Nutrition during a natural disaster for people with end-stage kidney disease

Megan Rossi, Valerie Young, Joanna Martin, Bettina Douglas and Katrina Campbell

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Abstract

Preparation and communication are key to ensuring the safety of dialysis patients when natural disasters strike. This paper recounts the Cyclone Yasi experience that hit Queensland in February 2011, with particular focus on the many nutritional challenges faced. Seventy-one dialysis patients were evacuated from Cairns to Brisbane in the early hours of the morning, a potentially life-saving decision made by the Queensland Government. Many patients, rushed from their homes, arrived in Brisbane with only the clothes on their back and no medications, identification cards or documented medical history.

Timely multidisciplinary response and communication and consistent advice on menu planning is necessary to inform both individual patients and evacuation centres of the appropriate dietary restrictions. This paper proposes a guide for future direction.

In early 2011, Queensland was hit by two major disasters in a matter of weeks, resulting in the need to reflect on our disaster management plans for dialysis patients, particularly those relating to education for disaster diet planning. This paper outlines the response of the dietetic team to the displacement of dialysis patients from Cairns and proposes recommendations for implementing future disaster plans, including meal plans for patients at risk of missing multiple dialysis sessions.

The events

On the evening of Wednesday 2 February 2011, 71 haemodialysis patients were evacuated from Cairns in anticipation of what was predicted to be one of the biggest cyclones in history crossing the coast close to Cairns Base Hospital. Sixty-five per cent (n=46) of the patients were of an Aboriginal Torres Strait Islander (ATSI) descent, 59% male with a mean age of 56 years (range 22–82).

The patients arrived in Brisbane in the early hours of the following morning, many with only the clothes on their back and no medications, identification cards or documented medical history. For the ambulatory patients, Queensland Health arranged accommodation at hotels in the central business district (CBD). One of these with a large number of vacant rooms available was a five-star hotel. Patients checked into their rooms to find a fridge full of high potassium snacks and alcohol, before being led to the five-star, full buffet breakfast. Many of the patients unfamiliar with the finer foods that a hotel like that had to offer were at high risk of overindulging in the mineral-laden foods readily available.

As part of the team responding to the needs of displaced patients, the dietitians working together to identify and administer insulin to those patients who had missed their dose, prioritised those who were due for dialysis and admitted any patients who appeared at high medical risk.

Fortunately, due to the concerted and coordinated efforts, there were few patients who missed dialysis sessions and the few emergency admissions of those originally evacuated were related to comorbidity management and problems not related to food choices.

What worked well

Assembly of an emergency relief team to the site of the evacuees (nephrologists, renal nurses, nurse practitioners, dietitians, psychologists, social workers, patient support representation and administrative assistance), to cover all bases for the needs of the evacuees and provide adequate communication to sites providing dialysis.

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Nutrition, dialysis, nursing, cyclone, disaster.

Focus was now on supporting patient compliance and safe meal provision. The dietitians also took the opportunity to ensure any urgent and immediate needs of the evacuees were addressed. This became prudent in the absence of available medical records; priority was placed on ensuring that food allergies were communicated to the hotel staff. In addition, many patients had left their insulin, potassium exchange resins (resonium) and phosphate binders back in Cairns. To minimise the risk of these hazards the team worked together to identify and administer insulin to those patients who had missed their dose, prioritised those who were due for dialysis and admitted any patients who appeared at high medical risk.

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The hotels were advised to minimise access to foods outside meal times and provided a modified menu on the advice of the dietitians. In the situation of buffet meal service, flyers were posted informing of menu choices, identifying high potassium foods and recommending guidelines on low potassium choices.

The dietitians communicated with the dialysis sites to ensure morning and evening dialysis patients received foods on-site and to further communicate food allergies to these sites.

What did not work so well

There was no readily available, consistent advice for menu planning to inform the evacuation centres housing these dialysis patients. Further menu challenges included coordinating meal times with dialysis times. It was also difficult having patients transferring without medical history, information and medications, despite having a local emergency policy in place (Queensland Health, 2010).

Recommendations based on this experience

Planned coordinated response and communication is essential. It is vital to have emergency medication supply and basic medical history (including allergy declaration) packs for patients. It is important to develop and provide consistent education for both patients and potential evacuation sites regarding menu planning, to be implemented prior to peak season for disasters (for example, in preparation for summer).

In summary, this experience was positive, with a relatively smooth and coordinated response and all ambulatory patients reliant on in-centre haemodialysis were provided with appropriate care, with minimal disruption to their dialysis regimen. However, this process was enhanced by the prior warning of this disaster, allowing time for evacuation and coordination of dialysis sites to receive incoming patients. The question remains, in the event of a repeat disaster, with less warning, would our dialysis patients be sufficiently prepared for the prospect of missing dialysis sessions?

Future directions

Natural disasters can impact the entire spectrum of the renal population, particularly those who are dialysis-dependent, including those undertaking home dialysis, as patients need uninterrupted power, clean water, appropriate equipment and trained personnel (for in-centre care).

Numerous studies in various chronic disease populations have shown that blood pressure, HbA1c levels and insulin requirements during natural disasters, such as earthquakes and hurricanes, increase significantly (Miller & Arquilla, 2008). In addition, cardiovascular morbidity and mortality is known to increase dramatically during disasters, thought to be as a direct relationship to psychological distress including anxiety (Miller & Arquilla, 2008).

Specific to the renal population, after the Maramar earthquake in Turkey in 1999 there was reported to be a high frequency of missed dialysis sessions. However, in this circumstance, interdialytic weight gain and consequently blood pressure did not increase when compared with the pre-disaster period (Sever et al., 2004). The authors identified these results are explained by increased compliance with dietary and fluid restrictions. However, this cannot be confirmed due to the limited data collected and may be more related to limited availability of foods and disruption to daily life following the event, rather than enhanced compliance alone.

From a study into dialysis patients affected by Hurricane Katrina, 44% of patients reported missing at least one and almost 17% reported missing three or more dialysis sessions in the week following the event (Anderson et al., 2009). Those identified at greatest risk of missing three or more sessions were those having been with a dialysis vintage less than two years, lived alone, reported unaware of their dialysis facility’s emergency plans, who did not evacuate prior to hurricane landfall and who were placed in an evacuation centre (shelter) (Anderson et al., 2009). It is unclear if a similar pattern emerged locally in this recent series of disasters in Queensland; however, this may indicate a population who is more likely to require attention in the event of an emergency and would also benefit from targeted preparation and education.

Generation of emergency diet guidance was a key recommendation from the Kidney Community Emergency Response Coalition (KCERC), Final Report from the January 2005 Disaster Summit (KCERC, 2006). Identified as a key component of the emergency kit, a diet plan was proposed that could theoretically sustain a patient who has gone without dialysis for up to three days. Although these diets are suitably comprehensive, they are not directly transferable to the Australian setting. In addition, there are notable logistical issues with targeting a low salt, renal/healthy heart diet in evacuation centres, due to the composition of non-perishable food items that are primarily available in these situations.

Therefore, we have devised an adapted meal plan more suited to the Australian population and food supply. The fundamental principles and rationale underpinning the meal plan are detailed in Table 1. It is appreciated this is challenging to implement in a bulk menu environment (such as an evacuation centre); however, these principles are recommended to be considered in the event of a disaster, for patients with renal disease who are at risk of missing dialysis sessions. General advice includes halving protein and fluid intake and avoiding all high potassium foods. In addition to this, as a precautionary measure, it is...
recommended that individuals maintain an emergency supply of potassium exchange resins to prevent hyperkalaemia in the case of missing greater than three days of dialysis treatment.

The principles from Table 1 have been translated into suggested meal plans in Table 2, which adhere to recommended nutrient targets of the KCERC (8000 kJ, 40–50 g protein, 40 mmol potassium, 65 mmol sodium, 630 mg phosphorous, 500 ml fluid). Analysis was undertaken using an average of a three-day menu, by FoodWorks Professional 2009 (Xyris Software ©; Database: AUSNUT 2007).

Reflecting on our experiences, and those before us, findings point toward the importance of planning and preparation. Ideally making patients aware of evacuation plans before an event and having frequent reminders of best practice, including reducing hazards associated with missed sessions in future emergencies. Every emergency will require a tailored response (Kutner et al. 2009).

### References


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### Table 1. Principles of menu planning for dialysis-dependent patients at risk of missing dialysis sessions.

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Rationale</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low protein</td>
<td>Minimise the uremic toxin load from protein metabolism.</td>
<td>Small portions of meat, chicken, fish, eggs and dairy foods.</td>
</tr>
<tr>
<td>High energy</td>
<td>Prevent dry body weight loss and minimise protein catabolism.</td>
<td>Adding extra oils, margarines and sugars to foods to enhance caloric value.</td>
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<tr>
<td>Low potassium</td>
<td>Prevent hyperkalaemia and ultimately cardiogenic arrest.</td>
<td>Limit dairy and avoid high potassium fruit and vegetables*</td>
</tr>
<tr>
<td>Low sodium</td>
<td>Minimise thirst, oedema, shortness of breath and hypertension in salt-sensitive patients.</td>
<td>Avoid sauces and gravies and tinned foods where possible*</td>
</tr>
<tr>
<td>Low phosphorus</td>
<td>Minimise severe itchiness and long-term risk of calciphylaxis.</td>
<td>Limit protein and dairy foods*</td>
</tr>
<tr>
<td>Fluid restriction</td>
<td>Minimise risk of excessive fluid gain, oedema, shortness of breath and hypertension.</td>
<td>Limit salt intake and drinking from measured small cups* Restriction of 500 ml/day may be necessary.</td>
</tr>
</tbody>
</table>

*with every meal, allow for 125 ml cordial/soft drink (non-cola base) with medications.

### Table 2. Sample meal plans adhering to recommended nutrient targets for dialysis dependant patients, at risk of missed dialysis sessions (adapted from National Kidney Foundation, 2006).

<table>
<thead>
<tr>
<th>Breakfast*</th>
<th>Lunch*</th>
<th>Dinner*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 cup cereal (puffed rice/wheat; wheat biscuits)</td>
<td>300 g instant noodles with 1 tbs of oil and flavouring (see flavouring list)</td>
<td>100 g of four bean mix (drained) with 2 tsp oil</td>
</tr>
<tr>
<td>½ cup milk (long-life/powdered/fresh)</td>
<td>OR</td>
<td>OR</td>
</tr>
<tr>
<td>1 tsp sugar OR 4 tsp condensed milk</td>
<td>2 slices bread/medium bread roll/1 pita or pocket bread with margarine on both slices</td>
<td>1 fried egg with oil</td>
</tr>
<tr>
<td>OR</td>
<td>Filling options: 1/3 small tin (30 g) canned meat in oil (tuna, chicken, salmon, turkey)</td>
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</tr>
<tr>
<td>2 slices thick toast/crumpets with margarine and jam/honey/diced condensed milk</td>
<td>OR</td>
<td>1 boiled egg with 2 tsp mayonnaise OR 2 tsp peanut butter</td>
</tr>
<tr>
<td>1/3 small tin (30 g) canned meat in oil (tuna, chicken, salmon, turkey)</td>
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</tr>
<tr>
<td>1 fried egg with oil</td>
<td>1 boiled egg with 2 tsp mayonnaise OR 2 tsp peanut butter</td>
<td>AND</td>
</tr>
<tr>
<td>AND</td>
<td>1/2 cup of canned peaches/pears (drained) with 2 tsp condensed milk</td>
<td>1–1.5 cup cooked rice/pasta/barley (added margarine/oil) with 1/3 cup mixed frozen/canned vegetables (added margarine and flavouring, see flavouring list)</td>
</tr>
</tbody>
</table>

Snacks (minimum 3/day)

- 4 plain crackers (e.g. cornthins, crackers) with 1 tsp of margarine on each (Diabetic choice)
- 4 plain sweet biscuits with margarine (e.g. milk arrowroot) (Diabetic choice)
- 1 slice white bread with margarine and jam/honey
- 2 plain pikelets with margarine and jam/honey
- 10 marshmallows or jelly lollies

Recommended flavourings (salt-free)

- garlic; curry; chilli; onion; ginger; spring onions; ground pepper; dry mustard powder; lemon juice; lime juice; vinegar; a sprinkle of dried herbs – basil, oregano, mint, rosemary, thyme, parsley, chives, sage, tarragon or spices – cinnamon, nutmeg, cardamom, ginger, cumin

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