

# Reducing Hyperphosphatemia in Dialysis Patients

Songyi Rebecca Ventura, BSN RN  
 DNP Project Chair: Barbara Niedz, PhD, RN, CPHQ  
 DNP Project Team: Sheron Kurian, DNP, AGACNP-BC, CCRN

## Abstract

- Purpose:**
  - Test Impact of phosphorus (PO4) education toolkit on hemodialysis patients with hyperphosphatemia
- Methodology:**
  - Educational material on PO4
  - Food log
  - Puzzles
  - Pre and post test
  - 5-week period
- Results:**
  - No significant mean reduction in PO4 levels post toolkit use
  - Minor improvement in individual PO4 levels (53% of participants)
  - Statistically significant improvement in quiz scores
- Implication for Practice**
  - Additional education will help increase patient knowledge and should be applied and reinforced in more dialysis facilities
  - Test impact of PO4 toolkit for more than 5-week period

## Methods and Materials

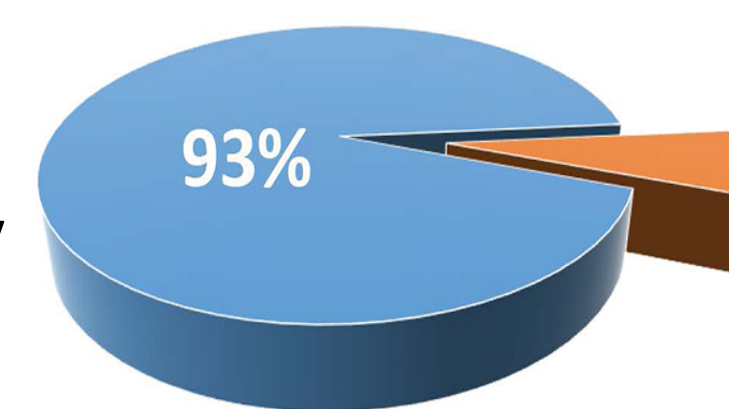
45 patient participants identified with having hyperphosphatemia were given the PO4 educational toolkit. The toolkit consisted of the following materials:

## Weekly Interventions

- | Week   | Intervention  |
|--------|---|
| Week 1 | Discuss pre PO4 levels with patient<br>Give PO4 education material<br>Pretest<br>Food log |
| Week 2 | Discuss Food log<br>Puzzle #1   |
| Week 3 | Discuss Food log<br>Puzzle #2   |
| Week 4 | Discuss Food log<br>Puzzle #3<br>Monthly PO4 lab repeat                                   |
| Week 5 | Posttest<br>Discuss post PO4 levels with patient  |

## Background

- Phosphorus = inorganic molecule abundant in our bodies
  - Bones, dental structure, genetic makeup, excreted by kidneys
- Kidney impairment = poor filtration
  - Causes hyperphosphatemia (PO4 > 4.5mg/dL)
  - ESRD patients struggle to keep PO4 <5.0mg/dL
- QI Study at project site
  - PO4 educational toolkit developed
  - Interventions implemented at site over 5-weeks
- QI project
  - Retrospective analysis of de-identified secondary data to determine the effects of the toolkit on serum phosphorus levels.
- Hyperphosphatemia in ESRD = ongoing issue
- Local clinic data in metropolitan suburban area in NJ
  - 93% with hyperphosphatemia, last 6 months
- Hyperphosphatemia
  - CV insufficiency, bone-related d/o, calcification, CV hypertrophy, fibrosis, increased mortality
- RD, medication, dialysis = management of electrolyte imbalance
- Toolkit benefit = knowledge expansion, avoid PO4 related issues
- Question
  - Will the use of the educational toolkit help reduce hyperphosphatemia in patients on dialysis?



## References

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## Results

### Mean Serum Phosphorus

- Pre phosphorus lab mean = 6.38 mg/dL
- Post phosphorus lab mean = 6.21 mg/dL
- Difference = .069
- $t = .578, p = .283$

### Mean Test Scores (Out of 10)

- Pretest score mean = 6.75
- Posttest score mean = 7.48
- Difference = -.72
- $t = -2.59, p = .007$

### Individual Phosphorus Results

- 25 of 45 (55.7%) = improved PO4 levels
- 19 of 45 (42.2%) = worsened PO4 levels
- 1 of 45 (2.2%) = unchanged PO4 levels

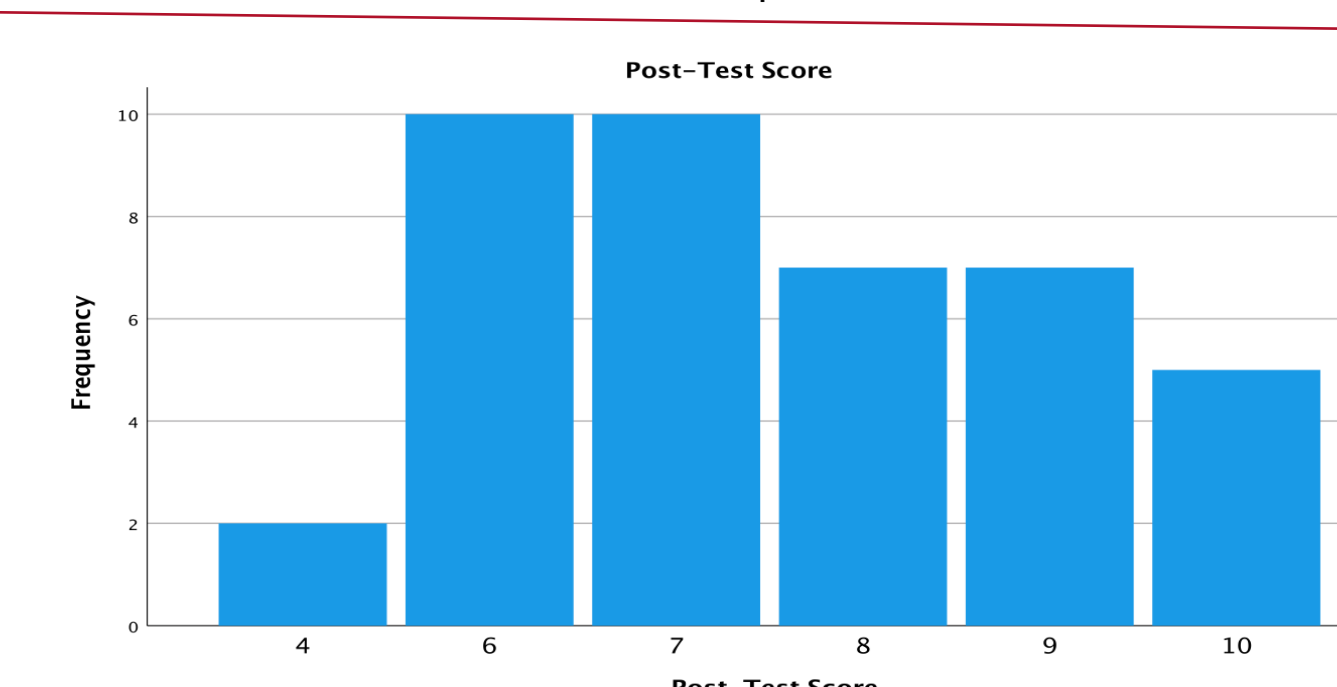
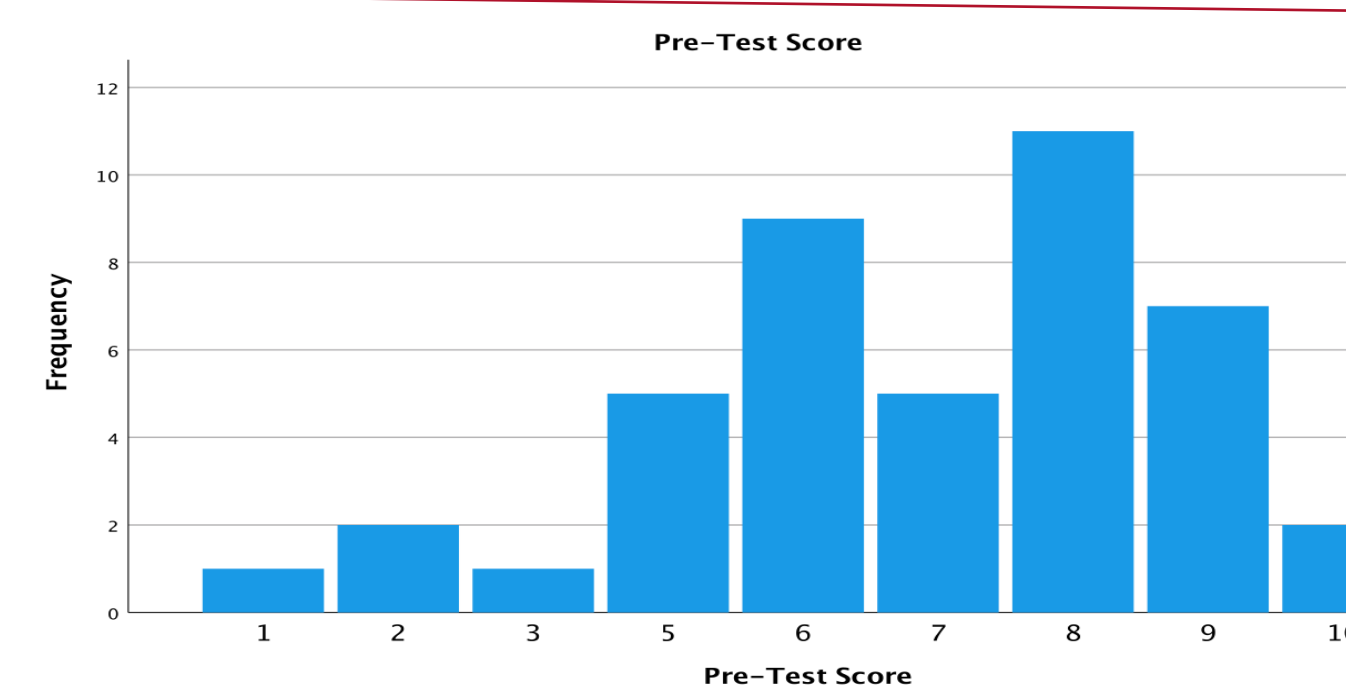
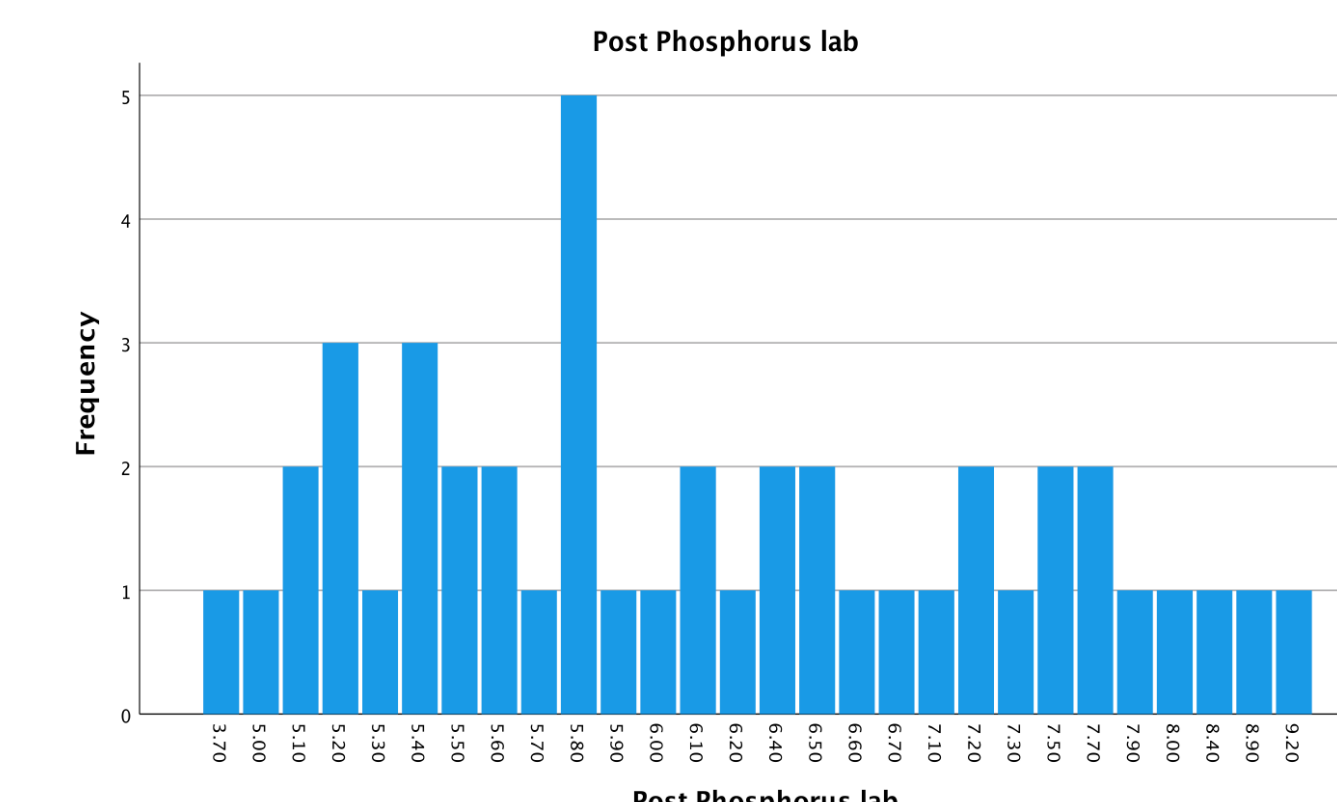
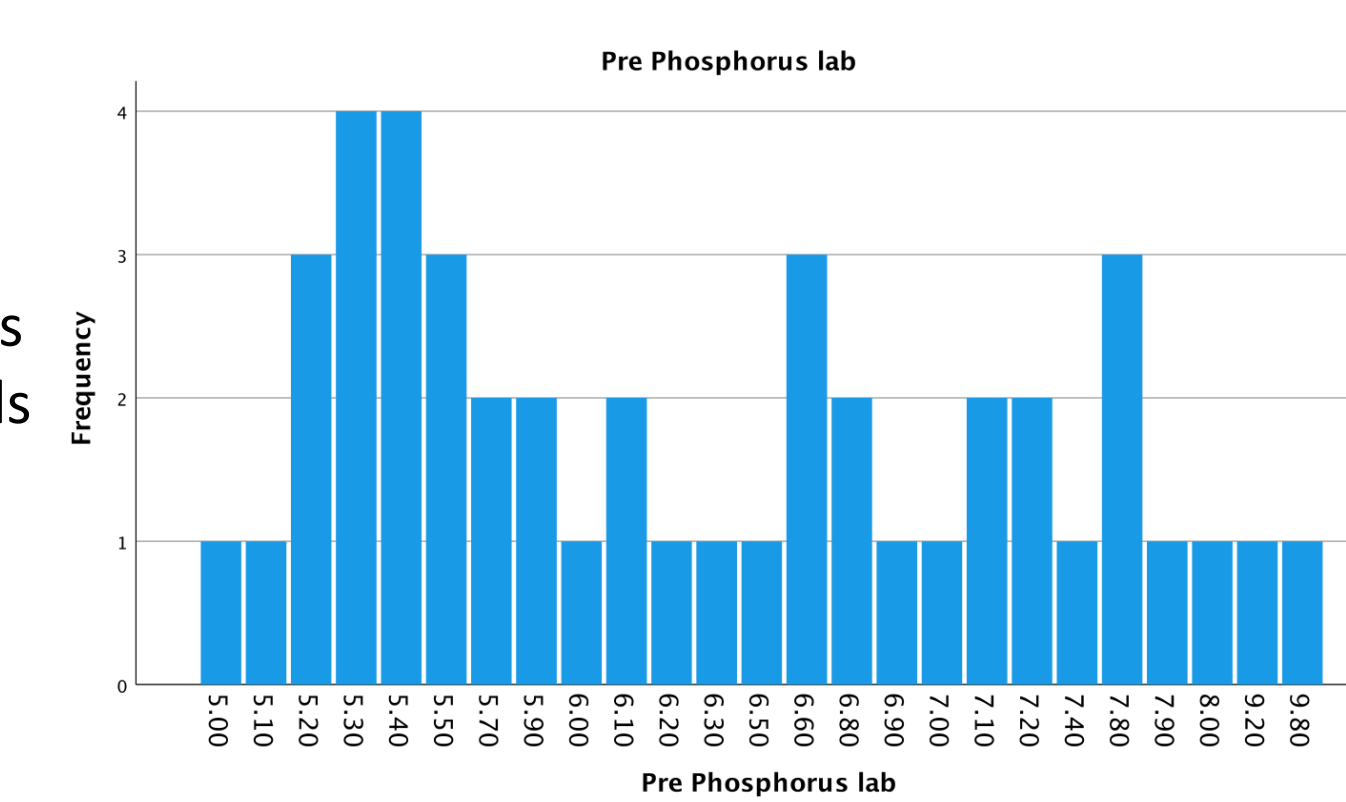
\*No correlation between post phosphorus lab results and posttest results noted.

Paired Samples Test

Pair	Mean	Std. Deviation	St. Error Mean	95% Confidence Interval of the Difference		t	df	Significance		
				Lower	Upper			One-Sided	Two-Sided	
								p	p	
Pair 1	Pre Phosphorus lab - Post Phosphorus lab	.069	.799	.119	-.17	.30	.578	.44	.283	.566
Pair 2	Pre-Test Score - Post-Test Score	-.72	1.768	.280	-1.29	-.16	-2.59	39	.007	.013

Paired Samples Statistics

Pair	Mean	N	Std. Deviation	Std. Error Mean	
Pair 1	Pre Phosphorus lab	6.38	45	1.12	.17
	Post Phosphorus lab	6.31	45	1.15	.17
Pair 2	Pre-Test Score	6.75	40	2.11	.33
	Post-Test Score	7.48	40	1.59	.25



## Future Direction

- Address following barriers:** ineffective delivery of education by clinic staff, varying degrees of education among patients, level of English comprehension, general apathy of participants
- Refine details of intervention:** simplify education material, reduce quantity, implement toolkit for period longer than 5 weeks
- Implication for Clinical Practice:** Improve clinic ratings (done internally through dialysis company)
- Implication for Healthcare Policy:** Refined toolkit concept used for other areas such as hyperkalemia
- Implication for Quality/ Safety:** Reduce number of cardiovascular events, bone-related disease, calcification of organs
- Implication for Education:** Increase staff and patient knowledge
- Plans for sustainability and Translation:** Repeat retrospective analysis of de-identified data after refined toolkit implementation
- Plans for Dissemination and Professional Reporting:** Disseminate to more dialysis facilities (locally in New Brunswick = 30, nationwide = 2,753); CDC partners of 73 different nephrology organization (i.e. CANNT 2021 Virtual Conference)
- Plans for Future Scholarship:** find and develop material to include all education levels, develop workshops to educate staff, collaborate with other providers to determine best mechanism of education delivery

## Student Contact Information

Email  
[shv22@sn.rutgers.edu](mailto:shv22@sn.rutgers.edu) / [rebeccahan88@hotmail.com](mailto:rebeccahan88@hotmail.com)

Phone  
 (973) 954 8489

