

**The Renal Treatment Satisfaction Questionnaire (RTSQ):
a measure of satisfaction with treatment for Chronic Kidney Failure.**

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Abstract

Background: Quality and effectiveness of care can be enhanced through the use of condition-specific measures of satisfaction with treatment. The aim of the present study was to design and develop a measure of satisfaction with treatment for chronic kidney failure (CKF) for use in routine clinical care and clinical trials. The Renal Treatment Satisfaction Questionnaire (RTSQ) was designed to be suitable for people using any of the various treatment modalities for CKF. Items measure satisfaction with aspects of treatment including convenience, flexibility, freedom, and satisfaction to continue with present form of treatment.

Methods: A 12-item RTSQ was investigated at a UK hospital-based renal unit, using data from 140 outpatients undergoing renal replacement therapy (Haemodialysis n = 35; Continuous Ambulatory Peritoneal Dialysis n = 57; Transplant n = 46).

Results: An 11-item scale was developed from the original 12-item version, with a single factor accounting for 59% of the variance and item loadings >0.58. Scale reliability was excellent ($\alpha=0.93$) in the full sample and proved robust to analysis in separate treatment subgroups. As expected, RTSQ scores differed significantly ($p<0.0001$) between transplant and other treatment groups. Those who had received a transplant expressed greater overall satisfaction, with specific advantages of transplant shown by all individual items including *convenience, time, lifestyle, freedom* and *satisfaction to continue current treatment*.

Conclusions: The RTSQ provides a brief, reliable measure of satisfaction with treatment for CKF that is suitable for use in routine clinical care and clinical trials.

Keywords: Treatment satisfaction, chronic kidney failure, individual differences

Abbreviations:

RTSQ: Renal Treatment Satisfaction Questionnaire

CKF: Chronic Kidney Failure

CAPD: Continuous Ambulatory Peritoneal Dialysis

DTSQ: Diabetes Treatment Satisfaction Questionnaire

Introduction

In recent years there has been increasing awareness that excellence in medical care not only requires optimal biomedical outcomes but also depends on careful attention to psychological outcomes^{1,2}. Systematic use of questionnaires to measure psychological outcomes has become more widespread in clinical trials to evaluate new drugs and other treatment interventions, and in routine patient care³. Experience with such measures shows that those designed for specific conditions prove more sensitive to individual differences than generic measures, and hence are more useful in guiding patient care^{4,5}.

Despite the invasiveness of treatments for Chronic Kidney Failure (CKF), very few psychological measures have been designed specifically for use by patients. Most of the condition-specific instruments available (e.g. the Kidney Disease Quality of Life (KDQOL) survey⁶, the Kidney Transplant Questionnaire (KTQ)⁷) focus on the measurement of health status and mood. However, an equally important goal of care is that of patient satisfaction with treatment. Experiences of treatment for CKF are likely to vary with the individual, the type of treatment regimen and the progression of the disease. Patients may discuss their treatment with healthcare professionals but such discussions can be limited by time constraints and conflicting priorities, the difficulty of addressing multiple aspects of a treatment regimen, or reluctance (on the part of either patient or health professional) to mention sources of dissatisfaction. In these circumstances, it is unlikely that a full picture of the individual's experience will be obtained. Formal measurement of patient satisfaction with treatment provides information about the individual patient's experience that can guide the selection and modification of the treatment regimen to suit his/her needs and, thus, is central to ensuring the best outcomes for patients.

The treatments for CKF share many common features with treatments for diabetes, including the demands of managing a condition that requires a high commitment to self-care if long-term health is to be protected. It is, therefore, appropriate when developing a measure of treatment satisfaction specific to the renal condition, to build on experience with treatment satisfaction measures designed and developed for use in diabetes. The Diabetes Treatment Satisfaction Questionnaire (DTSQ)^{8,9} has been well validated in many studies, widely used and linguistically validated in more than 40 languages¹⁰⁻¹⁴. The DTSQ has proved to be a valuable tool in understanding

patients' views of treatment and is sensitive to changes associated with new treatments under evaluation in clinical trials¹⁵⁻²⁰.

The current paper describes the design and initial development of a version of the questionnaire specifically for people with CKF: the Renal Treatment Satisfaction Questionnaire (RTSQ).

Methods

Questionnaire design

Initial qualitative work to aid the initial drafting of the RTSQ included visits by CB to eight UK renal units (Gloucester Royal Hospital, Edinburgh Royal Hospital, Queen Elizabeth Hospital in Birmingham, Charing Cross Hospital in London, Leicester General Hospital, Royal Berkshire Hospital in Reading, Royal Manchester Infirmary and the Middlesex Hospital in London). In-depth interviews were carried out by CB with 40 patients at two of the units, Leicester General and the Royal Berkshire, as part of a larger study to design measures of quality of life and satisfaction and to evaluate an existing measure of well-being for use with people receiving treatment for CKF²¹.

Interviewees included patients on all forms of dialysis, and those with current or failed transplants. During the interviews, patients were asked about sources of satisfaction and dissatisfaction with their present treatment and any important ways in which these differ from their experience of other forms of renal replacement therapy. Spontaneous mentions of sources of satisfaction and dissatisfaction were noted before patients completed draft versions of the RTSQ. Six items from the DTSQ appeared to be useful or readily modified to be appropriate for renal treatment and interviews confirmed this. Additional items were designed to measure satisfaction with other aspects of treatment specific to CKF. Items were designed to be answered by patients receiving any form of treatment for CKF, as individual patients may experience a variety of treatments throughout the course of their condition. Patients completed early drafts of the RTSQ, which were repeatedly extended and modified taking into account the views and experiences of interviewees.

Survey methods

The 12-item RTSQ was included in a questionnaire survey of 179 patients receiving renal replacement therapy at Leicester General Hospital. The local ethics committee approved the survey. Patients received a mailed invitation to participate in the study, together with a questionnaire package that included the RTSQ and a general information questionnaire. They were asked to return completed questionnaires to the research team in the pre-paid envelope provided.

Statistical analysis

Statistical analysis was conducted using SPSS for Windows. The structure of the RTSQ was examined using unforced principal components analysis with varimax rotation²². A one-factor solution was required to support the summing of individual item scores to form a single *Treatment Satisfaction* score. Cronbach's alpha reliability analyses were conducted to examine the internal consistency of the scale. Descriptive statistics are presented as mean \pm standard deviation or n (%). Discriminant validity was assessed by investigating differences between treatment groups (using Kruskal-Wallis or Mann-Whitney statistics).

Results

Preliminary version of the RTSQ

As a result of the initial qualitative interviews, four of the eight items were selected exactly as they appeared in the DTSQ and two further items were modified to change the name of the condition. A further six items were newly designed to measure other aspects of treatment satisfaction of importance to people with CKF. The instructions ask individuals to rate their satisfaction with aspects of treatment over the past few weeks, by circling one number on each of the 7-point scales [Figure 1].

Patient characteristics

One hundred and forty (78.2%) of the 179 patients accepted the invitation to participate. Of the 140 participants, 55 (39%) were women. The mean age was 52.8 \pm 14.3 years and the mean age at leaving full-time education was 16.8 \pm 5.4 years. Ninety-eight percent were white European with

English as their first language. Seventy-six percent were married or living with a partner, 12% were single and 12% were separated, divorced or widowed.

The mean number of years since first renal treatment was 5.6 ± 5.2 years, ranging from 0 to 23 years. Patients had been receiving their current treatment for a mean of 3.3 ± 3.1 years and had, on average, been attending the clinic for 8.0 ± 6.9 years. One quarter of participants had experienced a change in their treatment in the past year. Two people did not indicate their current treatment, but for the remaining 138 participants, treatment was as follows: Continuous Ambulatory Peritoneal Dialysis (CAPD) $n=57$ (41.3%); Haemodialysis $n=35$ (25.4%); Transplant $n=46$ (33.3%). Just over half of the participants (52%) reported other comorbid conditions (including diabetes, arthritis, hypertension, angina, and other heart conditions) and 26% reported that they were registered disabled due to their renal condition. One third of participants had lost workdays over the past two months (14.3 ± 21 days, median: 3, range: 0-60).

Structure and reliability

Investigation of the psychometric properties of the RTSQ using data from all treatment modalities revealed a two-factor solution, accounting for 64% of the variance. A forced one-factor analysis resulted in all items loading >0.579 on a single factor, except one (*demands*), which loaded 0.424 and was also the only item to load negatively due to the wording used: *How demanding is your present method of treatment (in terms of time, effort, thought etc.)?* with response options of *very demanding* scored 6 and *very undemanding* scored 0. The alpha-if-item-deleted statistic for the *demands* item indicated that the reliability of the scale would be improved (from 0.86 to 0.93) if this item were removed.

When the *demands* item was excluded, unforced principal components analysis of the remaining 11 items resulted in all items loading >0.58 on a single factor, which accounted for 59% of the variance [Table 1]. Reliability of the 11-item RTSQ was excellent ($\alpha=0.93$) [Table 2] and the scale also proved to be robust in analysis of separate treatment groups, for which the coefficient alphas ranged between 0.89 and 0.95. The wording of items for the final 11-item scale is shown in Figure 2. Investigation of the scale structure in separate treatment subgroups suggests that there may be some underlying differences in factor structure between treatment modalities. In the whole sample, unforced analysis revealed a one-factor solution. In separate treatment modalities, a

forced one-factor solution likewise revealed a single factor with all items loading >0.59. However, when an unforced solution was sought separately in each of the three treatment groups, items loaded onto two factors (transplant group) or three factors (haemodialysis and CAPD groups).

Scoring

Reliability analyses indicated that it was possible to remove the 4 best items (*convenience, time, current, lifestyle*) and retain an alpha coefficient >0.86. Removal of a fifth item (*flexibility*) reduced the alpha coefficient to 0.79, which was considered acceptable for a 7-item scale. Thus, scales could be calculated using estimated data (i.e. the mean of existing item scores to replace missing data) for up to and including 4 missing item scores while maintaining an α of 0.86, and for 5 missing scores to maintain an α of 0.79. If ≥ 7 scores are available, total scores can be calculated by summing the item scores, dividing by the count of scores and multiplying by 11. No missing values were substituted for the principal components and reliability analyses. For the sensitivity to treatment differences analyses (below), up to three missing values were substituted with means (no patient had >3 missing scores).

Discriminant Validity

Investigation of RTSQ scores by treatment group showed that the RTSQ was sensitive to differences in satisfaction with treatment between groups. As expected, total *Treatment Satisfaction* scores differed significantly between treatment groups (χ^2 34.97, df=2, p<0.001) [Figure 3; Table 3]. Patients who had successful transplants were more satisfied overall than those on haemodialysis or CAPD, and were more satisfied with every aspect of their treatment as measured by the 11 items. Although there were no significant differences in total RTSQ scores between haemodialysis and CAPD treatment groups, there was a non-significant trend for CAPD-treated patients to be more satisfied overall (U=675.50; n=30(Haemodialysis) and 56(CAPD); p=0.135 ns). CAPD-treated patients were significantly more satisfied with the amount of discomfort or pain associated with their treatment and more likely to recommend their treatment to others with CKD [Table 3].

Discussion

The RTSQ provides an accessible method of obtaining information about patient satisfaction with treatment. Item content covers the core aspects of treatment for CKF that were identified by patients (during initial interviews) as being central to their experience of satisfaction or dissatisfaction. The RTSQ measures key psychological outcomes (such as *convenience* and *flexibility*) that health professionals are well placed to influence, either by modifying the treatment regimen (e.g. by changing the timing of haemodialysis sessions), or by matching treatment modality to the individual needs of each patient. Such outcomes are particularly important for people with chronic illness, where treatment is necessary for survival but can damage quality of life. Studies using the Diabetes Treatment Satisfaction Questionnaire have shown that increasing flexibility and convenience can improve the acceptability to patients of intensive treatment regimens^{18,23}.

Psychometric evaluation of the RTSQ demonstrated the internal consistency and factor structure of the measure in a combined treatment sample. Due to the relatively small numbers in each treatment group (n<60), it was not possible to confirm the stability of the factor structure within the separate treatment groups. Larger patient samples are needed to investigate the factor structure within treatment subgroups and the possibilities of identifying subscales within the 11 items.

The failure of one of the 12 items (concerning *demands* of the treatment) to contribute to the single-factor solution was thought to be due more to the item wording than to the construct itself. It was the only item in the measure to be worded such that 'more' of the item indicated an undesirable outcome. For all other items 'more' represented a better outcome. This tendency of reversed-wording to detract from scale reliability and structure has been seen in other research using different questionnaires²⁴⁻²⁶, and parallel work developing the HIV-specific Treatment Satisfaction Questionnaire²⁷.

In the current study, the RTSQ was used successfully (78% response rate) in a mailed survey, which included several other questionnaires. As the RTSQ is such a brief instrument, it is likely to be equally well suited for completion in the renal unit (in paper or computerised format as has

been shown for the DTSQ¹¹). Little is known about those who declined to participate in the survey, except that at least one person cited ill-health. It is unclear how levels of satisfaction would be affected if the sample had been complete, but it is probable that non-respondents would report less, rather than more, satisfaction with their treatment than respondents.

The items of the RTSQ were designed to be specific to the treatment of CKF (and of importance to patients) while being general enough to be relevant across the treatment groups. For example, *convenience* is an important issue for all patients with CKF, though it will have different meaning for patients on each of the three treatment types. The sensitivity of the RTSQ to differences in scores between transplant and other treatment groups suggests that the measure is an effective tool in assessing patient satisfaction and dissatisfaction with different forms of treatment. As expected, patients on haemodialysis were less satisfied than other groups with the level of discomfort/pain associated with their treatment and were least likely to recommend their treatment to others with CKD. In the present study, however, no other differences between the CAPD and haemodialysis groups reached significance, perhaps due to the small sizes of the treatment subgroups. However, experience with the DTSQ indicates that differences between treatment groups are not always apparent (when measured cross-sectionally)²⁸ but become evident when measured longitudinally¹⁸. Use of the RTSQ in clinical trials will establish the responsiveness of the RTSQ to changes in treatment regimens.

In conclusion, the RTSQ provides a brief, reliable measure of satisfaction with treatment for CKF that has preliminary evidence of validity and is suitable for use in routine clinical care and clinical trials.

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Table 1. Unforced single-factor structure for the 11-item RTSQ

Item No.	Item content	Factor Loading
1	Satisfaction with current treatment	0.801
2	Satisfaction with control over renal condition	0.682
3	Convenience of treatment	0.862
4	Flexibility of treatment	0.833
5	Satisfaction with freedom afforded by treatment	0.762
6	Satisfaction with understanding of condition	0.584
7	Satisfaction with time taken by treatment	0.803
8	Discomfort or pain involved with treatment	0.786
9	How well treatment fits in with lifestyle	0.776
10	Would you recommend this treatment to others?	0.695
11	Satisfaction to continue with present treatment	0.796

Table 2. Reliability analyses for the 11-item RTSQ (all patients, n=140).

Item no & label	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Square multiple correlation	Alpha if item deleted
1 Current treatment	48.6604	102.7026	.7423	.7188	.9193
2 Control	48.6887	107.7783	.6110	.5404	.9250
3 Convenience	49.0189	99.2187	.8157	.8263	.9157
4 Flexibility	48.9340	101.7194	.7833	.7977	.9175
5 Freedom	49.1509	98.8722	.7093	.6409	.9214
6 Understand	48.5660	109.1051	.5179	.3472	.9287
7 Time	49.1415	99.9512	.7560	.6019	.9185
8 Discomfort	48.8491	103.2722	.7270	.6672	.9200
9 Lifestyle	49.2264	98.6721	.7260	.7253	.9204
10 Recommend to others	48.4528	106.0787	.6358	.4909	.9239
11 Wish to continue	48.4811	102.9568	.7433	.6584	.9194

Alpha = .9277 (Standardized item alpha = .9279)

Table 3. Satisfaction by treatment group

Item no & label	Mean±SD		
	Haemodialysis (n=35)	CAPD (n=57)	Transplant (n=46)
1 Current treatment	4.5±1.6	5.1±1.1	5.6±0.8 ^{b, c}
2 Control	4.7±1.7	5.0±1.1	5.5±0.9 ^{b, d}
3 Convenience	4.1±1.7	4.6±1.1	5.6±0.8 ^{b, e}
4 Flexibility	4.3±1.4	4.6±1.3	5.5±0.9 ^{b, e}
5 Freedom	4.3±1.6	4.3±1.6	5.7±0.9 ^{b, e}
6 Understand	4.9±1.6	4.3±1.6	5.7±0.9 ^{b, d}
7 Time	4.3±1.6	4.3±1.3	5.7±0.7 ^{b, e}
8 Discomfort	4.2±1.5 ^d	5.0±1.0 ^a	5.5±0.9 ^{b, c}
9 Lifestyle	3.7±1.6	4.3±1.5	5.7±0.7 ^{b, e}
10 Recommend to others	4.5±1.7 ^d	5.4±0.9 ^a	5.9±0.5 ^{b, e}
11 Wish to continue	4.6±1.6	5.2±1.1	5.8±0.8 ^{b, e}
Treatment Satisfaction	48.5±12.9	52.9±9.2	62.0±6.7 ^{b, e}

RTSQ items 1-11 are scored 0-6; maximum score for RTSQ Treatment Satisfaction = 66.

Significant differences in satisfaction compared with 1) haemodialysis ^a(p<0.01), ^b(p<0.001), 2) CAPD ^c(p<0.05), ^d(p<0.01), ^e(p<0.001).

Legends

Figure 1. Instructions to patients and item format

Figure 2. Wording (and response anchors) of the 11-item Renal Treatment Satisfaction Questionnaire

Figure 3. Total satisfaction with renal treatment (by treatment type)