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Theory-based Low-Sodium Diet Education for Heart Failure Patients

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Abstract

Theory-based teaching strategies for promoting adherence to a low-sodium diet among patients with heart failure are presented in this manuscript. The strategies, which are based on the theory of planned behavior, address patient attitude, subjective norm, and perceived control as they learn how to follow a low-sodium diet. Home health clinicians can select a variety of the instructional techniques presented to meet individual patient learning needs.

Over 5.5 million people in the U.S. have a medical diagnosis of heart failure (HF) (Lloyd-Jones, et al., 2009). Recent epidemiologic reports indicate that greater than one million HF patients were discharged alive, dead, or to an unknown status from hospitals in 2006 (Lloyd-Jones, et al., 2009). With the direct and indirect cost of heart failure estimated at \$37 billion in the U.S. for 2009, it is imperative that health care providers actively involve patients and their families in the management of care to produce optimal patient outcomes (Lloyd-Jones, et al., 2009; Riegel, et al., 2009). Expert guidelines for HF care affirm that patients and their families should receive individualized education and counseling to build self-care skills for effective disease management (Dickstein, et al., 2008; Jessup, et al., 2009). One of the most

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important skill sets for HF patients and their families is the self-management of a low-sodium diet.

Professional standards and the scope of practice for home health nurses emphasize care management, coordination of care, education, and advocacy for patients with acute and chronic diseases (American Nurses Association, 2008). A theory-based educational program that is currently under investigation contains information for home health clinicians to use as they provide instruction and counseling for low-sodium diet adherence to patients with HF. Components of the teaching protocol used in the clinical trial are described in this paper; the instructional techniques are based on the theory of planned behavior (Montano, Kasprzyk, & Taplin, 1997).

Theoretical Framework

Behavioral change, such as adherence to a low-sodium diet, requires more than additional knowledge. The theory of planned behavior (TPB) states that the most important determinant of behavior is a person's behavioral intention (Ajzen & Fishbein, 1980). The direct determinants of behavioral intention are attitude, subjective norm, and perceived control.

Attitude

The TPB distinguishes between attitude toward an object, heart failure, and attitude toward a behavior with respect to that object, following a low-sodium diet (Montano et al., 1997). Attitude, the first independent element of the TPB, is determined by the individual's beliefs about outcomes of performing the behavior and the behavioral beliefs are weighted by an evaluation of those outcomes. Therefore, an individual who holds strong beliefs that positively valued outcomes will result from a behavior will have a positive attitude toward that behavior. The educational protocol described in this paper encourages positive behavioral beliefs by first explaining the fundamental pathophysiology of HF and the significance of fluid excess in the body. A clear relationship between high-sodium foods and fluid volume excess is established. The negative consequences of volume overload and the benefits of adhering to a low-sodium diet are emphasized.

Subjective Norm

An individual's subjective norm, the second independent element, is determined by normative beliefs—whether important significant others approve or disapprove of the behavior (Montano et al., 1997). Normative beliefs are weighted by the individual's motivation to comply with the beliefs of significant others. Thus, a patient who believes that significant others support engagement in a behavior, and is motivated to meet the expectations of the significant others, will hold a positive subjective norm for the behavior. Therefore, significant others are included in the teaching sessions when appropriate and feasible. Conversations about who does the cooking and shopping for the patient are included in the intervention and appropriate suggestions for low-sodium diet adherence are made from this information.

Perceived Control

Perceived behavioral control is the third independent element of the TPB (Montano et al., 1997). The ease or difficulty of behavioral performance will affect behavioral change. Perceived control is determined by beliefs concerning the presence or absence of resources for and impediments to behavioral performance. Control beliefs are weighted by perceived power which includes evaluating the ability of each resource and impediment to facilitate or inhibit the behavior.

Resources and impediments to adhering to a low-sodium diet are identified as part of the educational program. Teaching is individualized to increase perceived control and reduce impediments to behavioral change. Factors that can impact adherence are also addressed. If lack of knowledge about the sodium content of foods, low-sodium food preparation, or purchasing economical low-sodium food items is a barrier, information is provided to overcome these obstacles.

General Teaching Plan

Attitudes

Adherence behavior is complex and multi-faceted. A patient's ability to adhere to treatment regimens may be compromised due to age-related changes such as a decline in hearing, vision, and functional status (Sweitzer & Warner Stevenson, 1999). Other factors such as low income, low level of education, lack of social support, comorbidities, and multiple symptoms may also compromise adherence behaviors (Happ, Naylor, & Roe-Prior, 1997; Naylor, et al., 1999; Vinson, Rich, Sperry, Shah, & McNamara, 1990). Because of these factors, it is not likely that any one educational program will work for all patients. Therefore, instruction needs to be flexible enough to respond to individual patient/family needs. Clinicians who teach during home visits are encouraged to pick and choose from the teaching strategies described in the following teaching plan. The plan should be adjusted to address factors that can prohibit adherence. The intervention in the clinical trial is flexible and individualized.

Implementation of the teaching plan begins with scheduling appointments for home visits and follow-up telephone calls. Home visits and phone calls are arranged over a time span agreed upon by the patient and the clinician.

In the pilot of the intervention study, a research intervention nurse made two home visits and two follow-up telephone calls to provide and reinforce education. The timeline and basic instructions provided by the intervention nurse are presented in Table 1. A simple, clear explanation of the link between HF and the development of fluid retention (Banasik, 2005) is presented during the first teaching session. Often, patients do not recognize symptoms such as weight gain, difficulty breathing, and ankle swelling as symptoms related to HF and fluid retention (Carlson, Riegel, & Moser, 2001; Horowitz, Rein, & Leventhal, 2004). Symptoms of fluid retention such as shortness of air (also known as shortness of breath) and edema should be described. A clear connection between symptoms of fluid retention and worsening HF should include an elaboration on the impact of high-sodium foods on fluid retention. Negative outcomes of fluid retention such as increased swelling, shortness of air, weight gain, and rehospitalizations should be reviewed. While hypertension is a potential adverse effect of fluid retention, blood pressure was not addressed in this pilot.

Visual aids appropriate for content introduction include diagrams of the heart, pictures of weight scales, drawings of salt shakers, high-sodium foods, swollen extremities, and pictures of the ambulance or hospital. These visual aids, along with verbal explanations, can help patients understand the connections between high dietary sodium intake, weight gain and edema, and subsequent clinic visits or hospitalization.

Patients frequently believe they cannot control their symptoms or that dietary sodium has a minor effect on their symptoms (Horowitz, et al., 2004; Schiff, Fung, Speroff, & McNutt, 2003). The clinician should inform HF patients that they can make a difference in their symptoms and hospitalizations by limiting their sodium intake to approximately 2 or less grams daily (Riegel, et al., 2009). Positive outcomes of adherence to a low-sodium diet

should also be described: decreased swelling, decreased shortness of air, decreased hospitalizations, and more energy.

Subjective Norm

Because HF patients may depend on others for shopping and meal preparation, it is crucial to include the people who are involved in the patient's care in the teaching sessions. Living arrangements and the patient's ability to cook or buy groceries may also influence menu planning. These areas should be addressed with patients and their significant others (e.g., spouses or other caregivers) for practical reasons and to support a positive subjective norm. Significant others, as well as patients, should be instructed on reading food labels for sodium content and low-sodium diet cooking and shopping to support patient adherence.

Perceived Behavioral Control

Perceived behavioral control is addressed by providing instruction on a low-sodium diet. According to the TPB, behavioral performance is determined partly by behavioral control. Perceived power will be increased by helping patients realize that they have multiple resources to facilitate the behavior and few barriers to impede the behavior. In attempting to increase perceived behavioral control, the instruction should provide ideas for overcoming barriers to adherence. This includes barriers specifically identified by patients and their family members as well as barriers identified in research: lack of knowledge, interference with socialization, and lack of food selections (Bentley, DeJong, Moser, & Peden, 2005).

Food Diaries

All teaching related to a low- sodium diet should be individualized and based on dietary information provided by the patient. The educational protocol under investigation includes the completion of food diaries (Table 2) by patients to document their dietary sodium intake. Patients should be taught to read food labels and measure portions with food scales or kitchen measuring tools so they can specify food intake on the diary. After the food diary contents are confirmed as accurate by the intervention nurse (Box 1), the diaries are analyzed by computer software, the Nutrition Data System for Research (NDSR), to calculate the sodium content of the patient's dietary intake in the clinical trial.

Clinicians who do not have access to computer software for food analysis can identify high-sodium foods on the diary using sodium content guides for common foods (Table 3). Food diaries can be used at varying points in time to determine dietary changes by the patient and to tailor low-sodium diet instruction. Patients receive simple instructions for food diary completion between clinician visits or the diary can be used for a 24-hour recall of dietary intake for discussion at any point in time. When specific high- sodium foods are found on the patient's food diary, low sodium alternatives can be suggested (Table 1). Mutually agreed upon substitutes for high-sodium foods are negotiated during food diary discussions. Examples of low-sodium foods and additives are provided in the booklet, *How to Follow a Low-Sodium Diet*, a publication available through the Heart Failure Society of American (Table 3).

Hidden Sodium

Sodium can be hidden in many home-prepared foods and favorite recipes. Homemade foods listed on the food diary can be broken down into specific ingredients to identify high-sodium additives. The clinician should examine patient recipes for sodium content and recommend alternative ingredients to reduce the sodium content of favorite recipes. Recipes should be altered to include fresh vegetables, low-sodium canned foods, and substitutions with diluted soups in place of high-sodium, processed ingredients.

Visual Aids

Because some patients are visual learners, visual aids can be used for sodium content comparisons. Test tubes that contain the amount of salt found in selected foods may be purchased to demonstrate salt intake (Table 3). The test tubes of salt provide direct visual evidence of sodium content and are useful for comparisons. For example, test tubes containing the amount of salt found in a serving of potato chips (higher sodium food) can be compared to tubes containing the amount found in a medium potato (lower sodium food).

Menu Planning

The patient's food diary can be used to plan a sample menu since the diary will contain the patient's food preferences. Many HF patients, due to other comorbidities such as diabetes, have more than one dietary guideline to follow (Bentley, et al., 2005; Carlson, et al., 2001). This potential obstacle should be addressed for each patient. Salt substitutes should be discussed and specific, written ideas for herb or spice blends can be given to patients. Low-sodium recipes can also be provided to the patient.

Eating away from home may be an obstacle to low-sodium diet adherence. The patient's favorite restaurants should be identified and the booklet, *Nutrition in the Fast Lane*, can be given to the patient (Table 3). This booklet contains sodium and other nutrient information for restaurant foods. The clinician should ask patients to describe what they typically order at their favorite restaurants. The sodium content is found in the booklet and if the sodium content is high, lower sodium alternatives can be suggested.

Patients are encouraged to select nutritious foods when making food choices. Dietary Guidelines for Americans (U.S. Department of Health & Human Services, 2005) can be used to select meats, vegetables, and dairy products that are nutritious and lower in sodium than processed foods. When planning for social activities, patients may need to omit high-sodium foods for several meals when they know they are going to an event that may result in higher sodium intake.

Creative Teaching Strategies

The use of analogy can be an interesting way to engage patients and families in the learning process and assist learning. One strategy created by the intervention nurse for the current clinical trial involves describing daily sodium intake in currency terms. The daily sodium allowance of 2,000 milligrams can be compared to spending \$20.00 per day. If 500 milligrams of sodium were consumed with breakfast, \$5.00 was spent. With that expenditure, 1,500 milligrams of sodium are left to consume for the day, or, in currency terms, \$15.00 remains in the daily allowance. Since patients are accustomed to spending money, this analogy is one that is familiar and useful to them.

Another analogy is based on traffic congestion, when something goes wrong with the flow of traffic, vehicles back up; when all is well, vehicles move smoothly along. The clinician explains that when fluids are balanced in the body, traffic, the blood and fluid in the body, moves well. Conversely, when too much fluid and blood is in the extremities, heart or lungs, it is difficult for blood to move in and out of these structures similar to vehicles in a traffic jam. When these traffic jam like events occur, fluid remains stagnant and congested which leads to swelling in the extremities, weakness, and shortness of air.

Summary

While incorporating patient education into home care visits is challenging from a time management perspective, there is a strong emphasis on providing patients and their families

with information on self-managing chronic diseases in today's health care community (American Nurses Association, 2008; Riegel, et al., 2009). Home health nurses reported that they may have only one opportunity to educate patients in the home in a study of Medicare home health practice variations by the U.S. Department of Health and Human Services (Brega et al., 2002). Consequently, instruction may be content heavy during one home visit which makes learning difficult (Brega et al., 2002). It is important, then, to use creative, individualized strategies for patient education when clinician-patient contact time is limited. This paper offers a variety of educational strategies to choose from as clinician's teach HF patients the specific skills they need to manage a low-sodium diet.

Box 1. Example of food diary entry confirmation

The patient writes "slice of pizza" on the food diary. After collecting the diary from the patient, the intervention nurse questions the patient about pizza ingredients, slice size, home-made or delivery, and other pizza characteristics. For research purposes, patients are instructed to save food containers for the investigators so that nutritional data can be obtained from the package label. The intervention nurse also examines packaged foods in the home along with patients and caregivers to compare and contrast the sodium content of foods.

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Teaching plan

Table 1

Contact	Educational Blueprint	Content
First home visit	Introduction	<u>Introduction</u> A low-sodium diet is the same thing as a low-salt diet.
Identify significant others and include in teaching sessions	Positive outcomes	<u>Positive Outcomes</u> Following a low sodium diet can be very beneficial to you in many ways. You may feel better and have fewer heart failure symptoms if you follow a low-sodium diet.
	Pathophysiology of HF	<u>What is heart failure?</u> Heart failure makes your heart weaker and your heart cannot pump as strongly as it used to before you had heart failure. Because of the weakness in the pumping action of the heart, blood and fluid backs up into the lungs. This causes shortness of air and difficulty breathing. With heart failure, your body tends to hold on to water (fluid). Fluid spills out of your blood vessels into other areas of your body such as your legs and ankles.
	Negative consequences Clear linkage between high Na foods and volume overload	<u>Consequences of high sodium diet</u> Eating a diet high in sodium causes the body to hold on to more fluids. This extra fluid makes your heart work even harder. It may also cause an increase in: <ol style="list-style-type: none">1 Swelling of the ankles, feet or abdomen2 Shortness of air3 Weight gain4 Hospitalizations
	Food diary instructions	<u>Completing food diary</u> <ol style="list-style-type: none">1 Demonstrate how to read labels for serving sizes2 Demonstrate writing food types and amounts on diary3 Include all food seasonings on diary
First telephone call	Follow-up phone call Reinforce previously taught content Answer questions Provide encouragement and applaud efforts	Answer questions and acknowledge positive changes in diet.
Second home visit	<u>Review basics of low sodium diet</u>	<u>Skills for following low sodium diet</u> Limit your sodium intake to no more than 2 grams (2,000 mg.) every day. This is equal to one teaspoon of salt per day. Remember that sodium is often hidden in foods.
	High & low sodium foods	High sodium foods: luncheon & deli meats, hot dogs, ham, sausage, bacon, canned foods, potato chips, dill pickles. Low sodium foods: fresh fruits and vegetables, eggs, chicken, some

Contact	Educational Blueprint	Content
	<p>Reading food labels for sodium content</p> <p>Using salt substitutes/seasoning</p> <p>Menu development</p> <p>Fast food choices</p> <p>Review food diary</p>	<p>bread and fresh fish.</p> <p>Demonstrate how to read food labels for sodium content of each portion – request a return demonstration from patient.</p> <p>Discuss appropriate salt substitutes and seasonings such as garlic powder, Italian seasonings.</p> <p>Plan sample menus incorporating low-sodium favorites.</p> <p>Identify favorite foods from fast food restaurant guide – suggest low-sodium substitutes.</p> <p>Identify high-sodium foods on food diary – suggest low-sodium substitutes.</p>
<p>Second telephone call</p>	<p>Follow-up phone call</p> <p>Reinforce previously taught content</p> <p>Answer questions</p> <p>Provide encouragement and applaud efforts</p>	<p>Answer questions and acknowledge positive changes in diet.</p>

Table 2
Example of a food diary template

Food Diary			
Date	Food or Beverage	Amount and Size	Description
Amount	ounce, cup, teaspoon, tablespoon, slice, or leg or breast		
Description	<p>1. Homemade—recipe and cooking method (boiled, grilled, baked, or with oil—what kind of oil; something added—salt, sugar, or seasoning—how much; something removed—fat or skin)?</p> <p>2. Commercial or prepared package—brand name, type, regular, low-fat, low-salt, sugar-free, caffeine-free</p> <p>3. Restaurant—Name, type of foods, cooking method (boiled, grilled, baked; with oil or not; something added—salt, sugar, or other seasoning—how much; something removed—fat or skin)?</p> <p>4. Drink — caffeine, sugar or cream added</p>		

Table 3
Educational resources

Type of material	Materials/Access Information
Pamphlets/ Sodium Content Guides	Module 1 – Introduction: Taking Control of Heart Failure Heart Failure Society of America; 2002 www.hfsa.org Module 2 – How to Follow a Low-Sodium Diet Heart Failure Society of America; 2002 www.hfsa.org Nutrition in the Fast Lane Franklin Publishing www.FastFoodFacts.com
Visual aids	<i>How Much Salt?</i> - test tubes filled with the amount of salt in specific foods Young People's Health Heart Program www.healthyheartprogram.com Generic Portion Sized Models Kit – plastic models of food portions, e.g. 1 tablespoon ketchup, 3 ounces meat, ½ cup mashed potatoes, others www.enasco.com