

Applying Theories of Behavioral Change to Manage Interdialytic Fluid Gains in Patients Undergoing Maintenance Hemodialysis Therapy

Philippa Norton-Feiertag, MEd, RD, LD

Clinical Information Specialist

Cincinnati, OH

Email: Philippa.Feiertag@fuse.net

This article has been approved for 1 CPE unit. The CPEU insert and certificate of completion can be accessed in the Members Only Section of the web site from the CPEU Inserts link.

Managing fluid balance is an integral part of treatment for patients with chronic kidney disease (CKD) undergoing maintenance hemodialysis (HD) therapy (1). Most patients with CKD are required to restrict potassium, phosphorus, sodium and fluid intake in order to avoid excess electrolyte accumulation and to prevent fluid overload. However, many patients adhere poorly to one or more aspects of their prescribed diet (2).

Maintenance HD patients are counseled to limit fluid intake to urine output plus 1000 cc daily (3). While some studies have suggested that higher interdialytic weight gains are indicative of better nutritional status, more recent findings do not support their use as a nutritional marker (4-6). Poor adherence to prescribed fluid restrictions is associated with edema, shortness of breath, episodes of intradialytic hypotension, cardiovascular complications, and increased mortality (7-10). Additionally, numerous medications prescribed for patients undergoing maintenance HD therapy – including phosphate binders, analgesics, antidepressants, vitamin D analogs and erythropoiesis stimulating agents – may impact fluid status (11).

In a study of 71 HD patients, no association was found between knowledge of sodium/fluid restrictions and compliance, assessed by measuring interdialytic fluid gains (7). In another study, a questionnaire was used to investigate dialysis patients' understanding of dietary advice (12). Although the majority of patients were able to identify foods high in sodium and fluid content, 56% of HD patients reported difficulty in maintaining fluid restrictions. Furthermore, when prevalence of fast food consumption was investigated among HD patients in 44 chronic hemodialysis facilities in northeast Ohio, findings indicated that fast foods were eaten frequently by this population and their

consumption was associated with higher sodium intake and larger interdialytic fluid gains (13).

Collectively, this research suggests that patient compliance is often poor when the focus of nutrition education is to provide information. To be effective in improving adherence to prescribed dietary and fluid restrictions, educational interventions may need to motivate patients to change behaviors. This article will review theories of behavioral change and examine strategies for improving compliance with prescribed fluid restrictions in maintenance HD patients.

Behavior Change Theories

Renal dietetics professionals can promote behavior change by educating their patients on pertinent nutrition information, motivating them to make changes, and providing them with the necessary skills and strategies to accomplish change. Applying theories of behavior change may help the renal dietetics professional to develop effective interventions for promoting behavior change (14). Table 1 summarizes theories of behavior change.

According to these theories, a patient's overall well-being and level of functioning may be impacted by self-management skills as well as knowledge. However, when measures of self-management and knowledge were applied to 372 patients on hemodialysis, findings indicated that these patients were poor self-managers (21). In another study, perceived self-efficacy in patients with CKD was a better predictor of self-management behavior than were demographic or health characteristics (22).

Strategies for Improving Compliance with Prescribed Fluid Restrictions in Maintenance HD Patients

Behavioral interventions targeted to improve adherence to prescribed fluid restrictions have achieved varying degrees of success in decreasing interdialytic fluid gains in patients undergoing maintenance HD therapy.

In a small study of 40 HD patients, self-efficacy, health beliefs and knowledge surveys were administered pre- and post-intervention to treatment and control groups (23). Patients in the treatment group received training in self-monitoring directed to increase adherence to prescribed fluid restrictions. During the intervention, a monthly progress report was used to educate each patient on acceptable interdialytic fluid gains and to provide feedback on their fluid gains for that month. In addition, a monthly written contract was developed to help patients formulate goals for fluid control. Each month, the progress report and goals were reviewed with the patient, and reasons for improvement or poor

Table 1
Theories of Behavior Change

Social Cognitive Theory	<ul style="list-style-type: none">• Behavior is affected by personal factors, environmental influences and attributes of the behavior. Social interactions provide models for new behavior patterns.• Self efficacy – a person's belief in his/her ability to attain required levels of performance – is essential for making appropriate choices and achieving behavior change (14-17).
Stages of Change (Transtheoretical Model)	<ul style="list-style-type: none">• Behavior change is a continuum related to readiness to change and consists of pre-contemplation, contemplation, preparation, action and maintenance.• Interventions should be customized to match a person's stage of change (14,16-19).
Health Behavioral Model	<ul style="list-style-type: none">• Health-related behaviors are determined by a person's perception of the severity of a potential disease, their susceptibility to that disease, benefits of taking preventive action and barriers to taking action.• Cues to action are important in achieving and/or maintaining desired behavior patterns (16).
Relapse Prevention Model	<ul style="list-style-type: none">• Inadequate coping skills, social pressure, interpersonal conflict, limited social support, low motivation and stress contribute to relapse.• High-risk situations for relapse must be identified so that appropriate solutions can be developed (16,20).

adherence were identified before developing another contract with new goals. Some patients in the treatment group showed small improvements in fluid control over time. However, no significant differences were found between treatment and control groups for adherence to fluid restrictions and scores on self-efficacy and health belief surveys.

A game developed to help HD patients maintain acceptable interdialytic fluid gains recognized the need to motivate patients to comply with their prescribed fluid regimen (24). Prior to launching the game, written materials and visual displays were used to educate 130 patients and their families about the need for fluid control and on techniques for limiting sodium and fluid intake. During the 3-month game, patients gaining no more than 2 kg between weekday treatments and 3 kg between weekend treatments received a star on their dialysis log sheet. Patients accumulating 25 stars were awarded a prize and certificate. After the game, 68% of patients were achieving interdialytic fluid gains within acceptable limits.

More successful approaches to increasing compliance with prescribed fluid restrictions have involved providing structured behavioral interventions. In one 4-week group program, educational, behavioral and cognitive strategies were used to facilitate self-management of fluid intake in 56 HD patients (25). Although no significant difference in mean interdialytic weight gains were found between treatment and control groups upon completion of the program, adherence to prescribed fluid

restrictions did improve significantly in the long term in those patients who participated in the program. Another intervention based on Bandura's theory included an educational component, performance mastery, experience sharing, and stress management for 62 HD patients (26). When compared with a control group, patients in the group receiving self-efficacy training showed gradual but significant decrease in interdialytic weight gains.

In a more recent study, questionnaires based on the Health Behavioral and Transtheoretical Models were used to assess 172 HD patients' perceptions of barriers, benefits, seriousness, susceptibility, and self-efficacy in readiness to change their behavior and to place patients into stages based on their interdialytic weight gains (27). Patients in the pre-contemplation stage scored significantly lower on perception of benefits than those in the action and maintenance stages, and their perception of self-efficacy was significantly less compared with patients in the contemplation, preparation, action, and maintenance stages. Findings from this study suggest that educational programs should focus on increasing patients' perceptions of the benefits and barriers to behavior change in order to facilitate their progress through the stages of change.

Summary

Studies investigating behavioral interventions directed to increase adherence to prescribed fluid restrictions in the maintenance HD population show some success in managing

Advances in Practice....

interdialytic weight gains. Findings from the studies reviewed indicate a number of approaches that may be useful to clinicians when counseling patients on fluid control. These include goal setting, development of written contracts and regular review of progress (23); rewarding patients achieving fluid control goals with recognition and prizes (24); encouraging self-management through education, behavior modification and experience sharing (25,26); and increasing patients' awareness of obstacles to, and benefits of, behavior change (27).

Future research should include controlled studies with larger numbers of participants (28). Results from existing studies also support further efforts to promote self-management in patients with CKD. The chronic care model emphasizes the need to support patients in managing their own care by assisting them with goal-setting and problem-solving, and by providing tips for undertaking specific tasks to improve their health outcomes (29). ♦

References

1. Raza H, Courts A, Quadri K, et al. The effect of active nutrition counseling in improving biochemical nutritional parameters and fluid overload problems in maintenance hemodialysis patients. *Saudi J Kidney Dis Transpl*. 2004;15:140-143.
2. Blackburn SL. Dietary compliance of chronic hemodialysis patients. *J Am Diet Assoc*. 1977;70:31-37.
3. Daily nutrient recommendations for CKD. In: *Pocket Guide to Nutrition Assessment of the Patient with CKD*. 3rd ed. New York, NY: National Kidney Foundation; 2002: 3-3 – 3-4.
4. Lopez-Gomez JM, Villaverde M, Jofre R, Rodriguez-Benitez P, Perez-Garcia R. Interdialytic weight gain as a marker of blood pressure, nutrition, and survival in hemodialysis patients. *Kidney Int Suppl*. 2005;3:S63-S68.
5. Testa A, Beaud JM. The other side of the coin: Interdialytic weight gain as an index of good nutrition. *Am J Kidney Dis*. 1998;31:830-834.
6. Yang SC, Chiang CK, Hsu SP, Hung KY. Relationship between interdialytic fluid gain and nutritional markers in younger and older hemodialysis patients. *J Ren Nutr*. 2008;18:210-222.
7. Durose CL, Holdsworth M, Watson V, Przygodzka F. Knowledge of dietary restrictions and the medical consequences of noncompliance by patients on hemodialysis are not predictive of dietary compliance. *J Am Diet Assoc*. 2004;104:35-41.
8. Szczech LA, Reddan DN, Klassen PS, et al. Interactions between dialysis-related volume exposures, nutritional surrogates and mortality among ESRD patients. *Nephrol Dial Transplant*. 2003;18:1585-1591.
9. Foley RN, Herzog CA, Collins AJ. United States Renal Data System. Blood pressure and long-term mortality in United States hemodialysis patients: USRDS Waves 3 and 4 Study. *Kidney Int*. 2002;62:1784-1790.
10. Rahman M, Fu P, Sehgal AR, Smith MC. Interdialytic weight gain, compliance with dialysis regimen, and age are independent predictors of blood pressure in hemodialysis patients. *Am J Kidney Dis*. 2000;35:257-265.
11. Iacono SA. Medication side effects: Barriers to the management of fluid intake. *Dial Transplant*. 2008;37:196-201.
12. McCloskey C, Clarke J, Rayner H. Dialysis patients' understanding of nutritional advice. *J Ren Nutr*. 1997;7: 90-101.
13. Butt S, Leon JB, David CL, Chang H, Sidhu S, Sehgal AR. The prevalence and nutritional implications of fast food consumption among patients receiving hemodialysis. *J Ren Nutr*. 2007;17: 264-268.
14. Baldwin TT, Falciglia GA. Application of cognitive behavioral theories to dietary change in clients. *J Am Diet Assoc*. 1995;95:1315-1317.
15. Bandura A. Social cognitive theory: An agent perspective. *Annu Rev Psychol*. 2001;52:1-26.
16. Grizzell J. Behavior change theories and models. Available at: http://www.csupomona.edu/~jvgrizzell/best_practices/bctheory.html. Accessed February 18, 2008.
17. Bandura A. Self-efficacy. In: *Encyclopedia of Human Behavior*. New York, NY: Academic Press; 1994:71-81.
18. Schüz B, Sniehotta FF, Mallach N, Wiedemann AU, Schwarzer R. Predicting transitions from preintentional, intentional and actional stages of change. *Health Educ Res*. Advance Access published January 31, 2008, doi:10.1093/her/cym092.
19. Greene GW, Rossi SR, Reed GR, Willey C, Prochaska JO. Stages of change for reducing dietary fat to 30% of energy or less. *J Am Diet Assoc*. 1994;94:1105-1110.
20. Holli BB. Using behavior modification in nutrition counseling. *J Am Diet Assoc*. 1988;88:1530-1536.
21. Curtin RB, Sitter DC, Schatell D, Chewning BA. Self-management, knowledge, and functioning and well-being of patients on hemodialysis. *Nephrol Nurs J*. 2004;31: 378-386,396.
22. Curtin RB, Walters BA, Schatell D, Pennell P, Wise M, Klicko K. Self-efficacy and self-management behaviors in patients with chronic kidney disease. *Adv Chronic Kidney Dis*. 2008;15: 191-205.
23. Tanner JL, Craig CB, Bartolucci AA, et al. The effect of a self-monitoring tool on self-efficacy, health beliefs, and adherence in patients receiving hemodialysis. *J Ren Nutr*. 1998;8: 203-211.
24. Bushman MC. Treating fluid noncompliance in the hemodialysis population using unit wide contests. *J Ren Nutr*. 1999;9:35-37.
25. Sharp J, Wild MR, Gumley AI, Deighan CJ. A cognitive behavioral group approach to enhance adherence to hemodialysis fluid restrictions: A randomized controlled trial. *Am J Kidney Dis*. 2005;45:1046-1057.
26. Tsay SL. Self-efficacy training for patients with end-stage renal disease. *J Adv Nurs*. 2003;43:370-375.
27. Ghaddar S, Shamseddine W, Elzein H. Behavioral modeling to guide patients' adherence to fluid control. *J Ren Nutr*. 2008;18:249.
28. Sharp J, Wild MR, Gumley AI. A systematic review of psychological interventions for the treatment of nonadherence to fluid-intake restrictions in people receiving hemodialysis. *Am J Kidney Dis*. 2005;45:15-27.
29. Alt PS, Schatell D. Shifting to the chronic care model may save lives. *Nephrol News Issues*. 2008;22:28-32.