A Client Care Module:

FLUID & ELECTROLYTES
FOR CNAs

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KEEP EVERYTHING IN BALANCE

Understanding fluid and electrolytes is as easy as trying to balance a baby elephant on a beach ball! There is no doubt—this is one heavy topic . . . but it doesn’t have to be. Just remember this one basic principle: Keep EVERYTHING in BALANCE!

The average human body contains about 60 percent water. Every organ system in the body needs water to function. When water becomes out of balance in the body, the consequences can be very serious.

For example, too little water in the body leads to dehydration. Prolonged dehydration can lead to death.

Too much water in the body leads to swelling or edema. When there is fluid causing swelling or edema in the brain, heart or lungs, the results can be damaging and even deadly.

There are six main electrolytes in the body: potassium, sodium, calcium, magnesium, chlorine, and phosphorus.

Electrolytes regulate all the body’s major functions. Think of them as tiny little floating batteries, creating electrical charges in the body that help operate muscles, nerves, and neurons.

Both the water and the electrolytes in the body must stay in perfect balance to maintain proper body functioning.

In this inservice you will learn the importance of tracking and maintaining water or fluid balance in your clients. You will also learn about the most important electrolytes, what they do and how you can help your client keep EVERYTHING in BALANCE!

Sadly, you will not learn how to balance a baby elephant on a beach ball! 😊
HERE’S HOW IT ALL BALANCES OUT

On average, the human body contains about 60 percent water. An older adult has less, at 54 percent, and an infant is higher at 77 percent.

These percentages are important because they give us an idea of how to KEEP the BALANCE. Remember, to be healthy, water in the body has to stay in balance!

Water is taken into the body from eating foods and drinking fluids. The average person takes in about 2000-2500ml of fluids a day. Water is lost through urine, feces, lungs and skin.

HOW WE STAY IN BALANCE

In healthy people, the body regulates itself to keep in balance. For instance, if there is not enough water in the body, the body will signal the brain to make the person feel thirsty. Thirst triggers the person to take a drink and balance is restored.

Some older adults may not respond correctly to the thirst signal and are at a greater risk of becoming dehydrated. This is one of the reasons why it is so important to track intake and output in all your clients.

When your client has a fever, or if the weather is very warm, the person may sweat more than usual. This can also lead to dehydration. It’s important to keep clients hydrated during times of fever and when the weather is particularly hot.

Clients with heart or kidney problems may have too much water in the body. To eliminate the extra fluid, they may need a medication called a diuretic, or water pill, to make them urinate more often.

You should always know if your client is on a diuretic—as it means more frequent trips to the bathroom or bedside commode, or more frequent bedpan or urinal usage. Make sure your client has a clear and safe path to get to the bathroom when the urge to go arises.

Answer call bells promptly and be prepared for more frequent linen, clothing and/or adult diaper changes.

WHAT’S NEW?

Grab your favorite highlighter! As you read through this inservice, highlight five things you learn that you didn’t know before. Share this new information with your supervisor and co-workers!

<table>
<thead>
<tr>
<th>FLUID INTAKE:</th>
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<tbody>
<tr>
<td>Liquid</td>
<td>1000-1200 ml</td>
</tr>
<tr>
<td>Food</td>
<td>1000-1300 ml</td>
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<tr>
<td><strong>Total In</strong></td>
<td><strong>2000-2500 ml</strong></td>
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<table>
<thead>
<tr>
<th>FLUID LOSS:</th>
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</thead>
<tbody>
<tr>
<td>Urine</td>
<td>1200-1400 ml</td>
</tr>
<tr>
<td>Feces</td>
<td>100 ml</td>
</tr>
<tr>
<td>Lungs</td>
<td>400-500 ml</td>
</tr>
<tr>
<td>Skin</td>
<td>300-500 ml</td>
</tr>
<tr>
<td><strong>Total Out</strong></td>
<td><strong>2000-2500 ml</strong></td>
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Working with clients in the home often requires coming up with creative solutions to common problems.

Get creative

The problem: You are caring for a frail 73 year old woman who lives alone and is receiving chemotherapy for lung cancer.

When you arrive at her home to do your routine care she complains that she is having trouble eating and drinking because the chemotherapy is causing nausea and painful sores in her mouth.

What you know: You know she is at an increased risk of developing dehydration because of her age and the effects of the chemo. Right now her vital signs are normal, the inside of her mouth has sores but is still moist and pink, and she is alert and oriented.

Get creative: Think of 3 creative solutions you could suggest to keep your client from becoming dehydrated as she undergoes treatment.

Talk about it: Share your ideas with your co-workers and supervisor and find out how they would solve the problem.
MORE ON ELECTROLYTES

REMEMBER: Electrolytes are like tiny batteries that carry actual electrical charges throughout the body. Just like water, electrolytes have to stay in balance in order to keep the body functioning properly.

Electrolyte balance is usually maintained in the body through eating a normal diet of a variety of healthy foods and fluids. An imbalance of any particular electrolyte can have some serious consequences.

- When there are not enough electrolytes . . . the body runs out of power.
- When there are too many electrolytes . . . things can really go haywire and even short-circuit!

Electrolytes are responsible for:
- Regulating the heart rate
- Muscle movement, control and coordination
- Nerve impulse functioning
- Fluid regulation

The six most vital electrolytes in the human body are:
- Potassium
- Sodium
- Calcium
- Magnesium
- Chlorine
- Phosphorus

Any number of situations, conditions, or disease processes can cause an electrolyte imbalance. Over the next few pages you will learn about some of the more common electrolyte imbalances you may encounter and how you can help.

Keep in mind as you read about electrolyte imbalances that only a doctor can diagnose an electrolyte imbalance after a careful assessment of lab values from blood tests.

Never offer your client a supplement or change a diet based on an observation you make while performing care.

WHAT Excites YOU?

Did you know you can prove that electrolytes are like little batteries by building a battery out of a vegetable or a piece of fruit!

The easiest example of this is the LEMON BATTERY!

You can get instructions on how to power a digital clock using lemons by visiting these web pages:

- http://pbskids.org/zoom/activities/sci/lemonbattery.html
- www.energyquest.ca.gov/projects/lemon.html

You can also do a similar experiment with a potato! Go to this website to find out how to make a POTATO BATTERY:

http://pbskids.org/zoom/activities/phenom/potatobattery.html

Why do you think these experiments work?

Try to explain how electrolytes are like batteries to your co-workers!
SPOTLIGHT ON POTASSIUM

Potassium is an electrolyte that helps regulate nerve and muscle contractions, especially those in the heart.

A client with hypokalemia (low potassium) may have weakness, fatigue, muscle cramps and an abnormal heart rhythm.

Low potassium may be caused by:
- Excessive water loss from diuretics
- Diarrhea or vomiting
- Laxatives overuse
- Kidney failure

Only a doctor can diagnose hypokalemia and prescribe treatment. Treatment may include a potassium supplement or a diet high in potassium.

If your client is prescribed a diet high in potassium, serve these foods: bananas, cantaloupe, grapefruit, oranges, tomato or prune juice, honeydew melons, prunes, molasses and potatoes.

A client with hyperkalemia (high potassium) may have nausea, weakness, paralysis, and an abnormal heart rhythm. Having too much potassium in the body is much more dangerous than not having enough and is potentially life threatening.

Excess potassium in the body may be caused by:
- Certain heart medications
- Kidney problems
- Severe burn or injury
- Drug or alcohol abuse
- Taking excessive potassium supplements

Hyperkalemia can lead to cardiac arrest. Emergency treatment is needed if this occurs. Long term treatment may include medications and a diet that restricts potassium.

QUICK VOCABULARY REVIEW

- When something is low in the body, the prefix "HYPO" is used.
- When something is high in the body, the prefix "HYPER" is used.
- On the periodic table of elements, potassium is symbolized by the letter "K" because in Latin potassium is kalium. The symbol for sodium is Na. Natrium is Latin for sodium.
- So, someone with low potassium is said to have hypo-kalemia. Someone with high sodium would have hyper-natremia.

THINK about it!

WHY DO ATHLETES DRINK GATORADE?

In 1965, the coach of the Florida Gators asked the team physicians why his players were becoming weak, tired, and getting muscle cramps while practicing during extreme heat.

The physicians understood the players were losing fluids and electrolytes from excessive sweating and by not taking enough fluids during practice.

This inspired them to develop a drink that would replace fluid and those essential electrolytes so that practice could continue and remain productive.

The electrolyte replacement drink they developed was Gatorade . . . named for the Gators that inspired the invention!

The main electrolytes in Gatorade include sodium, potassium and chloride.

Gatorade is not right for everyone. In fact, the high sugar content makes it a poor choice for young children, diabetics and those with chronic illness. Other products are available for electrolyte replacement in non-athletes.
SPOTLIGHT ON ELECTROLYTES, CONTINUED

SPOTLIGHT ON SODIUM

Sodium's main function in the body is to help regulate fluid balance. It also contributes to nerve and muscle functioning and helps maintain normal blood pressure.

When sodium levels become too low (hyponatremia), the body holds on to all of its extra water, causing swelling, usually in the brain. Swelling in the brain is especially dangerous because the brain is confined by the skull and unable to expand.

Symptoms of hyponatremia may include: nausea, vomiting, headache, confusion, fatigue, restlessness, irritability, seizures, decreased consciousness or coma.

Hyponatremia may be caused by:
- Drinking too much water (or other fluid)
- Hormonal imbalances
- Diuretics
- Severe vomiting or diarrhea
- Chronic alcohol abuse
- Congestive heart failure

Treatment for hyponatremia is usually aimed at correcting the underlying problem. For instance, if the imbalance is caused by a certain medication . . . that medication may be changed. If the problem is caused by excessive alcohol consumption then treatment for the addiction may be needed.

Hypernatremia (high sodium) both causes and is caused by dehydration. Depending on the level of the imbalance, symptoms can range from simply feeling thirsty to weakness, confusion, paralysis, seizures or even coma.

Treatment for hypernatremia may include oral hydration for mild cases or IV fluids may be needed for more severe cases. Once the fluids are replaced, the sodium level usually returns to normal.

FOODS HIGH IN POTASSIUM

FOODS HIGH IN CALCIUM
- All dairy foods, broccoli, collards, spinach, salmon, apricots and almonds.

FOOD HIGH IN PHOSPHORUS
- All dairy foods, dried beans, peas, artichokes, broccoli, sweet potatoes, bran, whole grains and raisins.

FOOD & DRINKS WITH ELECTROLYTES

It’s always best to get electrolytes from a variety of healthy foods. Here is a brief list of foods that are rich in potassium, calcium and phosphorus.

See if you can find any foods that are rich in all three! These are the “Super Foods!”
MEASURING FLUID OUTPUT

You probably already measure intake and output (I&O) on all your clients. But do you know why? Remember, the key is to **KEEP the BALANCE!** So, it’s important to know that what goes in—and also what goes out!

Measuring fluid output means tracking all urine, feces, and vomit from the commode, bedpan, urinal, catheter bag, colostomy bag or adult brief.

Any drainage from a chest tube, nasogastric tube or wound drainage will likely be recorded by the nurse. Be sure to ask what your responsibilities are if your client has any drainage tubes.

**For the most accurate measurements:**
- Always empty urine from the bedpan, urinal, catheter bag or collection hat into a *graduated measuring container* approved by your workplace.
- Place the container on a flat surface and measure at eye level.

Follow your workplace policy on estimating output for the client who uses adult diapers or briefs. Most employers will just have you keep a running tally of how many wet diapers were changed throughout the day. For clients on strict I&O, wet diapers may need to be weighed each time.

Beyond measuring amounts of output, it is also important to record what you observe about the output. **For example, with urine you will want to record:**
- Color
- Clarity
- Any foul odor you observe

**For feces you will record:**
- Color
- Consistency
- Presence of blood or mucus
- Any odor that seems abnormal

Clients who use a bedpan or collection hat for elimination should be instructed to keep toilet tissue out of the collection container. This makes measurement much easier.

**REMEMBER:** An average adult will urinate about 60 ml per hour. Anything less than 500ml in 24 hours is considered abnormal and should be reported immediately!
Tracking accurate I&O becomes especially important for clients with medical issues like kidney disease, heart disease, fever, trouble swallowing and dementia or Alzheimer’s Disease. These clients are at a much higher risk of getting out of balance and suffering dangerous consequences.

Most employers will require you to record I&O using the **metric system**. Fluids are measured in milliliters (ml). If you are in the habit of thinking about measuring fluid in ounces, it’s easy to convert. Here’s how:

\[
1 \text{ ounce} = 30 \text{ ml}
\]

So, if you know the cup your client used is an 8 ounce cup and she drank about half of the juice in it. You can estimate that she took in 4 ounces. Then, do the math:

\[
4 \times 30 = 120 \text{ ml}
\]

You would record 120 ml in the intake column on this client’s I&O record.

Remember to include all fluids in the intake column. This includes coffee, popsicles, tea, juice, water and even beer or other alcoholic beverages.

Ice chips can be recorded by estimating the volume by about half. For instance, your client has 4 ounces of ice chips. You would figure that half of 4 is 2. So, she had 2 ounces of fluid intake. And, \(2 \times 30 = 60\). You would record 60 ml in the intake column of this client’s I&O record.

Always record your client’s I&O as soon as you observe it. Don’t depend on your memory because memory is not reliable.

It’s very important to be accurate when recording your client’s I&O. This information could change the course of treatment for your client.

**Key Points to Remember**

The 5 most important key points to remember when you are measuring and recording intake and output are:

1. Know your client’s diagnosis and any medications that may alter intake or output.
2. Record I&O amounts as soon as you observe them.
3. Be accurate.
4. Take time at the beginning and end of each shift to see if intake and output are balanced.
5. Report any imbalance to the nurse right away.

“You know you’re a CNA when you can spend ten minutes writing an official report that describes your patient’s poop . . . and another thirty minutes laughing through your lunch break about that very same subject.”

~ Author Unknown
PROBLEMS IN SPECIAL POPULATIONS

Certain people are at greater risk of suffering a fluid or electrolyte imbalance and should be more closely monitored. This includes clients who are:

THE VERY OLD: As people age, the sense of thirst can become dull. This means older clients may not feel thirsty or take a drink to replenish lost fluids. You may have to remind older clients to take sips throughout the day.

If there are no special orders in place to restrict or increase fluids, then most people need about 2000 ml a day. This is equal to about eight 8 ounce glasses of fluid throughout the day.

DIABETICS: Remember the three P’s of diabetes?
- Polydipsia (excessive thirst)
- Polyurea (excessive urination)
- Polyphagia (excessive hunger)

These can all contribute to fluid and electrolyte imbalance in the diabetic client. Excessive thirst may lead your client to drink more than is needed—leading to hyponatremia. Excessive urination could lead to dehydration.

It is important to closely monitor the intake and output of your diabetic clients.

CANCER PATIENTS RECEIVING TREATMENT: Clients receiving chemotherapy or radiation therapy for cancer may have extreme nausea which can prevent the desire to take food and fluids. There may also be excessive vomiting—putting these clients at risk of becoming dehydrated.

In addition to nausea and vomiting, chemo and radiation can cause sores to develop in the mouth and throat making eating and drinking extremely painful.

Be sure to notify the nurse if your client complains of nausea, vomiting or painful sores in the mouth. These things can be minimized with certain medications.

Flat ginger ale will help with nausea and fluid replacement. Timing meals about 20-30 minutes after pain medication is administered will help your client eat more comfortably.

THE NEXT step!

Apply what you've learned!

Signs and Symptoms of Dehydration

Dehydration can be assessed many ways. Doctors look at blood and urine tests. Nurses assess I&O and look at physical symptoms.

Challenge: Set a timer for one minute and see how many signs and symptoms of dehydration you can remember.

Check your answers on page #3.
Every organ system in the body needs water (fluids) to function. (Remember: the average human is about 60 percent water.) Keeping fluids balanced in the body ensures all the organs continue to function properly.

Electrolytes are like tiny batteries floating in the body’s fluids that help charge the muscles and nerves in the body.

Generally, when fluids are out of balance . . . so are the electrolytes! Too much fluid in the body dilutes the electrolytes, making the concentration in the body HYPO, or too low. Too little fluid in the body makes concentrations of electrolytes HYPER, or too high.

- It is important to accurately track intake and output in ALL your clients but especially those who are at increased risk of becoming out of balance, such as the very old, diabetics and those receiving treatment for cancer.

- Take I&O tracking a step further. Check the history when you come onto your shift to make sure it looks balanced. Notify the nurse of any imbalances you notice. At the end of your shift, take a moment to look over the I&O worksheet to make sure what you recorded is accurate and makes sense. Notify the nurse and oncoming Aide of any imbalances you tracked.

- It's a good idea to know your client's diagnosis and any medications that may effect fluid balance. For example, it's important to know if your client is on a diuretic so you will be prepared to monitor urinary output more often and more carefully.

- While this inservice lists some general signs and symptoms of certain electrolyte imbalances, remember . . . only a doctor can diagnose and order treatment for these disorders. NEVER offer or recommend a supplement or change a client’s diet based on observations you make.

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**WHAT I KNOW NOW!**

Now that you've read this inservice on fluid and electrolytes, take a moment to jot down a couple of things you learned that you didn't know before.