

Comparison of Life Participation Activities Among Adults Treated by Hemodialysis, Peritoneal Dialysis, and Kidney Transplantation: A Systematic Review

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Background: A comprehensive assessment of the association of patients' renal replacement therapy (RRT) modality with their participation in life activities (physical function, travel, recreation, freedom, and work) is needed.

Study Design: Systematic review of peer-reviewed published studies.

Setting & Population: Adults undergoing RRT (hemodialysis, peritoneal dialysis, or transplantation).

Selection Criteria for Studies: We searched PubMed, Cochrane Library, and EMBASE from January 1980 through April 2012 for English-language articles that compared participation in life activities among patients receiving: (1) hemodialysis compared with peritoneal dialysis, (2) hemodialysis compared with kidney transplantation, or (3) peritoneal dialysis compared with kidney transplantation.

Predictor: RRT modality.

Outcomes: Reported rates of physical function, travel, recreation, freedom, and work-related activities by RRT modality.

Results: 46 studies (6 prospective cohort, 38 cross-sectional, and 2 pre-post transplantation) provided relevant comparisons of life participation activities among patients treated with hemodialysis, peritoneal dialysis, and kidney transplantation. Studies were conducted in 1985-2011 among diverse patient populations in 16 distinct locations. A majority of studies reported greater life participation rates for patients with kidney transplants compared with patients receiving either hemodialysis or peritoneal dialysis. In contrast, a majority of studies reported no differences in outcomes between patients receiving hemodialysis and patients receiving peritoneal dialysis. These results were consistent throughout the study period, across diverse populations, and among the subset of studies that performed appropriate adjustments for potential confounding factors.

Limitations: Many studies included in the review had significant design weaknesses.

Conclusions: Evidence suggests that patients with kidney transplants may experience better rates of life participation compared with patients receiving dialysis, whereas patients receiving hemodialysis and patients receiving peritoneal dialysis may experience similar rates of life participation. Rigorously performed studies are needed to better inform patients about the association of RRT with these important patient-reported outcomes. *Am J Kidney Dis.* 62(5):953-973. © 2013 by the National Kidney Foundation, Inc.

INDEX WORDS: Dialysis; end-stage renal disease (ESRD) treatment; kidney transplantation; physical functioning; quality of life; social participation.

Patients initiating renal replacement therapy (RRT) for end-stage renal disease (ESRD) experience significant morbidity and limitations in quality of life.^{1,2} Limitations include often substantial decrements in patients' involvement in social and recreational activities, freedom, and abilities to work and travel, which have been associated with poorer overall health status and

survival.¹⁻⁷ While their declining involvement in life activities may be attributed in part to patients' significant ESRD-associated morbidity,⁸ the extent to which patients' mode of RRT might independently influence their life participation has not been well quantified.

The various RRT modalities (hemodialysis, peritoneal dialysis, and kidney transplantation) have dis-

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tinct characteristics, including different delivery methods (eg, treatment in a center vs at home), requirements for self-care (eg, clinician-directed vs self-directed), levels of physical invasiveness (eg, need for catheters or surgery), and associated symptoms (eg, fatigue with dialysis or transplantation medication side effects). Each of these RRT characteristics could substantially influence patients' abilities to engage in social and recreational activities,⁹⁻¹² and they frequently are presented to patients as important factors they should consider while approaching decisions regarding initiating or switching RRT modalities.¹³⁻¹⁷

Prior studies suggested that patients who undergo transplantation generally experience better quality of life than dialysis patients,¹⁸⁻²⁰ whereas there may be no significant differences for patients on hemodialysis compared with peritoneal dialysis therapy.^{21,22} However, these studies broadly examined quality of life without a specific focus on systematically examining the independent association of RRT modality with patients' physical activity, freedom, and abilities to participate in key activities of daily living, such as their abilities to work, travel, and participate in social and recreational activities, all important but distinct aspects that contribute to patients' global quality of life. Patients with ESRD and their families view information about the influence of RRT selection on these life activities as important to include in educational material informing patients' RRT selection decisions.²³ Systematic reviews summarizing evidence of associations between RRT modality choice and patients' abilities to participate in these important life activities therefore could greatly enhance informed decisions about RRT selection.

We performed a systematic literature review to provide an evidence-based summary of the association of patients' RRT modality with their rates of life participation activities across a variety of outcome measures, settings, and patient populations.

METHODS

Study Design

We performed a systematic review of published peer-reviewed studies describing differences in rates of 5 types of activities reflecting various aspects of life participation (ie, physical function, travel, recreation, freedom, and work outcomes) reported by adults with ESRD receiving different RRTs. We assessed factors that could influence the validity of study findings and quantified the direction and magnitude of differences in life participation outcomes among patients receiving different RRTs.

Populations Studied

Eligible articles reported on adults receiving RRT (hemodialysis, peritoneal dialysis, and kidney transplantation). Hemodialysis modalities considered eligible in our study included both in-center hemodialysis and nonspecific hemodialysis (ie, patients on in-center hemodialysis plus ≥ 1 alternative mode of hemodialysis,

such as satellite hemodialysis, home hemodialysis, or nocturnal dialysis). We included both deceased donor and living donor kidney transplantation.

Data Sources and Literature Search Strategy

We identified studies potentially eligible for inclusion in our review through a search of all studies in PubMed, EMBASE, and the Cochrane Library (trials only) from January 1980 through April 2012. An expert methodologist and content experts within our team developed comprehensive search strategies to identify relevant studies. Our search terms consisted of key words for each treatment modality and terms for each of the 5 life participation outcomes. We hand searched bibliographies of all potentially relevant studies to identify additional articles that our electronic search might have missed. Our initial hand search of bibliographies revealed that there were missed studies reporting primarily on quality-of-life outcomes, but also reporting relevant life participation outcomes as secondary outcomes. Thus, we repeated our electronic search with additional terms consisting of key words to identify studies primarily reporting on quality-of-life outcomes. We conducted this expanded search in all 3 databases and screened all studies for their potential inclusion in our review. The detailed search strategies are included in Table S1 (provided as online supplementary material).

We identified studies as reporting on physical function outcomes if they reported data on patients' limitations in performing activities of daily living, patients' self-reported physical functioning assessed through quality-of-life subscales (eg, in the 36-Item Short Form health Survey [SF-36]), or other measures of physical activity. We identified studies as reporting on travel outcomes if they reported on patients' travel abilities or restrictions. We identified studies as reporting on recreation outcomes if they reported on patients' abilities to engage in recreational or social activities (eg, in the SF-36). We identified studies as reporting on freedom outcomes if they reported on patients' perceived independence, ability to perform usual tasks, or intrusiveness. We identified studies as reporting on work outcomes if they reported on employment status or working capacity.

Study Inclusion and Exclusion Criteria, Data Extraction

We reviewed titles and abstracts of identified citations for potential inclusion. We then reviewed the full text of any citation deemed potentially relevant. We included studies if they reported on relevant outcomes (physical function, travel, recreation, freedom, and work) as a primary or secondary outcome and if they compared relevant outcomes for participants on at least 2 different ESRD treatment modalities (ie, hemodialysis, peritoneal dialysis, or kidney transplantation). We excluded articles if they: (1) were not written in English, (2) did not include relevant outcomes, (3) included only participants younger than 18 years, (4) contained no original data (ie, review, commentary, editorial, meeting abstract, or letter), (5) were case reports, or (6) did not compare differences in relevant outcomes among patients receiving different RRT modalities. We also excluded studies of special populations (eg, studies including only home hemodialysis patients but not in-center hemodialysis patients) to prevent expected small study size bias. For each article that met our inclusion criteria, 2 reviewers independently extracted data, including information on study design, follow-up, RRT modalities compared, locations, sample sizes, participant characteristics, and outcomes. Reviewers resolved disagreements by discussion and adjudication with a third party.

Classification of Study Designs

We classified eligible studies into 1 of 4 main design types: randomized controlled trial, longitudinal cohort (prospective/

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