90 | 2.90 | 0.79 |
| $\alpha_{Comparison}$ | - | - | - | .87 | .94 | .94 | .93 | .89 | .89 | | | |
| $M_{Comparison}$ | - | - | - | 3.13 | 5.44 | 5.44 | 3.98 | 2.89 | 3.06 | | | |
| $SD_{Comparison}$ | - | - | - | 0.82 | 1.40 | 1.40 | 1.75 | 0.78 | 0.76 | | | |

Kidney transplant recipient (KTR) group values are above the diagonal; comparison group values are presented below the diagonal. Coping and HRQoL were not administered to the comparison group. Alpha cannot be estimated for HRQoL measures.

Key:  $^{\dagger}$ Controlling for suppressor effects of PC on PS    * $p<.05$     ** $<.01$      *** $p<.001$   *ns* Statistically non-significant ($p>.05$)

### 4.3 Latent variable measurement models and observed study variables

Model fit estimates for the measurement models of each of the latent constructs can be seen in Table 3. Apart from Coping (see below) and Perfectionism in the comparison group ($\chi^2(19, n=400)=24.66$, $p=.172$), the chi-square tests for all measurement models were highly significant, as would be expected for samples of this size. See Supplementary File 1 for tabulated factor loadings and further details on the measurement models.

**Table 3**
*Model fit estimates for latent variable measurement models*

| | $\chi^2$ | $df$ | CFI | TLI | SRMR | RMSEA | RMSEA: 90% CIs Lower | Upper |
|---|---|---|---|---|---|---|---|---|
| **Coping** | | | | | | | | |
| KTR | 0.00 | 0 | 1.00 | 1.00 | 0.00 | 0.84 | 0.79 | 0.89 |
| **Intuitive eating** | **200.49** | **82** | **0.98** | **0.97** | **0.04** | **0.04** | **0.04** | **0.05** |
| KTR | 96.83 | 41 | 0.98 | 0.97 | 0.04 | 0.06 | 0.05 | 0.08 |
| Comparison | 103.66 | 41 | 0.98 | 0.97 | 0.04 | 0.06 | 0.05 | 0.08 |
| **Perfectionism** | **71.39** | **38** | **0.99** | **0.99** | **0.02** | **0.03** | **0.02** | **0.05** |
| KTR | 46.72 | 19 | 0.99 | 0.99 | 0.02 | 0.06 | 0.04 | 0.09 |
| Comparison | 24.66 | 19 | 0.99 | 0.99 | 0.01 | 0.03 | 0.00 | 0.06 |
| **Self-compassion** | | | | | | | | |
| KTR | 113.68 | 39 | 0.96 | 0.94 | 0.05 | 0.07 | 0.06 | 0.09 |
| Comparison | 67.14 | 39 | 0.99 | 0.98 | 0.03 | 0.04 | 0.02 | 0.06 |
| **Stress** | | | | | | | | |
| KTR | 148.60 | 35 | 0.93 | 0.91 | 0.05 | 0.10 | 0.08 | 0.11 |
| Comparison | 165.21 | 35 | 0.92 | 0.90 | 0.05 | 0.10 | 0.08 | 0.11 |

Global fit indices from multigroup analyses are on bolded rows.
Coping measure was not administered to comparison group.
CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; SRMR = Standardized Root Mean Square Residual; RMSEA = Root Mean Square Error of Approximation

290 Once measurement model fit had been tested, the IE and perfectionism
291 measurement models were then analysed as nested models to test for multigroup
292 invariance. Whilst the measurement model for IE was invariant across the KTR
293 and comparison groups, variance was detected across these groups for the
294 perfectionism measurement model. See Supplementary File 1 for further details.

## 4.4    Structural equation models

### 4.4.1 Model 1

297 Correlation analyses showed that whilst criteria for establishing evidence for a
298 mediation effect were met in both groups for PC, PS was not significantly
299 associated with self-compassion (the mediator) in either group. Given the
300 theoretical basis of the model design, PS was retained in the model but not
301 included in the mediation analysis. Furthermore, due to variance in the
302 perfectionism measurement model, Model 1 could not be tested as a multigroup
303 SEM as originally planned. The model was therefore tested separately in the KTR
304 and comparison groups, meaning direct comparisons could not be drawn between
305 the outputs.

306 *Model 1a: KTR group.* Model 1a results revealed that, amongst KTRs, there was a
307 significant indirect effect of PC on IE via self-compassion ($\beta$=-.37, $p$<.001).
308 Furthermore, the direct effect of PC on IE reduced in magnitude in the presence
309 of the mediator (self-compassion) from $\beta$=-.22 ($p$<.001) to $\beta$=-.10 and was no
310 longer statistically significant ($p$=.22), suggesting that self-compassion fully
311 mediated the relationship between PC and IE in this sample. Mediation analysis
312 was not performed for PS as it was not significantly associated with the mediator
313 but there was a small, significant, direct effect of PS on IE ($\beta$=.16, $p$<.05),
314 suggesting that adaptive perfectionism may have a small, positive, association
315 with IE that is not explained by changes in self-compassion. Results are
316 summarised in Figure 1. With the exception of the chi-square test, which was
317 highly significant as expected for a sample of this size ($\chi^2$(163, n=354)=282.48,
318 $p$<.001), estimates of model fit also indicated that this model fit the data well in
319 this sample (see Table 4) and explained 35% of the variance in IE scores ($R^2$=0.35,
320 $p$=.001).

321

322                              [Insert Figure 1 here]

323   **Figure 1.** Model 1a: Mediation model (n=354) of PC on IE via self-compassion,
324        in a KTR sample. Direct effect of PC on IE without mediator is shown in
325     brackets. Dotted line indicates untested theoretical path. Estimates shown are
326                                      $\beta$-values.
327                              *$p$<.05, ***$p$<.001

328

329 *Model 1b: Comparison group.* Model 1b results revealed that, in the comparison
330 group, there was again a significant indirect effect of PC on IE via self-compassion
331 ($\beta$=-.29, $p$<.001). Furthermore, the direct effect of PC on IE reduced in magnitude
332 from $\beta$=-.41 ($p$<.001) to $\beta$=-.12 in the presence of the mediator (self-compassion)
333 and was no longer statistically significant ($p$=.16), suggesting that self-
334 compassion fully mediated the relationship between PC (maladaptive

perfectionism) and IE in this sample too. Mediation analysis was not performed for PS as it was not significantly associated with the mediator. There was also no significant direct effect between PS and IE in this sample. Results are summarised in Figure 2. With the exception of the chi-square test, which was highly significant as expected for a sample of this size ($\chi^2(163, n=400)=306.56$, $p<.001$), estimates of model fit also indicated that this model fit the data well in this sample and explained 24% of the variance in IE scores ($R^2=0.24$, $p=.001$).

[Insert Figure 2 here]

**Figure 2.** Model 1b: Mediation model (n=400) of PC on IE via self-compassion, in a non-CKD sample. Direct effect of PC on IE without mediator shown in brackets. Dotted line indicates untested theoretical path. Estimates shown are β-values.
*$p<.05$, ***$p<.001$

**Table 4**

*Fit indices for structural equation models*

| | KTRs | | | | | | RMSEA: 90% CIs | | Comparison group | | | | | | RMSEA: 90% CIs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\chi2$ | *df* | CFI | TLI | SRMR | RMSEA | Lower | Upper | $\chi2$ | *df* | CFI | TLI | SRMR | RMSEA | Lower | Upper |
| Model 1 – unmediated | 255.72 | 146 | 0.98 | 0.98 | 0.06 | 0.05 | 0.04 | 0.06 | 269.66 | 146 | 0.98 | 0.97 | 0.05 | 0.05 | 0.04 | 0.06 |
| Model 1 – mediated | 282.48 | 163 | 0.98 | 0.98 | 0.06 | 0.05 | 0.04 | 0.05 | 306.56 | 163 | 0.98 | 0.97 | 0.05 | 0.05 | 0.04 | 0.06 |
| Model 2 | 1113.82 | 549 | 0.94 | 0.93 | 0.07 | 0.05 | 0.05 | 0.06 | - | - | - | - | - | - | - | - |

CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; SRMR = Standardized Root Mean Square Residual; RMSEA = Root Mean Square Error of Approximation

### 4.4.2 Model 2

A second model was then tested in the KTR group to ascertain the direct and indirect relationships between perfectionism and IE and HRQoL via self-compassion, stress and coping. Model 2a results revealed that PC once again directly suppressed self-compassion ($\beta$=-.66, $p$<.001), thereby increasing stress ($\beta$=-.78, $p$<.001) and suppressing coping ($\beta$=.39, $p$<.001). Increased levels of stress directly decreased levels of IE ($\beta$=-.54, $p$<.001), physical HRQoL ($\beta$=-.14, $p$<.01) and mental HRQoL ($\beta$=-.77, $p$<.001), whilst decreased levels of coping directly led to lower levels of IE ($\beta$=.16, $p$<.01) and physical HRQoL ($\beta$=.34, $p$<.001) but not mental HRQoL ($\beta$=.07, $p$=.07). With the exception of the chi-square test, which was highly significant as expected for a sample of this size ($\chi^2$(549, n=354)=1113.82, $p$<.001) the hypothesised model was a good fit to the data. Results showed that the model also explained 37% of the variance in IE scores ($R^2$=0.37, $p$=.001), 63% of the variance in mental HRQoL scores ($R^2$=0.63, $p$=.001) and 17% of the variance in physical HRQoL scores ($R^2$=0.17, $p$=.001). Examination of direct effects found that once again PS did not significantly predict mean self-compassion ($\beta$=.08, $p$=.09). Results are summarised in Figure 3.


[Insert Figure 3 here]

**Figure 3.** Model 2: SEM (n=354) of perfectionism in illness in a KTR sample. Estimates shown are $\beta$-values. Dotted lines indicate non-statistically significant paths.
**$p$<.01, ***$p$<.001


## 5    Discussion

The aim of this study was to explore how perfectionism and self-compassion predict IE and other psychological health outcomes in KTRs and a non-CKD comparison group. To do this, two cross-sectional models of perfectionism in illness were tested; one testing the mediatory effect of self-compassion in the relationship between perfectionism and the health-promoting behaviour of IE, and one larger model which explored the direct and indirect relationships between perfectionism and IE and HRQoL, via self-compassion, coping and stress, showing stepwise theoretical refinement.

The first model tested found that maladaptive perfectionism (PC) significantly predicted lower levels of IE for both KTRs and the comparison group, which is supported by the findings of Iannantuono and Tylka (2012) as well as studies that have found an inverse relationship between perfectionism and other health-related behaviours (Williams and Cropley, 2014; Molnar, Sirois and Methot-Jones, 2016). However, this relationship was fully mediated by self-compassion for both groups, demonstrating that higher levels of this positive self-attitude could help to ameliorate the negative associations between maladaptive perfectionism and health-promoting behaviours like IE, even in clinical populations where the negative effects of perfectionism may be greater (Molnar *et al.*, 2012; Harrison *et al.*, 2015). These results also support the findings of Ong et al. (2021), who found

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394 that self-compassion buffers the effect of perfectionism on health outcomes such
395 as quality of life and symptom impairment, as well as studies that have found self-
396 compassion to mediate the relationship between maladaptive perfectionism and
397 other health outcomes such as depression and anxiety (Ferrari *et al.*, 2018;
398 Fletcher *et al.*, 2019) and disordered eating (Bergunde and Dritschel, 2020; Gwira
399 *et al.*, 2021). It is also supported by the findings of studies that have more
400 generally demonstrated a positive association between self-compassion and IE
401 (Carbonneau *et al.*, 2021; Linardon, Tylka and Fuller-Tyszkiewicz, 2021). This
402 model fit the data well in both the KTR and comparison groups, and explained
403 35% and 24% of the variance in IE scores, respectively.

404 The second model tested in this study found that PC indirectly led to lower levels
405 of IE and both physical and mental HRQoL via lower levels of self-compassion,
406 higher levels of stress and lower levels of coping. This is in agreement with the
407 predictions that Molnar et al. (2016) made in the development of the SCCAMPI in
408 terms of perfectionism affecting psychological health outcomes by impairing self-
409 compassion and coping responses and increasing stress. Consequently, alongside
410 explaining the inverse relationship between perfectionism and IE already
411 discussed, this means that the SCCAMPI may serve as an explanatory model for
412 the negative association between perfectionism and quality of life that has been
413 found elsewhere in the literature (Zarbo *et al.*, 2018; Rutter-Eley, James and
414 Jenkins, 2020).

415 Interestingly, whilst the second model explained a large proportion of the
416 variance in mental HRQoL scores ($R^2=0.63$), mental HRQoL was not significantly
417 associated with coping[4]. Consequently, out of stress and coping, the variance in
418 mental HRQoL scores explained by the model is more likely due to its large
419 inverse relationship with stress (which itself has a large negative relationship
420 with self-compassion). The negative association between stress and HRQoL is
421 well-established in clinical populations (Okwuosa, Onu and Onyedibe, 2023;
422 Scholz, Bierbauer and Lüscher, 2023) but, in this study, stress had a much
423 stronger association with the mental component of HRQoL than the physical,
424 suggesting that it considerably worsens the emotional impact of being a KTR but
425 only has a small relationship with the associated physical limitations. This model
426 was a good fit to the data and in addition to the variance in mental HRQoL scores
427 already discussed, explained 37% of the variance in IE scores and 17% of the
428 variance in physical HRQoL scores.

429 In addition, these findings showed that adaptive perfectionism (PS) did not have a
430 notable association with any of the main study variables and therefore appeared
431 to contribute little, if anything, to the models tested. The fact that PS was not
432 significantly associated with self-compassion (and only very weakly associated
433 with the other positive dimensions) suggests that, much of the time, even the
434 'adaptive' dimension of perfectionism may not have a great deal of positive
435 influence on individual health and wellbeing. This supported by Molnar et al.
436 (2016), who state that PS and PC are not distinguished between in the SCCAMPI
437 because both forms of perfectionism are so likely to lead to unfavourable health
438 outcomes if a person is living with the additional stressor of a chronic illness. In

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9 [4] It is possible that this was due to difficulties with fitting the measurement model for
10 coping; in future, a measure of coping with more than three indicators could be used, or it
11 could be operationalised as an observed variable.

439 short, whilst there may be some positive elements to perfectionism, it appears
440 that in many cases the psychological risks may outweigh the benefits.

441 **5.1    Strengths, limitations and future research directions**

442 Using SEM, this study has been the first to investigate how perfectionism and
443 self-compassion predict stress, coping, IE and HRQoL in a sample of KTRs.
444 Through a series of models, it has been demonstrated that maladaptive
445 perfectionism (PC) has a pernicious association with psychological health
446 outcomes like IE and HRQoL as it encourages a heightened stress response and
447 maladaptive coping with illness (Flett *et al.*, 2011; Shanmugasegaram *et al.*,
448 2014). This study has also been the first to show that self-compassion fully
449 mediates the relationship between PC and IE, demonstrating that self-compassion
450 can be a buffer between maladaptive perfectionism and negative psychological
451 health outcomes. Recruitment to the study was very successful in both the KTR
452 and comparison groups, which considerably strengthens the validity of the
453 findings.

454 One limitation of this study is that it was not possible to draw comparisons
455 between the KTR and comparison groups for either of the models tested, because
456 multigroup analysis detected variance in the measurement model for
457 perfectionism between the groups. This may have been due to random variation
458 within the data or may have been due to an intrinsic difference between the KTR
459 and comparison group participants; however, it is difficult to explicate the
460 differences between the two groups as the comparison group was heterogenous
461 in terms of health conditions (with the only inclusion criteria being that they did
462 not have CKD). In addition, comparisons between the two groups were not
463 possible for Model 2 as the variables of coping and HRQoL could not be
464 administered to the comparison group because the questions assume the
465 respondent is living with illness. Future research that wishes to draw
466 comparisons between a clinical and non-clinical sample may wish to choose
467 different health outcome measures that can be administered to both groups or
468 use measures of quality of life and coping that are not illness-focused.

469 **5.2    Conclusion and relevance to research and clinical practice**

470 In conclusion, this study is the first to test the tenets of the SCCAMPI in a sample
471 of KTRs and demonstrate how perfectionism and self-compassion predict
472 psychological health outcomes for this group and a non-CKD comparison group.
473 This work has shown how consistently negative PC is within both clinical and non-
474 clinical samples but also demonstrated that self-compassion is a crucial self-
475 attitude that can disrupt these negative effects. This is highly relevant to research
476 and practice as it means that any interventions such as Compassion-Focused
477 Therapy or Mindful Self-Compassion training that can attenuate levels of
478 perfectionism and increase levels of self-compassion are likely to lead to
479 improved health outcomes. It would therefore be beneficial for future research to
480 evaluate whether such interventions are effective methods of improving HRQoL
481 and other health outcomes for KTRs and other clinical groups. Furthermore,
482 whilst transplant care often focuses on adherence and physical monitoring, this
483 study shows that psychological processes like perfectionism and self-compassion
484 have downstream effects on adherence-related behaviours and quality of life.
485 Consequently, screening for perfectionism, particularly perfectionistic concerns,

486   in transplant services, could identify patients at risk of poor adjustment and focus
487   appropriate interventions targeting maladaptive perfectionism as adjuncts to
488   dietetic and psychological support.

489

490                                    **References**

491   Amos Development Corporation (2022) 'Amos (Version 29.0)'. McClean, VA: IBM
492   SPSS.

493   Babbott, K.M. *et al.* (2023) 'Outcomes of intuitive eating interventions: A
494   systematic review and meta-analysis', *Eating Disorders*, 31(1), pp. 33–63.
495   Available at: https://doi.org/10.1080/10640266.2022.2030124.

496   Barnett, M.D. and Sharp, K.J. (2016) 'Maladaptive perfectionism, body image
497   satisfaction, and disordered eating behaviors among U.S. college women: The
498   mediating role of self-compassion', *Personality and Individual Differences*, 99,
499   pp. 225–234. Available at: https://doi.org/10.1016/j.paid.2016.05.004.

500   Baron, R.M. and Kenny, D.A. (1986) 'The moderator-mediator variable
501   distinction in social psychological research: Conceptual, strategic, and
502   statistical considerations', *Journal of Personality and Social Psychology*, 51(6),
503   pp. 1173–1182. Available at: https://doi.org/10.1037/0022-3514.51.6.1173.

504   Bergunde, L. and Dritschel, B. (2020) 'The shield of self-compassion: A buffer
505   against disordered eating risk from physical appearance perfectionism', *PLOS*
506   *ONE*. Edited by K. Vickers, 15(1). Available at:
507   https://doi.org/10.1371/journal.pone.0227564.

508   Brown, S.A. *et al.* (2018) 'Kidney symptom questionnaire: Development, content
509   validation and relationship with quality of life', *Journal of Renal Care*, 44(3), pp.
510   162–173. Available at: https://doi.org/10.1111/jorc.12247.

511   Browne, M.W. and Cudeck, R. (1993) 'Alternative ways of assessing model fit', in
512   K.A. Bollen and J.S. Long (eds) *Testing structural equation models*. Newbury
513   Park, CA: SAGE, pp. 136–162.

514   Byrne, B.M. (2004) 'Testing for multigroup invariance using AMOS graphics: A
515   road less traveled', *Structural Equation Modeling: A Multidisciplinary Journal*,
516   11(2), pp. 272–300. Available at: https://doi.org/10.1207/s15328007sem1102_8.

517   Byrne, B.M. (2016) *Structural equation modeling with AMOS: Basic concepts,*
518   *applications and programming*. 3rd edn. New York, NY: Routledge.

519   Carbonneau, N. *et al.* (2021) 'Self-compassion as a mediator of the relationship
520   between adult women's attachment and intuitive eating', *Nutrients*, 13(9).
521   Available at: https://doi.org/10.3390/nu13093124.

522   Chaudhry, D. *et al.* (2022) 'Survival for waitlisted kidney failure patients
523   receiving transplantation versus remaining on waiting list: Systematic review
524   and meta-analysis', *British Medical Journal* [Preprint]. Available at:
525   https://doi.org/10.1136/bmj-2021-068769.

526   Cohen, S., Kamarck, T. and Mermelstein, R. (1983) 'A global measure of
527   perceived stress', *Journal of Health and Social Behavior*, 24(4), pp. 386–396.

528   DiMatteo, M.R., Lepper, H.S. and Croghan, T.W. (2000) 'Depression is a risk
529   factor for noncompliance with medical treatment: Meta-analysis of the effects of
530   anxiety and depression on patient adherence', *Archives of Internal Medicine*,

160(14), pp. 2101–2107. Available at:
https://doi.org/10.1001/archinte.160.14.2101.

Dunne, S., Sheffield, D. and Chilcot, J. (2018) 'Brief report: Self-compassion, physical health and the mediating role of health-promoting behaviours', *Journal of Health Psychology*, 23(7), pp. 993–999. Available at: https://doi.org/10.1177/1359105316643377.

Ferrari, M. *et al.* (2018) 'Self-compassion moderates the perfectionism and depression link in both adolescence and adulthood', *Plos One*, 13(2). Available at: https://doi.org/10.1371/journal.pone.0192022.

Fletcher, K. *et al.* (2019) 'Buffering against maladaptive perfectionism in bipolar disorder: The role of self-compassion', *Journal of Affective Disorders*, 250, pp. 132–139. Available at: https://doi.org/10.1016/j.jad.2019.03.003.

Flett, G.L. *et al.* (2011) 'Perfectionism, psychosocial impact and coping with irritable bowel disease: A study of patients with Crohn's disease and ulcerative colitis', *Journal of Health Psychology*, 16(4), pp. 561–571. Available at: https://doi.org/10.1177/1359105310383601.

Francis, A. *et al.* (2024) 'Chronic kidney disease and the global public health agenda: An international consensus', *Nature Reviews Nephrology*, 20(7), pp. 473–485. Available at: https://doi.org/10.1038/s41581-024-00820-6.

Gibbons, A. *et al.* (2021) 'Changes in quality of life (QoL) and other patient-reported outcome measures (PROMs) in living-donor and deceased-donor kidney transplant recipients and those awaiting transplantation in the UK ATTOM programme: A longitudinal cohort questionnaire survey with additional qualitative interviews', *BMJ Open*, 11(4). Available at: https://doi.org/10.1136/bmjopen-2020-047263.

Gick, M.L. and Sirois, F.M. (2010) 'Insecure attachment moderates women's adjustment to inflammatory bowel disease severity.', *Rehabilitation Psychology*, 55(2), pp. 170–179. Available at: https://doi.org/10.1037/a0019358.

Gignac, M.A.M., Cott, C. and Badley, E.M. (2000) 'Adaptation to chronic illness and disability and its relationship to perceptions of independence and dependence', *The Journals of Gerontology: Series B*, 55(6), pp. 362–372. Available at: https://doi.org/10.1093/geronb/55.6.P362.

Gwira, R. *et al.* (2021) 'Perfectionism and disordered eating cognitions with women of color: The moderating role of self-compassion', *Personality and Individual Differences*, 179. Available at: https://doi.org/10.1016/j.paid.2021.110923.

Harrison, S.L. *et al.* (2015) '``We are not worthy'' – understanding why patients decline pulmonary rehabilitation following an acute exacerbation of COPD', *Disability and Rehabilitation*, 37(9), pp. 750–756. Available at: https://doi.org/10.3109/09638288.2014.939770.

Hill, A.P. and Curran, T. (2015) 'Multidimensional perfectionism and burnout: A meta-analysis', *Personality and Social Psychology Review*, 20(3), pp. 269–288. Available at: https://doi.org/10.1177/1088868315596286.

574 Hu, L.-T. and Bentler, P.M. (1999) 'Cutoff criteria for fit indexes in covariance
575 structure analysis: Conventional criteria versus new alternatives', *Structural*
576 *Equation Modeling: A Multidisciplinary Journal*, 6(1), pp. 1–55. Available at:
577 https://doi.org/10.1080/10705519909540118.

578 Iannantuono, A.C. and Tylka, T.L. (2012) 'Interpersonal and intrapersonal links
579 to body appreciation in college women: An exploratory model', *Body Image*,
580 9(2), pp. 227–235. Available at: https://doi.org/10.1016/j.bodyim.2012.01.004.

581 Kline, R.B. (2011) *Principles and practice of structural equation modeling*. 3rd
582 edn. New York, NY: Guilford Press.

583 Lee, E.-H. (2012) 'Review of the psychometric evidence of the Perceived Stress
584 Scale', *Asian Nursing Research*, 6(4), pp. 121–127. Available at:
585 https://doi.org/10.1016/j.anr.2012.08.004.

586 Limburg, K. *et al.* (2017) 'The relationship between perfectionism and
587 psychopathology: A meta-analysis', *Journal of Clinical Psychology*, 73(10), pp.
588 1301–1326. Available at: https://doi.org/10.1002/jclp.22435.

589 Linardon, J. *et al.* (2020) 'Self-compassion as a moderator of the relationships
590 between shape and weight overvaluation and eating disorder psychopathology,
591 psychosocial impairment, and psychological distress', *Body Image*, 33, pp. 183–
592 189. Available at: https://doi.org/10.1016/j.bodyim.2020.03.001.

593 Linardon, J., Tylka, T.L. and Fuller-Tyszkiewicz, M. (2021) 'Intuitive eating and
594 its psychological correlates: A meta-analysis', *International Journal of Eating*
595 *Disorders*, 54(7), pp. 1073–1098. Available at:
596 https://doi.org/10.1002/eat.23509.

597 Linnett, R.J., Hubbard, S.J. and Robertson, N. (2025) 'Validation of the Intuitive
598 Eating Scale-2 for use with kidney transplant recipients'. Colchester, UK: UK
599 Data Service. Available at: https://doi.org/10.5255/UKDA-SN-857978.

600 Linnett, R.J. and Kibowski, F. (2020) 'A multidimensional approach to
601 perfectionism and self-compassion', *Self and Identity*, 19(7), pp. 757–783.
602 Available at: https://doi.org/10.1080/15298868.2019.1669695.

603 McCloskey, C., Clarke, J. and Rayner, H. (1997) 'Dialysis patients' understanding
604 of nutritional advice', *Journal of Renal Nutrition*, 7(2), pp. 90–101. Available at:
605 https://doi.org/10.1016/S1051-2276(97)90045-5.

606 Milicev, J. *et al.* (2023) 'Evaluating mental health and wellbeing of postgraduate
607 researchers: Prevalence and contributing factors', *Current Psychology*, 42(14),
608 pp. 12267–12280. Available at: https://doi.org/10.1007/s12144-021-02309-y.

609 Molnar, D.S. *et al.* (2006) 'A mediated model of perfectionism, affect, and
610 physical health', *Journal of Research in Personality*, 40(5), pp. 482–500.
611 Available at: https://doi.org/10.1016/j.jrp.2005.04.002.

612 Molnar, D.S. *et al.* (2012) 'Perfectionism and health functioning in women with
613 fibromyalgia', *Journal of Psychosomatic Research*, 73(4), pp. 295–300. Available
614 at: https://doi.org/10.1016/j.jpsychores.2012.08.001.

615 Molnar, D.S., Sirois, F.M. and Methot-Jones, T. (2016) 'Trying to be perfect in an
616 imperfect world: Examining the role of perfectionism in the context of chronic
617 illness', in F.M. Sirois and D.S. Molnar (eds) *Perfectionism, Health, and Well-*
618 *Being*. New York, NY: Springer, pp. 69–99.

619 Morrison, A.E. *et al.* (2021) 'Self-compassion, metabolic control and health
620 status in individuals with type 2 diabetes: A UK observational study',
621 *Experimental and Clinical Endocrinology & Diabetes*, 129(6), pp. 413–419.
622 Available at: https://doi.org/10.1055/a-0897-3772.

623 Neff, K.D. (2003) 'Development and validation of a scale to measure self-
624 compassion', *Self and Identity*, 2(3), pp. 223–250. Available at:
625 https://doi.org/10.1080/15298860309027.

626 Neff, K.D. and Germer, C.K. (2013) 'A pilot study and randomized controlled trial
627 of the mindful self-compassion program', *Journal of Clinical Psychology*, 69(1),
628 pp. 28–44. Available at: https://doi.org/10.1002/jclp.21923.

629 NICE (2018) *Renal replacement therapy and conservative management*.
630 Available at: https://www.nice.org.uk/guidance/ng107/resources/renal-
631 replacement-therapy-and-conservative-management-pdf-66141542991301.

632 Okwuosa, L.N., Onu, D.U. and Onyedibe, M.-C.C. (2023) 'Perceived stress and
633 health-related quality of life in cancer patients: The mediating role of religious
634 coping', *Current Psychology* [Preprint]. Available at:
635 https://doi.org/10.1007/s12144-023-04510-7.

636 Ong, C.W. *et al.* (2021) 'Is perfectionism always unhealthy? Examining the
637 moderating effects of psychological flexibility and self-compassion', *Journal of*
638 *Clinical Psychology*, 77(11), pp. 2576–2591. Available at:
639 https://doi.org/10.1002/jclp.23187.

640 Palmer, S.C. *et al.* (2013) 'Association between depression and death in people
641 with CKD: A meta-analysis of cohort studies', *American Journal of Kidney*
642 *Diseases*, 62(3), pp. 493–505. Available at:
643 https://doi.org/10.1053/j.ajkd.2013.02.369.

644 Peipert, J.D. *et al.* (2018) 'Psychometric properties of the Kidney Disease Quality
645 of Life 36-item short-form survey (KDQOL-36) in the United States', *American*
646 *Journal of Kidney Diseases*, 71(4), pp. 461–468. Available at:
647 https://doi.org/10.1053/j.ajkd.2017.07.020.

648 Peipert, J.D. *et al.* (2019) 'Kidney Disease Quality of Life 36-Item short form
649 survey (KDQOL-36) normative values for the United States dialysis population
650 and new single summary score', *Journal of the American Society of Nephrology*,
651 30(4), pp. 654–663. Available at: https://doi.org/10.1681/ASN.2018100994.

652 Pereira, R.A. *et al.* (2021) 'Strategies designed to increase the motivation for
653 and adherence to dietary recommendations in patients with chronic kidney
654 disease', *Nephrology Dialysis Transplantation*, 36(12), pp. 2173–2181. Available
655 at: https://doi.org/10.1093/ndt/gfaa177.

656 Preacher, K.J. and Hayes, A.F. (2008) 'Asymptotic and resampling strategies for
657 assessing and comparing indirect effects in multiple mediator models', *Behavior*

*Research Methods*, 40(3), pp. 879–891. Available at: https://doi.org/10.3758/BRM.40.3.879.

Raes, F. *et al.* (2011) 'Construction and factorial validation of a short form of the Self-Compassion Scale', *Clinical Psychology & Psychotherapy*, 18(3), pp. 250–255. Available at: https://doi.org/10.1002/cpp.702.

Rice, K.G., Richardson, C.M.E. and Tueller, S. (2014) 'The short form of the Revised Almost Perfect Scale', *Journal of Personality Assessment*, 96(3), pp. 368–379. Available at: https://doi.org/10.1080/00223891.2013.838172.

Rutter-Eley, E.L., James, M.K. and Jenkins, P.E. (2020) 'Eating disorders, perfectionism, and quality of life: Maladaptive perfectionism as a mediator between symptoms of disordered eating and quality of life', *Journal of Nervous & Mental Disease*, 208(10), pp. 771–776. Available at: https://doi.org/10.1097/NMD.0000000000001241.

Saunders, J.F., Nichols-Lopez, K.A. and Frazier, L.D. (2018) 'Psychometric properties of the intuitive eating scale-2 (IES-2) in a culturally diverse Hispanic American sample', *Eating Behaviors*, 28, pp. 1–7. Available at: https://doi.org/10.1016/j.eatbeh.2017.11.003.

Scholz, U., Bierbauer, W. and Lüscher, J. (2023) 'Social stigma, mental health, stress, and health-related quality of life in people with Long COVID', *International Journal of Environmental Research and Public Health*, 20(5). Available at: https://doi.org/10.3390/ijerph20053927.

Shanmugasegaram, S. *et al.* (2014) 'Perfectionism, Type D personality, and illness-related coping styles in cardiac rehabilitation patients', *Journal of Health Psychology*, 19(3), pp. 417–426. Available at: https://doi.org/10.1177/1359105312471571.

Shirazian, S. *et al.* (2017) 'Depression in chronic kidney disease and end-stage renal disease: Similarities and differences in diagnosis, epidemiology, and management', *Kidney International Reports*, 2(1), pp. 94–107. Available at: https://doi.org/10.1016/j.ekir.2016.09.005.

Shupo, F. *et al.* (2016) 'Patient survey to identify reasons for non-adherence and elicitation of quality of life concepts associated with immunosuppressant therapy in kidney transplant recipients', *Patient Preference and Adherence*, 10, pp. 27–36. Available at: https://doi.org/10.2147/PPA.S96086.

Sirois, F.M. *et al.* (2019) 'Trying to be perfect in an imperfect world: A person-centred test of perfectionism and health in fibromyalgia patients versus healthy controls', *Personality and Individual Differences*, 137, pp. 27–32. Available at: https://doi.org/10.1016/j.paid.2018.08.005.

Sirois, F.M. *et al.* (2021) 'A person-centred test of multidimensional perfectionism and health in people with chronic fatigue syndrome versus healthy controls', *Personality and Individual Differences*, 181. Available at: https://doi.org/10.1016/j.paid.2021.111036.

Sirois, F.M., Kitner, R. and Hirsch, J.K. (2015) 'Self-compassion, affect, and health-promoting behaviors', *Health Psychology*, 34(6), pp. 661–669. Available at: https://doi.org/10.1037/hea0000158.

Sirois, F.M. and Rowse, G. (2016) 'The role of self-compassion in chronic illness care', *Journal of Clinical Outcomes Management*, 23(11), pp. 521–527.

Sirois, F.M. and Wood, A.M. (2016) 'Gratitude uniquely predicts lower depression in chronic illness populations: A longitudinal study of inflammatory bowel disease and arthritis', *Health Psychology*, 36(2), pp. 122–132. Available at: https://doi.org/10.1037/hea0000436.

Smeets, E. *et al.* (2014) 'Meeting suffering with kindness: Effects of a brief self-compassion intervention for female college students', *Journal of Clinical Psychology*, 70(9), pp. 794–807. Available at: https://doi.org/10.1002/jclp.22076.

Soper, D.S. (2023) 'A-priori sample size calculator for structural equation models [software]'. Available at: https://www.danielsoper.com/statcalc.

Stoeber, J., Damian, L.E. and Madigan, D.J. (2017) 'Perfectionism: A motivational perspective', in J. Stoeber (ed.) *The psychology of perfectionism: Theory, research, and applications*. Oxon, UK: Routledge, pp. 19–43.

Stoeber, J. and Otto, K. (2006) 'Positive conceptions of perfectionism: Approaches, evidence, challenges', *Personality and Social Psychology Review*, 10(4), pp. 295–319. Available at: https://doi.org/10.1207/s15327957pspr1004_2.

Tabachnick, B.G. and Fidel, L.S. (2013) *Using multivariate statistics*. 6th edn. Harlow, UK: Pearson.

Terry, M.L. *et al.* (2013) 'Self-compassionate reactions to health threats.', *Personality & Social Psychology Bulletin*, 39(7), pp. 911–926. Available at: https://doi.org/10.1177/0146167213488213.

Tsai, Y.-C. *et al.* (2012) 'Association of symptoms of depression with progression of CKD', *American Journal of Kidney Diseases*, 60(1), pp. 54–61. Available at: https://doi.org/10.1053/j.ajkd.2012.02.325.

Tylka, T.L. and Kroon Van Diest, A.M. (2013) 'The Intuitive Eating Scale-2: Item refinement and psychometric evaluation with college women and men.', *Journal of Counseling Psychology*, 60(1), pp. 137–153. Available at: https://doi.org/10.1037/a0030893.

Van Dyke, N. and Drinkwater, E.J. (2022) 'Intuitive eating is positively associated with indicators of physical and mental health among rural Australian adults', *Australian Journal of Rural Health*, 30(4). Available at: https://doi.org/10.1111/ajr.12856.

Voth, J. and Sirois, F.M. (2009) 'The role of self-blame and responsibility in adjustment to inflammatory bowel disease.', *Rehabilitation Psychology*, 54(1), pp. 99–108. Available at: https://doi.org/10.1037/a0014739.

Ware, J.E., Kosinski, M. and Keller, S.D. (1996) 'A 12-item short-form health survey: Construction of scales and preliminary tests of reliability and validity', *Medical Care*, 34(3), pp. 220–233. Available at: https://doi.org/10.1097/00005650-199603000-00003.

Williams, C. and Cropley, M. (2014) 'The relationship between perfectionism and preventive health behaviours: The mediating role of self-concealment',

744 *Journal of Health Psychology*, 19(10), pp. 1211–1221. Available at:
745 https://doi.org/10.1177/1359105313488971.

746 Yang, F. *et al.* (2013) 'Validation of the English version of the Kidney Disease
747 Quality of Life Questionnaire (KDQOL-36) in haemodialysis patients in
748 Singapore', *The Patient - Patient-Centered Outcomes Research*, 6(2), pp. 135–
749 141. Available at: https://doi.org/10.1007/s40271-013-0015-2.

750 Zarbo, C. *et al.* (2018) 'Perfectionistic traits and importance given to parenthood
751 are associated with infertility-related quality of life in a sample of infertile
752 women with and without endometriosis', *Sexual & Reproductive Healthcare*, 17,
753 pp. 86–90. Available at: https://doi.org/10.1016/j.srhc.2018.07.008.

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