EDUCATING THE OLDER ADULT IN THE PREVENTION, DETECTION, AND TREATMENT OF EARLY STAGE DEHYDRATION

Scholarly Project for the Degree of M. S. N.

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KAREN R. STEWART

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EDUCATING THE OLDER ADULT IN THE PREVENTION, DETECTION, AND TREATMENT OF EARLY STAGE DEHYDRATION

By

Karen R. Stewart

A SCHOLARLY PROJECT

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ABSTRACT

Educating the Older Adult in the Prevention, Detection, and Treatment of Early Stage Dehydration

By

Karen R. Stewart

Dehydration is a common, serious, and costly medical problem. The elderly are at particular risk for dehydration due to normal aging changes, an increased incidence of chronic diseases, and an increased vulnerability to acute illnesses such as influenza and pneumonia. Unfortunately, dehydration often goes undetected until its later stages when hospitalization is required. Though prevalent, dehydration is largely preventable and in the initial stages, easily treated. Therefore, an emphasis on educating those at high risk about preventive measures is imperative. For those instances when dehydration has not been prevented, the ability to recognize dehydration in its early stages and intervene quickly can prevent the high morbidity and mortality associated with the condition. Educating the elderly is critical in terms of health maintenance and illness prevention. It is necessary to provide information to older individuals that will assist them to maintain optimal independence and quality of life. Such information can be provided in the form of an educational brochure and if utilized will hopefully aid in reducing the number of cases of dehydration reported in a community.

DEDICATION

I would like to dedicate this scholarly project to my husband, Eric, and our daughters, Lindsay and Samantha. This goal has been reached because of your love and your faith in me. Your support, encouragement, and cooperation over the past three and a half years have made this project an accomplishment for all of us.

ACKNOWLEDGEMENTS

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To my entire family and close friends, I extend my heartfelt gratitude for your prayers and words of encouragement. For those of you who suffered through being the subject of physical exams, I thank you.

Finally, to my dear friend and colleague, Judy Brady, who pushed me into this program, I thank you. We proved to be quite a team throughout this process and I hope that we can find the opportunity to work together in the future.

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INTRODUCTION

Dehydration is a common disorder among the elderly (Sansavero, 1997; Warren et al., 1994; Weinberg, Minaker, & the Council on Scientific Affairs, American Medical Association, 1995). In 1991, the Health Care Financing Administration ranked dehydration as one of the most frequent diagnosis for Medicare hospitalizations (Health Care Financing Administration, unpublished data). The actual incidence is probably much higher, as dehydration may be masked by other clinical disorders and not listed as a diagnosis even when present. It has been estimated that approximately 1.5% of community dwelling elderly will be hospitalized with dehydration annually (Warren, Harris, & Phillips, 1996).

Dehydration is frequently associated with an increased morbidity and mortality rate. Stachenfeld, DiPietro, Nadel, and Mack (1997) state that dehydration may trigger a cascade of adverse events initiating or accelerating a process leading to a severe deterioration in health status. Dehydration can cause serious and troublesome health problems such as renal failure and constipation. Dehydration has also been implicated in the increased incidence of skin breakdown, falls, and changes in mental status. Furthermore, one study reported that almost 50% of elderly Medicare beneficiaries hospitalized with a principle diagnosis of dehydration died within a year of admission (Warren et al., 1994). Such data indicate that dehydration in the elderly is a frequent, serious, and costly medical problem. Although serious, Hoffman (1991) states dehydration often goes unrecognized.

Current demographics project that by the year 2000, persons over 65 will represent 13% of the United States population and that this percentage will more than double by the year 2050 (Administration on Aging, 1997; U.S. Census Bureau, 1995). As the number of elderly persons increases the importance of dehydration as a serious medical problem is also likely to increase. Recognizing the incidence, risks, and consequences associated with dehydration increases the need for strategies to prevent the condition or to recognize and treat it in its early stages. Unfortunately, discerning dehydration in the elderly can be difficult because many of the classic signs of dehydration, such as sunken eyes and loss of skin turgor, are present among normally hydrated older populations (Sansavero, 1997). This indicates a need for age-specific assessment guidelines. This is important because if dehydration is identified early and prompt treatment is instituted health outcomes can be dramatically affected.

Changes in the health care arena have impacted the way those in primary care provide, manage, and evaluate their services (Starfield, 1992). Managed care is a system created, in part, to control what is spent on health care while still maintaining quality of care. Reimbursement is designed to provide incentives toward our becoming better stewards of the resources at our disposal. Care is shifting from a focus on disease treatment to a focus on primary and preventive care. Subsequently, teaching patients how to manage and promote health takes on added importance. Accountability for quality, cost-effective health care must be shared among health plans, health care providers, and consumers. Consumers must be viewed as partners with accountability for prevention. Consumers, therefore, need to be given health information if they are to make informed decisions and be held accountable. Advanced practice nurses (APNs), in

their role as primary care provider (PCP), will be health care consumers' initial contact with the health care system. This places the APN in an ideal position to provide the needed health information.

Purpose of the project

The purpose of this project is to develop a tool to educate community dwelling elderly health care consumers regarding the risk factors, consequences, signs and symptoms, and preventive measures related to dehydration in order to prevent the morbidity and mortality associated with this condition. The segment of the elderly population living independently and not in controlled environments that monitor blood pressure, pulse rates, mental status, intake and output, and laboratory tests need accurate and useable information to guide them in maintaining their health and independence. Education is the key to preventing initial episodes or the reoccurrence of dehydration among elderly populations. Although aimed at the consumer, this tool will hopefully increase health care provider awareness of this issue and their need to assess for dehydration and to educate the public about preventive meaures. To facilitate the development of this tool, the Health Belief Model (HBM) will be used as a conceptual framework (Janz & Becker, 1984; Pender, 1996).

CONCEPTUAL FRAMEWORK

The HBM (see Figure 1) is used as a framework for developing a tool aimed at the prevention and early detection and treatment of dehydration in the elderly population. The HBM is applicable to the concept of health protection because it focuses on efforts to move away from or avoid the negative events associated with illness and injury. Both primary prevention, that provides specific protection against disease and secondary

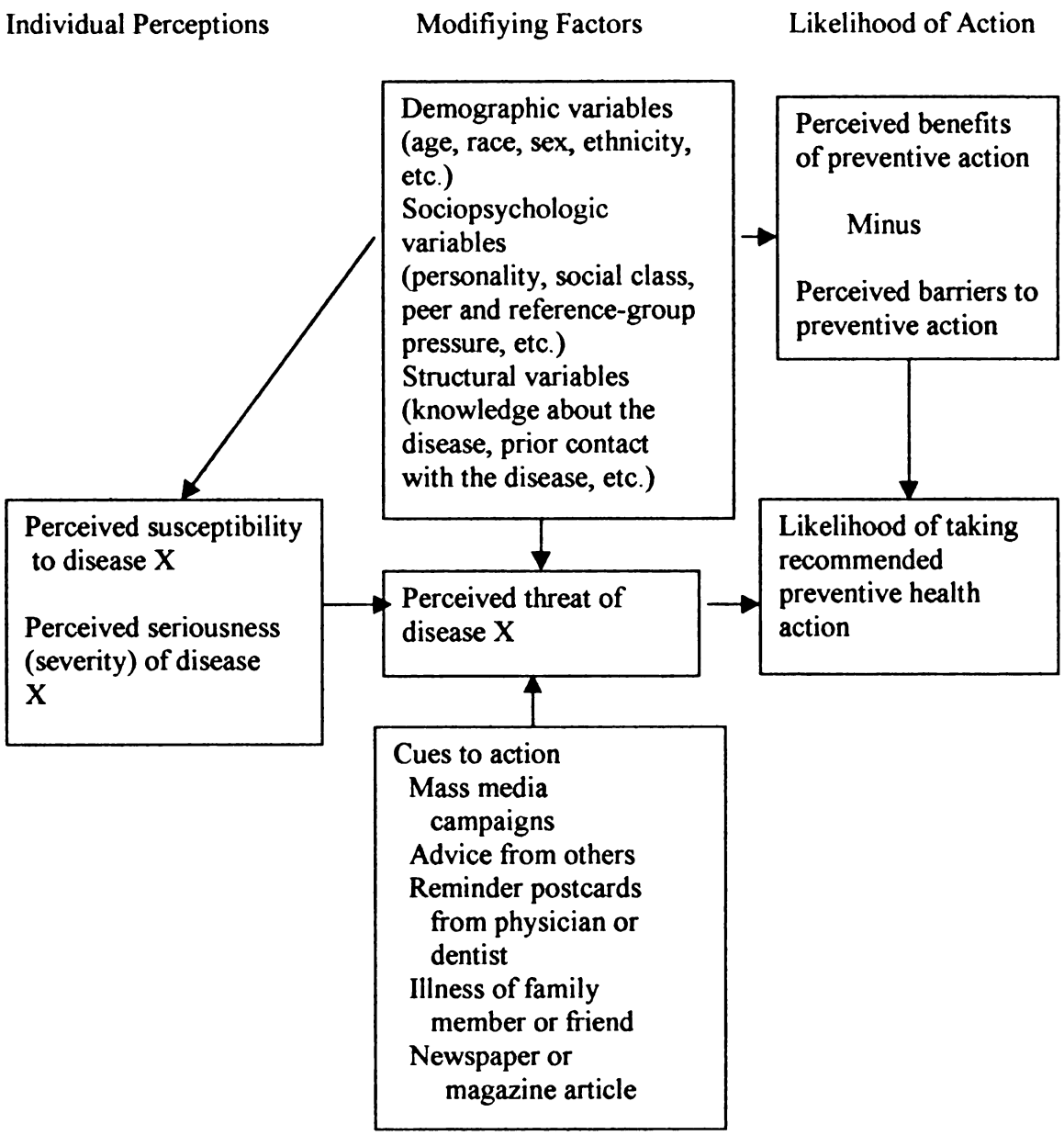


Figure 1. The Health Belief Model. (From Pender, N.J. (1996). Health Promotion in Nursing Practice (3rd ed.) Stamford, Connecticut: Appleton & Lange, pg. 36)

prevention, consisting of screening efforts and education that prompts early detection and intervention, are addressed in the HBM.

The HBM offers a method for understanding health-related behavior that is necessary if one is trying to predict, influence, and facilitate certain health behaviors. The HBM contends that whether or not an individual undertakes a recommended health action is dependent upon that person's perceptions of their susceptibility to the particular illness or condition and the degree of severity of the consequences that may result from the illness or condition (Janz & Becker, 1984; Pender, 1996). In other words, the individual must feel threatened in order to initiate a health action. Furthermore, the individual must believe the health action has potential benefits in preventing or decreasing their susceptibility and/or the severity of the illness or condition. In addition, the barriers to initiating or continuing the proposed actions must be acceptable to the individual.

The HBM further asserts that a cue to action must occur to stimulate or trigger the health action. In essence, it is this cue to action that makes the individual aware of the health threat. The modifying factors within the model influence an individual's perceptions regarding risks and benefits. Consequently, if the level of readiness to act (susceptibility and severity) is high and the negative aspects or barriers are low or weak the health action is more likely to be acted upon. The amount of cue necessary is related to the level of readiness; the lower the level of readiness the greater the cue needed.

The HBM assumes that "health" is a highly valued concern or goal for most individuals. When considering preventive health behavior, susceptibility, benefits, and barriers have consistently been associated with outcomes, barriers being the most

predictive. On the other hand, severity is more meaningful for patients who are experiencing symptoms already or who have been diagnosed (Janz & Becker, 1984).

The major constructs of the HBM include susceptibility, severity, benefits, barriers, modifying factors, and cues to action. The definitions of these constructs clarify the support this model gives to the development of a tool aimed at the prevention and early detection and treatment of dehydration in the elderly.

Susceptibility refers to the person's subjective perception of the risks of contracting a condition (Janz & Becker, 1984). Severity involves the feelings regarding the seriousness of contracting an illness. This construct includes evaluations of both medical and clinical consequences (e.g. death, pain, disability) and potential social consequences (e.g. effects on social relationships and family life, move to nursing home, loss of independence) that individuals believe the health condition would create for them. Benefits depend on the beliefs regarding the effectiveness of the various actions available in preventing or reducing the disease threat. Barriers involve the potential negative aspects of a particular health action (e.g. cost, inconvenience, pain, side effects, and complexity of regime). There is a cost-benefit analysis that is done when considering the benefits and barriers of a health action. Modifying factors include demographic factors (age, sex, race, etc.), sociopsychological variables (personality, peer pressure, social class, etc.), and structural variables (knowledge of disease, prior experience with disease). Cues to action include anything that triggers a health action. Cues may be internal (i.e.symptoms) or external (i.e.mass media, interpersonal communication, reminder postcards, and flyers).

The HBM constructs are used to define the components required in an educational tool in order to initiate or affect a change in health behavior (see Figure 2). Susceptibility is the first construct to be addressed. A person must feel they are at risk if an action is to be taken. Someone who has experienced poor health is more likely to perceive health threats from an illness/condition than someone who has experienced excellent health (Burns, 1992). It can be assumed that most elderly have experienced some health deviation over the years. This will increase their sense of vulnerability. Pointing out simple yet overwhelming statistics regarding the risks of dehydration for the elderly will increase their perception of susceptibility. In addition, providing information about the reasons for an older adult's increased risk of dehydration will also impact perception of susceptibility.

An individual's perception of severity will be affected by their current health status. Statistics can also be used to affect perceptions of dehydration's severity. A focus on potential consequences related to dehydration can further impact an individual's perception of severity.

To increase perceived benefits, health actions must demonstrate effectiveness in reducing or preventing dehydration. Recognition of signs and symptoms of dehydration can lead to early detection and intervention thus impacting the potential morbility and mortality associated with dehydration. Therefore, a listing of signs and symptoms in the teaching tool is indicated. Current treatment strategies for dehydration should also be utilized in the proposed tool.

Barriers are the strongest predictor of an individual's taking/declining a health action (Janz & Becker, 1984). The higher the perceived barrier, the less likely an

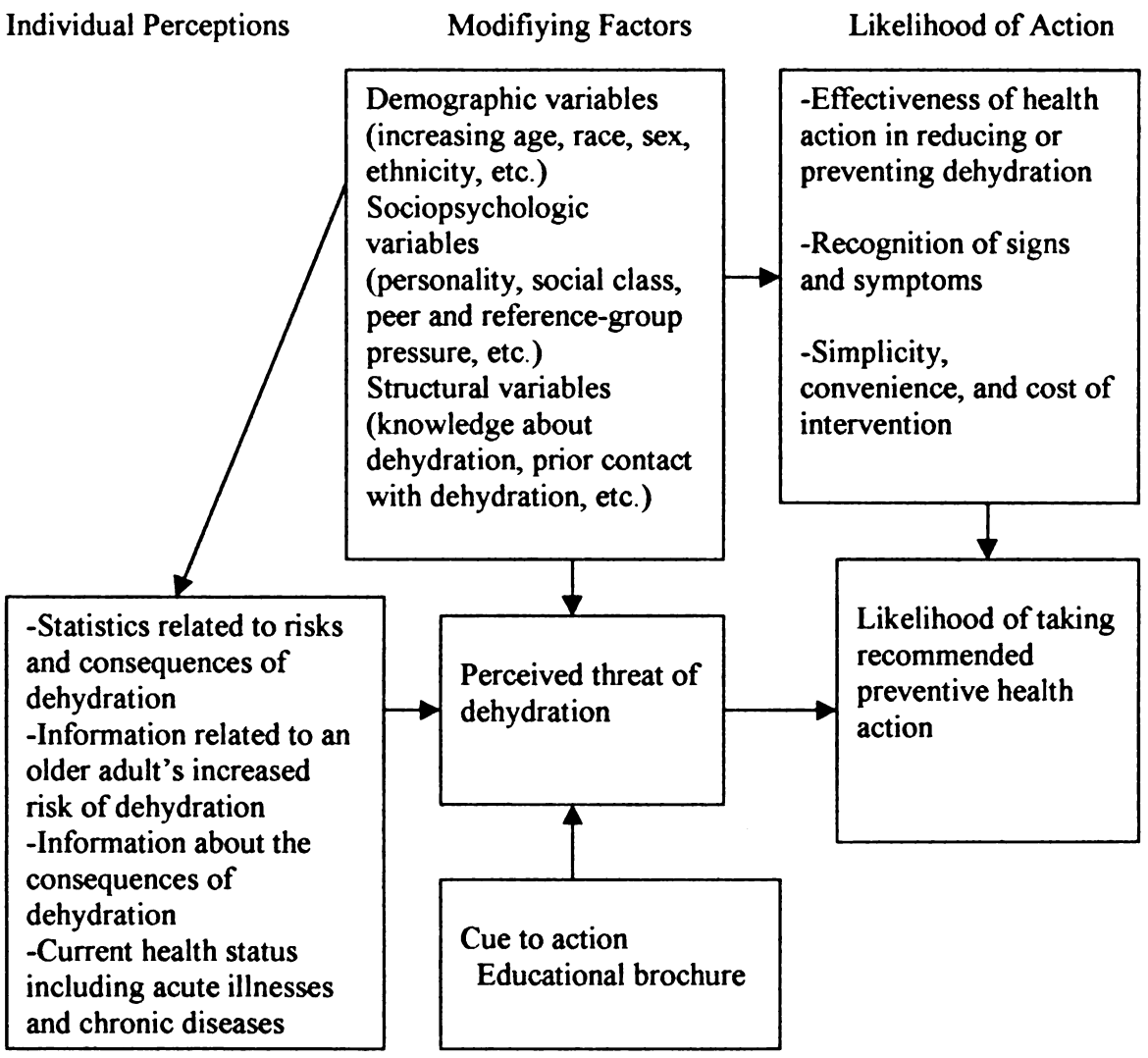


Figure 2. The application of the Health Belief Model to an educational brochure regarding dehydration in the elderly.

individual will take the proposed action. Consequently, health actions to prevent or treat early dehydration will need to be simple, convenient, and inexpensive if there is to be an increased likelihood of being followed. The individual must believe they have the ability to influence their health status. However, when a health practice is easy to accomplish no major concentration on efficacy is needed (Rosenstock, 1988).

Modifying factors include the target population's demographics. Since the aged population (those 65 years of age and older) are the ones targeted it is imperative that the tool used be written with the characteristics of the aged in mind. Some physical changes of aging that need to be considered when developing a written educational tool include a decreased ability to discriminate blues and greens due to the yellowing of the iris and a decrease in visual acuity. A sociopsychological variable to be considered is that of peer pressure. Increasing exposure to material through postings or distribution of materials in various sites frequented by elders will increase awareness and stimulate conversations among elders regarding the risks and means of prevention. Support and urgings from family and close friends are significantly related to preventive health behavior. Providing individuals with information regarding dehydration can influence structural variables. Only if one is aware of a health danger will action be taken to avoid it.

The written educational tool would be considered an external cue to action with its goal being to trigger certain health actions to prevent dehydration and its sequelae or intervene in its early stages. Ample cues need to be supplied to increase the sense of susceptibility and perceived severity. Timing for distribution of the educational tool could aid the impact of the cue (i.e. during flu season, hot weather).

LITERATURE REVIEW

The constructs of the HBM are used to define the components that need to be addressed in an educational tool designed to aid the prevention and early detection and treatment of dehydration in the elderly. In a review of the literature, the substance of the tool is clearly identified. It is within the literature review that the problem of dehydration is defined and the causes, risk factors, signs and symptoms, consequences, and treatments for dehydration are summarized. Furthermore, the review of the literature addresses the impact of this condition on quality of life and health care costs and supports the need for consumer education if prevention and early detection and treatment are to be realized.

Dehydration: Pathophysiology and Definition

Dehydration is a fluid and electrolyte imbalance. It involves the relationship between sodium and water. Water imbalances may develop due to changes in salt concentration and sodium imbalances occur with alterations in body water volume (Heuther, 1994). A basic concept to fluid and electrolyte balance is osmolarity, or solute concentration. Water moves between intracellular and extracellular fluid compartments in the direction of greater concentration of solutes. This is known as osmosis. The intake or elimination of fluid directly influences plasma osmolarity, hence the role of thirst and urinary losses in fluid balance. Plasma osmolarity increases when there is a water deficit or an increase in sodium (Sansavero, 1997).

Water balance involves a complex interplay and overlapping roles of the kidneys, adrenal glands, and endocrine system (Kositzke, 1990). These are the organs responsible for the production and secretion of aldosterone, antidiuretic hormone (ADH), and renin-

angiotensin. Aldosterone regulates sodium balance by increasing the reabsorption of sodium and secretion of potassium by the distal tubule of the kidney (Heuther, 1994; Sansavero, 1997). Aldosterone's secretion is controlled by the circulating blood volume and plasma concentrations of sodium and potassium. Aldosterone is secreted when sodium levels are depressed or when potassium levels are increased.

ADH is the regulating factor for water balance as it is secreted in response to increases in serum osmolarity or decreases in blood volume (Heuther, 1994; Sansavero, 1997). When ADH is secreted, renal tubules are more permeable to water, thus more water is reabsorbed and plasma osmolarity is decreased.

The renin-angiotensin system is activated by reduced circulating blood volume and decreased perfusion of the renal vasculature (Heuther, 1994). This system stimulates the secretion of aldosterone and causes vasoconstriction. Vasoconstriction restores renal perfusion by elevating the systemic blood pressure.

Dehydration is defined based on the pathophysiology of fluid balance. Gross et al. (1992) and Sansavero (1997) define dehydration as depletion in total body water. Weinberg et al. (1995) define dehydration as a rapid weight loss of more than 3% of body weight. Heuther (1994) states dehydration is a term used to describe water deficit and also to indicate a sodium and water loss. Hypernatremic dehydration is the most common type of dehydration in the elderly population (Gross et al.) and is due to inadequate intake of fluids or excessive fluid losses. Therefore, for the purpose of this project dehydration will be defined as a fluid volume deficit due to insufficient fluid intake, pathological fluid losses, or both.

Risk Factors

The risk factors for dehydration that are identified in the literature impact an individual's perception of susceptibility. Awareness of risk factors impacts the individual's ability to prevent dehydration by taking action before signs and symptoms develop. Any disease, illness, personal factor, or environmental situation that causes excessive fluid loss or insufficient fluid intake places an individual at risk for dehydration.

Age-related changes. Increased age is one of the major risk factors for dehydration. Individuals 85-99 years of age are six times more likely to be hospitalized with dehydration than those 65-69 years of age (Warren et al., 1994). Dehydration is a common problem in older persons because the aging process is often accompanied by a misregulation of the physiological mechanisms that would counteract excessive changes in body water. For instance, there is a decreased sensation of thirst and a decreased ability to concentrate urine as we age (Ayus & Arieff, 1996; Hoffman, 1991; Leaf, 1984; Phillips et al., 1991; Sansavero, 1997; Stachenfeld et al., 1997; Weinberg et al., 1995). The thirst mechanism is vital since fluid intake is the only way of replacing a deficit of water. Thirst is believed to diminish with aging due to alterations in oropharyngeal sensations or central nervous system disorders (Phillips et al.). The decreased ability to concentrate urine is due to the gradual loss of glomeruli that results in a decreased filtering surface. ADH responds to increases in serum osmolarity or decreases in circulating blood volume. Yet, this hormone also undergoes a diminished effect as we age (Sansavero). The elderly are also more susceptible to dehydration because they have a decrease in total body water content as a proportion of body weight due to decreased

muscle mass (Ayus & Arieff, Sansavero). Muscle holds 40% of total body water (Lavizzo-Mourey, 1987). An elder's decreased sense of taste and smell can dampen the desire for food and fluids further impacting their vulnerability to dehydration.

Chronic physical and/or mental disabilities. Diagnosis such as depression, dementia, arthritis, and stroke can predispose an individual to dehydration (Hoffman, 1991; Silver, 1990; Sansavero, 1997; Weinberg et al., 1995). Physical and mental disabilities can impose limits on the ability to physically access water or to communicate the need for fluid. Strokes and other neurologic disorders cause fluid regulation problems by affecting the functioning of the hypothalamus and pituitary gland thus impacting the thirst sensation (Kositzke, 1990). There may be a fear of aspiration due to dysphagia that causes an individual to limit their fluid intake. In addition, fluids may be intentionally restricted in order to limit incontinence, thus predisposing an individual to dehydration (Kositzke).

Acute illnesses. Older adults are more susceptible to acute illnesses, in part due to age-related immune system dysfunction (Bennett & Greenough, 1993). Pneumonia, urinary tract infections, influenza, and gastroenteritis are risk factors for dehydration (Hoffman, 1991; Sansavero, 1997; Warren et al., 1994). Loss of fluid can occur due to fever, tachypnea, diaphoresis, diarrhea, and vomiting. Antibiotics used to treat infections can also cause diarrhea. A change in functional status due to an acute illness may further predispose an individual to dehydration by impacting the ability to access fluid.

Chronic diseases. The elderly are more likely than their younger counterparts to have chronic diseases and be on multiple medications. The diseases that are considered to put individuals at risk for dehydration include congestive heart failure, hypertension, and

renal diseases due to their effect on renal perfusion (Sansavero, 1997; Warren et al., 1994). Diabetes, when uncontrolled, can cause intravascular fluid volume depletion through osmotic diuresis from glycosuria (Lorber,1995). Medications that raise glucose levels by inhibiting the secretion or action of insulin can adversely affect diabetic control, thus impacting fluid balance. These medications include corticosteroids, propranolol, phenytoin, and cimetidine (Lorber). Other medications that have the potential to cause problems with fluid balance include diuretics, laxatives, antacids, antipsychotics, major tranquilizers, sedatives, nonsteroidal antiinflamatory drugs, and hypertonic contrast dyes. Diuretics, as their name implies, influence fluid balance by causing diuresis. Laxatives and antacids can induce diarrhea. The antipsychotics, major tranquilizers, and sedatives can adversely affect the desire to drink fluids. Nonsteroidal antiinflammatory drugs impact fluid and electrolyte balance and cause renal vasoconstriction by inhibiting prostaglandin synthesis. Hypertonic contrast dyes used in diagnostic studies may cause an osmotic diuresis.

Miscellaneous factors. Other risk factors for dehydration include previous episodes of dehydration, anorexia, excessive alcohol intake, and excessive caffeine intake (Hoffman, 1991). High protein tube feedings, a lack of access to health care or follow-up, limited finances to purchase food and fluids, and a lack of air conditioning during hot weather have also been implicated as risk factors for dehydration (Sansavero, 1997; Vassallo, Gera, & Allen, 1994; Weinberg et al., 1995).

Consequences

Complications and other consequences associated with dehydration will impact an individual's perception of severity. Warren et al. (1994) concluded from their study that

older people, men, and blacks were at higher risk for hospitalization with dehydration. In addition, the study found that 50% of elderly Medicare beneficiaries that were hospitalized with a principle diagnosis of dehydration died within a year of admission, with 17.4% dying within 30 days of admission. Mortality rates increased with age.

When cells within the body are unable to maintain normal volume their structure and function are affected (Ayus & Arieff, 1996). The body's loss of normal cellular function predispose individuals to health problems such as infections, renal failure, decreased skin turgor with skin breakdown, and cognitive impairment. Other consequences associated with dehydration include functional decline, feelings of weakness, falls, and constipation with impaction (Hoffman, 1991; Sansavero, 1997). Cognitive impairment, functional decline, and falls may also impact an individual's ability to live independently.

Signs and Symptoms

Recognition of signs and symptoms of dehydration by the elder is important if early identification and intervention is to be accomplished. Being able to recognize early dehydration and begin treatment that prevents potential morbidity and mortality impacts an elder's perception of the benefits of their health action. In addition, if an elder believes that signs and symptoms suggest a problem with their hydration status they can seek further work-up from their primary care provider. Unfortunately, the literature states that there are few signs and symptoms unique to dehydration. Many may be attributed to aging and coexisting disorders. Furthermore, signs and symptoms may be vague, deceptive, or absent in the elderly (Weinberg et al., 1995). It is for this reason that

Pals et al. (1995) suggests using changes in function and oral fluid intake to determine hydration status.

According to Heuther (1994), the signs associated with dehydration include thirst, dry skin and mucous membranes, elevated temperature, weight loss, and concentrated urine. Sansavero (1997) lists the classic signs of dehydration as skin tenting, concentrated urine, oliguria, sunken eyes, lack of axillary moisture, and orthostatic blood pressure and pulse changes. These signs are somewhat vague and do not take into consideration the changes associated with aging. Gross et al. (1992) did look at age in determining risk factors for dehydration. It was determined from their study that the clinical indicators for dehydration in the elderly include: upper body muscle weakness, speech difficulty, dry mucous membranes of nose and mouth, longitudinal tongue furrows, confusion, and sunken appearance of eyes in their sockets.

Many potential signs of dehydration are detected through an examination of the mouth. In the study by Gross et al. (1992), tongue furrows and dry mucous membranes were among the strongest correlates of dehydration and were even present in over 70% of older adults with mild dehydration and in 100% of older adults with severe dehydration. Dryness of tongue, tongue coating, and absent salivary pools have also been highly correlated with dehydration (Aaronson & Seamen, 1989; Sansavero, 1997). However, a dry mouth can be related to mouth breathing, drug side effects, and anxiety (Gross et al).

Loss of skin turgor and sunken eyes though often associated with dehydration are generally considered unreliable indicators for the elderly due to a loss of skin elasticity with aging. Evaluation of turgor over the forehead or sternum affords slightly more accuracy in determining dehydration in this population.

Vital signs and weight measurements can also be used to evaluate hydration status. Orthostatic blood pressure and pulse measurements are considered fairly reliable in detecting dehydration in the elderly but changes in these measurements may also result from certain medications, deconditioning related to prolonged bedrest, or cardiovascular and neurological illnesses (Bennett &Greenough, 1993; Warren et al., 1994; Weinberg et al., 1995). Weight loss of 5% of body weight in the past 30 days or 10% loss in 6 months should trigger an evaluation for dehydration (Weinberg et al.). Baseline weights would be necessary for this to be an effective measurement. A less accurate method of noting weight loss would be observing changes in the way clothing fits.

Additional clinical indicators of dehydration include mental status changes, deterioration in functional ability, weakness, and dizziness. One should also be alerted to evaluate for dehydration if individuals complain of nausea, anorexia, headache, vomiting, and syncope.

Certain laboratory tests that can help detect dehydration include electrolytes, osmolality, creatinine, blood urea nitrogen (BUN), BUN/creatinine ratio, hematocrit, and urine specific gravity. A serum sodium level greater than 148 mmol/liter indicates dehydration but may also be noted in other disease states. Significant dehydration can be present even when hyponatremia (sodium levels less than 135 mmol/liter) is present. This is known as hypotonic dehydration. Sodium loss can exceed water loss due to overuse of diuretics. Vomiting and diarrhea can lead to isotonic dehydration where there is a balanced loss of sodium and water. Elevated creatinines are associated with dehydration. However, patients with muscle wasting that has resulted in chronically low serum creatinines can have normal serum creatinines when they are dehydrated (Bennett

& Greenough, 1993). Ratios of blood urea nitrogen to creatinine of 25 or more may be found in dehydrated individuals (Pals et al., 1995; Sansavero, 1997; Weinberg et al., 1995). However, a high ratio may also be found in patients with renal disease, obstructive uropathy, and steroid induced catabolism. An elevated hematocrit suggests dehydration but may be in the normal range in dehydrated patients with anemia. Urine specific gravity increases with a fluid volume deficit. Urine output generally decreases with dehydration and urine becomes concentrated.

No single sign or symptom will strongly correlate with dehydration. However, if several signs and/or symptoms are present an accurate diagnosis of dehydration is more likely. Due to the vague and sometimes absense of clinical indicators for dehydration in the elderly, it is reasonable to educate older adults to question the possibility of inadequate hydration if they note a change in functional ability or baseline status.

Prevention and Treatment

The complexity of health actions to prevent or treat dehydration positively correlates with an individual's perception of barriers. As perceived barriers increase an individual is less likely to follow through with a health action. The literature indicates that dehydration can easily be prevented and easily treated in its early stages. When dehydration becomes moderate to severe, treatment often requires hospitalization for intravenous fluid replacement (Sansavero, 1997).

Prevention of dehydration can be achieved simply by maintaining an adequate fluid intake. The literature suggests that this intake needs to range from 1500-2500 cc per day (Hoffman, 1991; Sansavero, 1997; Weinberg et al., 1995). The specific amount of fluid required would be based on the individual's weight, urinary and fecal losses, and

insensible losses due to lung vapor and sweat. Weinberg et al. state that the estimated daily fluid requirement for geriatric patients is 30 mL per kilogram of body weight. Fluids should be taken with meals and also between meals. Fluid excess needs to be considered in patients with diseases such as congestive heart failure, cirrhosis, and nephrotic syndrome. Water is the preferred liquid and should constitute half of one's fluid intake. Other fluids that can be used include fruit/vegetable juices, milk, soft drinks, sport drinks, and soup. The type of fluids used may be based on individual preference and other comorbidities. Alcohol and caffeinated beverages should be avoided due to their diuretic action.

Warren et al. (1994) suggest that the incidence of dehydration may be reduced or prevented by vaccination against influenza and pneumonia. This is appropriate because respiratory illnesses and dehydration have been strongly associated with one another. Furthermore, maintaining adequate fluid intake during acute illnesses such as gastroenteritis is essential as significant fluid losses can occur due to diarrhea.

Other preventive measures include the use of fans and airconditioners, obtaining bedside commodes, raised toilet seats, and adaptive devices, and evaluating support services. The use of fans and air conditioners during hot weather may help prevent dehydration by decreasing the insensible loss of fluids via perspiration and tachypnea that occurs when body temperature increases. Assistance obtaining bedside commodes or raised toilet seats may prevent individuals from limiting fluids due to difficulty getting to or using the bathroom. Obtaining adaptive devices for elders with dexterity problems can enhance their ability to obtain fluids. Finally, evaluating availability of support services

to address financial concerns and determining eligibility for such services as meals on wheels may prevent dehydration by making sure adequate food and fluids are available.

Monitoring and control of one's diabetes, CHF, hypertension, and renal disease is essential to preventing dehydration since poor control is often associated with an increased incidence of dehydration. A periodic review of medications and their side effects is also warrented. Elimination, limited use, or close monitoring of those medications known to be problematic for fluid balance should be considered. Periodic electrolyte evaluation is suggested for high-risk patients in order to detect dehydration in its early stages (Sansavero, 1997). Evaluation of fluid intake at office visits may also detect risk for dehydration and prompt education and intervention. For those patients who refuse to eat and drink a dietary referral and an evaluation for underlying cause such as depression may be indicated.

In summary, the literature review reveals dehydration to be a common and serious medical problem with dire financial and health consequences. The risk of dehydration for elders is significant due to age-related changes and predisposition to chronic diseases. The consequences of dehydration are serious and can range from constipation to cognitive and functional impairment and even death. The signs and symptoms of dehydration are often vague and may be absent in the elderly. One must therefore be vigilant to observe subtle changes and remain aware that dehydration is always possible. Prevention, early detection, and treatment are essential if significant morbidity and mortality from dehydration is to be avoided. Prevention is always preferred and this requires education. Elderly individuals need to be taught about their risks for dehydration and the consequences related to this condition. Signs and symptoms of dehydration as

well as prevention and early intervention strategies also need to be included in the educational process.

PROJECT PLAN

The development of an educational tool to prevent dehydration and to identify and intervene in its early stages is based on the HBM and a review of the literature. Increasing awareness of the problem of dehydration and education about this condition is considered essential if the associated morbidity and mortality is to be avoided. Based on the conceptual model and literature review the items to include in the tool are: risk factors, consequences, signs and symptoms, and prevention and treatment strategies. The elderly are targeted because the literature indicates that dehydration is a significant health problem for this population. Tiivel (1997) states that education of the older adult is critical if health is to be maintained and illness prevented. The goal of imparting information about dehydration is to aid community dwelling elders to maintain optimal independence and quality of life by preventing the serious consequences of dehydration. As it is increasingly difficult for the PCP to find time to impart needed information, the use of written materials to educate and reinforce instruction is needed.

A pamphlet format is utilized in presenting information because it is easily distributed in a variety of settings and can, therefore, reach many people in a cost-effective manner. Furthermore, individuals can look at a pamphlet when it is convenient for them and when they feel they are ready for the information. Although not a substitute for individualized instruction from one's PCP, a pamphlet can instigate discussions with the provider, reinforce instruction, and enhance understanding. An informed elder may also seek care from their PCP in a timely manner. According to Barlow and Wright

(1998) informational pamphlets can be effective in promoting longer-term increases in knowledge and be a source of reassurance without evidence of adverse reactions.

In developing a pamphlet for the elderly, age-related changes need to be considered. As we age there is a decreased ability to discriminate blues and greens due to a yellowing of the iris. There is also a decrease in visual acuity. Awareness of these physical changes helps to prompt the choice of paper color and font style and size. Petterson (1994) suggests that employing typeface less than 12 point is not appropriate for elders. Using a type size large enough to be legible to those with poor visual acuity will restrict the amount of information that can be put into a brochure but this also limits the information to the essentials.

The Gunning FOG test is a simple and reliable means of determining the readability of written work (Petterson, 1994). A score is provided which helps to determine the clarity of the language used. Petterson concludes that a FOG Index score of 12 or above may be incomprehensible to the elderly. However, the Gunning FOG test is restricted to continuous text and therefore may not be suitable for evaluating pamphlets that do not have this format. Petterson states that using short words, short sentences, and short paragraphs should produce increasingly readable documents. Further evidence pointing to the need for providing simply written educational materials is provided by Weirich et al. (1994) who conclude from their study that written materials for older adults should be adapted to the fifth grade reading level. This is recommended because the average educational level of the study population was the eighth grade, similar to the profile of older Americans who are poor, less educated than the general population, and predominantly female. According to Mayeaux et al. (1996), physicians tend to give too

much information on too high a level for many patients to understand. Using simpler language, avoiding too many directives, and repeating the instruction can enhance patients' understanding. In addition, combining easy to read educational materials with oral instruction augments understanding. Patient education materials should be short, simple, and encourage desired behavior especially for individuals with low literacy skills (Mayeaux et al.). Personalizing the information in leaflets also appears to improve readability (Albert & Chadwick, 1992).

According to the Profile of Older Americans: 1997 (Administration on Aging, 1997), the educational level of the older population is increasing. The percentage of elders who had completed high school rose from 28% to 64% between 1970 and 1995. However, even with the increases noted in educational level, it is still valid to keep instructions simple and short so that the greatest number of individuals can understand and benefit from them.

Once the brochure has been produced it can be distributed to senior centers, primary care clinics, senior housing units, and hospitals in a defined geographical location. They will need to be placed in an area that is visible and accessable to individuals. In the primary care clinics, providers will be given a brief inservice on the contents of the brochure with recommendations to distribute the brochures to all high-risk patients. PCPs will also be requested to document distribution of the brochure so that the brochure's effectiveness can be evaluated at a later date. Brochures in the other locations will be out on display but not personally distributed to individuals. By initially limiting distribution, evaluation of the brochure's effectiveness in meeting its intended goals can more easily be accomplished.

EVALUATION

Although disease related leaflets and brochures are widely available and often used to supplement verbal instruction, their impact on patient knowledge and health actions has seldom been evaluated (Barlow, Bishop, & Pennington, 1996). In order to evaluate the effectiveness of this brochure one needs to determine the extent to which the goals of the brochure were met. This is known as an outcomes analysis and this type of evaluation tends to be descriptive and does not use a rigorous design (Polit & Hungler, 1995). The goals for the proposed educational brochure on dehydration are to increase awareness of dehydration as a significant medical problem of the elderly, educate older adults about risk factors, consequences, signs and symptoms, prevention, and treatment of dehydration, and decrease the incidence of hospitalization, morbidity, and mortality associated with dehydration through prevention, early detection, and intervention.

Increased awareness of dehydration as a significant medical problem of the elderly can be grossly evaluated by determining the number of brochures picked up or given out by providers from the sites of distribution. This method of evaluation assumes that the brochures have been read. Surveys that directly ask about the impact of the brochure on an individual's awareness of the problem of dehydration could be completed at sites that had brochures. Direct questioning of providers at the initial inservice of the brochures about its impact on their awareness of dehydration as a significant problem for older adults could also be used to evaluate the brochure's effectiveness.

An older adult's knowledge of the risk factors, consequences, signs and symptoms, prevention, and treatment of dehydration can be evaluated by administering a follow-up questionaire or survey to those individuals known to have received a brochure.

This would be done most easily at a primary care practice that documented who was given a brochure. Another method that could be used for evaluation would be a pre and post test, given to these same individuals, that evaluated knowledge gained from information supplied in the brochure.

To evaluate the impact on health outcomes, a chart review at primary care practices could be done before and after distribution of the brochure that focused on the numbers of individuals being seen with signs and symptoms of dehydration, diagnosed with dehydration, and requiring treatment for dehydration. Caution would be necessary in interpreting results of these reviews since an increase in documentation of dehydration could be due to an increased awareness of the issue and increased evaluations for dehydration. Telephone logs at primary care practices could also be reviewed to determine the number of calls triaged related to dehydration symptoms and questions. Chart audits that indicated the number of hospital admissions and emergency room visits related to dehydration could be done both before and after distribution of the brochures to determine if the frequency of treatment and admissions for dehydration was affected. In order to evaluate the impact of the brochure on an older adult's behavior related to preventive care and early intervention, a questionaire or phone survey could be used that evaluated current health practices. Areas that could be evaluated include daily fluid intake, status of vaccinations against influenza and pneumonia, use of adaptive devices if appropriate, self-evaluation for signs of dehydration, adherence to medication regime including use of laxatives and antacids, self-treatment methods for early dehydration, and follow-up with PCP including the individual's rationale for follow-up.

IMPLICATIONS FOR THE ADVANCED PRACTICE NURSE

Implications for Practice

The restructuring of the health care delivery system is creating many challenges for the APN. PCPs are being challenged to provide quality health care in a cost-effective manner and APNs are in a position to accomplish these goals. Educating the elderly about the risks, consequences, signs and symptoms, prevention, and treatment of dehydration can impact cost of care and quality of life. Most elderly reside independently in the community and will seek health care from a PCP. It is imperative that PCPs be able to provide quality care to their elderly clients. Since dehydration is a common and serious problem for the aged population it is necessary that PCPs be able to accurately assess elderly for dehydration and educate them regarding prevention, early detection, and treatment of the condition. Utilization of educational materials that aid in reinforcing the teaching that is begun by the PCP or that increases awareness of common problems for the population is just one way the PCP can provide quality care in a cost-effective manner. In addition, informed elders are more likely to be effective partners in their care. Finally, it is because the PCP acts as a gatekeeper for those vulnerable to dehydration that it is necessary that they know the predisposing factors for dehydration and be able to implement preventive strategies whenever possible. By preventing or treating dehydration in its early stages, morbidity and mortality associated with dehydration will decline.

Implications for Education

The documented incidence rates for dehydration indicate that it is a frequently seen condition among the elderly. Though largely preventable, the incidence rates for

hospitalizations due to dehydration are high. Apparently, dehydration is not being detected in its early stages and preventive and treatment measures are not being instituted in a timely fashion. Increased awareness of dehydration, as a serious medical problem, needs to be addressed. The educational curriculum for all health care providers who will care for geriatric clients should, therefore, include information about dehydration. By educating future providers in the specific needs of the elderly, the likelihood of actually meeting those needs is increased. Age specific assessment guidelines need to be incorporated into the curriculums as well. Furthermore, education of currently practicing providers regarding dehydration is needed. Continuing education courses could be one avenue used to address this need. Awareness of incidence rates, risk factors, signs and symptoms, and consequences related to dehydration can lead to early case finding and treatment, thus impacting health care costs. Increasing awareness and educating the public regarding dehydration, particularly those at high risk for the condition, should also be goals. The methods of achieving these goals need to be explored. One possibility is to include content on dehydration in discharge planning in the acute care setting.

Implications for Research

The literature review points to the paucity of research on strategies for prevention and treatment of dehydration, effectiveness of early screening, and what tests or observations should be used for early screening. Further research is also needed in the area of age specific assessments as they impact diagnosis and treatment. Incorrect or delayed treatment greatly impacts outcomes both in terms of cost and quality of life. Additional research also needs to be done regarding the effectiveness of brochures as a means of educating the public and influencing health behaviors. Other areas related to

brochures that could be researched include the impact of distribution methods and how health care providers view and utilize brochures.

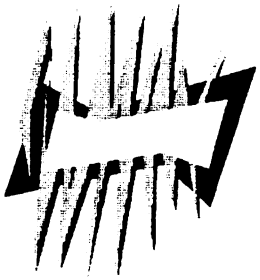
CONCLUSION

As the population ages, APNs will be caring for an increased number of elderly patients. Therefore, it is important for the APN to understand common medical problems of this age group. Dehydration is a common and serious medical problem for the elderly. Although pervasive, dehydration is largely preventable. In the face of limited resources, prevention and early intervention that maximizes functional status and quality of life is desired. Education, then, becomes increasingly important as it is key to prevention. No single educational strategy is effective for all patients. However, written materials that can support verbal instruction and offer additional information have been shown to be beneficial. Brochures are cost-effective as they are an inexpensive method of educating the public and can be widely distributed, reaching a large number of people. It is through educating the elderly about common health problems that they face and what they can do about them that they can become true partners in their health care.

APPENDIX

APPENDIX

The Danger of Dehydration as We Age



THE

DANGER

OF

DEHYDRATION

AS

WE AGE

What is dehydration?
Dehydration is a lack of fluid in your body. You are too dry.

Can dehydration be bad for me?
Yes, because when you are dehydrated you are more likely to:

- get infections
- develop kidney problems
- become constipated
- become weak and fall
- have problems with your skin
- become confused
- be less able to care for yourself

What causes dehydration?
There are 2 main causes of dehydration:

- too much fluid is being lost from the body
- not enough fluid is being taken into the body

Causes of fluid loss:

- diarrhea
- vomiting
- perspiration
- medications (diuretics, antacids, laxatives) that cause an increased passage of urine or stools

- certain beverages (alcohol, coffee, tea, soft drinks containing caffeine)
- fever

Reasons for not drinking enough fluid:

- do not feel thirsty
- do not want to get up at night to use the bathroom
- concerns about incontinence
- difficulty getting water or other beverage due to physical limitations
- fear of choking
- medications that affect the desire to drink fluid (tranquilizers, sedatives)
- lack of appetite
- cost of food and beverages

Why are older adults at greater risk for dehydration?

As we age:

- our sensation of thirst decreases so that we don't feel the need to drink even when we are dry
- our kidneys don't work as well
- we have a decreased sense of taste and smell which limits our desire to eat and drink
- we have less water in our body so that even small losses can have a big impact
- we are more likely to have diseases that have a greater risk for dehydration such as diabetes, congestive heart failure, and kidney disease
- we are more likely to be on medication that causes problems with fluid balance
- we are more prone to illnesses such as influenza and pneumonia
- we are more likely to have physical problems that make it difficult getting food and fluid

How can I tell if I'm dehydrated?

The classic signs of dehydration (thirst, sunken eyes, decreased +/or dark urine, dry skin) are sometimes absent in the older adult. As we age, one area that should be regularly checked for signs of dryness is the mouth.

You are probably too dry if:

- the skin inside your mouth looks dry
- your tongue is dry or has deep crevases or furrows in it
- you have no saliva in your mouth or your saliva is very thick

- your tongue looks like it has a coating on it

Other signs that may indicate a lack of adequate fluids include:

- weakness
- dizziness
- headache
- confusion
- constipation
- speech difficulty

Also be aware that you could be dehydrated if you have lost weight rapidly or if you notice a decreased ability to carry out your normal activities.

How can I prevent dehydration?

DRINK! DRINK! DRINK!

- Make sure you drink six to eight 8-ounce glasses of fluid each day.
  -**Water** is preferred and should make up at least ½ of your fluid intake.
  -A variety of other fluids that can be used include fruit/vegetable juices, milk, soft drinks, sport drinks, and soup.
  -Avoid alcohol and caffeinated beverages.
  -Do not limit your fluids to meal times. Drink between meals as well.
  -You will need to develop a habit of drinking fluid since you may not have thirst to remind you to drink something.

❖ **Important! If you have congestive heart failure, liver disease, or kidney disease make sure you check with your primary care provider about the amount of fluids you should be drinking.**

- Get your vaccinations against influenza and pneumonia

- Use fans/air conditioners during hot weather. During heat waves,

stay out of the sun, wear lighter clothing, and drink more fluids.

- Drink extra fluids before, during, and after exercise to replace fluids lost through perspiration and heavy breathing.

- For those who limit fluids due to difficulty getting to the bathroom or using the toilet, obtaining a bedside commode or raised toilet seat may help.

- If finances limit your ability to purchase food or beverages, ask your doctor, nurse, or social worker for assistance in determining your eligibility for such services as meals on wheels. Remember that **water** is the best source of fluid and is inexpensive.

- Make sure you see your primary care provider regularly to monitor any chronic diseases such as diabetes, congestive heart failure, or kidney disease. It is important to keep these diseases well controlled.

- Take your medications as they are prescribed. Remember, laxatives and antacids can cause you to lose fluid by causing diarrhea, so use cautiously.

When should I call or see my primary care provider?

Contact your provider if:

- symptoms of dehydration persist longer than 2 days or if your symptoms are worsening
- you are unable to eat or drink for a full day
- you are unsure if you are dehydrated

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LIST OF REFERENCES

List of References

Aaronson, L. & Seaman L. (1989). Managing hypernatremia in fluid deficient elderly. Journal of Gerontological Nursing, 15 (7), 29-34.

Administration on Aging. (1997). Profile of older Americans: 1997 [Online]. Available: http://www.aoa.dhhs.gov/aoa/stats/profile/ [1998, October 6].

Albert,T. & Chadwick, S. (1992). How readable are practice leaflets? British Medical Journal, 305, 1266-1268.

Ayus, J.C., & Arieff, A.I. (1996). Abnormalities of water metabolism in the elderly. Seminars in Nephrology, 16 (4), 277-288.

Barlow, J., Bishop, P., & Pennington, D. (1996). How are written patient-education materials used in out-patient clinics? Insight from rheumatology. Health Education Journal, 55, 275-284.

Barlow, J.H. & Wright, C.C. (1998). Knowledge in patients with rheumatoid arthritis: A longer term follow-up of a randomized controlled study of patient education leaflets. British Journal of Rheumatology, 37 (4), 373-376.

Bennett, R.G. & Greenough, W.B. (1993). Approach to acute diarrhea in the elderly. Gastroenterology Clinics of North America, 22 (3), 517-533.

Burns, A.C. (1992). The expanded health belief model as a basis for enlightened preventive health care practice and research. Journal of Health Care Marketing, 12 (3), 32-45.

Gross, C., Lindquist, R., Woolley, A., Granieri, R., Allard, K., & Webster, B. (1992). Clinical indicators of dehydration severity in elderly patients. Journal of Emergency Medicine, 10, 267-274.

Hoffman, N. (1991). Dehydration in the elderly: Insidious and manageable. Geriatrics, 46 (6), 35-38.

Huether, S. (1994). The cellular environment: Fluids and electrolytes, acids and bases. In S. Schrefer, P. Rudolph, & G. Brower (Eds.), Pathophysiology: The biological basis for disease in adults and children (pp.91-123). St. Louis, Missouri: Mosby-Year Book, Inc.

Janz, N.K., & Becker, M.H. (1984). The health belief model: A decade later. Health Education Quarterly, (Spring), 1-47.

Kositzke, J.A. (1990). A question of balance: Dehydration in the elderly. Journal of Gerontological Nursing, 16 (5), 4-11.

Lavizzo-Mourey, R.J. (1987). Dehydration in the elderly: A short review. Journal of the National Medical Association, 79 (10), 1033-1038.

Leaf, A. (1984). Dehydration in the elderly. New England Journal of Medicine, 311 (12), 791-792.

Lorber, D. (1995). Nonketotic hypertonicity in diabetes mellitus. Medical Clinics of North America,79 (1), 39-51.

Mayeaux, I.J. Jr., Murphy, P.W., Arnold, C., Davis, T.C., Jackson, R.H., & Sentell, T. (1996). Improving patient education for patients with low literacy skills. American Family Physician, 53 (1), 205-211.

Mentes, J., & Buckwalter, K. (1997). Getting back to basics: Maintaining hydration to prevent acute confusion in frail elderly. Journal of Gerontological Nursing 23 (10), 48-51.

Pals, J., Weinberg, A., Beal, L., Levesque, P., Cunningham, T., & Minaker, K. (1995). Clinical triggers for detection of fever and dehydration: Implications for long-term care nursing. Journal of Gerontological Nursing, 21 (4), 13-19.

Pender, N.J. (1996). Health promotion in nursing practice (3rd ed.). Stamford, Connecticut: Appleton & Lange.

Petterson, T. (1994). How readable are the hospital information leaflets available to elderly patients? Age and Ageing, 23 (1), 14-16.

Phillips, P. A., Rolls, B. J., Ledingham, J.G.G., Forsling, M.L., Morton, J.J., Crowe, M.J., & Wollner, L. (1984). Reduced thirst after water deprivation in healthy elderly men. New England Journal of Medicine, 311 (12), 753-759.

Polit, D.F. & Hungler, B.P. (1995). Nursing research: Principles and methods. Philadelphia: J.B. Lippencott Company.

Rosenstock, I.M., Strecher, V.J., & Becker, M.H. (1988). Social learning theory and the health belief model. Health Education Quarterly, 15 (2), 175-183.

Sansavero, A.C. (1997). Dehydration in the elderly: Strategies for Prevention and Management. The Nurse Practitioner, 22 (4), 41-72.

Silver, A.J. (1990). Aging and risks for dehydration. Cleveland Clinic Journal of Medicine, 57, 341-344.

Snyder, N.A., Feigal, D.W., & Arieff, A.I. (1987). Hypernatremia in elderly patients: A heterogeneous, morbid, and iatrogenic entity. Annals of Internal Medicine, 107, 309-319.

Starfield, B. (1992). Primary care: Concepts evaluation and policy. New York: Oxford University Press.

Tiivel, J. (1997). Increasing effectiveness of your teaching program for the elderly: Assessing the client's readiness to learn. Perspectives, 21 (3), 7-10.

U.S. Census Bureau. (1995). Statistical brief: Sixty-five plus in the United States. [Online]. Available: http://www.census.gov/socdemo/www/agebrief.html [1998, October 6].

Vassallo, M., Gera, K.N., & Allen, S. (1994). Factors associated with high risk of marginal hyperthermia in elderly patients living in an institution.

Warren, J.L., Bacon, W.E., Harris, T., McBean, A.M., Foley, D.J., & Phillips, C. (1994). The burden and outcomes associated with dehydration among US elderly, 1991. American Journal of Public Health, 84 (8), 1265-1269.

Warren, J.L., Harris, T., & Phillips, C. (1996, March). Dehydration in older adults [Letter to the editor]. Journal of the American Medical Association, 275 (12), 912.

Weinberg, A.D., Minaker, K.L., & the Council on Scientific Affairs, American Medical Association (1995). Dehydration: Evaluation and management in older adults. Journal of the American Medical Association, 274 (19), 1552-1556.

Weinrich, S.P., Weinrich, M.C., Boyd, M.D., Atwood, J., & Cervenka, B. (1994). Teaching older adults by adapting for aging changes. Cancer Nursing, 17 (6), 494-500.

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