

BRIEF REPORT

Instructions for kidney recipients and donors (In English for medical providers and in Arabic for patients and donors)

Ziad Arabi, Basmeh Ghalib, Ibrahim Asmari, Mohammed Gafar, Syed Alam, Mohamad Abdulgadir, Ala AlShareef, Awatif Rashidi, Mohammed Alruwaymi, Abdulrahman Altheaby

Adult Transplant Nephrology, The Organ Transplant Center at King Abdulaziz Medical City, King Abdullah International Medical Research Center, King Saud Bin Abdulaziz University for Health Sciences, Riyadh, Kingdom of Saudi Arabia

Access this article online

Website: www.avicennajmed.com

DOI: 10.4103/ajm.ajm_120_19

Quick Response Code:



ABSTRACT

Medical providers are often asked by their kidney recipients and donors about what to do or to avoid. Common questions include medications, diet, isolation, return to work or school, pregnancy, fasting Ramadan, or hajj and *Omrah*. However, there is only scant information about these in English language and none in Arabic. Here, we present evidence-based education materials for medical providers (in English language) and for patients and donors (in Arabic language). These educational materials are prepared to be easy to print or adopt by patients, providers, and centers.

Key words: Arabic, education, instructions, kidney donors, kidney recipients, lifestyle, Muslim

INSTRUCTIONS FOR KIDNEY GRAFT RECIPIENTS (PROVIDERS' INFORMATION)

1. Medications:

- Immunosuppression medications:
 - These medications are to protect against rejection of the transplanted kidney.
 - These medications include tacrolimus (Prograf or FK) and mycophenolate mofetil (MMF) (CellCept) and prednisolone.
 - These medications are to be maintained for the life of the graft.
 - Stopping these medications will lead to rejection and possibly loss of the graft.
 - These medications must be taken at the exact time prescribed by your doctor.
- Prophylactic antimicrobial medications:
 - These medications are to decrease the risk of opportunistic viral, bacterial, and fungal infections.

- These medications include valganciclovir (Valgan), nystatin, and Bactrim.^[1,2]

2. Medication side effects:

Tacrolimus (Prograf or FK) may cause diabetes, hypertension, alopecia, tremor, and renal insufficiency. MMF (CellCept) may cause low white blood count. Prednisolone may cause high blood sugar.^[1-3]

3. Clinic follow-up and laboratory testing:

- You need to keep your appointments for clinic visits and laboratory testing.
- Do not take tacrolimus (Prograf or FK) in the morning of your labs but take it right away after the blood draw.
- Remember to have an appointment for the stent removal, which is typically removed by urologist in

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

Cite this article as: Arabi Z, Ghalib B, Asmari I, Gafar M, Alam S, Abdulgadir M, et al. Instructions for kidney recipients and donors (In English for medical providers and in Arabic for patients and donors). Avicenna J Med 2020;10:41-53.

Address for correspondence: Dr. Ziad Arabi,
Adult Transplant Nephrology, King Abdul-Aziz Medical City (KAMC),
Riyadh, Kingdom of Saudi Arabia.
E-mail: arabizi@ngha.med.sa

- 1–2 months after transplant. Stent removal does not require overnight stay nor general anesthesia.
- Remember that staples are typically removed 3 weeks after the surgery.
4. Potential complications of renal transplant include rejection, infections, internal urine leak from ureter, renal artery stenosis, ureteric stricture, diabetes, tremor, recurrence of the original disease, bone disease, or cancer such as lymphoma.
5. Diet: Renal transplant recipients frequently encounter significant weight gain after transplantation. To prevent gaining weight after transplantation, you are strongly advised to balance the calorie intake with especial attention to the amount of carbohydrates consumed. You are advised also to drink enough fluid (2–3 L/day) but excessive fluid intake is not needed.^[1,4–13] Low salt diet is advised in most of the patients. Magnesium- and phosphorous-rich diet are often recommended. Potassium restriction is not required in most of the patients.
- Examples of magnesium-rich food: dark leafy greens, seeds, beans, fish, whole grains, nuts, dark chocolate, yogurt, and bananas.
- Examples of phosphorous-rich food: protein-rich foods such as meats, poultry, fish, nuts, beans, and dairy products. Some bottled beverages may also have high content of phosphate additives.
- Examples of potassium-rich food: leafy greens, potato, dates, banana, tomato, orange juice, and cardamom.
6. Exercise and sports:
- Exercise is associated with improved quality of life and patients are encouraged to follow regular exercise program.^[14]
 - Walking is encouraged in the immediate postsurgical period.
 - Noncompetitive sports (such as cycling and jogging) can be resumed once the surgical pain resolves (after 1–2 months).
 - Competitive sports (such as boxing and karate) should be avoided because of risk of direct trauma to the kidney.
 - Driving can be resumed once the surgical pain resolves (after 1–2 months).
7. Work/school: Most of the renal transplant recipients will be able to go back to school/work in 2–3 months. Strenuous activity and exposure to the hot weather should be avoided.^[1,15–19]
8. Isolation: You should avoid contact with sick. You should wash hands frequently and not share personal items with family. You are also advised to avoid crowded area; however, strict isolation in a single room is usually not necessary as it can lead to social isolation and depression.^[1,15–19]
9. Fasting during Ramadan: Fasting Ramadan does not adversely affect kidney function as shown by several small studies. In these conditions, fasting might be allowed after the first 1–2 years. Special care might be given to the timing of medications and drug levels. You may try initially to fast every other day then advance as tolerated. You must break your fast if you feel exhausted or dehydrated. You must consult with your nephrologist before attempting to fast.^[1,20–35]
10. Fasting of renal transplant patients with diabetes: In addition to the previously mentioned precautions, patients with diabetes on medications or insulin need to adjust their medications or insulin requirement, monitor their blood sugar closely, and never miss *Suhour*. Patients must consult with their provider before attempting to fast. Fasting by patients with renal transplant having type 1 diabetes mellitus is trickier and requires consultation from endocrinologist.^[1,36–41]
11. *Omrah*: Owing to the risk of upper respiratory infection (URI), it is recommended to postpone *Omrah* for at least 6–12 months after renal transplant. *Omrah* during peak hours is not recommended. Extra precautions should be taken against airborne and foodborne infections.^[1,42–46]
12. Hajj: Owing to the very high risk of URI, it is recommended to perform hajj before renal transplant. For those who have never performed the obligatory hajj, it is recommended to delay hajj at least 1-year posttransplant. Patients are to weigh their potential risks. Frail or elderly on immunosuppressants might be excused from hajj.^[1,43–47]
13. Marital relations: In 2–3 months after transplant, most of the patients can resume marital relations once the surgical incision is healed and the urinary stent is removed.^[1]
14. Fertility in male renal transplant recipients: Fertility improves after kidney transplantation in many patients. Certain medications should be avoided. For example, sirolimus (Mammalian target of rapamycin (mTOR) inhibitors) can affect sperm genesis and fertility. Patients are advised to consult with their doctor.^[1,47–53]
15. Pregnancy after kidney transplant:
- Women of childbearing age should be alerted that fertility may improve after kidney transplantation.
 - Oral contraceptive pills can be used as a contraceptive method after an appropriate medical consultation.
 - The intrauterine devices are generally discouraged because of increased risk of infection with immunosuppressants.

- Pregnancy after renal transplant can negatively affect both the transplanted kidney and the fetus (low birth weight and preterm delivery).
 - Women should wait for at least 1–2 years before attempting pregnancy, renal function must be stable and without significant proteinuria nor a recent rejection.
 - Many posttransplant women who already have children before transplant may prefer not to have any further children over risking the fetus and the transplanted kidney.
 - Pregnant transplant recipient should be followed up by obstetrician experienced in high-risk pregnancies.
 - With close medical follow-up, most of the pregnancies after renal transplantation have successful outcome.
 - Some medications can negatively affect the fetus:
 - MMF is teratogenic and should be stopped or replaced with azathioprine before pregnancy is attempted (allow 12 weeks window before contemplating pregnancy after switching from MMF to AZA).
 - mTORi should be discontinued before pregnancy is attempted.
 - Angiotensin converting enzyme inhibitors (ACE) / angiotensin-receptor blockers (ARBs) should be discontinued or replaced with other class of medication during pregnancy.
 - Calcineurin inhibitor, prednisone, and AZA are generally safe during pregnancy.
 - Delivery in transplanted patient can be through vaginal route if there is no indication for cesarian section.^[1,54-68]
16. Vaccinations: Yearly vaccination against flu (inactive) is highly recommended. Pneumonia vaccination is also recommended.
17. Signs and symptoms of rejection: There are no specific signs or symptoms for rejection in most of the cases. Blood tests are the only ways to find out. Patients are strongly advised to adhere to their medications and their routinely scheduled laboratory tests. In early stages decreased urine output, fever, vomiting, pain at the site of the graft or lassitude can appear in late stages.
18. You must report to the emergency room in case of fever, decreased amount of urine, vomiting, inability to take medications, or not feeling well in general [Tables 1 and 2].

INSTRUCTIONS FOR KIDNEY DONORS (PROVIDERS' INFORMATION)

1. Work: You can return to work once the surgical pain resolves (after 1–2 months). Please consult with your surgeon.

2. Donors should avoid heavy lifting.
3. Sport:
 - Walking is encouraged immediately after surgery.
 - Noncompetitive sports (walking and cycling) can be resumed once the surgical pain resolves (after 1–2 months).
 - Competitive sports such as boxing and karate should be avoided.
 - Please consult with your surgeon for further instructions.
4. Driving can be resumed once the surgical pain resolves (after 1–2 months).
5. Medications:
 - Acetaminophen is considered as a safe painkiller that can be used after kidney donation.
 - Frequent use of nonsteroidal anti-inflammatory drugs is discouraged but sporadic use is likely to be safe in most of the donors.
 - Please alert your doctor if you are undergoing imaging with intravenous contrast (even though oral contrast is mostly okay if clinically needed).
6. Fasting:
 - Most of the donors can enjoy fasting once their renal functions stabilize (2–3 months after kidney donation).
 - Donors might initially try to fast every other day and then progress to daily fasting.
 - Donors must break their fast if they are exhausted or dehydrated.
 - Donors should not miss *Suhour* and should have enough fluid intake after iftar [Tables 3 and 4].^[1,69,70]

Disclaimer: This educational material was designed to aid the renal transplant team to provide written educational material to their renal transplant recipients. This document should not be construed as dictating exclusive courses of recommendations. Patients are advised to consult with their health providers for more specific advice. Variations from these educational materials may be warranted in actual practice based on individual patient characteristics and clinical judgment in unique care circumstances.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Arabi Z, Altheaby A, Elhassan A, Abdalla M, Farooqui M, Mateen A, et al. Multinational survey of the advice given to Muslim kidney graft

- recipients by Muslim nephrologists about lifestyle and religious rituals with potential medical risk. *Saudi J Kidney Disease Transplant* (In Press).
2. Lexicomp I. Tacrolimus (systemic): Drug information. Available from: <https://wwwuptodatecom/contents/tacrolimus-systemic-drug-information?source=autocomplete&index=1~4&search=Tacolim>. [Last accessed on Jan 17 2018].
 3. Lexicomp I. Mycophenolate mofetil (CellCept) and mycophenolate sodium (Myfortic): Patient drug information. Available from: https://wwwuptodatecom/contents/mycophenolate-mofetil-cellcept-and-mycophenolate-sodium-myfortic-patient-drug-information?search=mycophenolate%20patient%20info&source=panel_search_result&selectedTitle=1~148&use_type=panel&kp_tab=drug_patient&display_rank=1. 2018. [Last accessed on Jan 15 2018].
 4. Choi HY, Park HC, Ha SK. High water intake and progression of chronic kidney diseases. *Electrolyte Blood Press* 2015;13:46-51.
 5. Clark WF, Sontrop JM, Macnab JJ, Suri RS, Moist L, Salvadori M, et al. Urine volume and change in estimated GFR in a community-based cohort study. *Clin J Am Soc Nephrol* 2011;6:2634-41.
 6. Strippoli GF, Craig JC, Rochtchina E, Flood VM, Wang JJ, Mitchell P. Fluid and nutrient intake and risk of chronic kidney disease. *Nephrology (Carlton)* 2011;16:326-34.
 7. Sontrop JM, Dixon SN, Garg AX, Buendia-Jimenez I, Dohein O, Huang SH, et al. Association between water intake, chronic kidney disease, and cardiovascular disease: A cross-sectional analysis of NHANES data. *Am J Nephrol* 2013;37:434-42.
 8. Hebert LA, Greene T, Levey A, Falkenhain ME, Klahr S. High urine volume and low urine osmolality are risk factors for faster progression of renal disease. *Am J Kidney Dis* 2003;41:962-71.
 9. Clark WF, Sontrop JM, Huang SH, Gallo K, Moist L, House AA, et al. Effect of coaching to increase water intake on kidney function decline in adults with chronic kidney disease: The Ckd Wit randomized clinical trial. *JAMA* 2018;319:1870-9.
 10. Magpantay L, Ziai F, Oberbauer R, Haas M. The effect of fluid intake on chronic kidney transplant failure: A pilot study. *J Ren Nutr* 2011;21:499-505.
 11. Gordon EJ, Prohaska TR, Gallant MP, Sehgal AR, Strogatz D, Yucel R, et al. Longitudinal analysis of physical activity, fluid intake, and graft function among kidney transplant recipients. *Transpl Int* 2009;22:990-8.
 12. Weber M, Berglund D, Reule S, Jackson S, Matas AJ, Ibrahim HN. Daily fluid intake and outcomes in kidney recipients: Post hoc analysis from the randomized ABCAN trial. *Clin Transplant* 2015;29:261-7.
 13. Musso CG, Castañeda A, Giordani M, Mombelli C, Groppa S, Imperiali N, et al. Hyponatremia in kidney transplant patients: Its pathophysiologic mechanisms. *Clin Kidney J* 2018;11:581-5.
 14. Oguchi H, Tsujita M, Yazawa M, Kawaguchi T, Hoshino J, Kohzuki M, et al. The efficacy of exercise training in kidney transplant recipients: A meta-analysis and systematic review. *Clin Exp Nephrol* 2019;23:275-84.
 15. (NKF) NKF. 2012. After kidney transplant, do patients require complete isolation for 3 months? Available from: <https://www.kidney.org/blog/ask-doctor/after-kidney-transplant-do-patients-require-complete-isolation-3-months>. [Last accessed on 2018 Dec 25].
 16. (NKF) NKF. Care after kidney transplant. Available from: <https://www.kidney.org/atoz/content/immunosuppression>. [Last accessed on 2018 Dec 25].
 17. CENTER CUIM. Resuming life after kidney transplantation. Available from: <https://columbiasurgery.org/kidney-transplant/resuming-life-after-kidney-transplantation>. [Last accessed on 2018 Dec 25].
 18. Center UoKM. Recovery after transplant surgery. Available from: <https://iytmed.com/recovery-after-transplant-surgery/>. [Last accessed on 2018 Dec 25].
 19. UK GaSTN. Your guide to kidney transplantation. Available from: <https://www.guysandstthomas.nhs.uk/resources/patient-information/> kidney/kidney-transplantation-guide.pdf. [Last accessed on Dec 3 2019].
 20. Matter Y, Sheashaa H, Refaei A. Effect of Ramadan fasting on patients with different kidney diseases: An updated review. *2018;18:1-5*.
 21. Qurashi S, Tamimi A, Jaradat M, Al Sayyari A. Effect of fasting for Ramadan on kidney graft function during the hottest month of the year (August) in Riyadh, Saudi Arabia. *Exp Clin Transplant* 2012;10:551-3.
 22. Ibrahim IA, Hassan EA, Alkhan AM, Hussein MA, Alhabashi AF, Ali TZ, et al. Ramadan fasting in kidney transplant recipients: A single-centre retrospective study. *J Transplant* 2018;2018:4890978.
 23. Abdalla AH, Shaheen FA, Rassoul Z, Owda AK, Popovich WF, Mousa DH, et al. Effect of Ramadan fasting on Moslem kidney transplant recipients. *Am J Nephrol* 1998;18:101-4.
 24. Hejaili F, Qurashi S, Binsalih S, Jaradat M, Al Sayyari A. Effect of repeated Ramadan fasting in the hottest months of the year on renal graft function. *Nephrourol Mon* 2014;6:e14362.
 25. Ghalib M, Qureshi J, Tamim H, Ghamsi G, Flaiw A, Hejaili F, et al. Does repeated Ramadan fasting adversely affect kidney function in renal transplant patients? *Transplantation* 2008;85:141-4.
 26. Ekinci I, Erkoc R, Gursu M, Dogan EE, Kilic E, Cebeci E, et al. Effects of fasting during the month of Ramadan on renal function in patients with autosomal dominant polycystic kidney disease. *Clin Nephrol* 2018;89:103-12.
 27. Hassan S, Hassan F, Abbas N, Hassan K, Khatib N, Edgim R, et al. Does Ramadan fasting affect hydration status and kidney function in CKD patients? *Ann Nutr Metab* 2018;72:241-7.
 28. Kara E, Sahin OZ, Kizilkaya B, Ozturk B, Pusuroglu G, Yildirim S, et al. Fasting in Ramadan is not associated with deterioration of chronic kidney disease: A prospective observational study. *Saudi J Kidney Dis Transpl* 2017;28:68-75.
 29. Bragazzi NL. Ramadan fasting and chronic kidney disease: Does estimated glomerular filtration rate change after and before Ramadan? Insights from a mini meta-analysis. *Int J Nephrol Renovasc Dis* 2015;8:53-7.
 30. Mbarki H, Tazi N, Najdi A, Tachfouti N, Arrayhani M, Sqalli T. Effects of fasting during Ramadan on renal function of patients with chronic kidney disease. *Saudi J Kidney Dis Transpl* 2015;26:320-4.
 31. Bakhit AA, Kurdi AM, Wadera JJ, Alsuaaida AO. Effects of Ramadan fasting on moderate to severe chronic kidney disease. A prospective observational study. *Saudi Med J* 2017;38:48-52.
 32. NasrAllah MM, Osman NA. Fasting during the month of Ramadan among patients with chronic kidney disease: Renal and cardiovascular outcomes. *Clin Kidney J* 2014;7:348-53.
 33. Cevik Y, Corbacioglu SK, Cikrikci G, Oncul V, Emektar E. The effects of Ramadan fasting on the number of renal colic visits to the emergency department. *Pak J Med Sci* 2016;32:18-21.
 34. Al Mahayni AO, Alkhateeb SS, Abusaq IH, Al Mufarrih AA, Jaafari MI, Bawazir AA. Does fasting in Ramadan increase the risk of developing urinary stones? *Saudi Med J* 2018;39:481-6.
 35. Imtiaz S, Salman B, Dhrolia MF, Nasir K, Abbas HN, Ahmad A. Clinical and biochemical parameters of hemodialysis patients before and during Islamic month of Ramadan. *Iran J Kidney Dis* 2016;10:75-8.
 36. Salti I, Bénard E, Detournay B, Bianchi-Biscay M, Le Brigand C, Voinet C, et al.; EPIDIAR Study Group. A population-based study of diabetes and its characteristics during the fasting month of Ramadan in 13 countries: Results of the epidemiology of diabetes and Ramadan 1422/2001 (EPIDIAR) study. *Diabetes Care* 2004;27:2306-11.
 37. Aziz KM. Effect of fasting Ramadan in diabetes control status—Application of extensive diabetes education, serum creatinine with HbA1c statistical ANOVA and regression models to prevent hypoglycemia. *Recent Pat Endocr Metab Immune Drug Discov* 2013;7:233-51.
 38. Alawadi F, R, Bashier A, Abdelgadir E, Al Saeed M, Abualkheir S, et al. The impact of Ramadan fasting on glycemic control and kidney

- function in patients with diabetes and chronic kidney disease stage 3. 2017.
39. Diabetes UK. Available from: <https://www.diabetes.org.uk/guide-to-diabetes/managing-your-diabetes/ramadan>. [Last accessed on Dec 11 2018].
 40. Society AD. Available from: <https://diabetessocietycomau/documents/DARHCPLeaflet-Copy.pdf>. [Last accessed on Jan 15 2018].
 41. Hassanein M, Al-Arouj M, Hamdy O, Bebakar WMW, Jabbar A, Al-Madani A, et al.; International Diabetes Federation (IDF), in Collaboration with the Diabetes and Ramadan (DAR) International Alliance. Diabetes and Ramadan: Practical guidelines. *Diabetes Res Clin Pract* 2017;126:303-16.
 42. Alzeer AH. Respiratory tract infection during Hajj. *Ann Thorac Med* 2009;4:50-3.
 43. Rashid H, Shafi S, Haworth E, El Bashir H, Memish ZA, Sudhanva M, et al. Viral respiratory infections at the Hajj: Comparison between UK and Saudi pilgrims. *Clin Microbiol Infect* 2008;14:569-74.
 44. health.govt.nz. Travelling for Hajj or Umrah. 2018. Available from: <https://www.health.govt.nz/your-health/healthy-living/travelling/travelling-hajj-or-umrah>. [Last accessed on Dec 3 2019].
 45. Patel RR, Liang SY, Koolwal P, Kuhlmann FM. Travel advice for the immunocompromised traveler: Prophylaxis, vaccination, and other preventive measures. *Ther Clin Risk Manag* 2015;11:217-28.
 46. Kotton CN, Hibberd PL; AST Infectious Diseases Community of Practice. Travel medicine and transplant tourism in solid organ transplantation. *Am J Transplant* 2013;13:337-47.
 47. Kidney Disease: Improving Global Outcomes (KDIGO) Transplant Work Group. *Am J Transplant*. 2009;9:S1-155.
 48. Highlights of prescribing information of CellCept. 2018. Available from: https://www.gene.com/download/pdf/cellcept_prescribing.pdf. [Last accessed on Dec 3 2019].
 49. CellCept. CellCept [package insert]. San Francisco, CA: Genentech USA; 2012. Available from: <https://www.gene.com/medical-professionals/medicines/cellcept>. Last accessed on Dec 3 2019].
 50. Kim M, Rostas S, Gabardi S. Mycophenolate fetal toxicity and risk evaluation and mitigation strategies. *Am J Transplant* 2013;13:1383-9.
 51. Jones A, Clary MJ, McDermott E, Coscia LA, Constantinescu S, Moritz MJ, et al. Outcomes of pregnancies fathered by solid-organ transplant recipients exposed to mycophenolic acid products. *Prog Transplant* 2013;23:153-7.
 52. Midtvedt K, Bergan S, Reisæter A, Vikse B, Asberg A. Exposure to mycophenolate and fatherhood. *Transplantation*. 2017;101:e214-e217.
 53. Morlidge MHGLCAC. Recommendations for men taking mycophenolate derivatives and pregnancy following MHRA recommendations. 2016. Available from: <https://renal.org/wp-content/uploads/2017/06/mycophenolate-and-fathers-to-be-letter-may-2016da90a131181561659443ff000014d4d8.pdf>. [Last accessed on Dec 3 2019].
 54. Chittka D, Hutchinson JA. Pregnancy after renal transplantation. *Transplantation* 2017;101:675-8.
 55. Shah S, Verma P. Overview of pregnancy in renal transplant patients. *Int J Nephrol* 2016;2016:4539342.
 56. McKay DB, Josephson MA, Armenti VT, August P, Coscia LA, Davis CL, et al.; Women's Health Committee of the American Society of Transplantation. Reproduction and transplantation: Report on the AST consensus conference on reproductive issues and transplantation. *Am J Transplant* 2005;5:1592-9.
 57. McKay DB, Josephson MA. Pregnancy after kidney transplantation. *Clin J Am Soc Nephrol* 2008;3:S117-25.
 58. Deshpande NA, James NT, Kucirk LM, Boyarsky BJ, Garonzik-Wang JM, Montgomery RA, et al. Pregnancy outcomes in kidney transplant recipients: A systematic review and meta-analysis. *Am J Transplant* 2011;11:2388-404.
 59. Al-Khadar AA, Al-Ghamdi, Basri N, Shaheen F, Hejaili, Flaiw, et al. Pregnancies in renal transplant recipients—With a focus on the maternal issues. *Ann Transplant* 2004;9:62-4.
 60. Al-Khadar AA, Basri N, Al-Ghamdi, Shaheen, Hejaili, Flaiw, et al. Pregnancies in renal transplant recipients—With a focus on babies. *Ann Transplant* 2004;9:65-7.
 61. Al Duraihim H, Ghamdi G, Moussa D, Shaheen F, Mohsen N, Sharma U, et al. Outcome of 234 pregnancies in 140 renal transplant recipients from five middle eastern countries. *Transplantation* 2008;85:840-3.
 62. Rose C, Gill J, Zalunardo N, Johnston O, Mehrotra A, Gill JS. Timing of pregnancy after kidney transplantation and risk of allograft failure. *Am J Transplant* 2016;16:2360-7.
 63. EBPG Expert Group on Renal Transplantation. European best practice guidelines for renal transplantation. Section IV: Long-term management of the transplant recipient. *Nephrology, Dialysis, Transplant* 2002;17:1-67.
 64. Imbasciati E, Gregorini G, Cabiddu G, Gammaro L, Ambroso G, Del Giudice A, et al. Pregnancy in CKD stages 3 to 5: Fetal and maternal outcomes. *Am J Kidney Dis* 2007;49:753-62.
 65. Bramham K, Nelson-Piercy C, Gao H, Pierce M, Bush N, Spark P, et al. Pregnancy in renal transplant recipients: A UK national cohort study. *Clin J Am Soc Nephrol* 2013;8:290-8.
 66. Kasiske BL, Zeier MG, Chapman JR, Craig JC, Ekberg H, Garvey CA, et al.; Kidney Disease: Improving Global Outcomes. KDIGO clinical practice guideline for the care of kidney transplant recipients: A summary. *Kidney Int* 2010;77:299-311.
 67. Sara Simonsen MWV. Grand multiparity. Available from: <https://www.uptodate.com/contents/grand-multiparity/contributors>. [Last accessed on Dec 21 2018].
 68. Shivaswamy V, Boerner B, Larsen J. Post-transplant diabetes mellitus: Causes, treatment, and impact on outcomes. *Endocr Rev* 2016;37:37-61.
 69. Kalantar-Zadeh K. What not to eat after nephrectomy. *Renal Urol News* 2017. Available from: <https://www.renalurologynews.com/home/news/urology/kidney-cancer/what-not-to-eat-after-nephrectomy/>. [Last accessed on Dec 3 2019].
 70. Society AC. Fluids intake with one kidney. Available from: <https://csn.cancer.org/node/220718>. [Last accessed on Dec 25 2018].

Table I:

<h2 style="text-align: center;">Instructions for Kidney Graft Recipients (Provider's Information)</h2>	
<p>1- Medications:</p> <ul style="list-style-type: none"> • Immunosuppression medications: <ul style="list-style-type: none"> - These medications are to protect against rejection of the transplanted kidney. - These medications include Tacrolimus (Prograf or FK) and Mycophenolate (CellCept) and Prednisolone. - These medications are to be maintained for the life of the graft. - Stopping these medications will lead to rejection and possibly loss of the graft. - These medications must be taken at the exact time prescribed by your doctor. • Prophylactic Antimicrobial medications: <ul style="list-style-type: none"> - These medications are to decrease the risk of opportunistic viral, bacterial and fungal infections. - These medications include Valganciclovir (Valgan), Nystatin and Bactrim. (1-2) <p>2- Medications side effects:</p> <p>Tacrolimus (Prograf or FK) may cause diabetes, hypertension, alopecia, tremor and renal insufficiency. Mycophenolate (CellCept): may cause low white blood count. Prednisolone: may cause high blood sugar. (1-2)</p> <p>3- Clinic follow up and laboratory testing:</p> <ul style="list-style-type: none"> - You need to keep your appointments for clinic visits and laboratory testing. - Do not take you Tacrolimus (Prograf or FK) in the morning of your labs but take it right away after the blood draw. - Remember to have an appointment for the stent removal which is typically removed by urology in 1-2 months after transplant. Stent removal does not require overnight stay nor general anesthesia. - Remember that staples are typically removed 3 weeks after the surgery. - <p>4- Potential complications of renal transplant include rejection, infections, internal urine leak from ureter, renal artery stenosis, ureteric stricture, diabetes, and tremor, recurrence of the original disease, bone disease or cancer such as lymphoma.</p> <p>5- Diet: Renal transplant recipients frequently encounter significant weight gain after transplantation. To prevent gaining weight post transplantation, you are strongly advised to balance their calorie intake with especial attention to the amount of carbohydrates consumed. You are advised also to drink enough fluid (2-3 L/day) but excessive fluid intake is not needed. (1, 4-13) Low salt diet is advised in most of the patients. Magnesium and phosphorous- rich diet are often recommended. Potassium restriction is not required in most of the patients.</p> <p>Examples of magnesium- rich food: dark leafy greens, seeds, beans, fish, whole grains, nuts, dark chocolate, yogurt, bananas and more.</p> <p>Examples of phosphorous - rich food: protein-rich foods such as meats, poultry, fish, nuts, beans and dairy products. Some bottled beverages may also have high content of phosphate additives.</p> <p>Examples of potassium- rich food: leafy greens, potato, dates, banana, tomato, orange juice, cardamom.</p>	

Table I: Continued

- 6- **Exercise and sports:** - Exercise is associated with improved quality of life and pts are encouraged to follow regular exercise program (14).
 - Walking is encouraged in the immediate post-surgery period.
 - None competitive sports (as Cycling, joking) can be resumed once the surgical pain resolves (after 1-2 month).
 - Competitive sports (such as boxing and karate) should be avoided because of risk of direct trauma to the kidney.
 - Driving can be resumed once the surgical pain resolves (after 1-2 month)
- 7- **Work/ School:** Most of the renal transplant recipients will be able to go back to school / work in 2-3 months. Strenuous activity and exposure to the hot weather should be avoided (1, 15-19).
- 8- **Isolation:** You should avoid sick contact. You should wash hands frequently and not share personal items with family. You are also advised to avoid crowded area whoever strict isolation in a single room is usually not necessary and can lead to social isolation and depression (1, 15-19).
- 9- **Fasting Ramadan:** There are several small studies that showed fasting Ramadan does not adversely affect kidney function in patients who are more than one-year post transplant and with stable graft function. In these conditions, fasting might be allowed after the first 1-2 yrs. Special care to the timing of medications and drug levels. You may try initially to fast every other day then advance as tolerated. You must break your fast if you feel exhausted or dehydrated. You must consult with your nephrologist before attempting to fast (1, 20-35).
- 10- **Fasting of renal transplant pts with diabetes:** In addition to the previously mentioned precautions, patients with diabetes on or medications or insulin needs to adjust their medications or Insulin requirement down, monitor their blood sugar closely and never miss Suhour. Patients must consult with their provider before attempting to fast. Fasting of renal transplant with DM 1 is more tricky and requires consultation from endocrinology (1, 36-41)
- 11- **Omrah:** due to the risk of upper airway infection (URI), it is recommended to postpone Omrah for at least 6-12 months after renal transplant. Omrah during peak hours is not recommended. Extra precautions should be taken against airborne and foodborne infections (1, 42-46).
- 12- **Hajj:** due to the very high risk of URI, it is recommended to do hajj before renal transplant. For those who never performed the obligatory Hajj, it is recommended to delay hajj at least one-year post-transplant. Patients are to weight the potential risks. Frail or elderly on immunosuppression might be excused from Haj (1, 43-47).
- 13- **Marital relations:** In 2-3 months post-transplant, most of the patients can resume marital relations once the surgical incision healed and the urinary stent is removed (1).
- 14- **Fertility in male renal transplant recipients:** Fertility improves after kidney transplantation in many patients. Certain medications should be avoided. For example, Sirolimus (mTORi) can affect sperm genesis and fertility. Patients are advised to consult with their doctor (1, 47-53).
- 15- **Pregnancy post kidney transplant:**
 - Women of child bearing age should be alerted that fertility may improve after kidney transplantation.
 - Oral contraceptive pills (OCP) can be used as a contraceptive method after the appropriate medical consultation.
 - The intrauterine devices are generally discouraged because of increased risk of infection with immunosuppression.
 - Pregnancy post renal transplant can negatively affect both the transplanted kidney and the fetus (low birth weight & preterm delivery).
 - Women should wait at least 1- 2 year before attempting pregnancy, renal function must be stable and without

Table I: Continued

significant proteinuria nor a recent rejection.

- Many post-transplant women who are already have children prior transplant may prefer not to have any further children over risking the fetus and the transplanted kidney.
- Pregnant transplant recipient should be followed by obstetrician experienced in high risk pregnancies.
- With close medical follow-up, most of the pregnancies post renal transplantation have successful outcome.
- Some medications can negatively affect the fetus:

- Mycophenolate (MMF) is teratogenic and should be stopped or replaced with AZA before pregnancy is attempted (allow 12 weeks window before contemplating pregnancy after switching from MMF to AZA).
- mTORi should be discontinued before pregnancy is attempted.
- Ace/ARBs should be discontinued or replaced with other class of medication during pregnancy.
- CNI, prednisone, and AZA are generally safe during pregnancy

- Delivery in transplanted patient can be through vaginal route if there is no indication for caesarian section (1, 54-68).

13- Vaccinations: Yearly vaccination against Flu (inactive) is highly recommended. Pneumonia vaccination is also recommended.

14. Signs and symptoms of rejection: There are no specific signs or symptoms for rejection in most of the cases. Blood tests are the only way to find it out. Patients are strongly advised to adhere to their medications and the routinely scheduled laboratory tests. Decreased urine output, fever, vomiting, pain at the site of the graft or lability can appear in late stages.

15. You must report to the emergency room in the case of fever, decreased the amount of urine, vomiting, inability to take medications or not feeling well in general.

Disclaimer: This educational material was designed to aid the renal transplant team to provide written educational material to their renal transplant recipients. This document should not be construed as dictating exclusive courses of recommendations. Patients are advised to consult with their health providers for more specific advice. Variations from these educational materials may be warranted in actual practice based upon individual patient characteristics and clinical judgment in unique care circumstances

Table 2:

تعليمات ما بعد زراعة الكلى (إرشادات موجهة للمريض)	
الادوية:	<p>- 1- مثبطة المناعة (الادوية المضادة للرفض): ومنها التكرولمس (البروغراف) والسلسيبت: مهمة هذه الادوية هو منع الجسم من رفض الكلية الجديدة. يجب المواظبة على هذه الادوية مدى الحياة. من المهم ان تأخذ هذه الادوية في نفس الوقت المحدد من الطبيب. <u>ابقاء هذه الادوية من غير استشارة الطبيب يؤدي الى رفض و خسارة الكلية المزروعة.</u></p> <p>- 2- الكورتيزون (البريدنزولون): هو أحد الادوية المثبطة للمناعة التي تمنع تليف الكلية المزروعة. - 3- الادوية المضادة للميكروبات: وظيفتها هو الحد من العدوى الفيروسية والفطرية والبكتيرية.</p>
المتابعة في العيادة والتحاليل المخبرية:	<p>- يجب الالتزام بمواعيد الطبية والتحاليل المخبرية. - لا تأخذ التكرولمس (البروغراف) صباح يوم التحليل بل خذه مباشرة بعد الانتهاء من التحاليل. - يتم إزالة الدعامة البولية الداخلية من قبل الطبيب المختص بالمسالك البولية خلال الشهر الأول ما بعد الزراعة وازالتها عادة لا تحتاج إلى تنويم. - يتم إزالة المشابك الجراحية من مكان العملية بعد 3 أسابيع من العملية.</p>
مضاعفات زراعة الكلية:	<p>- رفض الكلية - امراض انتانية - تسرب البول من الحالبين بعد العملية - تصيب او عية الكلية المزروعة او تخثرها - تكرار المرضى الكلوي الأصلي - اختلال في الاملاح</p>
الاثار الجانبية للأدوية	<p>- التكرولمس (بروغراف): داء السكري وارتفاع الضغط وسقوط الشعر والرعشة. - بريد نيزولون: زيادة الوزن.</p>
الحمية الغذائية:	<p>- زيادة الوزن ما بعد الزراعة امرا شائع، ولذلك ينصح مرضى ما بعد الزراعة لاتباع حمية غذائية متوازنة من حيث كمية السعرات الحرارية وبشكل خاص كمية التشوييات (الكريوبهيدرات) المتداولة. - ينصح مرضى ما بعد الزراعة بتناول 3-2 لتر من السوائل يومياً غير أن تناول السوائل بشكل مفرط غير مفيد. - ينصح المرضى بالتحديد كمية الملح المضاف إلى الطعام. - كثيراً ما يحتاج مرضى ما بعد الزراعة إلى حمية غنية بالمعنيسيوم والفسفور وبإمكان كثير من المرضى تناول كمية معتدلة من البوتاسيوم. - من الأغذية الغنية بالمعنيسيوم: الخضار والورقيات الخضراء والبذريات والبقوليات والمكسرات واللبن والموتز. - من الأغذية الغنية بالفسفور: الأغذية الغنية بالبروتينات مثل اللحوم والدواجن والأسماك واللسان والمكسرات والبقوليات. قد تحتوي المشروبات المعلبة على كميات من الفوسفور المضاف. - من الأغذية الغنية بالبوتاسيوم: الورقيات الخضراء والبطاطس والتمور والموتز وعصير البرتقال والهيل.</p>

Table 2: Continued

<p>وقد تغير الحمية الموصوفة حسب التحاليل المخبرية وينصح باتباع ارشادات الطبيب..</p> <p>الرياضة:</p> <ul style="list-style-type: none"> - في معظم الأحيان ينصح بالمشي مباشرة في اليوم التالي من العمل الجراحي. - ينصح المرضى بممارسة النشاط الرياضي يومياً وهذا يساعد على تحسين الحالة العامة للمرضى. - بإمكان معظم المرضى بممارسة الرياضات غير التنفسية (كره قذف الدراجة والهرولة) بعد شهر أو شهرين من الزراعة. - ينصح المرضى بتجنب الرياضات التنفسية (كعبة القدم أو المصارعة) خوفاً من أي آذية مباشرة للكلية المزروعة. <p>العودة الى المدرسة او العمل:</p> <ul style="list-style-type: none"> - يتمكن معظم المرضى بعد الزراعة الكلية من العودة الى المدرسة او العمل خلال شهرين او ثلاثة أشهر من الزراعة ويتبع ذلك لطبيعة العمل. - ينصح بتجنب الاشتغال المرهقة او التي تعرض صاحبها الى الحر الشديد. <p>العزل الطبي بعد زراعة الكلية:</p> <ul style="list-style-type: none"> - يجب تجنب الاشخاص المصابين بأمراض معدية كالمسافرين بالزكام او الامراض الشبيهة بالأنفلونزا. - أغسل يديك بشكل مستمر وتجنب استخدام الحاجات الشخصية لأفراد آخرين. - تجنب الأماكن المزدحمة مالم يكن هناك ضرورة لذلك. - لا داع لأن تعزل نفسك بغارة منفردة فان ذلك يسبب انعزلاً اجتماعياً. <p>صيام رمضان:</p> <ul style="list-style-type: none"> - أظهرت عدة دراسات بأن صيام رمضان ممكن ما بعد الزراعة الكلية (غير أن هذه الدراسات تعتبر صغيرة الحجم نسبياً). - بشكل عام ينصح بتأجيل الصيام لمدة سنة أو أكثر ما بعد الزراعة. - يجب الحرص قدر الإمكان على توقيت الأدوية والتحاليل الطبية. - لا ينصح بالصيام مالم تكن وظيفة الكلية ثابتة ومناسبة، ويجب استشارة الطبيب قبل الصيام. - بإمكانك أن تجرب الصيام بشكل متقطع حسب القدرة. - يجب إيقاف الصيام في حال الإرهاق. - مرة أخرى يجب استشارة الطبيب قبل الشروع بصوم رمضان. <p>الصيام بالنسبة لمرضى زراعة الكلية المصابين بداء السكري:</p> <ul style="list-style-type: none"> - بالإضافة إلى التعليمات السابقة يجب على المرضى تعديل أدوية السكري والأنسولين حسب تعليمات الطبيب. - يجب مراقبة سكر الدم بشكل متكرر خلال اليوم. - يجب عدم اهمال وجة السحور. - مرأة ثانية يجب استشارة الطبيب قبل الشروع بصوم رمضان. - يجب على المرضى المصابين بالسكري من النعم الأول استشارة الطبيب المختص بداء السكري قبل الروع في صيام رمضان. <p>العمرة:</p> <ul style="list-style-type: none"> - ينصح بتأخير العمرة لمدة ستة أشهر أو سنة من الزراعة مع اخذ الاحتياطات الممكنة لتجنب العدوى من الامراض التنفسية. - تجنب أوقات الازدحام الشديد. - تجنب الأغذية المعدة بشكل غير صحي. <p>الحج:</p> <ul style="list-style-type: none"> - لتجنب خطورة العدوى التنفسية ينصح المرضى الراغبين بالحج بالقيام بهذا الركن قبل الزراعة. - ينصح بتأخير الحج سنة أو أكثر ما بعد الزراعة. - قد ينصح الطبيب بعدم تكرار الحج (إذا كان قد قام بهذا الركن من قبل). - ينصح باستشارة الطبيب قبل الشروع ببرحة الحج. - قد ينصح الطبيب المستعين وضعاف البنية بتجنب الحج. <p>العلاقة الزوجية:</p> <ul style="list-style-type: none"> - ينصح معظم مرضى ما بعد الزراعة إلى تجنب العلاقات الزوجية حتى تتمالج الروح بشكل تام ويتم نزع الداعمة البولية الداخلية.

Table 2: Continued

<p>14- الانجاب عند الرجال ما بعد زراعة الكلية:</p> <ul style="list-style-type: none"> - تتحسن القدرة على الانجاب عند معظم المرضى. - يجب استشارة الطبيب بخصوص الادوية لأن بعضها قد يؤثر على الانجاب. <p>15- الحمل ما بعد زراعة الكلية:</p> <ul style="list-style-type: none"> - يجب على النساء في سن الحمل ان تكون على دراية بان القدرة على الانجاب تتحسن ما بعد الزراعة الكلية. - قد يعرض الحمل الكلية المزروعة والجنبين الى خطر لذلك على المرأة الحامل ما بعد الزراعة اتباع تعليمات اطبائها بدقة. - ينصح النساء بتأجيل الحمل سنة او أكثر ما بعد الزراعة. - يجب ان تكون وظائف الكلية ثابتة ومناسبة من غير اي رفض حديث. - يجب على المرأة استشارة الطبيبة في حالة رغبتها باستخدام حبوب منع الحمل. - لا ينصح باستخدام اللولب الواقي للحمل في الرحم. - معظم الحمول ما بعد الزراعة تمر بامان مع المراقبة الطبية الدقيقة. - بعض الادوية تعتبر ضارة بالحمل: <ul style="list-style-type: none"> • مايكوفينوليات (سيسلبيت): قد يحدث هذا الدواء تشوهات خطيرة بالجنين، يجب إيقاف هذا الدواء قبل الحمل بثلاثة أشهر، يستبدل هذا الدواء بـ (أذثوبرين) (اميورن) قبل وخلال الحمل. • سيروليماس (راباميون) يجب إيقاف هذا الدواء قبل الحمل. • يجب مراجعة ادوية الضغط مع الطبيب. <p>16- التطعيمات:</p> <ul style="list-style-type: none"> - ينصح كل المرضى ما بعد الزراعة بأخذ التطعيم السنوي المضاد للأنفلونزا وتطعيم المضاد لذات الرئة. <p>17- يجب مراجعة المشفى في حال وجود:</p> <ul style="list-style-type: none"> - انخفاض مفاجئ في كمية البول. - عدم التمكّن من اخذ الادوية. - الحمى او التقيؤ او الاسهال. - الم حول مكان الكلية المزروعة. - الشعور بالألم وعدم الارتياح عند التبول. - إذا شعرت انا الجرح يبدو ملتهبا. <p>18- علامات الرفض:</p> <ul style="list-style-type: none"> - لا توجد اعراض في اغلب حالات الرفض ولا يمكن اكتشافه الا في وقت متاخر بعد ظهور نتائج فحوصات الدم، لذلك ينصح بتجنب ايقاف الدواءمهما كان السبب. كما ينصح بإجراء التحاليل الدموية بشكل دوري وحسب ارشادات الطبيب. - في الحالات المتاخرة قد يحدث: انخفاض مفاجئ في كمية البول، اكتساب وزن مفاجئ، ارتفاع ضغط الدم، نقص في الطاقة، ارتفاع في مستوى السموم بالدم، حمى، تقيؤ، أو الام حول مكان الكلية المزروعة. - هذه العلامات قد تعني مرحلة متقدمة من الرفض الذي قد يؤدي الى الفشل الدائم للكلية المزروعة. <p style="text-align: center;">مع دعائنا لك بدوام الصحة والعافية</p>

اعدت هذه الارشادات الطبية العامة من اجل مرضى زراعة الكلية بشكل عام، يجب استشارة طبيبك لمزيد من المعلومات الخاصة بحالتك الصحية

Table 3:

Instructions for Kidney Donors (Medical provider's Information)
<p>1- Work: You can be return to work once the surgical pain resolves (after 1-2 month). Please consult with your surgeon.</p> <p>2- Heavy lifting should be avoided especially. Please consult with your surgeon.</p> <p>3- Sport:</p> <ul style="list-style-type: none">- Walking is encouraged in the immediate post-surgery.- Noncompetitive sports (Walking, Cycling) can be resumed once the surgical pain resolves (after 1-2 month)- Competitive sports such as boxing, and karate should be avoided.- Please consult with your surgeon. <p>4- Driving can be resumed once the surgical pain resolves (after 1-2 month).</p> <p>5- Medications:</p> <ul style="list-style-type: none">- Acetaminophen is considered a safe painkiller post kidney donation.- Frequent use of NSAIDS is discouraged but sporadic use is likely to be safe in most of the donors.- Please alert your doctor if you are going for imaging with IV contrast (even though oral contrast is mostly okay if clinically needed). <p>6- Fasting:</p> <ul style="list-style-type: none">- Most of the donors can enjoy fasting once their renal functions stabilize (2- 3 months after kidney donation).- Donors might initially try to fast every other day then progress to daily fasting.- Donors must break his fast if he exhausted or dehydrated.- Donors should not miss Suhour and should keep enough fluid intake post iftaar (1, 69-70).

Disclaimer: This educational material was designed to aid the renal transplant team to provide written educational material to their kidney donors. This document should not be construed as dictating exclusive courses of recommendations. Kidney donors are advised to consult with their health providers for more specific advice. Variations from these educational materials may be warranted in actual practice based upon individual patient characteristics and clinical judgment in unique care circumstances.

Table 4:

تعليمات ما بعد التبرع بالكلية (إرشادات موجهة للمتبرع)	
1- العودة الى العمل:	<ul style="list-style-type: none"> - بإمكان معظم المتبرعين بالكلية العودة الى العمل عندما يلتئم الجرح ويزول الألم (شهر او شهرين من العملية الجراحية). - يجب استشارة الطبيب الجراح بهذا الخصوص.
2- تجنب حمل الاوزان الزائدة.	
3- الرياضة:	<ul style="list-style-type: none"> - ينصح بالمشي بعد العملية الجراحية. - بإمكانك ممارسة الرياضات الغير تنافسية (كره الكرة) متى زال الألم الجراحي خلال شهر او شهرين. - ينصح بتجنب الرياضات التنافسية (كرة القدم).
4- بإمكانك العودة لقيادة السيارة	متى زال الألم الجراحي خلال شهر او شهرين.
5- الادوية:	<ul style="list-style-type: none"> - يعتر تناول أسيتامينوفين (بنادول) آمنا بعد التبرع بالكلية. - ينصح بتجنب التناول المتكرر للأدوية المضادة للالتهاب غير الستيرويدية. - يجب استشارة الطبيب قبل إجراء أي تصوير اشعاعي يحتوي على مادة ظليلة (مع انه يعتبر آمنا في معظم الأحيان).
6- الصيام:	<ul style="list-style-type: none"> - بإمكان معظم المتبرعين الراغبين بالصيام من القيام بذلك عندما تستقر وظائف الكلية بعد شهرين او ثلاثة. - يجب استشارة الطبيب. - بإمكان المتبرع بالتجربة الصيام المتقطع (أيام متداولة) ثم الصيام كل يوم او حسب القدرة. - يجب على المتبرع ان لا يهمل شرب كمية كافية من السوائل ووجبة السحور. - يجب على المتبرع وقف الصيام إذا شعر بالإنهال الشديد او العطش الشديد.

أعدت هذه الإرشادات الطبية العامة من أجل المتبرعين بالكلية بشكل عام. يجب استشارة طبيبك لمزيد من المعلومات الخاصة بحالتك الصحية