MY KIDNEY JOURNEY

Do you know that obesity is linked to CKD?

Obesity is related to various health problems, including CKD. Learn more on page 2.

Why and how should you monitor CKD?

Learn about close monitoring of CKD on page 4.

How should I choose my renal replacement therapy (RRT)?

Making dialysis choices is tough.
Learn more about your options on page 5.

Living well with CKD

Treatment alone is not enough.
Learn how to manage your CKD condition with appropriate exercises on page 7.

Renal diet tips

How much is one portion?
How to plan a kidney-friendly meal?
Learn nutritional facts on page 9.

CKD: Chronic kidney disease.

DO YOU KNOW THAT OBESITY IS LINKED TO CKD?

A high amount of body fat can lead to obesity and related diseases. For adults, a normal weight is the appropriate body weight in relation to height. When your weight is higher than normal, it is considered overweight or obesity. Body mass index (BMI) is your weight in kilograms divided by the square of your height in meters (kg/m^2). The higher your BMI, the higher your body fat percentage/amount.[1]

BMI

$$\text{BMI} = \frac{\text{Weight in kg}}{(\text{height in m})^2}$$

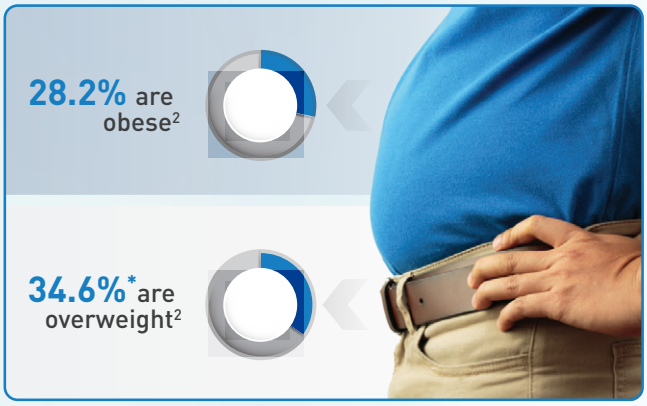
Normal: 18.5 to <25

Overweight: 25 to <30

Obese: ⩾30

BMI

- There is a trend of rapid increase in overweight and obesity among children and adults in Brunei.[2]
- Obesity is estimated to account for approximately 20%–25% of kidney diseases.[3]



Obesity is a potential risk factor for kidney disease.[3]

Sedentary lifestyle, psychological stress, unhealthy food habits, and genetic factors may lead to obesity and related problems, which together increase your chances of developing CKD.[4]

Being obese also increases your chances of developing:[4,5]

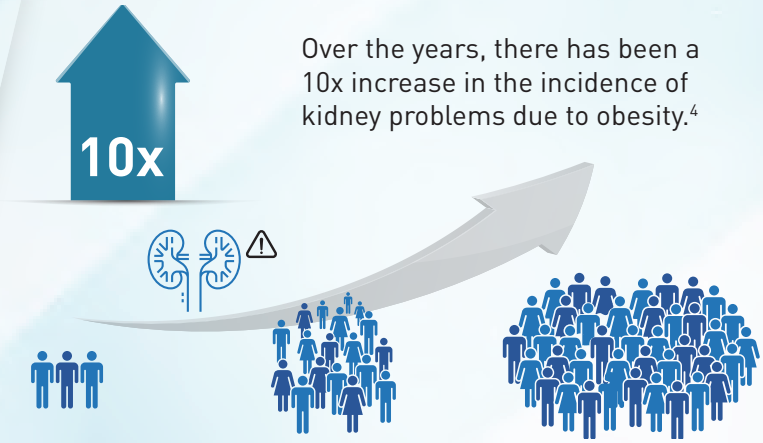
- Diabetes
- Hypertension
- Cholesterol deposits in blood vessels
- Heart diseases

*The prevalence of overweight is exclusive of the obese population.
BMI: Body mass index; CKD: Chronic kidney disease; kg/m^2: Kilogram per square meter.

Other key facts about obesity and CKD you should know

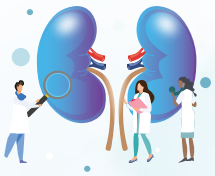
Obesity does not just cause CKD but may also worsen it.[6]

Further, children born to overweight and obese mothers have an increased risk of obesity and CKD.[6]



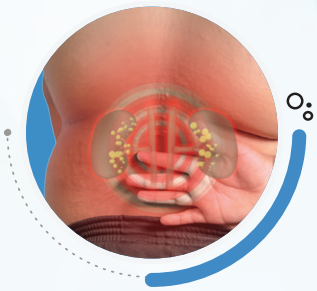
Over the years, there has been a 10x increase in the incidence of kidney problems due to obesity.[4]

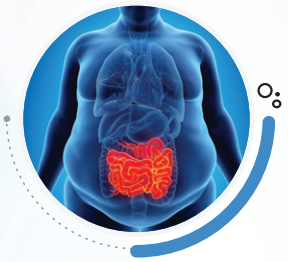
How does obesity affect your kidneys?



Obesity can make your kidneys work harder by filtering more blood, called **hyperfiltration,** to meet your body demands. This can cause damage to your kidney structure, leading to kidney disease.[5]

The glomerulus is the tiny cleaning unit of kidneys, which filters wastes and excess fluid.[7] Fat accumulation in the kidneys can lead to structural and functional changes in the kidney cells, causing an abnormal increase in the size of glomeruli and leading to CKD.[6] **Hyperlipidemia**, a condition with high levels of fat in the blood, can increase the risk of diabetes and cardiovascular diseases.[4]





Obesity also leads to an imbalance in the microbes in your gut, resulting in an inflammatory response in the body. This causes disruptions in various body mechanisms, leading to diabetes and cardiovascular diseases, which ultimately leads to CKD.[8] Controlling obesity with caloric restrictions, increasing physical activity, and carefully managing comorbid conditions can help prevent the development or worsening of CKD.[5]

Increase in BMI leads to:

- Increase in loss of protein in urine[5]
- Increase in risk of kidney stones[5]
- Increase in sodium retention in the body[6]

- Fall in eGFR[5]
- Low urine pH[5]

BMI: Body mass index; CKD: Chronic kidney disease; eGFR: Estimated glomerular filtration rate.

References: 1. Defining adult overweight & obesity. Available at: https://www.cdc.gov/obesity/basics/adult-defining.html. Accessed on: 26 August 2022. **2.** National dietary guidelines for healthy eating Brunei Darussalam. Available at: https://www.moh.gov.bn/Shared%20Documents/National%20Dietary%20Guideline%202020/NDG%20finalised%202020.pdf. Accessed on: 19 July 2022. **3.** Friedman AN, Kaplan AM, Le Roux CW, *et al.* Management of obesity in adults with CKD. *J Am Soc Nephrol.* 2021;32(4):777–790. **4.** Sharma I, Liao Y, Zheng X, *et al.* New pandemic: Obesity and associated nephropathy. *Front Med.* 2021;8:673556. **5.** Kovesdy CP, Furth SL, Zoccali C, *et al.* Obesity and kidney disease: Hidden consequences of the epidemic. *J Nephrol.* 2017;30(1):1–10. **6.** Yim HE, Yoo KH. Obesity and chronic kidney disease: Prevalence, mechanism, and management. *Clin Exp Pediatr.* 2021;64(10):511–518. **7.** Glomerular diseases. Available at: https://www.niddk.nih.gov/health-information/kidney-disease/glomerular-diseases. Accessed on: 13 July 2022. **8.** Than WH, Chan GCK, Ng JKC, *et al.* The role of obesity on chronic kidney disease development, progression, and cardiovascular complications. *Adv Biomark Sci Technol.* 2020;2:24–34.

WHY AND HOW SHOULD YOU MONITOR CKD?

It is important to monitor your CKD progression as some people can progress faster to kidney failure than others. Monitoring, therefore, allows aggressive treatment when necessary. Some of the reasons for the rapid progression are:[1]

- Diabetes
- High blood pressure
- High levels of albumin in urine (albuminuria)

Albuminura and GFR need to be monitored regularly to denote your CKD progression.[1]

When to monitor?

The frequency of CKD monitoring varies with your GFR and albuminuria as shown below:[2]

CKD stage (GFR in mL/min/1.73 m²)	Stage 1 (≥90)	Stage 2 (60–89)	Stage 3a (45–59)	Stage 3b (30–44)	Stage 4 (15–29)	Stage 5 (<15)
TESTING FREQUENCY						
Albuminuria (mg/g)						
Normal to mildly increased (<30)	Annually	Annually	Annually	Every 6 months	Every 3 months	3 months or more frequently
Moderately increased (30–300)	Annually	Annually	Every 6 months	Every 4 months	Every 4 months	3 months or more frequently
Severely increased (>300)	Every 6 months	Every 6 months	Every 4 months	Every 4 months	3 months or more frequently	3 months or more frequently

Other parameters to be monitored include:[2,3]

The frequency of monitoring may vary for each parameter.

- Blood pressure and blood sugar levels
- Protein in blood (proteinuria)
- Serum creatinine
- Heart conditions, if any
- Anemia and nutritional status
- Serum calcium, phosphate, and electrolyte balance

CKD: Chronic kidney disease; GFR: Glomerular filtration rate; mg/g: Milligram per gram.

References: **1.** Monitor chronic kidney disease progression. Available at: https://www.niddk.nih.gov/health-information/professionals/clinical-tools-patient-management/kidney-disease/identify-manage-patients/manage-ckd/monitor-progression. Accessed on: 13 July 2022. **2.** Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group. KDIGO clinical practice guideline for the evaluation and management of chronic kidney disease. *Kidney Int Suppl.* 2013;3:1–150. **3.** Qaseem A, Hopkins RH, Sweet DE, *et al.* Screening, monitoring, and treatment of stage 1 to 3 chronic kidney disease: A clinical practice guideline from the American College of Physicians. *Ann Intern Med.* 2013;159(12):835–847.

HOW SHOULD I CHOOSE MY RENAL REPLACEMENT THERAPY (RRT)?

Choosing dialysis modality

Understanding the RRT options that you choose and getting used to the idea that you need a particular treatment will take time. Be aware that each type of RRT has pros and cons and will have a significant impact on your daily life. You will have to understand what is best for you by asking a few questions to your nephrologist.[1]

All patients should consider transplant, but there is generally a lack of donor organs and a long waiting list for living donors.[1]

Here are some of the important points for consideration:

- Are you working and willing to continue work?[1]
- Do you want to travel for work or go on a vacation?[4]
- Do you have a caregiver? If not, are you able to perform self-care?[2]
- How does RRT affect your food and fluid restriction?[1]
- Do you prefer daily home dialysis (PD) or visit the dialysis center (HD) 2–3 times a week?[3]

HD: Hemodialysis; PD: Peritoneal dialysis; RRT: Renal replacement therapy.

Understand the benefits and drawbacks of each dialysis option

PERITONEAL DIALYSIS

- No need to visit a dialysis center frequently[4]
- Fewer diet and fluid intake restrictions[4]
- Continuous therapy; needs to be done daily[4]
- You can carry on with your normal routine[4]
- Can have PD during traveling[4]
- Blood pressure is less affected[5]

VS

HEMODIALYSIS

- Need to visit dialysis center 2–3 times per week[3]
- Strict restrictions on diet and fluid intake[4]
- You need to plan your days according to the hemodialysis sessions[4]
- You will have to arrange dialysis facilities while traveling[4]
- Fluctuation in blood pressure may limit therapy duration and fluid removal[5]

To learn more on peritoneal dialysis, **SCAN HERE**

To learn more on hemodialysis, **SCAN HERE**

Drawbacks of hemodialysis:

- Risk of fluid overload[6]
- Risk of infection at the AV fistula[7]
- Risk of thrombosis, aneurysm, and bleeding[7]
- Risk of bone weakness due to phosphate accumulation[8]
- Risk of cardiovascular events, such as heart failure[6]
- Impacts patients' and their families' social life in addition to their economic and psychological conditions[9]
- Risk of low hemoglobin (anemia)[10]

Obesity can impact PD outcomes

Obese patients on PD may have different outcomes compared to non-obese patients receiving PD, including:[11]

- Less dialysis clearance due to less efficient fluid removal
- Higher risk of infection
- Greater difficulties in daily care of catheter exit site
- Cather insertion site takes longer to heal
- Higher risk of kidney failure

To understand your suitability for PD, please consult your doctor.

AV: Arteriovenous; PD: Peritoneal dialysis.

References: 1. Choosing a treatment for kidney failure. Available at: https://www.niddk.nih.gov/health-information/kidney-disease/kidney-failure/choosing-treatment. Accessed on: 25 August 2022. **2.** Blake PG, Brown EA. Person-centered peritoneal dialysis prescription and the role of shared decision-making. *Perit Dial Int.* 2020;40(3):302–309. **3.** Lin X, Gu L, Zhu M, *et al.* Clinical outcome of twice-weekly hemodialysis patients with long-term dialysis vintage. *Kidney Blood Press Res.* 2018;43(4):1104–1112. **4.** Pros and cons-Dialysis. Available at: https://www.nhs.uk/conditions/dialysis/pros-cons/. Accessed on: 13 July 2022. **5.** Davies S, Lally F, Satchithananda D, *et al.* Extending the role of peritoneal dialysis: Can we win hearts and minds? *Nephrol Dial Transplant.* 2014;29:1648–1654. **6.** Loutradis C, Sarafidis PA, Ferro CJ, *et al.* Volume overload in hemodialysis: Diagnosis, cardiovascular consequences, and management. *Nephrol Dial Transplant.* 2021;36(12): 2182–2193. **7.** Marsh AM, Genova R, Buicko JL. Dialysis fistula. [Updated 2022 Jun 26]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022. Available at: https://www.ncbi.nlm.nih.gov/books/NBK559085/. Accessed on: 06 December 2022. **8.** Slouma M, Sahli H, Bahlous A, *et al.* Mineral bone disorder and osteoporosis in hemodialysis patients. *Adv Rheumatol.* 2020;60(1):15. **9.** Gerogianni S, Babatsikou F, Gerogianni G, *et al.* Social life of patients undergoing haemodialysis. *IJCS.* 2016;9(1):122–134. **10.** Karaboyas A, Morgenstern H, Waechter S, *et al.* Low hemoglobin at hemodialysis initiation: An international study of anemia management and mortality in the early dialysis period. *CKJ.* 2020;13(3):425–433. **11.** Obi Y, Streja E, Mehrotra R, *et al.* Impact of obesity on modality longevity, residual kidney function, peritonitis, and survival among incident peritoneal dialysis patients. *Am J Kidney Dis.* 2018;71(6):802–813.

LIVING WELL WITH CKD

Can you exercise while on dialysis?

Patients with CKD experience considerable muscle loss and weakness as a low GFR is associated with muscle impairment, which can lead to:[1]

01 Low physical activity

02 Slower walking and poor balancing abilities

03 Low energy and weight loss

04 Difficulty climbing stairs

05 Weak grip strength

06 Inability to move and do basic day-to-day activities

Special precautions while exercising Stop exercising if you develop excessive shortness of breath, chest pain, severe headache, or dizziness.

Patients on hemodialysis

Avoid excessive movements of the arm or leg that has dialysis access. You can exercise with this limb once the access site heals.[1]

Patients on PD

Rarely, some patients may experience abdominal discomfort due to contact between the dialysis catheter and abdomen. Keeping enough fluid in the peritoneum will allow the catheter to float.[1]

Patients prone to hypoglycemia

Check glucose levels before and after exercise. Keep snacks with high glycemic index handy.[1]

Patients with comorbidities

Specialized evaluation and treatment before starting an exercise training program must be done, especially if you have arrhythmia and uncontrolled high blood pressure.[1]

Some recommendations for exercising during PD:[2]

- Walking is safe and can be done as soon as possible after catheter insertion.
- Avoid intense activities, such as jumping, lifting 5–10 kg, and vacuuming, for at least 2–3 weeks after catheter insertion.
- Sports that require frequent bending, squatting, or lifting must be done after draining the PD fluid and under supervision.
- Core strengthening exercises are suggested to manage lower back pain.

Resistance exercises

Aerobic exercises

Mild exercises under supervision of a professional can help you improve or avoid your physical limitations.[1]

Flexibility exercises

Balance exercises

CKD: Chronic kidney disease; GFR: Glomerular filtration rate; PD: Peritoneal dialysis.

One may have to temporarily modify or cease their sporting activities if their PD fluid becomes pink or red-tinged and must be resumed only under the supervision of the doctor.[1]

Medications

Once you are diagnosed with CKD, your medications may change as you are susceptible to further kidney damage. Also, almost half of the medications are excreted by the kidneys and an impaired kidney means higher risk of toxicity. Here are a few things you can do:[3,4]

- Inform your doctor about all the medications that you consume on a regular basis.
- Avoid any traditional herbs or medications as they might worsen the kidney condition and lead to acidosis in some patients.
- Inform your doctor about any dietary supplements that you consume, including herbal supplements.
- Take medications as prescribed.
- Try to fill your prescription at the same pharmacy store so they can track your medications.

Counseling

CKD comes with its own share of emotional burden. Therefore, mental support is as important as medical and dietary support. You may want to seek counseling for the following aspects:[1,5]

Intimacy

Both men and women with CKD may experience some level of sexual changes due to the changes in the body, routine, and treatments. Do not let it get to your self-esteem or your relationship. Here are a few things you and your partner can do to maintain the intimacy between both of you:[6]

- Talk and understand each other's perspective.
- Consider other forms, such as caressing, cuddling, and massage.
- Intimacy can be resumed 4 weeks after transplantation.
- Sexual activity is safe for patients undergoing dialysis; consult your doctor to address your concern.

CKD: Chronic kidney disease.

References: 1. Roshanravan B, Gamboa J, Wilund K. Exercise and CKD: Skeletal muscle dysfunction and practical application of exercise to prevent and treat physical impairments in CKD. *Am J Kidney Dis.* 2017;69(6):837–852. **2.** Bennett PN, Bohm C, Harasemiw O, *et al.* Physical activity and exercise in peritoneal dialysis: International Society for Peritoneal Dialysis and the Global Renal Exercise Network practice recommendations. *Perit Dial Int.* 2022;42(1):8–24. **3.** Whittaker CF, Miklich MA, Patel RS, *et al.* Medication safety principles and practice in CKD. *Clin J Am Soc Nephrol.* 2018;13(11):1738–1746. **4.** Managing chronic kidney disease. Available at: https://www.niddk.nih.gov/health-information/kidney-disease/chronic-kidney-disease-ckd/managing#four. Accessed on: 23 June 2022. **5.** Watson AR. Psychosocial support for children and families requiring renal replacement therapy. *Pediatr Nephrol.* 2014;29:1169–1174. **6.** Maintaining a healthy sex life. Renal Resource Centre, 2010. Available at: https://kidney.org.au/resources/booklets/maintaining-a-healthy-sex-life-info-for-people-with-chronic-kidney-disease-booklet. Accessed on: 24 June 2022.

RENAL DIET TIPS

Controlling portion size

For maintaining a healthy weight, portion size is as important as your choice of food. So, the serving size on the food label can be different from what you should be eating. And this depends on the:[1]

- Age and gender
- Current weight and height
- Metabolism
- Level of physical activity a person has

For patients with CKD, it is important to follow dietary restrictions to prevent CKD progression, which requires one to identify a kidney-friendly diet such that adequate nutrition is maintained. Following are the portion sizes, dietary recommendations, and modifications required for an individual with CKD:[2]

How to plan a kidney-friendly meal?

Portion sizes of low-potassium fruits[2]

<200 mg per small fruit or ½ a cup of fresh or one whole small fruit

Portion sizes of low-potassium vegetables[2]

<200 mg per cup of leafy greens or ½ a cup of vegetables fresh or cooked

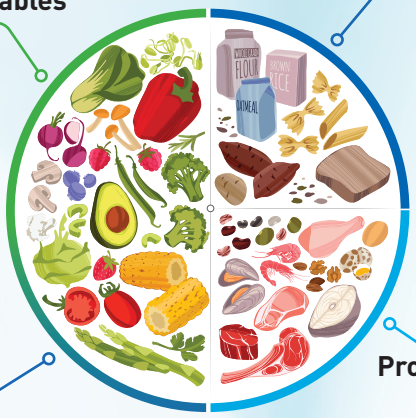
Fruits and vegetables

Grains

Avoid foods with phosphorus additives[2]

Portion sizes[2]

1 serving: ½ a cup of cooked rice/noodles or 1 slice of bread



Balance of minerals is important in CKD patients.[2]

Proteins

At least 50% of your protein needs to be from animal sources, such as meat, eggs, milk, cheese, and yogurt.[2]

Portion sizes[2]

- 1 serving: 2–3 ounces of cooked meat or ½ a cup of beans or ¼ cup of nuts

Requirements[2]

- Average person: 40–65 g
- CKD patient (not on hemodialysis): 0.6–0.8 g/kg

Dairy

- 1 serving: ½ a cup of milk/yogurt or 1 handful of cheese
- Reduce intake of high-fat milk, cheese, and yogurt to balance phosphorus levels[2]
- Consider milk alternatives[2]

Tips:[1,2]

- Keep a track of how much you eat.
- Eat food on a plate instead of straight out of the box or bag.
- Avoid eating in front of the TV or while busy.
- Focus while eating food and enjoy the flavors.
- Eat slowly and at regular times.
- Use smaller dishes, bowls, and glasses.
- Look for nutritional information.

CKD: Chronic kidney disease.

Reading a nutrition label

Due to wide variations in nutrient needs for CKD, it is always a good idea to read the nutrition label to make quick, informed food decisions for choosing a healthy diet and controlling the portion size. This is how you can read a nutrition label completely:[3,4]

Serving information

Calories

Measure how much energy you get from this food. One serving has 250 calories, and if you eat an entire container, it will be 250x6, which is 1500 calories.

Nutrients

Eat less of saturated fat, sodium, and added sugars; and more of fibers, vitamins, iron, and calcium.

Nutrition Facts

6 servings per container
Serving size **1 cup (230 g)**

Amount per serving
Calories **250**

	% Daily Value*
Total Fat 12 g	**14%**
Saturated Fat 2 g	**10%**
Trans Fat 0 g	
Cholesterol 8 mg	**3%**
Sodium 210 mg	**9%**
Total Carbohydrate 34 g	**12%**
Dietary Fiber 7 g	**25%**
Total Sugars 5 g	
Includes 4 g Added Sugars	**8%**
Protein 11 g	
Vitamin D 4 mcg	20%
Calcium 210 mg	16%
Iron 4 mg	22%
Potassium 380 mg	8%

*The % daily value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2000 calories a day is used for general nutrition advice.

Quick guide to percent daily value

- 5% or less is low in nutrients
- 20% or more is high in nutrients

Shows how much a nutrient in a serving of a food contributes to a total daily diet

This means that the product has 4 grams of added sugars and 1 gram of natural sugars.

Kidney-friendly tips while reading a nutrition label[4]

Sodium

- 10% or less daily value or ⩽240 mg per serving
- Rinse canned products to reduce the sodium content.

Potassium

- 6% or less daily value or ≤200 mg per serving
- If it is not mentioned on the label, check for potassium chloride in the ingredients list.

Phosphorus

- 15% or less daily value or ≤150 mg per serving
- If it is not mentioned on the label, check for words that contain the letters 'phos', such as magnesium phosphate, calcium phosphate, and ferric pyrophosphate.

Keep in mind that if it is not listed, that **does not** mean that potassium and phosphorus are not present in the food product.[4]

Know your nuts[5]

Nuts have various health benefits, but they also contain high phosphorus and potassium content, which is often restricted in advanced CKD to avoid retention of high phosphorus and potassium levels in the blood. Here are a few commonly consumed nuts and their potassium and phosphorus content for your reference:

A serving of 1 oz or 28 g of	Phosphorus (mg)	Potassium (mg)
Almonds	135	205
Cashews	166	185
Hazelnuts	81	190
Peanuts	105	197
Walnuts	97	123
Pistachios	137	287

Always consult your dietitian or nutritionist before making any modifications in your diet.

CKD: Chronic kidney disease.

References: **1.** Food portions: Choosing just enough for you. Available at: https://www.niddk.nih.gov/health-information/weight-management/just-enough-food-portions. Accessed on: 21 June 2022. **2.** Ladsten T, Sarakatsannis Z. Your guide to create a balanced kidney-friendly meal. *J Ren Nutr.* 2019;29(4):e9–e11. **3.** How to understand and use the nutrition facts label? Available at: https://www.fda.gov/food/new-nutrition-facts-label/how-understand-and-use-nutrition-facts-label. Accessed on: 21 June 2022. **4.** Hill LJ, Herald AJ. Kidney-friendly label reading for chronic kidney disease shoppers. *J Ren Nutr.* 2018;28(1):e1–e4. **5.** Narasaki Y, Rhee CM, Kalantar-Zadeh K. Going nuts to protect kidneys and to live longer with kidney disease. *Am J Nephrol.* 2022;53:423–426.

BUSTING THE MYTHS ON PD

Although PD is commonly practiced, there remain some misconceptions that surround its concept. Let us debunk some of the common myths about PD:

MYTHS	FACTS
MYTH #1 If you have had any abdominal surgery, you cannot undergo PD.[1]	**FACT #1** Appendix and hernia surgeries do not affect outcomes of PD.[2,3] However, patients with intra-abdominal adhesion will not be suitable candidates for PD.[4] Patients with cardiothoracic surgery can be effectively managed with PD.[5]
MYTH #2 If you are obese, PD is not for you as there will be a risk of omentum wrap (fat deposits), inadequate clearance, and low chances of survival.[1,3]	**FACT #2** Irrespective of the weight, the chances of survival are similar with PD, and it can be performed effectively.[3]
MYTH #3 If you opt for PD, you are at a higher risk of infections than HD.[6]	**FACT #3** Peritonitis is common but can be managed with proper care. With HD, you are at a higher risk of sepsis, which can be fatal.[6]

DID YOU KNOW?

Chronic kidney disease can lead to altered mental function, ranging from mild memory issues to dementia, a disorder affecting a person's thinking and social abilities.[7]

This risk is

2X

higher in patients with CKD.[7]

CKD: Chronic kidney disease; HD: Hemodialysis; PD: Peritoneal dialysis.

References: 1. Lee MB, Bargan JM. Myths in peritoneal dialysis. *Curr Opin Nephrol Hypertens.* 2016;25(6):602–608. **2.** Balda S, Power A, Papalois V, *et al.* Impact of hernias on peritoneal dialysis technique survival and residual renal function. *Perit Dial Int.* 2013;33(6):629–634. **3.** Haggerty S, Roth S, Walsh D, *et al.* Guidelines for laparoscopic peritoneal dialysis access surgery. *Surg Endosc.* 2014;28(11):3016–3045. **4.** Cheng BC, Tsai NW, Lai YR, *et al.* Impact of intra-abdominal adhesion on dialysis outcome in peritoneal dialysis patients. *Biomed Res Int.* 2018;2018:1978765. **5.** Teitelbaum I. Peritoneal dialysis after cardiothoracic surgery: Do It! *Perit Dial Int.* 2012;32(2):131–133. **6.** Bernardini J. Peritoneal dialysis: Myths, barriers, and achieving optimum outcomes. *Nephrol Nurs J.* 2004;31(5):494–498. **7.** Hobson P, Kumwenda M, Shrikanth S, *et al.* Risk and incidence of cognitive impairment in patients with chronic kidney disease and diabetes: The results from a longitudinal study in a community cohort of patients and an age and gender-matched control cohort in North Wales, UK. *BMJ Open.* 2022;12(3):e053008.

TEAM KIDNEY

It is quiz time! While your kidneys are trying to keep up with your body's demands, let us try and find kidney-friendly fruits, vegetables, and sources of proteins and carbohydrates by searching for the right words.

N	S	L	S	P	P	A	S	T	A	S	O	L	C
B	L	E	W	S	B	S	U	E	U	R	E	T	A
P	E	G	T	I	E	P	L	U	M	S	G	F	U
S	G	G	A	L	E	S	E	B	R	R	R	A	L
C	A	S	P	S	I	U	R	E	G	U	G	L	I
A	B	P	C	R	W	P	G	R	A	P	E	S	F
R	A	T	W	H	A	P	R	R	S	T	R	E	L
R	L	G	L	L	E	Y	S	I	R	U	P	G	O
O	P	R	E	B	R	R	E	E	R	R	P	G	W
T	F	A	R	T	O	F	R	S	N	N	W	P	E
S	A	I	L	R	O	S	S	I	P	I	E	L	R
Y	S	U	S	T	E	C	R	N	E	P	A	A	A
C	O	R	G	H	A	R	R	M	T	S	A	N	P
P	L	S	R	E	O	N	O	N	T	E	A	T	Y

Answer key:
Apples, berries, cherries, plums, grapes, carrots, cauliflower, eggplant, turnips, poultry, fish, eggs, pasta.

CKD: Chronic kidney disease.

Reference: Diabetes and kidney disease: What to eat?
Available at: https://www.cdc.gov/diabetes/managing/eat-well/what-to-eat.html. Accessed on: 19 July 2022.

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