

SECTION EIGHT:

Quality of Life

Quality of life is greatly reduced in dialysis patients compared to the general population. More frequent dialysis has been shown to improve upon many quality of life parameters, including employment, rehabilitation, and time spent in the hospital.

OVERVIEW

Chronic renal illness affects the quality of daily life by hindering the performance of everyday tasks and recreational activities, and by causing non-life-threatening but disruptive conditions. Both kidney disease itself and some consequences of traditional treatment regimens may diminish quality of life in a number of ways:

- ***Low Energy:*** Lack of energy and reduced capacity for exercise is one of the most pervasive conditions in dialysis patients.¹¹⁴ Anemia, malnutrition, sleep disorders, and some uremic toxins may all contribute to this malaise. Restrictions in water, salt, and dietary proteins intake, necessitated by intermittent therapy (see section on Malnutrition), may also contribute to low energy levels.
- ***Burden of dialysis therapy:*** Conventional hemodialysis may occupy the greater part of 3 days each week. In addition to the 4-hour dialysis session, patients spend considerable time traveling to and from dialysis centers and may take another 4-5 hours to recover from cramps, fatigue and washed-out feelings that typically follow standard treatments.⁵ Intradialytic symptoms, including headaches, nausea, cramps, and hypotensive episodes add to the discomfort of dialysis days.
- ***Unemployment and rehabilitation opportunity:*** ESRD patients may be unable to work either part-time or full-time. While 64% of the general population, aged 18-55, is working, only 34.5% of hemodialysis patients are working 6 months prior to therapy initiation and only 20.5% work at 90 days after starting therapy.¹¹⁵ Patients not working are less likely to have employer group insurance ($p < 0.001$) and thus increase costs to Medicare.

Section 8: Quality of Life

- ***Skin disorders:*** An estimated 37% to 90% of dialysis patients suffer from pruritis. Various treatments have been used to alleviate this condition but none are totally satisfactory. ^{116, 117}
- ***Morbidities and hospitalizations:*** Hemodialysis patients spend an average of about 15 days in the hospital each year. ^{73, 118, 119}
Hospitalization is the single largest cost of caring for ESRD patients on an annual basis, comprising over 40% (approximately \$30,000) of annual costs. ^{73, 118, 119}

Overall, quality of life for dialysis patients, as measured by several standardized questionnaires, is greatly reduced compared to the general population. ^{118, 119} Diminished quality of life can lead to noncompliance with medications and dietary restrictions and increase the risk of hospitalization, withdrawal from treatment, depression and suicide.

POTENTIAL BENEFITS OF DAILY THERAPY

Daily therapy may impact some of the root causes of these quality of life deficiencies.

In addition, sessions are typically much less intrusive (because of treatment length with short daily and treatment timing with long nocturnal) and require less recovery time than conventional hemodialysis sessions. The economic impact of quality of life improvements could be tremendous to the Medicare system. Increased employment and rehabilitation enables Medicare to share the cost of patient care with employer group health plans, while a 33% reduction in hospitalizations could lead to savings of over \$10,000 per patient annually.

SUMMARY OF PUBLISHED RESULTS

Standard measures of quality of life have demonstrated improvements with more frequent therapy. These include:

- The Nottingham profile in energy ^{51, 76}
- SF-36 in energy, mental health, physical functioning, role – physical, role – emotional, and social functioning ^{3, 5, 9, 22, 33, 51, 61, 64, 118, 120-123}
- The Beckman Depression Inventory ^{55, 121}

- The Sickness Impact Profile in social interaction, mobility, and household management ¹²¹
- The Kidney Disease Quality-of-Life Instrument in cognitive and sexual function and burden of kidney disease ^{11, 52, 66, 120}

Data from all studies on daily and nocturnal renal replacement therapy indicate that more frequent treatment improves quality of life for ESRD patients. Reported improvements include:

Parameter Measured	Observations
Energy Level	Enhanced energy, vitality and well-being ^{2, 3, 5, 6, 8, 9, 20, 21, 48, 50-52, 58, 63, 66, 67, 69, 76, 121-124} 54, 55 Improved appetite and increased intake of protein and calories ^{3, 9, 20, 21, 51, 56, 69, 102} 54 Decreased incidence of sleep disorders. ^{6, 8, 20, 48, 125-127} 55 Improved sexual function. ^{9, 20, 48, 50}
Therapy Tolerance	An almost immediate decline in adverse intradialytic symptoms (hypotension, cramps, headache, asthenia); patients recovered from dialysis treatments on average within 30 minutes or less (vs. several hours on conventional dialysis) ^{2, 3, 5, 6, 21, 22, 50, 52-55, 62, 63, 68-70, 121-123}
Employment	Increased rates of employment in some groups of patients ^{3, 6, 8, 9, 66, 120, 122, 128}
Skin Disorders	Decrease in the incidence and severity of pruritis in many patients ^{52, 60, 63, 69}
Morbidity and Hospitalization	Fewer days spent in the hospital and fewer admissions to hospitals than controls on conventional dialysis ^{3, 9, 22, 61, 118, 129}

TABULATED STUDY RESULTS ON QUALITY OF LIFE

Study & Design	Supporting Points
<p>Chan, CT. <i>Kidney Int.</i> 2004; 65:661 ¹²⁶</p> <p>Nocturnal HD 9 pt; 6-15 mo Prospective</p>	<ul style="list-style-type: none"> Nocturnal HD significantly decreased the frequency of sleep apnea (29.7±9.3 to 8.2±2.0 episodes/hour, p=0.02) and duration of nocturnal hypoxemia (13.9±5.2 to 2.6±1.9% of total sleep time, p=0.02)
<p>Lindsay, RM. <i>Sem Dial.</i> 2004; 17:85 ¹²³</p> <p>Daily HD 11 pt Nocturnal HD 12 pt; 1.5 yr Prospective Case/Control</p>	<ul style="list-style-type: none"> Compared to controls on conventional dialysis, both daily and nocturnal HD patients had significantly better results in measures of fatigue (p<0.001), uremic symptomatology (p<0.005), psychosocial stress (p<0.001), and time for full recovery from dialysis treatment (p<0.001) There was evidence of improvement in both groups in some quality of life scales from SF-36: General Health, Vitality, and Mental Health
<p>Lockridge Jr, RS. <i>Hemodial Int.</i> 2004;8:61 ⁹</p> <p>Nocturnal HD 40 pt; 1-5 yr Longitudinal</p>	<ul style="list-style-type: none"> All patients showed a statistically significant increase in the physical composite score and the mental composite score after starting nocturnal HD Hospitalization rates and length of stay were significantly decreased after starting nocturnal HD Patients reported increased energy and appetite and a decrease in nausea and headaches
<p>Williams, AW. <i>Am J Kid Dis.</i> 2004; 43:90 ⁵³</p> <p>Daily HD 20 pt; 4 wk Prospective</p>	<ul style="list-style-type: none"> All measures of quality of life improved during daily dialysis Patients reported less frequent headaches, nausea, vomiting and other signs of hypotension during dialysis
<p>Agar, JWM. <i>Hemodial Int.</i> 2003; 7:278 ⁸</p> <p>Nocturnal HD 10 pt; 3 mo Prospective</p>	<ul style="list-style-type: none"> All except one patient reported improved sleep patterns

<p>Goldfarb-Rumyantzev, AS. J Am Soc Nephrol. 2003; 14:233A ⁶³</p> <p>Daily HD 8 pt; 8 wk Prospective</p>	<ul style="list-style-type: none"> • Two patients reported higher energy levels • Three patients reported less severe cramping during dialysis • Pruritis resolved in one patient during daily HD
<p>Hanly, PJ. Am J Kid Dis.2003;41:403 ¹³⁰</p> <p>Nocturnal HD 15 pt Prospective</p>	<ul style="list-style-type: none"> • A majority of patients tested experienced excessive daytime sleepiness. This appeared to be related to uremia but was not significantly helped by nocturnal HD
<p>Heidenheim, AP. Am J Kid Dis. 2003; 42:S36 ¹²²</p> <p>Daily HD 11 pt Nocturnal HD 12 pt; 1.5 yr Prospective</p>	<ul style="list-style-type: none"> • On the SF-36 questionnaire, there were significant improvements in General Health and Vitality for both groups and in Emotional and Mental Health, Physical Components summary, and Mental Components summary for DHD • Mean levels of fatigue decreased significantly and dramatically ($p < 0.05$) for patients on NHD • On DHD, there were significantly fewer and less severe dialysis symptoms (cramping, headaches, hypotension) . ($p < 0.05$) On NHD, there was a trend for fewer and less severe dialysis symptoms (cramping, headaches, hypotension) that was significant at 12 months
<p>Koshikawa, S. Nephron Clin Practice. 2003; 95:C23 ⁵²</p> <p>Daily HD 21 pt; 3 mo Prospective</p>	<ul style="list-style-type: none"> • Patients reported increased appetite and a decrease in fatigue and pruritis • Scores on KDQOL improved significantly after starting daily HD ($p < 0.05$) • Patients reported fewer intradialytic symptoms of hypotension and dizziness
<p>Kunz, KW. J Am Soc Nephrol. 2003; 14:233A ⁶⁴</p> <p>Daily HD 8 pt; 9 mo Prospective</p>	<ul style="list-style-type: none"> • Quality of life, as evaluated by SF-36, improved from an average of 40% to 78% of well-being
<p>Maduell, F. Kidney Int. 2003; 64:305 ²⁰</p> <p>Daily HDF 8 pt; 6 mo Prospective</p>	<ul style="list-style-type: none"> • Three patients reported rapid improvement in sleep disorders after starting daily HDF • In the first 4 weeks, rapid improvement was reported in appetite (5 patients), headaches (3 patients), sexual disorders (2 patients) • Most significant was the disappearance of post-dialysis fatigue. Scores for fatigue intensity and duration both dramatically decreased ($p < 0.01$)

Section 8: Quality of Life

<p>McFarlane, PA. <i>Kidney Int.</i>2003; 64:1004 ¹³¹</p> <p>Nocturnal HD 43 pt Case Control</p>	<ul style="list-style-type: none"> Quality of life was evaluated for 24 nocturnal HD patients compared to 19 conventional HD patients A standard gamble technique, in which patients were given a choice of remaining in their current state of health or accepting a hypothetical treatment, was used to assess overall quality of life Nocturnal HD patients expressed a higher quality of life ($p=0.03$)
<p>Rocco, MV. <i>Rocco, MV. J Am So Nephrol.</i>2003; 14:502A ¹⁰²</p> <p>Daily HD 18 pt; 8 mo Case control</p>	<ul style="list-style-type: none"> There was a statistically significant increase in intakes of fat and energy reflecting an improved appetite on daily HD
<p>Ting, GO. <i>Am J Kid Dis.</i> 2003; 42:1020. ¹¹</p> <p>Daily HD 42 pt;1.5 yr Prospective</p>	<ul style="list-style-type: none"> Scores on KDQOL improved significantly within 3 months of starting daily HD. ($p<0.05$) for measures of energy/fatigue, symptoms, effects of kidney disease, cognitive function, social interactions, sexual function, and physical, emotional and general health Scores on KDQOL improved significantly within 3 months of starting daily HD. ($p<0.05$) for measures of symptoms during and after dialysis
<p>Traeger, J. <i>J Am Soc Nephrol.</i> 2003; 14:501A ³³</p> <p>Daily HD 13 pt; 2-6 yr Prospective</p>	<ul style="list-style-type: none"> Quality of life, as evaluated by SF-36, improved significantly from an average of 73% to 81% for physical score component and from 63% to 73% for mental score component ($p<0.01$)
<p>Zimmerman, DL. <i>ASAIO Journal.</i> 2003; 49:426 ⁶⁶</p> <p>Daily HF 11 pt; 4 wk Prospective</p>	<ul style="list-style-type: none"> All parameters of the KDQOL improved or remained the same. Energy level increased significantly ($p<0.03$) and cognitive function tended to improve ($p<0.07$) One patient returned to full time employment
<p>André, MB. <i>Am J Nephrol.</i> 2002; 22:473 ⁴⁸</p> <p>Daily HD 5 pt; 2 yr Prospective</p>	<ul style="list-style-type: none"> Patients reported significant improvement in social relationships, emotional health, work performance and sexual performance Patients reported significant improvements in sleeping patterns

<p>Cagle, J. ASAIO J. 2001;47:470 ⁶⁷</p> <p>Nocturnal HD 1 pt; ~3 yr Case pers.</p>	<ul style="list-style-type: none"> • No headaches or nausea, increased energy within a week of long nocturnal HD • Blood pressure dropped to 110/70 where previously the patient had to take 5 antihypertensives
<p>Galland, R. Am J Kid Dis. 2001;37Suppl 2:S95 ²¹</p> <p>Daily HD 10 pt; 13-38 mo Prospective</p>	<ul style="list-style-type: none"> • Less medication and dietary constraints • No post-dialysis asthenia • Shorter sessions caused less interference with professional and social life (no values given) • Excellent tolerance on daily HD • Hypotension or headaches disappeared • AV fistula puncture easy (no values given)
<p>Hanly, P. J. N E J Med. 2001;344:102 ¹²⁵</p> <p>Nocturnal HD 7 pt; 6 wk Prospective</p>	<ul style="list-style-type: none"> • For these patients with sleep apnea while on conventional HD, change to nocturnal HD reduced snoring and apnea episodes from 46 ± 19 to 9 ± 9 per hour ($p < 0.006$) and increased oxygen saturation during sleep from $91.7\% \pm 3.1\%$ to $95.3\% \pm 1.3\%$ ($p = 0.02$)
<p>Levenspiel, B. ASAIO J 2001;47:469 ¹²⁴</p> <p>Daily HD 1 pt; ~1 yr Case pers.</p>	<ul style="list-style-type: none"> • No nausea, cramping, or hypotension; increased energy, improved better, less restrictive diet (no values given) • Decreased need for EPO after starting short daily HD: from 30,000 U/wk to <5,000 U/wk
<p>Lindsay, R. M. ASAIO J. 2001;47:449 ⁵</p> <p>Daily HD 9 pt Nocturnal HD 10 pt; 1-18 mo Prospective/ Case-control</p>	<ul style="list-style-type: none"> • Quality of life questionnaires showed significant improvements in fatigue ($p < 0.05$), intradialytic symptoms ($p < 0.05$), time for full recovery from dialysis treatment ($p < 0.03$), uremic symptoms ($p < 0.005$) and psychosocial stress ($p < 0.05$) after switching from conventional HD to daily or nocturnal HD
<p>Traeger, J. Dial Transplant. 2001;30:76 ²²</p> <p>Daily HD 15 pt; ≥ 1 yr Prospective</p>	<ul style="list-style-type: none"> • No hypotension or headaches • Disappearance of post-dialysis fatigue

Section 8: Quality of Life

<p>Vos, PF. Am J Kid Dis. 2001;37:S99 ⁷⁶</p> <p>Daily HD 11 pt; 18 mo Prospective</p>	<ul style="list-style-type: none"> • Quality of life questionnaires (Rand 36, Nottingham Health Profile) showed significant improvements in energy, mental health, and vitality (no p values given)
<p>Cacho, C. Nephrol News Issues. 2000;14:36 ²</p> <p>Nocturnal HD 6 pt; 6 mo Prospective</p>	<ul style="list-style-type: none"> • Increased energy, improved appetite and sleep, and lack of symptoms immediately after dialysis
<p>Pierratos, A. Nephrol Dial Transplant. 1999;14:2835 ⁶</p> <p>Nocturnal HD 37 pt; 5 yr Prospective</p>	<ul style="list-style-type: none"> • All patients reported significant improvements in energy and well-being • Hemodynamic stability improved with disappearance of hypotension, cramping, and shortness of breath • Psychological tests demonstrated an improvement in cognitive function • Most patients assumed full time employment • Four patients with sleep apnea improved on nocturnal HD
<p>Williams, AW. Sem Dial. 1999;12:431 ⁶²</p> <p>Daily HD 5 pt; 8 wk Prospective</p>	<ul style="list-style-type: none"> • Intradialytic symptoms hypotension disappeared • Post-dialysis fatigue disappeared
<p>Williams, AW. J Am Soc Nephrol. 1999;10:270A ⁶⁸</p> <p>Daily HD 20 pt; 8 wk Crossover</p>	<ul style="list-style-type: none"> • Intradialytic cramps, chills, hypertension, and severe hypotension decreased on daily HD
<p>Anon. Nephrol News Issues. 1998;12:32 ¹²⁸</p> <p>Daily HD 1 pt; 4 mo Case report</p>	<ul style="list-style-type: none"> • No fatigue, recovery time after dialysis and minimal fluid gain • Shorter time in dialysis allowed for a better work schedule • Blood pressure decreased from 201/112 at the beginning of daily HD to 138/70 after 4 months

<p>Brissenden, JE. J Am Soc Nephrol. 1998;9:168A ¹²¹</p> <p>Nocturnal HD 18 pt; 3-12 mo Prospective</p>	<ul style="list-style-type: none"> • Mean total score on the Sickness Impact Profile (SIP) improved significantly (p=0.03) and scores on subsections on eating and household management were also significant (p=0.003 or 0.01) and scores on ambulation, mobility, and social action were nearly significant (p=0.07-0.08) • Beck Depression Index improved significantly after starting nocturnal HD (p=0.02) • SF-36 questionnaire also showed significantly improved social functioning (p=0.008), physical functioning (p=0.05), and role physical (p=0.05)
<p>Kooistra, MP. Nephrol Dial Transplant. 1998;13:2853 ⁵¹</p> <p>Daily HD 13 pt; 12 mo Retrospective</p>	<ul style="list-style-type: none"> • Quality of life questionnaires (Rand 36, Nottingham Health Profile, Uraemic Symptoms Profile) showed significant improvements in energy (p<0.05), physical condition (p<0.02), mental health (p<0.05), fatigue (p<0.02), and thirst (p<0.03)
<p>Pierratos, A. J Am Soc Nephrol. 1998;9:859 ⁶⁹</p> <p>Nocturnal HD 11 pt; 3 yr Prospective</p>	<ul style="list-style-type: none"> • Most patients reported greatly increased energy • Appetites increased and diets became more liberal; patients adapted easily and slept without difficulty • Nausea and post-dialytic symptoms decreased or disappeared • Pruritis decreased or disappeared • Of 8 able-bodied patients: On conventional HD, 2 patients worked full time, 3 worked part time, 3 were unemployed; after starting nocturnal HD, 6 worked full time, 1 worked part time, and 1 was seeking employment
<p>Ting, G. J Am Soc Nephrol. 1998;9:228A ⁶¹</p> <p>Daily HD 7 pt; 6 mo Prospective</p>	<ul style="list-style-type: none"> • Kidney disease quality of life indicators improved significantly for Health (p=0.008) and ESRD (p=0.002) • Hospitalization rates were reduced over 50%
<p>Twardowski, ZJ. Adv Ren Repl Therap. 1996;3:124 ⁷⁰</p> <p>Daily HD 3 pt; 6 mo Prospective</p>	<ul style="list-style-type: none"> • Symptoms of intradialytic intolerance and post-dialysis weakness almost completely disappeared • During 504 treatment sessions with daily HD, only 19 mild hypotensive episodes occurred; during 104 sessions of conventional HD, 23 hypotensive episodes occurred including 3 severe crashes
<p>Uldall, R. Adv Ren Repl Therap. 1996;3:133 ⁵⁸</p> <p>Nocturnal HD 5 pt; 6-16 mo. Prospective</p>	<ul style="list-style-type: none"> • Increased energy, appetite and generally well-being reported

Section 8: Quality of Life

Buoncrisiani, U. Kid Int.
1988;33:S137⁵⁰

Daily HD
12 pt; ~2 yr
Prospective

- Appetites, muscular strength, and general well-being increased significantly in all patients
 - Sexual potency was improved in 5 patients
 - Symptoms of intolerance (hypotension, cramps, headache, asthenia) almost completely disappeared
-