

## **Diet Interventions and Renal Disease**

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End stage renal disease (ESRD) affects both genders, all races, and ages (Shah et al., 2018). According to the Center for Disease Control (CDC) and Prevention (2017), 1 in 7 adults in United States (U.S.) has Chronic Kidney Disease (CKD). Along, with a pre-existing condition such as: diabetes (44%) and/or hypertension (29%) being the leading cause of ESRD (Center for Disease Control, 2017). CKD is a serious lifelong illness that requires dialysis to maintain proper electrolyte and healthy function to the wellbeing of an individual (J. Weiland, Registered Dietitian, personal communication, March 5<sup>th</sup>, 2021). Nurses providing patient with education on proper diet for CKD can help delay disease process with patient compliance (Anderson & Nguyan, 2018).

Obese patients are at an increased risk to develop ESRD due to sedentary lifestyle from comorbidities like HTN and T2DM (Hall et al, 2004). Under the obese population findings, patients were more likely to have hypertension or type 2 diabetes mellitus (T2DM) due to excess weight (Hall et al., 2004). The excess weight correlates directly to T2DM due to prolonged uncontrolled blood sugar with an elevated hemoglobin A1C evaluation (Wang et al., 2020). The hypertension causes the renin-angiotensin system to work harder, due to decreased glomerular reabsorption, eventually wearing down leading to ESRD (Amann & Benz, 2013). Moreover, weight loss through diet links to a better health outcome ie. management of hypertension, diabetes, and kidney disease (Hall et al., 2004).

Diets vary from different cultures, regions, and latest trends. The base of a diet consists of everyday food intake for nutritional value throughout a human's lifespan. The nutritional value in the diet is what makes our cells in our bodies energized or fatigued. An individual's diet and activity level can cause illness and disease or prevent/delay the onset (J. Weiland, Registered

Dietitian, personal communication, March 5<sup>th</sup>, 2021). However, there are other factors, such as genetics, that put individuals at risk for obesity, diabetes, hypertension, and renal disease. A diet consisting of plant-based foods and low-protein helps preserve kidney function in those patients diagnosed with CKD (Kalantar-Zadeh et al., 2020). Therefore, focusing on diet for disease prevention tailored for renal disease patients can delay the onset of ESRD (J. Weiland, Registered Dietitian, personal communication, March 5<sup>th</sup>, 2021).

### **PICO(T) Question**

The *population* focus is on obese patients with chronic kidney disease stages 3-4. The *intervention* is a renal healing diet that slows the prognosis of end stage renal disease with pre-existing conditions like T2DM. The *comparison* is a diet/lifestyle high in processed foods with saturated fats and little to no exercise with a hemoglobin A1C of 10 verses incorporating exercise with low protein diet with less stress decreasing hemoglobin A1C below 7. The *outcome* is opportunity to delay or reverse end stage kidney disease by 5-10 years. The research question translates into:

In obese patients with chronic kidney disease stages 3-4, does a kidney healing diet make a difference in slowing the process of end stage renal disease for 5-10 years with pre-existing conditions such as T2DM.

### **Search Strategies**

The search for literature was obtained using the University of North Dakota School of Medicine and Health Science (SMHS) Library webpage. PubMed's database was the primary source for the literature search which is mainly content driven from biomedical literature and life science journals. A second literature search used for ease was Google Scholar utilizing Elsevier database. The final search engine database utilized was CINDAHL. Inclusion criteria original

articles, journals and research studies/findings comparing obese individuals diagnoses of chronic kidney disease stages 3-4 with preventative education on diet regarding the prognoses to ESRD. The causes of chronic kidney disease and promotion of controlled sugar level in T2DM. CKD diet modification. Years 2017 and earlier. Exclusion criteria over 5 years outdated articles, including those non-diabetic.

The first search engine database using Google Scholar was opened with Microsoft Edge in the search engine terms *obesity kidney disease* resulted in a milestone of articles approximately 48,800 results. Four articles review throughout this search. During this search one citation was found for use for this review. A similar search in Google Scholar *end stage renal disease prevention diet* that resulted in 17,770 articles from years 2017-2021. Three citations found during this search in Elsevier for this review.

The next search using PubMed was opened via Microsoft Edge typing in [www.und.edu](http://www.und.edu) tab selected search Library Database appeared. Then SMHS website was opened. PubMed database was selected and opened in new Microsoft Edge tab. Search engine diet term *low protein diet*. Resulting in third on this list of results articles titled *Low-protein diet for conservative management of chronic kidney disease: a systematic review and meta-analysis of controlled trials* (Kalantar-Zadeh et al., 2020). Search enquired a list of 8,231 results. Five articles reviewed; however, the information was not prevalent to this review. Three citations found applicable for this review.

Last search using CINDAHL search engine opened using Microsoft Edge through [www.und.edu](http://www.und.edu) search engine found in library, then selected online scholarly articles. CINDAHL search engine words used in *diet related to preventing kidney failure*. This search resulted in

three articles. Three articles reviewed however, only one citation was found useful in this review. Concluding the list for the literature review incorporated seven articles.

### **Summary of Findings**

The evidence findings support preventative measures through low-protein diet, controlled blood sugar levels and controlled blood pressure CKD can be managed in stages 1-4 delaying the start of dialysis with ESRD (Kalantar-Zadeh et al., 2020). In contrary a patient disregarding a low protein diet resulting in non-compliance evidence supports worsening the CKD resulting in a faster progression of the disease process to ESRD (Lakkis & Weir, 2016). The evidence also, shows through diet and weight management CKD can be a lifelong disease (Joshi et al., 2020). Regarding patient care management research article supports a more tolerable outcome resulting in a better outlook on life (Anderson & Nyguan, 2018). CKD can be maintained through follow-up care with the oversight of a nephrologist assuring the best interests of the patient needs based on lab findings of kidney function testing and patient symptoms reported (Selamet et al., 2016).

In facilitating the evidence for the PICO(T) question, in this paper there are systemized findings which lead to a diet making a difference in slowing the process of end stage renal disease. The benefit of facilitating the evidence gains to clinical decision-making. Characteristic features of this literature search apply to answer the PICO(T) question. The characteristic features are specific, professional, and up to date evidence to support categorized evidence on a numeric level of 1 – 5. Level 1 is the sharpest evidence through systematic review or meta-analysis. While level 5 is the lowest quality of research evidence. The sum of three research articles with the level of evidence is listed in the Appendix A. Hierarchy of Evidence proves for one research article findings supporting the PICO(T) is level 1 systematic review (Kalantar-Zadeh et al., 2020).

## Practice Recommendations

Cumulatively administrative and educational practices form the practice recommendations. One recommendation is set forward. Prevention is significance, centering on early screening with education. Insurance incentives are promoted across annual laboratory blood workup and education. The standard of practice being early screening and education of CKD. The screening is obtained from the primary care provider measuring kidney function testing and CKD diet education (Selamet et al., 2016). CKD diet education provided by registered dietitians (RD) and registered nurse (RN) educators (Narva et al., 2016). All studies observed this form of involvement to be successful in preserving kidney function through low protein-based diet (Kalantar-Zadeh et al., 2020; Narva et al., 2016). The complete grading system for strength of recommendation taxonomy (SORT) for the research listed above. Using the SORT algorithm. SOR = A. The evidence is consistent with good-quality patient-oriented evidence with systematic review.

Implications associated to implementing this recommendation incorporate several factors. Adverse reactions to patients are insignificant. The evidence-based diet interventions for renal disease are easy to learn and access for patient needs. Time to screen and measure kidney function for the primary provider and patient require minimal of 60-90 minutes depending on clinic and patient needs. Whereas the education on CKD diet from the RD/RN length of time varies from 60-90 minutes, allotting time for opportunities for patient to ask question/concerns (Litvin et al., 2016). The cost of CKD management of care through primary care provider varies from patient to patient. Various follow-up visits are required to maintain optimal health for the CKD patient. The change process of patient care is in current practice, however, the balance of

patients willing to follow-up with care and the primary care provider assessing and meeting all the needs of the patient to maintain care is rarely the case (Litvin et al., 2016).

### **Conclusion**

Although the cumulative evidence literature review is not one hundred percent ensured high-quality evidence is available. The literature review offers the diet interventions of renal disease prevention approaches in early screening and education of CKD as the standard of practice to delay ESRD. Furthermore, the evidence does plainly indicate the interventions with motivated patient compliance can be successful. The benefit of this approach to maintain CKD stages 1-4 thus preventing ESRD as evidence supports.

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## Appendix A

## Matrix

Authors/ Publication Year	Pur pos e	Des ign	Sample	Data Collecti on and Measur ement	Findings	Strengths	Limitations	Level of Evidence
Citation  Kalantar-Zadeh, K., Joshi, S., Schlueter, R., Cooke, J., Brown-Tortorici, A., Donnelly, M., Schulman, S., Lau, W. L., Rhee, C. M., Streja, E., Tantisattamo, E., Ferrey, A. J., Hanna, R., Chen, J., Malik, S., Nguyen, D. V., Crowley, S. T., &	Pur pos e of stud y (in you r own word s) Pre vent ion of ES RD thro ugh the use of plan t- base	Stu dy desi gn Syst emi c Rev iew	Describe Sample (inclusion/ex clusion criteria); include (N=)  Inclusion diet and kidney disease, low protein diet	30 or more adult participa tes. Includes protein diet recomm endation s to delay the onset of ESRD  11 Primary care	Diet modificatio n can delay the onset of ESRD. Low protein and weight loss can help the individual attain this.	The controlled trials support the low- protein diet CKD offers a great preservation of lowers the need for dialysis.	Limitation on patient compliance to low protein diet.	Level 1: Systemic review

<p>Kovesdy, C. P. (2020). Plant-Dominant Low-Protein Diet for Conservative Management of Chronic Kidney Disease. <i>Nutrients</i>, 12(7), 1931. <a href="https://doi.org/10.3390/nu12071931">https://doi.org/10.3390/nu12071931</a></p>	<p>d nutritional intake delay the kidney disease prognoses</p>			<p>(PCP) PPRNet practices . Included : risk assessment tool, health maintenance protocol, flow chart and patient registry. Practices received performance reports and hosted annual half day on-set visits.</p>	<p>Early screening can delay the onset of ESRD, improves CKD management through PCPs.</p>	<p>Good way to monitor existing patients identified as CKD targets.</p>	<p>Inadequate recognition of patients with CKD and lack of treatment guidelines to provide quality care. PCPs have different clinical decision tools in monitoring CKD. Inconsistency in facilitating and monitoring</p>	
<p>Citation</p>	<p>Primary care provider supporting CK</p>	<p>Cohort Study</p>	<p>Inclusion – primary care provider, CKD early detection, interventions of ESRD.</p>	<p>71 patients.</p>				<p>Level 4: Cohort study</p>

Management of Chronic Kidney Disease (CKD). <i>Journal of the American Board of Family Medicine : JABFM</i> , 29(5), 604–612. <a href="https://doi.org/10.3122/jabfm.2016.05.160020">https://doi.org/10.3122/jabfm.2016.05.160020</a>	Early prevention screenings.			18-85 years old with GFR 30-90 mL/min/1.73 stages 2-3. Blood collections, dietary inorganic phosphorus modulation			adherence to treatment targets.	
Citation  Selamet, U., Tighiouart, H., Sarnak, M. J., Beck, G., Levey, A. S., Block, G., & Ix, J. H. (2016). Relationship of dietary phosphate intake with risk of end-stage renal	Identifying GFR rates in CKD patients 1-4 with	Cross-sectional study	Inclusion criteria patients CKD 2-3 Exclusion criteria patients serum P concentration >1.61 mmol/L, CHF, GFR	Protein malnutrition plays a role in CKD patients decreasing GFR leading to ESRD.	Effective in providing support to CKD 2-3 management of care to standard of practice.	Limitation not including serum bicarbonate level, some medications conflicted serum blood draws, diet plays a role in what blood draw results are.		Level 3: Cross sectional study

disease and mortality in chronic kidney disease stages 3-5: The Modification of Diet in Renal Disease Study. <i>Kidney international</i> , 89(1), 176–184. <a href="https://doi.org/10.1038/ki.2015.284">https://doi.org/10.1038/ki.2015.284</a>	phosphate	disease, HIV infection, hep. B or C, Chronic liver disease, systematic inflammatory disease, or previous history of cancer in the last 5 years.					
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