time
make it count

Salt & Fluid Management programme

INFORMATION FOR HEALTHCARE PROFESSIONALS

time
make it count

Contents

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Message from ANSA

Message from ANSA

The Renal team faces constant challenges in the 21st century; demands on our time have never been higher. In an increasingly busy NHS, there is often an overwhelming feeling that we are all working to our capacity. Patient volume continues to increase, dialysis facilities are overstretched, survival rates improve and early diagnosis means that nephrology nurses' responsibilities are extended even further.

With few exceptions, the more information and preparation provided to our patients the better they are able to adjust to changes in lifestyle imposed by renal replacement therapies. However the NHS Institute has found that nurses in acute settings spend an average of only 40% of their time on direct patient care. The challenge is to reverse this trend, to release time from unnecessary activities and reinvest this in direct care and education.

ANSA supports *time*, a patient education programme developed by patients and healthcare professionals in collaboration with Roche which provides us with an opportunity to inform motivate and empower our patients, at a pace that suits the individual and environment which in turn has the potential to positively impact on outcomes.

Catherine Johnson
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ANSA

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Foreword

Foreword

"...the hardest part of my diet is not drinking..."
"...salt!... don't touch it"

These are comments I hear everyday from patients. Fluid is much more than food and drink; it plays a vital part of daily life. Often the first thing you get offered when you visit friends is a cup of tea or coffee. Imagine what it must be like for our patients who must restrict their fluid intake to just 500 ml a day.

Many patients are not aware of the link between a diet high in salt and thirst, making it impossible for patients to keep within their fluid allowance. Some are aware that they must not add salt to food; however the majority of salt in people's diets comes from pre-packaged foods. Most of the population are eating too much salt without even realising it.

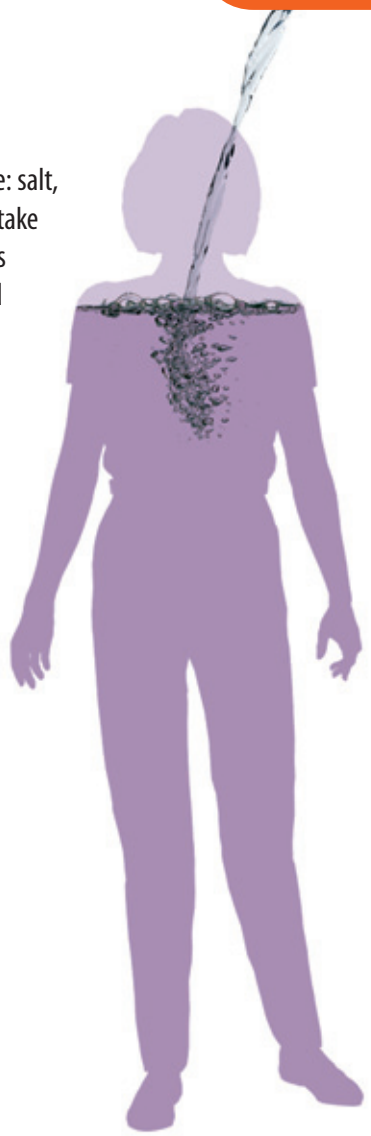
Good practical information on salt and fluid will help to control your patients' thirst, which will ensure fluid gains and blood pressure are much better controlled. This programme will equip you with the information and practical advice required to provide your patients with quality care.

Diane Green
Renal Dietitian, Salford Royal Hospitals NHS Trust

Introduction

Introduction

Fluid balance in dialysis patients can be affected by three components of dietary intake: salt, glucose and free water. In all patients, increased salt intake and high levels of water intake are key contributors to fluid overload, whilst in diabetic and peritoneal dialysis patients glucose control is also an important factor. This module explains the link between fluid overload and cardiovascular disease in renal patients, and provides practical guidance on how to adjust dietary intake.



Disclaimer

This module looks at the role of fluid and sodium in the development of renal disease with a practical emphasis on how to manage these two components. It does not cover general dietary control and patients should refer to their dietitian if they need more advice on specific dietary aspects.

How to use

How to use

About *time*

The *time* programme is an initiative created to help empower renal patients and healthcare professionals, with the aim of improving patient care and strengthening the relationship that patients have with staff. To this end, *t.i.m.e.* stands for *Time to Inform, Motivate and Empower.* The title and concept of time has been chosen to represent this educational initiative for its ability to portray the idea that with a little time and focus, great gains can be made.

When a patient's understanding of their condition and their treatment is improved, there is increased satisfaction, empowerment and ultimately health outcomes. This greater patient understanding is what the *time* programme seeks to achieve by offering an integrated education campaign involving patients and healthcare professionals alike.

time is designed to be systematically implemented in the renal unit, and once in place, key messages can be effectively delivered using 3 minute blocks of time. This is important as, in today's busy renal unit, time is at a premium, and this programme is built on the premise that, if small efficiencies were made in the way that staff carry out care, these 3 minute blocks of time could be freed up and utilised to improve the care for patients.

Developed in conjunction with healthcare professionals and patient representatives, the *time* programme comprises resources that can be used by the individual renal unit to create their own targeted education campaign delivering consistent, clear and useful messages for renal patients.

time salt and fluid management programme

The *time* salt and fluid management programme has been developed to explain the issues that patients on haemodialysis should understand about salt and fluid management. It also conveys dietary advice. The materials described below will help you develop a salt and fluid management education programme in your renal unit.

The following guide shows briefly what materials are included in the salt and fluid management programme and how they may be used. Not all materials are designed to be used with **every** patient. Rather, a range of materials has been developed to help meet the needs of individuals.

Posters

The education programme begins the minute a patient walks into the unit. These posters are displayed in areas such as the waiting room to raise awareness about salt and fluid management. The posters could be rotated to maintain interest (for example a different one for each month). They are specifically designed not to provide all information, but to initiate thoughts and comments, leading to dialogue with the healthcare professional.

Flashcards

The key messages in the salt and fluid management programme are communicated via Flashcards. They are designed to give clear and consistent messages in a short space of time. In addition to a key message, each Flashcard shows a frequently asked question, the answer to which is revealed on the back of the card. Patients can either read the Flashcards themselves, or nurses can use them as a prompt during discussion. Ideally they could be placed in a prominent position on the ward so that patients and staff can easily access them. They also have a wipeable surface.

Patient information manual

This contains detailed information for those patients who wish to read more. The information guides are designed to be kept on the unit for patients to read whilst having treatment.

Healthcare professional information manual

This guide contains, and elaborates on, the information presented in the Patient Information Manual. It may be used by staff interested to read more about salt and fluid management, and/or for general staff training. This guide also has a section on monitoring fluid status in dialysis patients.

Top tips cards

The top tips cards come in two formats (business card and passport size) and are designed for patients to keep. They give tips on how to maintain and monitor salt and fluid intake and also provide space for monitoring blood pressure and weight.

Fluid assessment tool

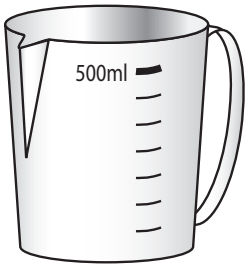
This is a tool that allows nurses to assess and monitor patients' target weight on a regular basis (e.g. monthly), to ensure it is appropriate. It is easy to complete and can be filed with patients' notes. Once the score has been calculated from the tear off pad form, then the action table will give the appropriate action for that patient.

Reusable ice cubes

Reusable ice cubes are given to patients so they can keep drinks cold without adding to their fluid intake.

False bottomed mug

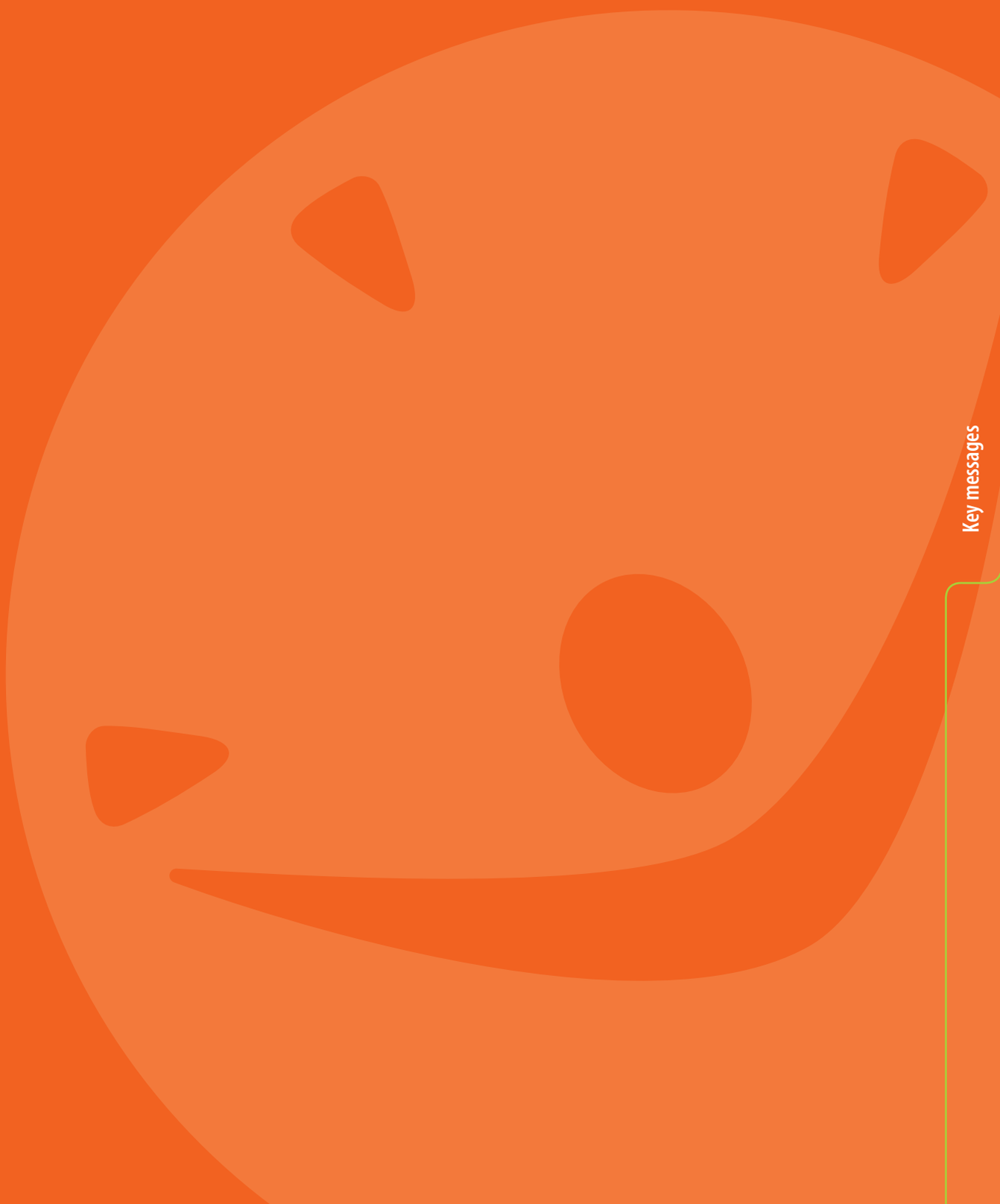
These are given to patients so they can have a 200 ml drink while drinking from a normal sized mug.



500 ml jug

The 500 ml measuring jug can be made available for patients who do not have a way to measure how much they are drinking.

Key messages



Key messages

The key messages that you should aim to convey to your patients when discussing the importance of fluid management are:

- Dialysis patients need to be very careful about their liquid intake so that they do not become fluid 'overloaded'
- Most dialysis patients have a fluid restriction of 500-700 ml, plus the previous day's amount of urine output. (i.e. if you urinate 500 ml in a 24 hour period, your fluid intake can be 1000-1200 ml in 24 hours)
- Excessive weight gain between dialysis sessions means that dialysis patients need to cut back on salt and water intake
- For haemodialysis patients, it is recommended that no more than 1.5-2 kg should be gained in between dialysis sessions. Patients on peritoneal dialysis should also try and stick to their fluid restriction
- Fluid 'overload' can result in breathlessness, swelling, high blood pressure and eventually, over time, enlargement of the heart and heart failure
- Fluid can come from obvious sources (drinks) but also from foods with a high water content such as ice cream, custard, ice cubes and gravy
- Too much frequent fluid intake may result in longer dialysis sessions or more frequent dialysis
- For patients on haemodialysis, sodium should be restricted to 1600-2000 mg per day (depending on urine output)
- Controlling sodium intake will help avoid cramping and blood pressure drops during dialysis
- Too much sodium will make the body retain fluid and raise blood pressure which can be detrimental to a patient's health
- One tablespoon of salt has approximately 2400 mg sodium
- Salty fluids or foods will increase thirst
- Salt substitutes such as 'Lo-Salt' should NEVER be used in patients with CKD
- For people with diabetes, good blood sugar control will help to control thirst

Fluid intake and dialysis

Fluid ingestion and cardiovascular disease

Cardiovascular disease is the leading cause of morbidity and mortality in patients in all stages of chronic kidney disease (Medical News Today, 2004). This is often due to cardiac failure which occurs in 25-30% of haemodialysis patients (Harnett *et al.*, 1995).

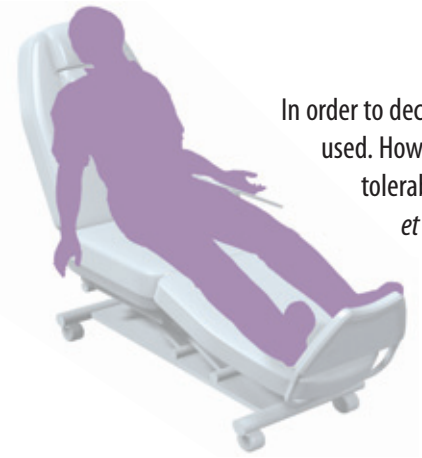
Of these cardiovascular complications, left ventricular hypertrophy (LVH) occurs in approximately 57-77% of patients on dialysis, leading to cardiac overload and failure (Hlebovy, 2006).

It is essential for fluid levels to be carefully controlled in renal patients to help avoid these cardiovascular complications.

If patients consume too much fluid, they are likely to experience the following complications:

- Increased blood pressure
- Oedema, particularly of lower extremities
- Shortness of breath, (possibly fluid in the lungs)
- Tachycardia, congestive heart failure, LVH
- Sudden hypotension (on dialysis)

High levels of fluid intake can be caused by a number of factors including a high salt diet (in all patients) and poorly controlled blood glucose levels (in diabetic and peritoneal dialysis (PD) patients). This increased fluid intake can lead to patients having high total body water levels, which increases cardiac workload and can directly result in LVH.



In order to decrease fluid levels during dialysis, a high ultra filtration rate (UFR) must be used. However, this can result in patients becoming unstable on dialysis, reduces their tolerability to dialysis and increases their risk of death (Movilli *et al*., 2007; Saran *et al*., 2006).

Effectively managing patients' blood volume through salt restriction and ultrafiltration can reduce their risk of developing LVH and is an important factor in improving patient outcomes (Ozkahya *et al*., 1998).

Other implications of fluid overload on haemodialysis treatment

Dialysis eliminates excess fluid but is generally only carried out three times a week. If patients exceed their fluid allowance, more fluid must be removed during dialysis. If the dialysis time is relatively short, and the excess fluid is being removed faster than it is being replaced, this may lead to hypotension and haemodynamic instability. Patients may experience muscle cramping, nausea, dizziness and weakness following treatment. This can then limit the ability of the dialysis to correct fluid overload and an extra dialysis session may be required. However, since fluid levels may be influenced by salt intake, monitoring salt intake could be useful for controlling excessive interdialytic fluid gain.

Causes of increased fluid ingestion

It is essential for fluid levels to be carefully controlled in dialysis patients. Fluid intake should be carefully monitored to ensure fluid levels remain stable.

There are three main causes of increased fluid intake:

- Increased salt intake

- Poor glucose control in diabetic and peritoneal dialysis patients

- Increased social consumption of free water (e.g. drinking to cool down, finishing cups of tea instead of drinking half, or smaller cups)

Increased salt intake

The role of sodium in the body

Sodium is one of the three electrolytes that control the passage of fluid in and out of cells. Sodium is also essential for regulation of blood pressure and volume, nerve transmission, muscle contraction and the acidity of blood and body fluids. However, high sodium levels contribute to hypertension, oedema, heart failure, pulmonary oedema and of course, further damage to kidney function.

The relationship between salt and fluid

As renal function declines, the ability of the kidney to excrete sodium also declines. If the patient continues to consume salt in their diet, they can go on to develop hypertension. Since hypertension is one of the strongest predictors of poor outcome in dialysis patients it is important that patients understand the effect of salt in managing their health.

Sodium intake triggers the thirst mechanism so if a patient consumes too much sodium they are also likely to increase their fluid intake.

Sodium restriction versus fluid restriction

Fluid consumption between dialysis sessions is directly linked to sodium intake and the thirst that this causes. Therefore sodium restriction is one of the most effective and important ways to limit fluid-related weight gain between dialysis sessions (Mailloux, 2000). Excess fluid intake without an associated sodium intake does not cause hypertension, as it increases intracellular rather than extracellular volume.

Therefore, although fluid restriction is the most common advice given by caregivers, sodium intake is also an important factor to consider (Ahmad, 2004).

In units where restricted sodium intake is commonplace, low rates of mortality on dialysis and good control of blood pressure have been demonstrated (Mailloux, 2000).

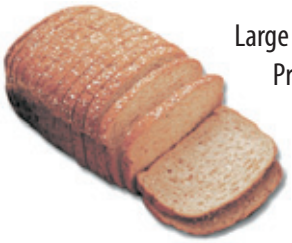
Permitted sodium intake

Basal sodium excretion (BSE) is the amount of sodium excreted in urine over a 24 hour period. If sodium intake exceeds the amount of sodium excreted, the body will accumulate water to balance out sodium levels and the patient will develop hypertension. The aim for patients with chronic kidney disease is to ensure that their dietary intake of sodium is equal to, or less than their 24 hour urinary sodium excretion (Ahmad, 2004). For most patients on haemodialysis, this means that sodium should be restricted to 1600-2000 mg per day (depending on urine output).

Limiting sodium intake

The most important action that patients can take is to stop adding salt to cooking water, and to food at the table.

Initially reducing salt added to food may make it seem bland but patients should be encouraged to persist: salt is a strong stimulant of the taste buds at the tip of the tongue but also has the effect of masking the taste of the food. After a few days, patients will find that they can begin to appreciate the underlying taste of their food.



Large amounts of salt are used in processed food, largely as preservatives and taste 'enhancers'. Processed and fast foods can contribute nearly three-quarters of the recommended daily sodium allowance. For example, one slice of brown bread contains 150 mg sodium and canned food is high in sodium. Fresh or frozen foods with ready-prepared sauces often contain high levels of salt, and some canned drinks have added sodium.

Cooking

Patients should be made aware of sources of 'hidden' sodium.

When cooking, patients could use alternatives such as fresh herbs or allowing a splash of wine to reduce down towards the end of cooking leaving behind a tasty but low-sodium sauce. Trained dietitians can advise on other ways to keep food tasty and appealing without adding salt.

Eating out

When eating out in restaurants, patients can ask for foods to be prepared without MSG (monosodium glutamate) or salt, and for sauces and salad dressings to be provided in a separate jug rather than poured over the food.

Salt substitutes

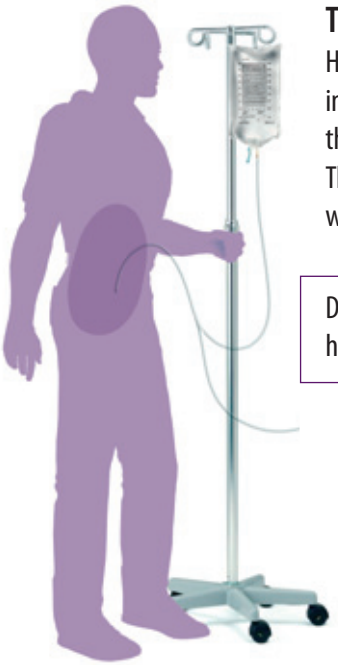
Salt substitutes should not be used by patients with poor renal function, as they are generally very high in potassium.

Increased fluid consumption between dialysis sessions is linked to increased sodium intake and the thirst that this leads to. Sodium restriction is one of the most effective and important ways to limit weight gain between sessions.

Glucose control

The role of glucose in the body

Glucose is an important source of energy in the body and is the sole source of energy for the brain. It is stored in the body in the form of glycogen. The concentration of glucose that remains in the blood is maintained at around 5 mmol/l by a variety of hormones, including insulin. If the blood glucose level is raised above its normal level, to 10 mmol/l, hyperglycaemia develops. This is a symptom of diabetes.

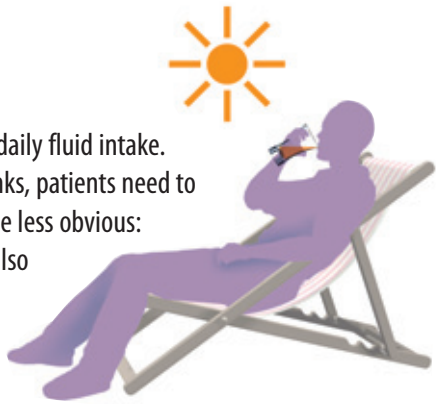


The role of glucose in fluid management

High glucose levels in the blood induce thirst, resulting in a greater need for fluid intake. It is important for glucose levels to be regulated in dialysis patients to ensure that excessive fluid intake does not occur due to high glucose levels in the blood. This is especially important for diabetic patients and for those on peritoneal dialysis, who do not have the ability to effectively regulate their blood glucose levels.

Diabetic and peritoneal dialysis patients need to control their intake of glucose, as high blood glucose levels can lead to excessive thirst and subsequent fluid overload.

Free water ingestion



Sources of fluid

Any fluids that are liquid at room temperature must be counted as part of the daily fluid intake. In addition to obvious fluids such as water, juices, tea, coffee, milk, or fizzy drinks, patients need to be reminded that other food items contribute to fluid intake although it may be less obvious: ice, gelatine, ice cream, sauces, gravies and soups. Some fruit and vegetables also contain a substantial amount of water, for example: melons, grapes, apples, oranges, tomatoes, lettuce, celery and cucumbers.

Daily fluid allowance

Fluid allowance is determined by the amount of urine a patient can produce in a 24 hour period. The usual allowance is 500-700 ml of fluid per day plus urine output. Therefore, if a patient can urinate 500 ml per day and their fluid allowance is 700 ml per day, their total daily fluid allowance would be 1200 ml.

In standard measures, an average size cup contains around 240 ml of liquid

Managing thirst

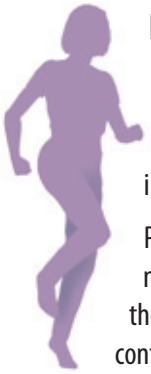
As patients will inevitably become thirsty, it is important to help them manage thirst without exceeding their daily fluid allowance. Limiting sodium and effectively managing their glucose levels are the most important ways of controlling thirst, but there are also many helpful hints patients can use:

- Ask the pharmacist to review medications in case thirst or dry mouth are known side effects
- Avoid salty and spicy foods as these increase thirst
- Be aware of 'hidden' fluids in foods (see above in Sources of fluid)
- Stay cool, especially in warm weather and drink cold liquids instead of hot
- If thirsty between meals, snack on approved (low potassium) ice-cold vegetables and fruit
- Sip drinks and use small cups or glasses
- Suck an ice cube rather than drink a glass of water
- Take medicines with meals rather than with extra water
- Use mouthwash, hard sweets, gum, mints, or a wedge of lime or lemon to combat dry mouth and stimulate production of saliva

Patients must be wary of certain fluids which contain high levels of salt or glucose. These include:

- Fruit juices and vegetable juices
- Beers, lager, cider, sweet wines, sherry, port
- Oxo®, Bovril®, Marmite® and other meat or vegetable extracts
- Cocoa, drinking chocolate, malted milk drinks
- Evaporated and condensed milk

Encourage patients to carefully read the labels of all drinks and processed foods to assess their mineral content.



Exercise and fluid intake

Exercise is likely to increase thirst but patients must be cautioned not to increase their fluid allowance for the day without first consulting a nurse or nephrologist. If patients find it impossible to exercise at a certain level without becoming excessively thirsty, they should be counselled to reduce the exercise intensity until they feel more comfortable.

Patients will find it more difficult to exercise on the day before dialysis as they will be carrying their maximum fluid load. The most comfortable period for exercise is after dialysis has been carried out, and the following day. Patients who exercise should avoid drinks which are aimed at athletes, as these often contain high levels of sodium.

Alcohol intake

Patients with renal failure are not required to eliminate alcohol from their diet but should be encouraged to drink in moderation bearing in mind the possible adverse effects. Consumption of more than two alcoholic drinks a day increases the likelihood of developing hypertension which is a risk factor for kidney failure. Alcohol may also interfere with some medications.

Patients with renal failure should be encouraged to drink no more than two units a day (men) or one unit a day (women) and should be reminded that the main drawback of alcohol consumption at this level is that it increases urinary output and may therefore lead to increased thirst. The carbohydrate load from alcoholic drinks is also a contributory factor to obesity.

Alcohol can exacerbate renal disease in patients. It is known that excessive alcohol can increase blood pressure. This can result in increased pressure within the tubules of the kidney, leading to fibrosis and renal failure in the long term. High blood pressure also increases the strain on the heart and can lead to an increased risk of cardiovascular events.

Sodium, glucose and fluid intake are all important factors in maintaining suitable fluid levels in dialysis patients. All three factors should be carefully monitored and managed.

Monitoring fluid status

Monitoring fluid status in dialysis patients

Fluid status should be regularly monitored in dialysis patients. Each patient should be set a dry weight as a target for each dialysis treatment. It is important to make a correct dry weight assessment: if it is set too low, the patient may suffer from severe dehydration and hypotension, whilst if it is too high, over-hydration of the patient may lead to hypertension, left ventricular hypertrophy (LVH) and even left ventricular failure (LVF) (Mitchell 2002, Charra 1996).

Dry weight

Dry weight is the patient's own weight without extra fluid and is used as a target for each dialysis treatment. It may also be referred to as a target weight. For most patients, weight gain between treatments (intradialytic weight gain) should be no more than 1-2 kg.

Reviewing and maintaining a patient's dry weight can often be made difficult if the patient's weight fluctuates due to other reasons (e.g. weight loss due to co-morbidities or dieting). Establishing an accurate dry weight therefore, requires patients to be monitored on a regular basis. Simple monthly diaries or weight gain graphs can be used to review both the dry weights and fluid gains of haemodialysis patients, and are provided as part of the *time* programme materials.

Tools used to monitor fluid status during haemodialysis

It is useful to monitor relative blood volume changes during dialysis, to ensure that patients are adequately hydrated, reducing their risk of developing hypotension and haemodynamic instability on dialysis (Basile 2001, Steuer 1996).

There are three ways to monitor relative blood volume (RBV) non-invasively:

1. The Crit-line® (Hema Metrics, Utah, USA) is a stand-alone device that uses an optical method and measures absolute haematocrit (Ht) during haemodialysis, from which the RBV is calculated (Steuer 1993).
2. The Haemo-scan® (Gambro-Hospal, Lund, Sweden) is incorporated into the Integra haemodialysis machine. It calculates the RBV change by measuring haemoglobin levels through the optical absorbance of monochromatic light (Paolini 1995).
3. The Blood Volume Monitor or BVM (Fresenius, Bad Homburg, Germany) calculates RBV by continuously monitoring changes in total protein concentration (TPC) during haemodialysis (Schneditz 1990, Johner 1998).

Fluid assessment tool

The fluid assessment form below has been developed to provide a comprehensive assessment of the patient's fluid status whilst they are off dialysis (Fielding, 2006).

Patient name: .....

Unit name: .....

Hospital number: .....

Date of assessment: .....

Assessment chart:

Post-dialysis blood pressure (averaged over the last three sessions [SBP/DBP])	
Presence of oedema? (Yes/No)	
Regular cramps on dialysis? (Yes/No)	
Stable on dialysis? (Yes/No)	
Current target weight	
Number of in-patient days in last month	
Subjective patient appetite assessment (Good/Normal/Poor)	
Any blood pressure medication (list):	

Variable	Over-load	Under-load
Post dialysis SBP > 130	+1	
Post dialysis DBP > 80	+1	
Cramps on dialysis		-1
Post dialysis SBP < 100		-0.5
Post dialysis DBP < 50		-0.5
Oedema at ankle	+1	
Three or more in-patient days in last 30 days	+0.5	
Patient appetite poor	+0.5	
Patient appetite good		-0.5

Date	Score	Current target (kg)	Revised target (kg)	Completed by	Signature

Scoring sheet (circle relevant scores):

Date of next assessment: .....

Actions table:

Score	Action
Less than -0.5	Increase target weight by 1 kg (or increase by 0.5 kg if current target weight is 45 kg or less)
Between +0.5 and -0.5	No action required
Greater than +0.5	Reduce target weight by 1 kg (or reduce by 0.5 kg if current target weight is 45 kg or less)

Ongoing assessment

Based on the desired course of action, the following ongoing assessments should then be carried out:

Action	Ongoing assessment
No action required	Repeat assessment in 1 month
Target weight requires adjustment (patient stable and not on antihypertensive medication)	Make change and repeat assessment in 2 weeks
Target weight requires adjustment (patient unstable and/or on antihypertensive medication)	Discuss with unit consultant or SpR

Reproduced with kind permission from Sr C Fielding, Sr C Rhodes and Dr R Fluck, Derby Hospitals NHS Foundation Trust.

How to use:

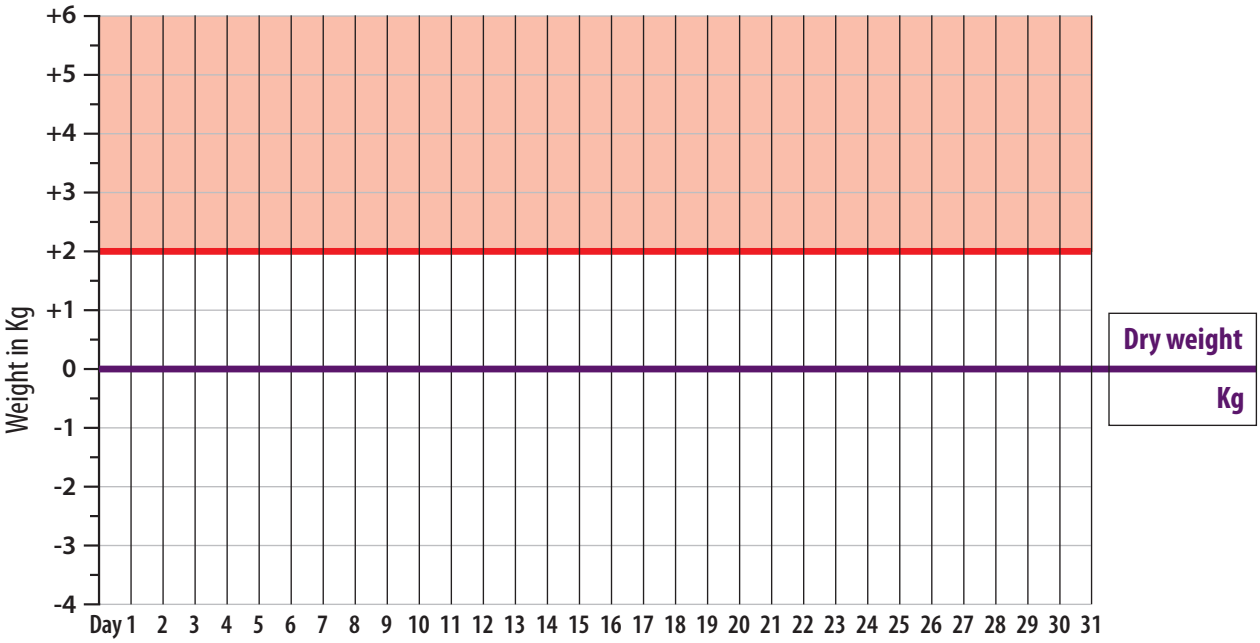
The assessment form is provided as a tear-off pad as part of the *time* programme materials. It should be used as follows:

1. Fill in the fields on the assessment chart
2. Use the scoring system table to calculate a score for the patient
3. Compare the patient's score to those listed on the actions table and decide on an appropriate course of action
4. Once a course of action has been taken, use the ongoing assessment table to decide on next steps
5. Store the assessment form in the patient's notes or dialysis records for reference

Using the Top Tips card

This card, provided with the *time* programme, can be used with those patients who are having problems with large intradialytic weight gains. The main features include:

- Helpful hints on how to manage fluid intake
- A table to record blood pressure and weights pre- and post-dialysis, so that patients can monitor changes over a period of time
- A graph to record patients' body weight against their dry weight targets over a period of 1 month. The nurse should note the patient's dry (target) weight on the graph.



The patient should then weigh themselves at the same time each day and add readings to the graph.
This allows the patient to develop a good picture of any trends that are occurring and to monitor any progress they may be making.

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