Psychological factors associated with successful outcomes in home haemodialysis

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ABSTRACT:

Aim: Performing haemodialysis therapy at home has been associated with improved survival for end-stage kidney disease patients and can generally be delivered at a lower cost to the healthcare system when compared with centre and satellite unit dialysis. However, only a minority of dialysis dependent end-stage kidney disease patients successfully sustain haemodialysis at home. Current practice for determining dialysis treatment modality and location takes into account medical suitability and social situation, but infrequently formally examines the contribution of psychological factors. This study explores demographic, health, and psychological factors that may predict patients’ ability to sustain home haemodialysis.

Methods: One hundred and thirteen successful and unsuccessful home haemodialysis users were recruited to the study, and 55 responded to selfreport measures. Demographic (age, gender, education level, carer support), health (comorbidities, diabetes, psychiatric
condition) and psychological (locus of control beliefs, coping styles) information was used as predictor variables for the participants’ time maintaining home therapy (Home Time).

Results: In a three-step regression, the model explained 32% of variance in Home Time. Coping styles significantly contributed 16% of the variance in Home Time after accounting for other variables. Adaptive Coping was significantly correlated with the length of time sustaining home therapy.

Conclusion: Adaptive coping strategies are associated with improved ability to sustain home haemodialysis therapy. Evidence-based psychological approaches can help patients develop more adaptive coping strategies. More research is needed to assess whether instituting these psychological interventions will assist patients to adopt and sustain dialysis therapies which require increased patient self-management.

Performing haemodialysis therapy at home has been associated with advantages including a more flexible and individualized dialysis regimen, improved fluid balance and blood pressure control, better quality of life including more independence and dietary freedom and improved survival for end-stage kidney disease (ESKD) patients.1–3 It can generally be delivered at a lower cost to the healthcare system when compared with dialysis in-centre and satellite unit dialysis provided patients can be maintained on dialysis at home for at least 12–18 months.4,5 Despite these incentives, only a minority of dialysis dependent ESKD patients currently successfully sustain haemodialysis at home. Although Australia and New Zealand have some of the highest prevalence rates of home haemodialysis in the world, only approximately 9–18% of dialysis-dependent ESKD patients are sustained on home haemodialysis.6,7

There is substantial variation in uptake of home dialysis therapies between different nephrology units. These differences are not primarily explained by differences in patient populations but rather by non-patient factors, including funding models, location and the preferences of the treating nephrologist.8–10 Currently, assessment of patient suitability and recruitment for home haemodialysis relies largely on nephrologists and senior nurses subjectively weighing up perceived physical morbidities, cognitive capacity and social
situations of patients in the context of the practitioner’s own personal experiences and preferences, in addition to patient preferences. This subjective process is likely a substantial contributor to the variability of uptake of home dialysis therapies.

In an effort to systematically maximize the availability of home haemodialysis with its associated benefits to all capable candidates, there is increasing interest in defining more objectively patient focussed factors that are associated with ability to sustain home haemodialysis. We should be particularly interested in those factors that may be improved with targeted interventions.

Previous studies identified a variety of demographic, physical health, social and psychological patient factors that are associated with ability to sustain home haemodialysis. Demographic and physical health factors including younger age, higher education level, the absence of diabetes and fewer medical comorbidities have been associated with successful home haemodialysis. Social factors including availability of high quality social support for the dialysis user, and employment status have also been identified as predictors for successfully establishing home haemodialysis. There has been a previous attempt to combine assessment of multiple patient factors into a comprehensive screening tool to assist nephrology staff in identifying patients most likely to successfully maintain home dialysis therapies. The Jo-Pre-training Assessment Tool version 2.1 (JPAT) is based on the Medical Outcomes Study Short-Form 36-Item Health Survey (SF-36) and assesses factors under the domains of physical stability, nutritional status, communication ability, ability to maintain self-care, social support and psychological suitability using a structured interview. Psychological factors assessed were mental status, emotional stress, response to external stimuli, level of self-esteem and level of concentration. In a study of 20 randomly selected haemodialysis dependent ESKD patients, each domain assessed using the JPAT was found to significantly correlate with patients’ current treatment modality. Psychological suitability factors contributed to 8.7% and communication ability 15.1% of the variance in the model. The JPAT model explained 55.5% of the variance. There are no data currently available on the predictive power of this tool to determine whether individuals being assessed prospectively will subsequently be successfully established on home dialysis therapy.
In our experience, failure to sustain home haemodialysis in the short to medium term is often more associated with psychosocial factors rather than physical health factors. However, there has been very little in-depth exploration of the impact of psychological factors on success of home haemodialysis. Locus of control is one construct that has been suggested as important in outcomes for ESKD patients. Locus of control refers to person’s beliefs about what influences their health outcomes, whether they see their own efforts as most influential (internal locus of control) or prioritizing the influence of their medical practitioner (external locus of control) or the influence of chance (chance locus of control).

Self-management interventions rely on increasing the patient’s perception of self-efficacy or control over their health, and has demonstrated positive outcomes in chronic conditions such as arthritis, lung disease, and heart disease. Chronic haemodialysis patients who have a strong internal locus of control have been shown to have lower rates of depression and better quality of life. It is possible that having a sense of personal control could also promote active participation in their health care.

However, there are many situations where ESKD patients have little control, and they require different coping strategies to manage the diverse stressors experienced. Adaptive coping strategies that include problem solving and planning have been associated with better adherence behaviours in haemodialysis patients and improvements in depression and other chronic health conditions. In a study of rheumatoid arthritis patients, outcomes from a cognitive-behavioural intervention were mediated by adaptive and maladaptive coping behaviours and those strategies that assist the person to reinterpret their experience positively have been adaptive for cancer survivors.

Coping skills can be enhanced by education and supportive interventions. A study of an Internet education program on problem solving demonstrated this type of intervention can improve outcomes for paediatric Type 1 diabetes patients. Another intervention to enhance adaptive coping in the form of self-empowerment demonstrated improvements in self-efficacy and depression symptoms. It would therefore be useful to explore how relevant these skills could be in the sustainability of home haemodialysis.
This study aims to evaluate the contribution of demographic and health factors (i.e. carer support; psychiatric condition; age; medical comorbidities; diabetes; and educational level) and psychological factors (i.e. locus of control and coping styles) to the successful establishment of home haemodialysis in ESKD patients.

METHODS

Study design and population

This is a retrospective observational cohort study and was approved by the Princess Alexandra Hospital Ethics Committee. Patients were recruited from the adult ESKD population who were considered potential candidates for home haemodialysis by their treating nephrologist and were referred for formal nursing and psychological assessment prior to commencing home haemodialysis training at the Princess Alexandra Hospital in Brisbane between 2005 and 2010. In addition, 15 randomly selected in-centre haemodialysis patients, who had never been considered for home haemodialysis were included.

Patients were approached by a psychologist to gain consent for their demographic and psychological assessment information to be included in this study. Patients were excluded if they had (i) been type of carer; and presence of a diagnosed psychiatric condition. Locus of control was assessed using The Multidimensional Health Locus of Control (Form A) scale.31 Reliability indices for this scale have suggested alpha scores ranging from 0.673 to 0.767. The 18-item scale is self-administered and the user rates each item on a six-point scale from ‘strongly disagree’ to ‘strongly agree’. The three subscale scores range from six to 36, and are interpreted as separate measures of the perceived control over health.

Coping was assessed using the COPE scale, a self-administered scale containing thirteen subscales that can be grouped into three categories: adaptive coping, maladaptive coping, and general coping.32,33 Adaptive coping strategies, such as planning and problem solving, are seen as more effective for long-term outcomes.34 Maladaptive coping, including denial and behavioural disengagement, are seen as unhelpful, despite their use for short-term
relief of stress. General coping strategies such as seeking emotional support or relying on religion, are strategies that are not strongly adaptive or maladaptive, but may be used as part of general coping.35

In the COPE, statements corresponding to a coping strategy are rated on a four-point scale from one, ‘don’t do this at all’, to four, ‘do this a lot’, yielding subscale scores ranging from one to 16. Validation of the scale suggests that it correlates modestly with measures of optimism, control, self-esteem, hardiness and Type A personality (r = 0.02–0.32). Internal consistency of the scale has been rated as high, with Cronbach’s alpha exceeding 0.6 for all scales except mental disengagement. Test–retest reliability has been demonstrated with correlations between 0.42 and 0.77.36

The effect of these variables on the dependent variable, Home Time, was assessed. Home Time is the number of days they were able to maintain haemodialysis in their home from the completion of training until change of dialysis modality, death or end of study assessment period.

Statistical analysis

Hierarchical multiple regression was applied as it allows for the unique contribution of each independent (or predictor) variable to be assessed. Other predictor variables known to be associated with the dependent variable are initially entered (in this case Step 1: Demographic/Health). Subsequent blocks including new variables of interest related to this study are then entered (Step 2: Locus of Control; Step 3: Coping). This approach provides an evaluation of the entire three-step model, where the sum of squares (R2) is the percentage (%) variance in the dependent variable explained by the model. The change in the sum of squares (R2 change) provides the amount of variance (percent) that is explained by each subsequent step or block of variables. In addition, the contribution of each separate variable in the final model is provided by the standardized coefficients or Beta weights (b), where higher values indicate a higher contribution from that variable. We interpret P-values < 0.05 as significant.
RESULTS

One hundred and forty-nine patients were referred for psychological assessment during the study period. Of these 113 consented to participate in this study. Thirty-six patients were excluded: 14 were currently dialysing successfully at home but had not completed 365 days required to qualify as ‘successful’, 22 patients did not complete training for medical reasons including eight patients receiving renal transplants. Demographic data are presented in Table 1. Of the 113 patients, 72 were successful at maintaining haemodialysis at home for at least 365 days while 41 chose for psychosocial reasons not to attempt or continue home haemodialysis. The median (interquartile range) home time was 825 (56–1481) days. Fifty-five patients responded to the self-report measures of locus of control and coping and their data were used for the analysis.

Table 2 provides the results of the hierarchical multiple regression analysis where the overall model predicted 32.1% of variance in Home Time. Demographic/Health variables contributed 13.4% of the variance in Home Time ($R^2 = 0.134, P = 0.42$), with Locus of Control adding an additional 2.4% ($R^2 = 0.024, P = 0.74$) and these were not significant. Coping styles uniquely contributed 16.3% additional variance ($R^2 = 0.163, P < 0.05$) above Demographic/Health and Locus of Control (Table 2) and this was statistically significant.

In the final model, Adaptive Coping was the only significant variable that uniquely contributed to Home Time ($b = 0.486, P < 0.01$). Higher reported use of Adaptive Coping was associated with longer Home Time. The remaining coping styles, General Coping and Maladaptive Coping, and all of the Demographic/Health and Locus of Control variables were not significant in the final model.

DISCUSSION

Coping styles were significantly associated with successfully maintaining haemodialysis at home, explaining 16% of variance in our model. In particular those who reported higher use of adaptive coping strategies were significantly more likely to sustain home dialysis for a longer time.
This finding is significant because coping skills can be taught and reinforced through education in self-management and problem solving skills. Such skill-based interventions have been beneficial in treating depression symptoms, and assisting distressed cancer patients. Other studies have suggested that self-management behaviours and cognitive-behavioural interventions have the potential to improve care for ESKD patients. Coping skills may therefore provide a target for therapeutic intervention.

Strengths and limitations

This is the second largest observational cohort study exploring patient factors associated with successful maintenance of home haemodialysis. It is the only study that attempts to assess psychological factors in any detail. It is the only study that has specifically attempted to identify factors that may be potentially modifiable and may represent therapeutic targets for future interventional studies.

However, as this is an observational cohort study, we have only documented an association between coping style and successful maintenance of home haemodialysis, and causation cannot be implied. Our relatively small sample size limited the number of independent variables that could be included in the model and the power of this study. In particular, there was only a very limited assessment of carer factors, which are important correlates of the success of this modality.

This study draws on findings from dialysis users of a single public healthcare service with few privately insured patients included. Therefore, this population may not be completely representative of all haemodialysis patients in Australia.

The constructs associated with coping skills, as defined in the COPE measure, have been used in this study to equate with the life skills that are helpful or not helpful in managing this technique. However, the construct validity and factor structure of the COPE continue to be the subject of inquiry and may not generalize to other definitions of adaptive coping.

Conclusions
Coping style, and particularly the use of adaptive strategies such as planning and problem solving, was assessed by this study to be a significant contributor to success with home haemodialysis. This finding is of particular significance because, unlike many other factors which have been associated with success in sustaining home haemodialysis, coping skills can be taught and reinforced through education in self-management and problem solving skills. This suggests that more detailed psychological assessment and intervention may play an important role in assessing and establishing patients on home haemodialysis and increasing the number of patients who may be suitable for this therapy. Further research is needed to better define the impact of psychological factors on the ability to sustain home haemodialysis and to investigate the impact of interventions to improve problem solving and self-management on the uptake and sustainability of home haemodialysis.

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REFERENCES


